Tweed New Haven Regional Airport (HVN)
Runway Extension and Terminal Expansion
Inland Wetlands/Watercourses and WQC & Tidal Wetlands and WQC
Trans #202503729

CT Department of
Energy and Environmental Protection
for
Runway Extension and
Terminal Expansion
at
Tweed New Haven Regional Airport

April 25, 2025

Prepared For

Tweed New Haven Airport Authority
New Haven, CT

And

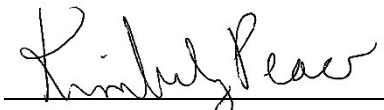
The New HVN, LLC

Prepared By

Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

This document entitled Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion Project – Inland Wetlands/Watercourses and WQC & Tidal Wetlands and WQC Application was prepared by Hoyle, Tanner & Associates, Inc. (Hoyle Tanner) for the Tweed New Haven Airport Authority (the "Client"). Any reliance on this document by any third party is strictly prohibited. The material in it reflects Hoyle Tanner's professional judgment in light of the scope, schedule and other limitations stated in the document and in the contract between Hoyle Tanner and the Client. The opinions in the document are based on conditions and information existing at the time the document was published and do not take into account any subsequent changes. In preparing the document, Hoyle Tanner did not verify information supplied to it by others. Any use which a third party makes of this document is the responsibility of such third party. Such third party agrees that Hoyle Tanner shall not be responsible for costs or damages of any kind, if any, suffered by it or any other third party as a result of decisions made or actions taken based on this document.

Prepared by 
(signature)

Kimberly R. Peace
Senior Environmental Coordinator

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

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APPLICATION FORM DEEP-LWRD-APP-001L

Connecticut Department of
Energy & Environmental Protection
Bureau of Water Protection & Land Reuse
Land & Water Resources Division

LWRD License Application Form L

Check Application Type(s):

- ☐ **Section 401 Water Quality Certificate (WQC) (Non-Tidal)**
- ☐ **Pre-Construction Notification (PCN) - USACE General Permits for CT**
- ☐ **Inland Wetlands and Watercourses** ***(State Agency/State Lands only)***
- ☒ **Inland Wetlands and Watercourses and WQC** ***(State Agency/State Lands only)***
- ☐ **Non-Consumptive Water Diversion**

All sections of the LWRD License Application, when applicable, must be posted to the DEEP LWRD FTP site as instructed on Part VII of the LWRD Transmittal Form. See LWRD Application Instructions for general guidance.

Application Number (as assigned in CPPU e-mail): 202503729

Applicant Name (same name used on Part III of the LWRD Transmittal Form): Tweed New Haven Airport Authority

Part I: Pre-Submission Consultations

The application process requires preliminary coordination and input from other agencies/groups depending on the activity and the location. Consultations with other agencies must occur prior to application submission. Please allow 6-8 weeks for the necessary coordination. For this application, the applicant should start with these consultations, as applicable (See Part VII for further guidance).

Attachments:

20	NDDB
23	Fisheries

Part II: Notifications

1. **PUBLIC NOTICE OF APPLICATION – Attachment 1**
   (REQUIRED for Section 401 Water Quality Certification , Inland Wetlands and Watercourses, and Non-consumptive Diversion applications)

   One notice for any combination of these programs is acceptable. Please refer to the *Public Notice Requirements for Permit Applications* (DEEP-INST-005A). The public notice of application must be published prior to submitting an application, as required in CGS section 22a-6g. Refer to the LWRD Application Instructions for public notice language. A copy of the published notice of application and the completed Certification of Notice Form (DEEP-APP-005A) must be included as Attachment 1 to this application. Your application will not be processed if Attachment 1 is not included.

2. **PROJECTS LOCATED IN A PUBLIC SUPPLY WATERSHED – Attachment 5**
   (REQUIRED for Inland Wetland and Watercourse application)
   Provide proof of written notice to the water company of the filing of this application in accordance with CGS section 22a-42f as Attachment 5 following this form.

Part III: U.S. Army Corps of Engineers Coordination

(Section 401 WQC and PCN only)

1. Include a copy of the United States Army Corps of Engineers (USACE) application as Attachment 28 and provide the name of USACE Project Manager, if known:

USACE Project Manager: Jared Pritts

2. For PCN Applications Only:
Check the applicable General Permit(s).

- ☐ GP2 Repair or maintenance of existing currently serviceable authorized or grandfathered structures & fill, removal of structures
- ☐ GP5 Boat ramps and marine railways
- ☐ GP6* Utility line activities
- ☐ GP9* Shoreline and bank stabilization projects
- ☐ GP10 Aquatic Habitat restoration, establishment and enhancement activities
- ☐ GP11 Fish and wildlife harvesting activities
- ☐ GP17 New/expanded developments and recreational facilities
- ☐ GP18* Linear transportation projects – wetland crossings only
- ☐ GP19* Stream, river and brook crossing (not including wetland crossings)
- ☐ GP21* Temporary fill not associated with any other GP activities

* If a town is receiving funding through the CTDOT, the applicant has to coordinate with the DOT program manager to arrange participation in an Interagency Coordination Meeting. Provide a copy of the meeting notes as Attachment 30.

Part IV: Site and Resource Information

1. SITE ADDRESS
Address of Site: 155 Burr Street City/Town: New Haven State: CT Zip Code: 06512

2. MUNICIPAL ZONING
Is the proposed work consistent with municipal zoning requirements?
☒ Yes ☐ No If no, explain: _____

3. WATERBODY/WATERCOURSES/WETLANDS
List names of all waters impacted by the proposed activity: Morris Creek, Tuttle Brook and associated inland and tidal wetlands

4. INDIAN LANDS
Is the activity that is the subject of this application located on federally recognized Indian lands? ☐ Yes ☒ No

Part IV: Site and Resource Information (continued)

5. AQUIFER PROTECTION AREAS

Is the site located within a mapped Level A or Level B Aquifer Protection Area, as defined in CGS section 22a-354a through 22a-354bb?

☐ Yes ☒ No If yes, check one: ☐ Level A or ☐ Level B

If Level A, are any of the regulated activities, as defined in RCSA section 22a-354i-1(34), conducted on this site? ☐ Yes ☐ No If yes, and your business is **not** already registered with the Aquifer Protection Program, contact the aquifer protection agent or DEEP to take appropriate action.

For more information on the Aquifer Protection Area Program, contact the program at 860-424-3019 or visit the website at www.ct.gov/deep/aquiferprotection. See LWRD Application Instructions for further guidance.

6. CONSERVATION OR PRESERVATION RESTRICTIONS

Will the activity which is the subject of this application be located within a conservation or preservation restriction area? ☐ Yes ☒ No

If yes, provide proof of written notice of this application to the holder of such restriction, and/or or a letter from the holder of such restriction verifying that this application is in compliance with the terms of the restriction, as Attachment 8.

7. LICENSE HISTORY

Indicate the number and date of issuance of any previous state permits or certificates issued by DEEP or USACE which authorized work at the site, and the names to whom they were issued.

License/Permit/COP Authorization Number and Name of Agency	*Date Issued*	*Name of Permittee/ Certificate Holder*	*Brief Description of Work Authorized*
OLISP 200003049-KZ, DIV-200003052, IW-2000-116, WQC-200003051, #200600317 NPDES	5/8/2007	Tweed-New Haven Airport Authority (TNHAA)	Creation of RSAs for RW 2 and RW 20, relocation of Morris Creek, extension of TW B, replace tide gate, wetland restoration
OLISP COP 201304084-KZ	11/19/2013	TNHAA	Install wildlife fence, add culverts under Pig Farm Rd, tidal impacts and wetland restoration
IW- 201304088 and IW-201304086	11/16/2013	TNHAA	wildlife fence and culverts under Pig Farm Rd, inland wetland impacts
FMC 201304274-FM and 201304275-FM	11/14/2013	TNHAA	Flood management certification for wildlife fence and Pig Farm Rc culverts
USACE NAE-2005-3307	11/8/2013	TNHAA	USACE permit for RSAs, revised to allow for wildlife fence

8. SOIL AND/OR GROUNDWATER REMEDIATION

Does the site work include soil and/or groundwater remediation? ☐ Yes ☒ No

If yes, please provide reference documentation including a) plan views of the site showing the area of contamination and b) a summary of remediation with chemical analysis, clean-up status, and remediation program identification, as Attachment 9.

9. ENFORCEMENT HISTORY

Is this application associated with a formal or informal enforcement action that is pending with DEEP?

☐ Yes ☒ No

If yes, please provide the enforcement action reference number and name of the DEEP staff contact:

Enforcement Action #: _____
DEEP Division/Program: _____
DEEP Staff Contact: _____

If the property was the subject of any historical enforcement actions known to the applicant, explain:

_____

Part IV: Site and Resource Information (continued)

10. RESOURCES IMPACTED

Check all that apply and complete Attachment 16, *Water Resource Impact Table*.

A. ☒ Inland Wetland(s)

☒ Check here to confirm that a Wetland Report (include functions and values*, USACE Wetland Determination Data Forms, Northcentral and Northeast Region*, and a description of any proposed impacts) is provided as Attachment 15. See LWRD Application Instructions for report requirements.

B. ☐ Watercourses – includes waterbodies (lakes, ponds, and impoundments)

Please be aware that any work involving construction, alteration or modification of a dam may require additional approvals from the DEEP Dam Safety Division (860-424-3704).

11. SPECIAL RESOURCE AREAS. If one of the following wetland types (see Table 1, p. 5 of 5 of the Department of the Army General Permits for the State of Connecticut) may be impacted by the proposed activity, please coordinate with LWRD staff (860-424-3019) to determine if an Individual Section 401 Water Quality Certification is necessary:

bog	calcareous seepage swamp
cedar swamp	fen
spruce swamp	vernal pool

12. MITIGATION

Regulated activities should be designed to avoid environmental impacts, and environmental impacts that are unavoidable should be minimized. Where unavoidable environmental impacts occur as a result of construction and/or operation of the proposed activity, mitigation for adverse impacts to wildlife and fish habitat, wetlands, watercourses, waterbodies and other natural resources should be incorporated into project plans.

☒ **Check here if mitigation was recommended through pre-application consultation with DEEP's Land & Water Resources Division, Fisheries Division, and/or Wildlife Division. Provide a mitigation plan with narrative as Attachment 17.**

Part V: Project Information

1. Describe the existing structures, conditions and uses at the site of the proposed work.
Provide photographs showing resources and existing site conditions as Attachment 10.

The site is an active airport that includes runways, taxiways, a terminal and associated structures pertinent to airport operation. The airport includes several tidal and freshwater/inland wetland systems along the edges of the property. See attached Executive Summary and Supplemental Narrative.

2a. Describe the proposed regulated work and activities in a detailed narrative, including the number and dimensions of structures and the volume and area of fill or excavations. See LWRD Application Instructions for required information.

The Applicant proposes the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways. See attached Executive Summary and Supplemental Narrative for details.

Part V: Project Information (continued)

2b. Describe the construction activities involved for the project in detail, including methods, sequencing, equipment, and any alternative construction methods that might be employed.

See attached Executive Summary and Supplemental Narrative that provides the Construction Sequence in detail and the plans provided in this aplication package.

2c. Describe any erosion and sedimentation or turbidity control installation and maintenance schedule and plans in detail. Such plans should be prepared in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as revised, established pursuant to CGS section 22a-328.

Erosion and Sediment Controls have been developed for the project site as required to address the 2024 Connecticut Guidelines for Soil Erosion and Sediment Control, as revised, established pursuant to CGS section 22a-328. Those are shown on the plans provided in this application package.

2d. Anticipated date of project initiation: Spring 2026

Indicate the length of time needed to complete the project and identify any anticipated time restrictions:
2 years

3. For **new** structures, activities or encroachments, discuss project alternatives which were considered and indicate why they were rejected. After all measures to eliminate or minimize adverse resource impacts have been incorporated in the proposed project, describe why any adverse impacts that remain should be deemed acceptable by the Land & Water Resources Division. For projects involving stormwater management, low-impact development practices should be incorporated to the greatest extent practicable. Explain any reasons for not using a low-impact development practice. See LWRD Application Instructions for further guidance.

A complete alternatives analysis and discussion of avoidance and minimization meaures has been provided in the attached Executive Summary and Supplemental Narrative.

4. If the project includes hydraulic and drainage structures, provide *Hydraulics Summary* as Attachment 19 and include Attachment 18, *Engineering Report Cover Sheet*.

a. Identify the type of structure: (Check one below that applies)

☒ Culvert	☐ Detention/Retention Basin	☐ Infiltration Basin/Structure
☐ Drainage Outfall	☐ Drainage Swale	☐ Bridge
☐ Dam	☐ Dike	☐ Outlet Control Structure
☐ Weir	☐ Pipe/Conduit/Aqueduct	☐ Other:

b. For bridge/culvert structures, what is the openness ratio? meters

The openness ratio is the X-sectional area of structure opening/ length of the structure parallel to the stream.)

c. What is the size of the contributing watershed to the structure? _____ Acres _____ Square Miles

Part VI: Engineering Support Documentation and Certification

Certain types of projects require documentation of engineering design. If you answer yes to one of the questions below, you must submit a completed *Engineering Report Cover Sheet* (DEEP-LWRD-APP-001R) as Attachment 18 along with the relevant engineering report(s).

1. Does the proposed activity include engineered structures such as bridges, culverts, stormwater management systems, detention basins, and/or flood & erosion control structures?

   ☒ Yes ☐ No

2. Is the proposed activity located in a FEMA-designated Riverine or Coastal Floodplain?

   ☒ Yes ☐ No

   If yes, provide documentation in the Engineering Report which demonstrates that the project is in compliance with FEMA's National Flood Insurance Program requirements and the local flood ordinance for the municipality.

   NOTE – Only the following activities in the Coastal Floodplain require engineering: buildings, flood and erosion control structures; public access facilities; and, tide regulating structures. See Engineering Report Cover Sheet for further guidance.

3. Is the proposed activity located in a FEMA-designated Floodway ☐ Yes ☒ No

   If yes, the Engineering Report must include a statement signed by a registered professional engineer that there is no-rise. This documentation must be supported by technical data that is derived from a standard step-backwater computer model utilizing source data from the Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM). If a No-rise Certification form is available through the municipality, please include it in the Engineering Report. For further information on No-Rise Certification, see No-Rise Certification for Floodways | FEMA.gov

The *Engineering Report Cover Sheet* shall be signed and sealed by a Professional Engineer licensed in the State of Connecticut. Supporting documentation as identified in the checklist may consist of engineering studies and other documentation, as appropriate, in order to describe the hydrologic and hydraulic effects of the proposed actions.

Part VII: Supporting Documents

The following attachments correspond to Form L. **If the Attachment name is followed by "REQUIRED", the attachment must be submitted with every application.** When submitting any supporting documents, please label the documents as indicated in this part (e.g., Attachment 20, etc.) and be sure to include the same applicant name used on Page 1 of this application form. Please check the box next to the attachments listed to indicate that they have been submitted, and provide the applicable attachments following this form. NOTE: Attachment numbering is NOT consecutive as the attachments relate to multiple LWRD program applications.

Attachment I.D.	Attachment Description
☒ **Attachment 1**	**Notice of Permit Application** *(**REQUIRED** for Section 401 Water Quality Certification, Inland Wetlands and Watercourses, and Non-consumptive Diversion applications only)* A copy of the published notice of permit application, as described in the instructions, attached to a completed "*Certification of Notice Form- Notice of Application*" (DEEP-APP-005A)
☐ **Attachment 5**	**Water Company Notification** *(**REQUIRED** for Inland Wetland and Watercourse application only)* If the project is located in a public supply watershed, provide a certified mail receipt as proof of notice to the water company of the filing of this application in accordance with CGS section 22a-42f.
☒ **Attachment 7**	**Executive Summary REQUIRED** Summarize the information contained in the complete application which must include a description of the proposed regulated activities and a synopsis of the environmental and engineering analyses of the impact of such activities. Include a list of the titles of all plans, drawings, reports, studies, appendices, or other documentation which are attached as part of the application.

Part VII: Supporting Documents (continued)

☐ **Attachment 8** **Conservation or Preservation Restriction** Information, if applicable.

☐ **Attachment 9** **Remediation Documentation**, if applicable.

☒ **Attachment 10** **Photographs showing existing conditions of the site REQUIRED**

☒ **Attachment 14** **Project Plans**, use *Project Plan Checklist* for requirements **REQUIRED**

☒ **Attachment 15** **Wetland Report** as explained in Part IV, item 10A.

☒ **Attachment 16** ***Water Resource Impact Table*** (DEEP-LWRD-APP-001W) **REQUIRED**

☒ **Attachment 17** **Mitigation Plan (with narrative)** as coordinated with DEEP Staff.

☒ **Attachment 18** ***Engineering Report Cover Sheet*** (DEEP-LWRD-APP-001R)

☒ **Attachment 19** ***Hydraulics Summary*** (DEEP-LWRD-APP-001X)

☒ **Attachment 20** **Natural Diversity Data Base (NDDB)**
Completed NDDB Determination #: **202402808 & 202408268**
If the proposed activity is within an NDDB area, complete and submit a *Request for NDDB State Listed Species Review Form* (DEEP-APP-007) to the address specified on the form, **prior** to submitting this application. For NDDB maps and more information, visit the DEEP website at www.ct.gov/deep/nddbrequest or call the NDDB staff at 860-424-3011.

Please note NDDB review generally takes 4 to 6 weeks and may require the applicant to produce additional documentation, such as ecological surveys, which must be completed prior to submitting this permit application. A copy of the NDDB Final Determination response letter that has not expired ***must*** be submitted as Attachment 20. Include a copy of any mitigation measures or management plan developed for this activity and approved by NDDB. Please DO NOT include a copy of the NDDB Review Request/Application. Be aware that you must renew your NDDB Determination if it expires before project work commences.

☒ **Attachment 23** **Fisheries Consultation Form**
If your project involves one or more of the following activities, check the applicable box(es) below and submit a completed *Fisheries Consultation Form* (DEEP-FISH-APP-007).

☐ new public/fishing access;

☒ activities in inland/non-tidal waterbodies and watercourses.

☒ **Attachment 28** **For 401 Water Quality Certification and Pre-Construction Notification only**, attach a copy of the USACE application, ENG FORM 4345 (form only, no attachments)

☐ **Attachment 30** **For Pre-Construction Notification projects with DOT funding**, attach a copy of the Interagency Coordination Meeting notes

☒ **Attachment 41** ***Applicant Compliance Information Form*** (DEEP-APP-002) **REQUIRED**

☒ **Attachment 42** ***Applicant Background Information Form*** (DEEP-APP-008) **REQUIRED**

☐ **Attachment 43** **Other Information:** Any other applicable information the applicant deems relevant or is required by DEEP.

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

APPLICATION FORM DEEP-LWRD-APP 001C

Connecticut Department of
Energy & Environmental Protection
Bureau of Water Protection & Land Reuse
Land & Water Resources Division

LWRD License Application Form C

Check Application Type:

- ☐ **Structures, Dredging & Fill (SDF)**
- ☐ **Structures, Dredging & Fill & Tidal Wetlands (TW)**
- ☐ **Structures, Dredging & Fill & Section 401 Water Quality Certificate (WQC)**
- ☒ **Structures, Dredging & Fill; TW; Section 401 WQC**
- ☐ **Section 401 Water Quality Certificate (Tidal Waters, Federal Agency Activity only)**

All sections of the LWRD application, when applicable, must be posted to the DEEP LWRD FTP site as instructed on Part VII of the LWRD Transmittal Form. See LWRD Application Instructions for general guidance.

Application Number (as assigned in CPPU e-mail): 202503729

Applicant Name (same name used on Part III of the LWRD Transmittal Form): Tweed New Haven Airport Authority

Part I: Pre-Submission Consultations

The application process requires preliminary coordination and input from other agencies/groups depending on the activity and the location. Consultations with other agencies must occur prior to application submission. Please allow 6-8 weeks for the necessary coordination. For this application, the applicant should start with these consultations, as applicable (See Part VI for further guidance).

Attachments:

20	NDDB	24	Bureau of Aquaculture
21	Wildlife- osprey	25	Harbor Management Commission
22	Dredging Projects	26	Shellfish Commission
23	Fisheries	27	USACE

Part II: Notifications

3. **PUBLIC NOTICE OF APPLICATION – Attachment 1**
One notice for any combination of these programs is acceptable. Please refer to the *Public Notice Requirements for Permit Applications* (DEEP-INST-005A). The public notice of application must be published prior to submitting an application, as required in CGS section 22a-6g. Refer to the LWRD Application Instructions for public notice language. A copy of the published notice of application and the completed Certification of Notice Form (DEEP-APP-005A) must be included as Attachment 1 to this application. Your application will not be processed if Attachment 1 is not included.

4. **ADJACENT PARCEL OWNER NOTIFICATION – Attachment 3**
(REQUIRED for Structures, Dredging and Fill & Tidal Wetland applications only)
The "*Certification of Notice Form - Notice of Application*" (Attachment 3) has to be mailed to any land owner of record for any property that is located five hundred (500) feet or less from the property line where the activity is proposed. See Part VI for further guidance.

5. **MUNICIPAL NOTIFICATION OF TIDAL WETLAND APPLICATION – Attachment 4**
(REQUIRED for Tidal Wetland applications only)
The applicant shall mail or e-mail a copy of the application to the chief administrative officer and the chairmen of the conservation and shellfish commissions. See Part VI for further guidance.

Part III: Site and Resource Information

1. SITE ADDRESS

Street: 155 Burr Street City/Town: New Haven State: CT Zip Code: 06512

2. MUNICIPAL ZONING

Is the proposed work consistent with municipal zoning requirements?

☒ Yes ☐ No If no, explain: _____

3. WATERBODY/WATERCOURSES/WETLANDS

List names of all waters impacted by the proposed activity: Morris Creek, Tuttle Brook and associated inland and tidal wetlands

4. INDIAN LANDS

Is the activity that is the subject of this application on federally recognized Indian lands? ☐ Yes ☒ No

5. AQUIFER PROTECTION AREAS

Is the site located within a mapped Level A or Level B Aquifer Protection Area, as defined in CGS section 22a-354a through 22a-354bb?

☐ Yes ☒ No If yes, check one: ☐ Level A or ☐ Level B

If Level A, are any of the regulated activities, as defined in RCSA section 22a-354i-1(34), conducted on this site? ☐ Yes ☐ No

If yes, and your business is **not** already registered with the Aquifer Protection Program, contact the aquifer protection agent or DEEP to take appropriate action. For more information on the Aquifer Protection Area Program, contact the program at 860-424-3019 or visit the website at www.ct.gov/deep/aquiferprotection. See LWRD Application Instructions for further guidance.

6. CONSERVATION OR PRESERVATION RESTRICTIONS

Will the activity which is the subject of this application be located within a conservation or preservation restriction area? ☐ Yes ☒ No

If yes, provide proof of written notice of this application to the holder of such restriction, and/or or a letter from the holder of such restriction verifying that this application is in compliance with the terms of the restriction, as Attachment 8.

7. LICENSE HISTORY

Indicate the number and date of issuance of any previous state permits or certificates issued by DEEP or USACE which authorized work at the site, and the names to whom they were issued.

License/Permit/COP Authorization Number and Name of Agency	*Date Issued*	*Name of Permittee/ Certificate Holder*	*Brief Description of Work Authorized*
OLISP 200003049-KZ, DIV-200003052, IW-2000-116, WQC-200003051, #200600317 NPDES	5/8/2007	Tweed-New Haven Airport Authority (TNHAA)	Creation of RSAs for RW 2 and RW 20, relocation of Morris Creek, extension of TW B, replace tide gate, wetland restoration
OLISP COP 201304084-KZ	11/19/2013	TNHAA	Install wildlife fence, add culverts under Pig Farm Rd, tidal impacts and wetland restoration
IW- 201304088 and IW-201304086	11/16/2013	TNHAA	wildlife fence and culverts under Pig Farm Rd, inland wetland impacts
FMC 201304274-FM and 201304275-FM	11/14/2013	TNHAA	Flood management certification for wildlife fence and Pig Farm Rd culverts
USACE NAE-2005-3307	11/8/2013	TNHAA	USACE permit for RSAs, revised to allow for wildlife fence

Part III: Site and Resource Information (continued)

8. SOIL AND/OR GROUNDWATER REMEDIATION

Does the site work include soil and/or groundwater remediation? ☐ Yes ☒ No

If yes, please provide reference documentation including a) plan views of the site showing the area of contamination and b) a summary of remediation with chemical analysis, clean-up status, and remediation program identification, as Attachment 9.

9. ENFORCEMENT HISTORY

Is this application associated with a formal or informal enforcement action that is pending with DEEP?

☐ Yes ☒ No

If yes, please provide the enforcement action reference number and name of the DEEP staff contact:

Enforcement Action #: _____

DEEP Division/Program: _____

DEEP Staff Contact: _____

If the property was the subject of any historical enforcement actions known to the applicant, explain:

_____

10. Regulatory Limit – See Reference Guide for Regulatory Jurisdiction for further explanation if necessary. Indicate the landward extent of the State's regulatory jurisdiction by checking one box:

☐ **Coastal Jurisdiction Line** (CJL)- for CJL information, refer to the Coastal Jurisdiction Fact Sheet and Chart.

☐ **Mean High Water** (MHW) - for projects located upstream of a tide gate, dam or weir (structure must be shown on project plans).

☒ **Tidal Wetland Boundary** – To be used if tidal wetlands are located landward of CJL or MHW. Include one foot above local extreme high water, if applicable.

11. Tidal Elevations

Provide site elevations for CJL, MHW, Mean Low Water (MLW) and the High Tide Line (HTL)* in NAVD88. For general elevation reference and conversion, please refer to USACE Tidal Flood Profiles; CO-OPS Map - NOAA Tides & Currents; or, Online VDatum: Vertical Datums Transformation

CJL = 2.5' MHW = 2.5' MLW = -3.4' HTL = 2.5'

This data is from previously established CJL at the site – see permit narrative for additional explanation

*The HTL is necessary for USACE jurisdiction and required as part of the USACE application.

Part III: Site and Resource Information (continued)

12. Coastal Resource Impact Table

Check the applicable boxes below to identify coastal resources to be impacted by the proposed activity at the project site. Describe the impacts, as applicable. For definitions, refer to the Connecticut Coastal Management Manual.

Resource Type	square feet			Describe Impacts
	Permanent impact	Temporary impact	Mitigation	
☐ Beaches/Dunes below HTL below CJL				
☒ Tidal Wetlands	0	421		**Identify if existing vegetation is salt, brackish or freshwater wetland.** Impacts will be to install a cofferdam to dewater the area of alteration to the tide gate; area is estuarine channel with no vegetation.
☐ Nearshore waters				

Resource Type	Describe Impacts (temporary and permanent)
☐ Benthic Habitat	
☐ Intertidal Flats	
☐ Submerged Aquatic Vegetation (SAV)	
☐ Rocky Shorefront	**Include rocky intertidal areas.**
☐ Finfish	
☐ Wildlife	
☐ Shellfish Areas	**Maps available at The Aquaculture Mapping Atlas.**
☐ Coastal Hazard Area	**Discuss FEMA compliance.**
☐ Bluffs/Escarpments	**Describe impacts associated with flood and erosion control structures.**
☐ Islands	**If new access is proposed, describe how island resources will be impacted.**
☐ Coastal Flooding	**Describe how tide gates/fill/seawall height increases will impact flooding.**
☐ Water Circulation Patterns	**Describe impacts from groins/abutments/jetties.**
☐ Drainage Patterns	**Describe impacts from impervious surfaces/outfalls/weep holes and stormwater modifications.**
☐ Visual Quality	**Only applies to public views of statewide scenic significance.**
☐ Water Quality	**Discuss sediment and erosion controls, water handling, and stormwater treatment.**

Part IV: Project Information

Please note: Upon adoption of the Long Island Sound Blue Plan, the policies of the Blue Plan will be factors for consideration for projects in the Blue Plan Policy Area boundary. The Policy Area boundary can be found on the Blue Plan Map Viewer, while the policies are located in Chapter 4 of the Blue Plan document.

2. Describe, briefly, the existing structures within state regulatory jurisdiction, and their conditions and uses at the site of the proposed work. **Provide photographs showing resources and existing site conditions as Attachment 10.**

   The site is an active airport that includes runways, taxiways, a terminal and associated structures pertinent to airport operation. The airport includes several tidal and freshwater/inland wetland systems along the edges of the property. See attached Executive Summary and Supplemental Narrative.

3. a. Describe the proposed regulated work and activities in a detailed narrative, including the number and dimensions of structures and the volume and area of fill or excavations. See LWRD Application Instructions for required information.

   The Applicant proposes the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways. See attached Executive Summary and Supplemental Narrative for details.

   b. Describe the construction activities involved for the project in detail, including methods, sequencing, equipment, and any alternative construction methods that might be employed. For coastal dredging projects, identify the type of equipment with bucket and barge capacity and, for upland disposal, provide containment facility details (See Reference for Coastal/Tidal Dredging).

   See attached Executive Summary and Supplemental Narrative that provides the Construction Sequence in detail and the plans provided in this aplication package.

   c. Describe any erosion and sedimentation or turbidity control installation and maintenance schedule and plans in detail. Such plans should be prepared in accordance with the 2002 Connecticut Guidelines for Soil Erosion and Sediment Control, as revised, established pursuant to CGS section 22a- 328. Erosion and Sediment Controls have been developed for the project site as required to address the 2024 Connecticut Guidelines for Soil Erosion and Sediment Control, as revised, established pursuant to CGS section 22a-328. Those are shown on the plans provided in this application package.

   d. Anticipated date of project initiation: Spring 2026

   Indicate the length of time needed to complete the project and identify any anticipated time restrictions: 2 years

4. For **new** structures, activities or encroachments, discuss project alternatives which were considered and indicate why they were rejected. After all measures to eliminate or minimize adverse resource impacts have been incorporated in the proposed project, describe why any adverse impacts that remain should be deemed acceptable by the Land & Water Resources Division. For projects involving stormwater management, low-impact development practices should be incorporated to the greatest extent practicable. Explain any reasons for not using a low-impact development practice. See LWRD Application Instructions for further guidance.

   A complete alternatives analysis and discussion of avoidance and minimization meaures has been provided in the attached Executive Summary and Supplemental Narrative.

Part IV: Project Information (continued)

4. The proposed work is associated with which of the following uses? (Check all that apply)

   ☐ Marine commercial/industrial use including aquaculture

   ☐ Flood and erosion control

   ☐ Residential boating access

   ☐ Shared residential boating access

   ☐ Public access

   ☒ Infrastructure improvement

   ☐ Other – explain: _____

5. If the site is a marina or yacht club, provide the following:

   a. Number of boat slips and moorings: _____ (should be consistent with plans submitted as Attachment 14)

   b. Type of marine sanitation service provided at the facility. _____

   c. ☐ Check here to confirm that at least one plan view notes the location of upland support including adequate parking, a marina office, and restrooms.

   d. Check the applicable services provided:

   ☐ boat repair/maintenance ☐ winter storage

   ☐ gas/fuel hook-up ☐ electric hook-up

   ☐ fishing amenities ☐ boating and/or equipment sales

6. If local/municipal review has or will require a Coastal Site Plan Review for activities at this site, please explain the associated upland work. _____

7. If a new or expanded flood and erosion control structure (e.g. seawall) is proposed, it would provide for the protection of:

   ☐ an infrastructural facility ☐ cemetery or burial grounds

   ☐ a water-dependent use ☐ a pre-1995 commercial or residential structure

   Please make sure Item 3., above, documents that there are no feasible, less environmentally damaging alternatives and include Attachment 18, Engineering Report Cover Sheet. Also, the municipality must forward the related Coastal Site Plan Review to LWRD. See LWRD Application Instructions for further guidance.

8. Identify and evaluate any potential beneficial or adverse impacts to:

   a. Navigation (include federal and local navigation channels and distance to nearby docks):

   _____

   b. Public access to, and public use of, public trust lands and waters waterward of Mean High Water:

   Impacts waterward of MHW will be temporary and for alteration of the tide gate that serves as flood protection for the residential neighborhoods to the west of the airport.

Part V: Engineering Support Documentation and Certification

Certain types of projects require documentation of engineering design. If you answer yes to one of the questions below, you must submit a completed ***Engineering Report Cover Sheet*** (DEEP-LWRD-APP-001R) as Attachment 18 along with the relevant engineering report(s).

4. Does the proposed activity include engineered structures such as bridges, culverts, stormwater management systems, detention basins, and/or flood & erosion control structures?

   ☒ Yes ☐ No

5. Is the proposed activity located in a FEMA-designated Riverine or Coastal Floodplain?

   ☒ Yes ☐ No

   If yes, provide documentation in the Engineering Report which demonstrates that the project is in compliance with FEMA's National Flood Insurance Program requirements and the local flood ordinance for the municipality.

   NOTE – Only the following activities in the Coastal Floodplain require engineering: buildings, flood and erosion control structures; public access facilities; and, tide regulating structures. See Engineering Report Cover Sheet for further guidance.

6. Is the proposed activity located in a FEMA-designated Floodway ☐ Yes ☒ No

   If yes, the Engineering Report must include a statement signed by a registered professional engineer that there is no-rise. This documentation must be supported by technical data that is derived from a standard step-backwater computer model utilizing source data from the Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM). If a No-rise Certification form is available through the municipality, please include it in the Engineering Report. For further information on No-Rise Certification, see No-Rise Certification for Floodways | FEMA.gov

The *Engineering Report Cover Sheet* shall be signed and sealed by a Professional Engineer licensed in the State of Connecticut. Supporting documentation as identified in the checklist may consist of engineering studies and other documentation, as appropriate, in order to describe the hydrologic and hydraulic effects of the proposed actions.

Part VI: Supporting Documents

The following attachments correspond to Form C. **If the Attachment name is followed by "REQUIRED", the attachment must be submitted with every application.** When submitting any supporting documents, please label the documents as indicated in this part (e.g., Attachment 1, etc.) and be sure to include the same applicant name used on Page 1 of this application form. Please check the box next to the attachments listed to indicate that they have been submitted and provide the applicable attachments following this form. NOTE: Attachment numbering is NOT consecutive as the attachments relate to multiple LWRD program applications.

Attachment ID	Attachment Description
☒ **Attachment 1**	**Public Notice of Application REQUIRED** A copy of the published notice of permit application, as described in the instructions, attached to a completed "*Certification of Notice Form- Notice of Application*" (DEEP-APP-005A)
☒ **Attachment 3**	**Adjacent Parcel Notification REQUIRED** *(Structures, Dredging and Fill & Tidal Wetland applications only)* Any land owner of record for any property that is located five hundred (500) feet or less from the property line where the activity is proposed has to be mailed the "Certification of Notice Form - Notice of Application" (Attachment 1). As Attachment 3, provide the names and mailing addresses for these individuals and a certified mail receipt to document that a copy of the Notice of Application was sent to each. If the proposed work is entirely waterward of Mean High Water, but within the apparent riparian/littoral area of a shoreline property, that property should be used to compile the list of the names and addresses of all land owners of record located within five hundred feet from the property lines. Include any known claimants of water rights adjacent to the project and owners or lessees of shellfish grounds or franchises within the work area.

Part VI: Supporting Documents (continued)

☒ **Attachment 4** **Application Copy to Municipality**

(REQUIRED for Tidal Wetland applications only)
In accordance with CGS section 22a-32, the applicant shall mail or e-mail a copy of the application to the chief administrative officer and the chairmen of the conservation and shellfish commissions of the town or towns where the proposed work is located. Provide documentation such as a return receipt email or certified mail receipt to prove that such notification was completed. The applicant is also responsible for providing a copy of any substantive revisions made during the application review process.

☒ **Attachment 7** **Executive Summary** REQUIRED

Summarize the information contained in the complete application which must include a description of the proposed regulated activities and a synopsis of the environmental and engineering analyses of the impact of such activities. Include a list of the titles of all plans, drawings, reports, studies, appendices, or other documentation which are attached as part of the application.

☐ **Attachment 8** **Conservation or Preservation Restriction Information, if applicable.**

☐ **Attachment 9** **Remediation Documentation**, if applicable.

☒ **Attachment 10** **Photographs showing existing conditions of the site REQUIRED**

☒ **Attachment 14** **Project Plans,** use *Project Plan Checklist* for requirements **REQUIRED**

☒ **Attachment 18** ***Engineering Report Cover Sheet*** (DEEP-LWRD-APP-001R)

☒ **Attachment 20** **Natural Diversity Data Base (NDDB)**
Completed NDDB Determination #: **202402808 & 202408268**
If the proposed activity is within an NDDB area, complete and submit a *Request for NDDB State Listed Species Review Form* (DEEP-APP-007) to the address specified on the form, **prior** to submitting this application. For NDDB maps and more information, visit the DEEP website at www.ct.gov/deep/nddbrequest or call the NDDB staff at 860-424-3011.

Please note NDDB review generally takes 4 to 6 weeks and may require the applicant to produce additional documentation, such as ecological surveys, which must be completed prior to submitting this permit application. A copy of the NDDB Final Determination response letter that has not expired ***must*** be submitted as Attachment 20. Include a copy of any mitigation measures or management plan developed for this activity and approved by NDDB. Please DO NOT include a copy of the NDDB Review Request/Application. Be aware that you must renew your NDDB Determination if it expires before project work commences.

☐ **Attachment 21** **DEEP Wildlife Division – Osprey Consultation**

If the proposed activity will occur within 300 feet of an osprey platform, please note that work will be prohibited between May 1st and July 31st unless a DEEP waiver is obtained. If this seasonal prohibition conflicts with the proposed work schedule, please contact the DEEP Wildlife Division's Wildlife Diversity Program staff at deep.wildlife@ct.gov or 860-424-3011 for technical assistance before submitting your application. If you are seeking a seasonal prohibition waiver, documentation of the waiver issued by Wildlife Diversity Program staff must be submitted as Attachment 21. For known nesting locations, reference the Osprey Map at:

https://www.google.com/maps/d/viewer?mid=1GyxnB-UAGxmseIecH9Zj4UdH1ug&usp=sharing or https://www.ctaudubon.org/citizen-science.

Part VI: Supporting Documents (continued)

☐ **Attachment 22** Dredging **Consultation Form**
*(**REQUIRED** for dredging activities only.)*
If dredging is proposed, please refer to Reference for Coastal/Tidal Dredging and submit a completed *Dredging Consultation Form*.

☒ **Attachment 23** **Fisheries Consultation Form**
If your project involves one or more of the following activities, check the applicable box(es) below and submit a completed *Fisheries Consultation Form* (DEEP-FISH-APP-007).

- ☐ new public/fishing access;
- ☐ beach nourishment;
- ☐ new docks and marinas on the Connecticut River;
- ☒ coastal/tidal dredging projects;
- ☐ culverts and bridges; and
- ☐ activities within the Blue Plan Policy Area boundary.

Note: Fisheries consultation is **not required** for docks and marinas on Long Island Sound and for disposal only of dredge sediment at one of the open water sites (generally NY dredge projects).

☐ **Attachment 24** **Department of Agriculture/Bureau of Aquaculture Consultation**
If your project falls within one the categories below, check the box and submit a completed *Department of Agriculture/Bureau of Aquaculture Consultation Form*.

- ☐ any project in a municipality directly on Long Island Sound
- ☐ any project on the Connecticut River in Old Saybrook or Lyme
- ☐ any project on the Housatonic River in Stratford or Milford
- ☐ any project on the Thames River in New London, Waterford, Montville, Ledyard or Groton
- ☐ dredging projects only in Lyme, Essex, Orange, Derby/Ansonia, Norwich or Preston

☐ **Attachment 25** **Harbor Management Consultation Form**
If your town has a Harbor Management Commission, submit a completed *Harbor Management Commission Consultation Form*.

☐ **Attachment 26** **Shellfish Commission Consultation Form**
If your town has a Shellfish Commission, submit a completed *Shellfish Commission Consultation Form*.

☒ **Attachment 27** **USACE Consultation Form**
This consultation form is required to be submitted as part of an application for a Structures, Dredging & Fill license (Connecticut General Statutes (CGS) Section 22a-361) and/or Tidal Wetlands license (CGS Section 22a-32).

☒ **Attachment 41** ***Applicant Compliance Information Form*** (DEEP-APP-002) **REQUIRED**.

☒ **Attachment 42** ***Applicant Background Information Form*** (DEEP-APP-008) **REQUIRED**.

☐ **Attachment 43** **Other Information:** Any other applicable information the applicant deems relevant or is required by DEEP.

ATTACHMENT 1 – NOTICE OF PERMIT APPLICATION

Notice of Permit Application

Town(s): **New Haven and East Haven, CT**

Notice is hereby given that the **Tweed New Haven Airport Authority** (the "applicant") of **155 Burr Street, New Haven, CT 06512** and **The New HVN LLC** (co-applicant) of **45025 Aviation Drive, Suite 100, Dulles, VA 20166** will submit to the Department of Energy & Environmental Protection an application under Connecticut General Statutes Section(s):22a-32**;** 22a-361 and Section 401 of the Federal Clean Water Act, 33 U.S.C. 1341.

Specifically, the applicants propose the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways on airport property. The proposed activity will take place at the Tweed New Haven Regional Airport, 155 Burr Street, New Haven, CT 06512. The proposed activity will potentially affect: Morris Creek, Tuttle Brook and associated inland and tidal wetlands**.**

Interested persons may obtain copies of the application from Kimberly Peace, Hoyle, Tanner & Associates, Inc., 150 Dow Street, Manchester, NH 03101, 603-460-5205, kpeace@hoyletanner.com.

The application will be available for inspection at the Department of Energy & Environmental Protection, Land & Water Resources Division, 79 Elm Street, Hartford, CT 06106-5127, telephone 860-424-3019 from 8:30 to 4:30 Monday through Friday. Please call in advance to schedule a review of the application.

Connecticut Department of
Energy & Environmental Protection

Certification of Notice Form - Notice of Application

DEEP USE ONLY
Division
Application No.

I , **Tweed New Haven Airport Authority/The New HVN LLC**, certify that
(Name of Applicant)

the attached notice represents a true copy of the notice that appeared in **The New Haven Register**
(Name of Newspaper)

on April 18 2025
(Date)

I also certify that I have provided a copy of said notice to the chief elected municipal official listed below as required by section 22a-6g CGS.

Justin Elicker	**Mayor of New Haven**
Name of Official	*Title of Official*

City of New Haven, 165 Church Street		
Address		
New Haven	**CT**	**06510**
City/Town	*State*	*Zip Code*

Michael Jones	04/17/2025
Signature of Applicant	*Date*
Jeremy Nielson/Michael Jones	**Airport Manager/Chief Executive Officer**
Name of Applicant (print or type)	*Title (if applicable)*

Connecticut Department of
Energy & Environmental Protection

Certification of Notice Form - Notice of Application

DEEP USE ONLY
Division
Application No.

I , **Tweed New Haven Airport Authority/ The New HVN LLC**, certify that
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on April 18 2025
(Date)

I also certify that I have provided a copy of said notice to the chief elected municipal official listed below as required by section 22a-6g CGS.

Joseph A. Carfora	**Mayor of East Haven**	
Name of Official	*Title of Official*	
Town of East Haven, 250 Main Street		
Address		
East Haven	**CT**	**06512**
City/Town	*State*	*Zip Code*
Michael Jones	04/17/2025	
Signature of Applicant	*Date*	
Jeremy Nielson/Michael Jones	**Airport Manager/ Chief Executive Officer**	
Name of Applicant (print or type)	*Title (if applicable)*	

PUBLIC NOTICES

PUBLIC NOTICE

Notice is hereby given that T Westbrook Center LLC in partnership with Lexington Partners LLC with an address of One Financial Plaza, 12th Floor, Hartford, Connecticut will submit to the Department of Energy and Environmental Protection an application under Section 22a-430 of the Connecticut General Statutes for a permit to initiate, create, originate and maintain a discharge of water, substance or material to the waters of the State.

Specifically, the applicant proposes a transit orientated redevelopment of the Westbrook Outlet Shopping Center located at 314 Flat Rock Place in Westbrook, Connecticut. These activities will require a modification to an existing Subsurface Sewage Disposal System (SSDS) increasing the disposal capacity to approximately 170,000 gallons per day. The effluent disposal will be dispersed across the property in siz (6) SSDS leaching fields. The location of these leaching fields will be designed in accordance with the Connecticut Department of Energy and Environmental Protection's (DEEP) "Guidance for Design of Large-Scale On-Site Wastewater Renovation Systems" with approval from Westbrook Inland Wetlands & Watercourse Commission.

Interested persons may obtain copies of the application from Mark Zimmermann c/o Updike, Kelly & Spellacy, P.C., 225 Asylum Street, 20th Floor, Hartford, CT 06103, or by email at mzimmermann@uks.com.

The application will also be available for inspection at the Department of Energy and Environmental Protection, Bureau of Materials Management and Compliance Assurance, Permitting and Enforcement, 79 Elm Street, Hartford, CT 06106-5127 (860-424-3025) from 8:30 to 4:30, Monday through Friday. Please call-in advance to schedule review of the application.

Section 106 Public Notice

T-Mobile Northeast, LLC proposes to collocate antennas on the rooftop and steeple of a 100-foot-tall (overall height) building located at 56 South Cliff Street, Ansonia, New Haven County, CT 06401. Interested parties with comments regarding potential effects on Historic Properties may contact T-Mobile c/o Julia Klima at Dynamic Environmental Associates, Inc., 3850 Lake Street, Suite C, Macon, GA 31204, 877-968-4787, Sec106@DynamicEnvironmental.com within 30 days from the date of this publication. Re: 22503114

STATE OF CONNECTICUT
SUPERIOR COURT
JUVENILE MATTERS
www.jud.ct.gov

ORDER OF NOTICE

NOTICE TO: Octavia Moore, mother of female child born on 03/17/2009 to father, Lavar C. of parts unknown.

A petition has been filed seeking: Commitment of minor child(ren) of the above named or vesting of custody and care of said child(ren) of the above named in lawful, private or public agency or a suitable and worthy person.

The petition, whereby the court's decision can affect your parental rights, if any, regarding minor child(ren) will be heard on: **5/27/25 at 2:00 PM at 239 Whalley Ave, New Haven, CT 06511.**

Hearing on an Order of Temporary Custody will be heard on: **4/25/25 at 9:00 AM at 239 Whalley Ave, New Haven, CT 06511.**

Therefore, ORDERED, that notice of the hearing of this petition be given by publishing this Order of Notice once, immediately upon receipt, in the: New Haven Register a newspaper having a circulation in the town/city of: New Haven

Name of Judge:
Honorable Tara Knight
Signed (Clerk): Beth Marsan
Date Signed: 4/16/25

Right to Counsel: Upon proof of inability to pay for a lawyer, the court will make sure that an attorney is provided to you by the Chief Public Defender. Request for an attorney should be made immediately in person, by mail, or by fax at the court office where your hearing is to be held.

STATE OF CONNECTICUT
SUPERIOR COURT
JUVENILE MATTERS
www.jud.ct.gov

ORDER OF NOTICE

NOTICE TO: Jamal Glasgow, father of baby girl born on 12/25/2018 to mother Shanae D. of parts unknown.

A petition has been filed seeking: Termination of parental rights of the above named in minor child(ren).

The petition, whereby the court's decision can affect your parental rights, if any, regarding minor child(ren) will be heard on: **5/13/25 at 2:00 PM at 239 Whalley Ave, New Haven, CT 06511.**

Therefore, ORDERED, that notice of the hearing of this petition be given by publishing this Order of Notice once, immediately upon receipt, in the: New Haven Register a newspaper having a circulation in the town/city of: New Haven

Name of Judge:
Honorable Tara Knight
Signed (Clerk): Beth Marsan
Date Signed: 4/16/25

Right to Counsel: Upon proof of inability to pay for a lawyer, the court will make sure that an attorney is provided to you by the Chief Public Defender. Request for an attorney should be made immediately in person, by mail, or by fax at the court office where your hearing is to be held.

CLASSIFIED ADVERTISING
Call 203-333-4151
Monday - Friday
8:30 a.m. to 3:30 p.m.

PUBLIC NOTICES

State of Connecticut
Court of Probate, New Haven Regional Children's Probate Court District

NOTICE TO Natasha Clay, whose last known address is unknown to the court.

Pursuant to an order of Hon. Americo R. Carchia, Judge, a hearing will be held at New Haven Regional Children's Probate Court, 873 State Street, New Haven, CT 06511-3923 on April 30, 2025 at 2:00 PM on a petition for Family Case Conference concerning a certain minor child born on January 15, 2015. The court's decision will affect your interest, if any, as in the petition on file more fully appears.

RIGHT TO COUNSEL: If the above-named person wishes to have an attorney, but is unable to pay for one, the court will provide an attorney upon proof of inability to pay. Any such request should be made immediately by contacting the court office where the hearing is to be held.

By order of the court

Josephine Smith, Clerk

WEST HAVEN CITY COUNCIL

NOTICE OF PUBLIC HEARING is hereby given that on April 28, 2025, at 6:55 P.M. at the West Haven City Hall, 355 Main Street, 3rd Floor, City Council Chambers, the West Haven Legislative Committee will conduct a public hearing regarding: AN AMENDMENT TO ARTICLE VIII OF CHAPTER 211 OF THE CODE OF THE CITY OF WEST HAVEN, ELDERLY TAX FREEZE. SUMMARY: Article VIII of Chapter 211 provides for a tax freeze on owner-occupied real property for certain qualifying individuals 70 years and older. The proposed amendment changes the residency requirement from 20 consecutive years to 10 consecutive years; clarifies the language to define the freeze date as the October Grand List for the fiscal year immediately preceding the date of application; eliminates the requirement that no children under the age of 25 years may reside in the residence; clarifies the language regarding property owned jointly, allowing for a survivor age 65 years or older to maintain the tax freeze; and provides that new applications shall be considered by the Assessor between February first and May fifteenth of each year. For a complete copy you can go to the City Clerk's Office or the City of West Haven website. Comments by mail to West Haven City Council, 355 Main Street, West Haven, CT 06516, or email to: cserrini@westhaven-ct.gov

WEST HAVEN, CT LEGAL NOTICE
PLANNING AND ZONING COMMISSION
CITY OF WEST HAVEN, CONNECTICUT

The West Haven Planning and Zoning Commission will hold a Public Hearing and Regular Meetings on Tuesday, April 22, 2025, in the Harriett North Room, 2nd Floor, City Hall, 355 Main Street, West Haven, CT at 6:00 P.M.

172 Beatrice Drive: An application to expand the parking in the front yard. In the R2 (single Family Detached Residence) Owner: Lou & Tanya Silva/ Applicant: Dylan's Paving & Excavating LLC. File # SP 25-15

50 Industry Drive: Add an accessory building and outdoor living display area. Located in the IPD (Industrial Planned Development) district Owner / Applicant Eli Properties, LLC File # SR 25-16

441 Derby Avenue: A modification for a previously approved Site Plan Review. Located in the RB (Regional Business) district. Owner: Grinnell, LLC/ Applicant Highway 84 LLC. File # SR25-17

855 Boston Post Road: A Special Permit and Site Plan review to allow the front portion of the building to be utilized as an indoor soccer venue. The applicant will add interior and exterior paint and repair cracks and deficiencies in the parking lot and drive. Also seal coat parking and striping for 100 parking spaces for user and add signage. Owner: 855 Orange Avenue, LLC/ Applicant Five Star Holdings, LLC. File #SP 25-18 and #SR 25-19

Applications and supporting documents available for review in the office of Planning & Development, 355 Main Street, West Haven, CT.

Christopher Suggs
Chairman

FLOOD SAFETY

Floods are among the most frequent and costly natural disasters. Flooding often occurs following a hurricane, thawing snow, or several days of sustained rain. Flash floods occur suddenly, due to rapidly rising water along a stream or low-lying area.

KNOW THE DIFFERENCE!

A flood/flash flood WATCH means a flood or flash flood is possible.

A flood/flash flood WARNING means flooding or flash flooding is already occurring or will occur soon. TAKE IMMEDIATE PRECAUTIONS!

American Red Cross

For more information on disaster and emergency preparedness, visit **RedCross.org**

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PUBLIC NOTICES

Notice of Permit Application
Town(s): New Haven and East Haven, CT

Notice is hereby given that the Tweed New Haven Airport Authority (the "applicant") of 155 Burr Street, New Haven, CT 06512 and The New HVN LLC (co-applicant) of 45025 Aviation Drive, Suite 100, Dulles, VA 20166 will submit to the Department of Energy & Environmental Protection an application under Connecticut General Statutes Section(s):22a-32; 22a-361 and Section 401 of the Federal Clean Water Act, 33 U.S.C. 1341.

Specifically, the applicants propose the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways on airport property. The proposed activity will take place at the Tweed New Haven Regional Airport, 155 Burr Street, New Haven, CT 06512. The proposed activity will potentially affect: Morris Creek, Tuttle Brook and associated inland and tidal wetlands.

Interested persons may obtain copies of the application from Kimberly Peace, Hoyle, Tanner & Associates, Inc., 150 Dow Street, Manchester, NH 03101, 603-460-5205, kpeace@hoyletanner.com.

The application will be available for inspection at the Department of Energy & Environmental Protection, Land & Water Resources Division, 79 Elm Street, Hartford, CT 06106-5127, telephone 860-424-3019 from 8:30 to 4:30 Monday through Friday. Please call in advance to schedule a review of the application.k

PROBATE NOTICES

NOTICE TO CREDITORS

ESTATE OF Bruce M. Russett (23-00723)

The Hon. Michael Dolan, Judge of the Court of Probate, District of Hamden - Bethany Probate Court, by decree dated April 2, 2025, ordered that all claims must be presented to the fiduciary at the address below. Failure to promptly present any such claim may result in the loss of rights to recover on such claim.

Melanie Purchio, Clerk

The fiduciary is:

Mark D. Russett,
66 Meridian Street,
Melrose, MA 02176

Did You Know?

There's much to celebrate on the Spring Equinox, which is also referred to as the "Vernal Equinox" or the "March Equinox" and marks the official beginning of spring, a season many people associate with rejuvenation and longer hours of daylight. One unusual aspect of the equinoxes (the Autumnal Equinox in September ushers in the beginning of fall) is these days feature the fastest sunsets and sunrises of the year. According to Earthsky.org, this phenomenon occurs because the sun rises due east and sets due west on the equinoxes, which means the setting sun hits the horizon at its steepest possible angle. That steep angle leads to a very short sunrise and sunset on the equinoxes.

HOME FIRE PREPAREDNESS: FIRE ESCAPE PLANNING

The most effective way to protect yourself and your home from fire is to identify and remove fire hazards. Sixty-five percent of home fire deaths occur in homes with no working smoke alarms. During a home fire, working smoke alarms and a fire escape plan that has been practiced regularly can save lives.

*If a fire occurs in your home, **GET OUT, STAY OUT** and **CALL** for help.*

***Install smoke alarms** on every level of your home, inside bedrooms and outside sleeping areas. Test them every month and replace the batteries at least once a year.*

*Talk with all household members about a **fire escape plan** and practice the plan twice a year.*

- ❑ Ensure that all household members know two ways to escape from every room of your home.
- ❑ Go to your outside meeting place and then call for help.
- ❑ If closed doors or handles are warm, use your second way out. Never open doors that are warm to the touch.
- ❑ If smoke, heat or flames block your exit routes, stay in the room with doors closed. Place a wet towel under the door and call the fire department or 9-1-1. Open a window and wave a brightly colored cloth or flashlight to signal for help.
- ❑ Practice escaping from your home at least twice a year and at different times of the day. Practice waking up to smoke alarms, low crawling and meeting outside. Make sure everyone knows how to call 9-1-1.
- ❑ Teach household members to **STOP, DROP** and **ROLL** if their clothes should catch on fire.

American Red Cross

For more information on disaster and emergency preparedness, visit **RedCross.org**

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2008 Honda Civic EX
SUPER CLEAN, LOOKS AND RUNS EXCELLENT! AS ALWAYS... ASK LEN FOR DETAILS!
$8,895
LOW MILES!

2014 Jeep Compass Sport
AWD ONLY 93K MILES!
SUPER CLEAN, LOOKS AND RUNS EXCELLENT! AS ALWAYS...SEE LEN FOR DETAILS!
$9,995

2013 Ford Edge SEL
REDUCED!
SUPER CLEAN, LOADED AWD WITH ALL THE LUXURY FEATURES, LOOKS AND RUNS EXCELLENT! AS ALWAYS...SEE LEN FOR DETAILS!
$11,295

2006 Chevy Cobalt LS
LOW MILES!
SUPER CLEAN, GREAT LOOKING VEHICLE! AS ALWAYS...SEE LEN FOR DETAILS
$6,995

2013 Chevy Impala LTZ
PRETTY CAR!
SUPER CLEAN AND SHARP, LOW MILEAGE, LTZ EDITION, LOOKS AND RUNS EXCELLENT! AS ALWAYS...SEE LEN FOR DETAILS!
$9,495

2009 Ford Focus SES
SUPER SHARP!
LOADED W/LEATHER INT, POWER MOONROOF AND HEATED SEATS. LOOKS AND RUNS EXCELLENT! AS ALWAYS...SEE LEN FOR DETAILS!
$7,295

2009 Toyota Camry LE
RUNS GREAT!
SUPER CLEAN, LOOKS GREAT, NICE RIDING, DON'T MISS THIS ONE! AS ALWAYS...ASK LEN FOR DETAILS!
$9,495

2011 Mazda3i Touring
NICE CAR!
SUPER CLEAN, ONE OWNER, POWER MOONROOF AND MORE! AS ALWAYS...SEE LEN FOR DETAILS!
$7,795

2008 Chevy Malibu LT
ONLY 76K!
SUPER CLEAN, LOOKS AND RUNS EXCELLENT! AS ALWAYS...SEE LEN FOR DETAILS
$7,295

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 3 – ADJACENT PARCEL NOTIFICATION

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
Abutter List

Parcel ID	Owner Name	Mailing Address	City State Zip
030/ 0885/ 00700	107 Parker Place LLC	154 Townsend Ave	New Haven, CT 06512
060-0407-003	1332 Chapel Associates LLC	7805 18Th Ave	Brooklyn, NY 112214
028/ 0895/ 01600	139 Summit LLC	2341 Whitney Ave, 2nd Floor	Hamden, CT 06518
060-0509-001	17 Commerce Street LLC	17 Commerce St	East Haven, CT 06512
015/ 0876/ 01700	17 Townsend Avenue LLC	17 Townsend Av	New Haven, CT 06512
150-1610-012	18 Wheelbarrow Lane LLC	4 Beverly Dr	North Haven, CT 06473
033/ 0862/ 01000	182 South End LLC	30 Hazel Terrace	Woodbridge, CT 06525
150-1909-108	234E Aviation LLC	41 Flying Point Rd	Branford, CT 06405
050-0405-026	25 Canna Dr LLC	201 N Rolling Acres Rd	Cheshire, CT 06410
033/ 0861/ 01500	272 Marion St LLC	54 Skyview Rd	Orange, CT 06477
032/ 0873/ 00300	30 Townsend Inc	120 Bloomingdale Rd, Suite 400	White Plains, NY 10605
032/ 0873/ 02000	30 Townsend Inc	120 Bloomingdale Rd, Suite 400	White Plains, NY 10605
050-0406-003	305 South End Road LLC	305 South End Rd	East Haven, CT 06512
020/ 0917/ 00700	360 Burr Street LLC	360 Burr St	New Haven, CT 06512
032/ 0872/ 02000	491 Lighthouse Avenue LLC	450 Lighthouse Rd	New Haven, CT 06512
032/ 0872/ 02100	499 Lighthouse Associates LLC	499 Lighthouse Rd	New Haven, CT 06512
015/ 0874/ 01800	5 Townsend Avenue LLC	5 Townsend Av	New Haven, CT 06512
029/ 0893/ 00500	65 Burr Street LLC	15 Sandra Dr	Branford, CT 06405
016/ 1303/ 00100	Abbagnaro Est Joseph	265 Lighthouse Rd	New Haven, CT 06512
200-2507-015	Abreu Jorge	1C Charter Oak Ave	East Haven, CT 06512
200-2507-016	Abreu Jorge	1C Charter Oak	East Haven, CT 06512
015/ 0874/ 00100	Acampora Frank	9 Townsend Ave	New Haven, CT 06512
028/ 0897/ 01100	Acampora Nicholas P	63 Ley St	New Haven, CT 06512
021/ 0928/ 00200	Aceto Pasquale & Rita & Surv / Robert M Errato	102 Laura La	New Haven, CT 06512
028/ 0897/ 02000	Acri Ann	100 Burr St	New Haven, CT 06512
031/ 0879/ 00900	Adinolfi Family 2023 Trust / Plaziak Janice A Tr, Adinolfi Joseph & Salvatore M	1254 Dean St	New Haven, CT 06512
016/ 1303/ 00500	Adinolfi Salvatore & Bette Jan	1254 Dean St	New Haven, CT 06512
016/ 1303/ 00400	Adinolfi Salvatore M Jr & Foss-Adinolfi Laura Jean	1244 Dean St	New Haven, CT 06512
031/ 0879/ 01000	Adinolfi Salvatore M Jr & Foss-Adinolfi Laura Jean	1244 Dean St	New Haven, CT 06512
014/ 0863/ 03100	Adorno Rafaella Panay	577 Whalley Ave	New Haven, CT 06511
033/ 0862/ 03000	Affinito Steven P & Kathy L & Constantine	337 Marion St	New Haven, CT 06512
024/ 0920/ 01200	Agnellino Giuseppe A, Celia D, Joseph E, Anastasio Ann Marie,	110 Townsend Ter	New Haven, CT 06512
150-1710-007	Agosto Domingo Delgado & Cruz	103 Edgar St	East Haven, CT 06512
032/ 0872/ 00200	Aiardo Anthony P	9 Depot St	Milford, CT 06460
032/ 0872/ 00201	Aiardo Anthony P	9 Depot St	Milford, CT 06460
032/ 0872/ 01800	Aiardo Anthony P	9 Depot St	Milford, CT 06460
150-1611-008	Aiksnoras Kimberly A	29 Burgess St	East Haven, CT 06512
021/ 0920/ 02906	Albanese Rose Marie & Rosa Jose A	420 Burr St	New Haven, CT 06512
150-1611-026	Albano Paul & Rose & Surv	16 Burgess St	East Haven, CT 06512
050-0505-012	Albe Donna M	38 Canna Dr	East Haven, CT 06512
027/ 0913/ 02000	Albino Michele M	520 Fort Hale Rd	New Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
Abutter List

Parcel ID	Owner Name	Mailing Address	City State Zip
026/ 0903/ 01600	Alem Joseph A & Mitchell Micheala L	88 Hyde St	New Haven, CT 06512
027/ 0913/ 01300	Alvarez Myreya	266 Burr St	New Haven, CT 06512
150-1610-017	Amaro Vitor R	34 Hall St	New Haven, CT 06512
060-0507-004	Amato Donna M	32 Roses Farm Rd	East Haven, CT 06512
031/ 0879/ 00400	Amodio Gloria Tr / Gloria Amodio Revocable Trust	1320 Dean St	New Haven, CT 06512
034/ 0851/ 00100	Anastasio Anita M	10 Lighthouse Point Ter	New Haven, CT 06512
034/ 0849/ 01100	Anastasio Donald & Diane	6 Lighthouse Point Ter	New Haven, CT 06512
034/ 0852/ 00701	Anastasio Vincent Jr & Anastasio Laurie Lopez	21 Lighthouse Point Ter	New Haven, CT 06512
028/ 0898/ 02900	Anaya Diana M	100 Ley St	New Haven, CT 06512
180-2210-005	Andreozzi Nicholas	7 Emma Rd	East Haven, CT 06512
029/ 0889/ 00300	Andrews Melinda	19 Alfred St	New Haven, CT 06512
150-1810-001	Angelino Guiseppe & Emma & Surv	77 Thompson Ave	East Haven, CT 06512
029/ 0889/ 01500	Annan Vernonica N	16 Nelson St	New Haven, CT 06511
020/ 0917/ 02700	Ansley Camille	150 Townsend Ter	New Haven, CT 06512
034/ 0852/ 01202	Aponte Avimael & Emily	44 South End Rd	New Haven, CT 06512
034/ 0852/ 01201	Aponte Avimael & Emily	44 South End Rd	New Haven, CT 06512
150-1611-004	Appi Lorraine	41 Burgess St	East Haven, CT 06512
033/ 0862/ 01700	Arcos Antonio L	116 Morris St	New Haven, CT 06519
031/ 0883/ 00700	Aretis Tamara	14 Eden St	New Haven, CT 06512
180-2109-009	Argento Agnes J & John J & Anna P & Sv	3 Robert Dr	East Haven, CT 06512
180-2109-008	Argento John L	11 Robert Dr	East Haven, CT 06512
027/ 0917/ 00800	Arminio John P	174 Hall St	New Haven, CT 06512
032/ 0878/ 00600	Arotsky Marvin A	50 Concord St	New Haven, CT 06512
150-1611-018	Arsenault Frances	45 Edgar St	East Haven, CT 06512
180-2309-012	Asaolu Temitope Olubunmi & Ayodele	94 Robert Dr	East Haven, CT 06512
150-1909-111	Astmann Roger	11 Mansfield Rd	North Haven, CT 06473
150-1810-005	Avila Israel & Tara & Sv	86 Victor St	East Haven, CT 06512
027/ 0908/ 01300	Azevedo Ann & Manuel (L/U) & Mattei Judith Ann	54 Stewart St	New Haven, CT 06512
033/ 0862/ 02700	Baez Ramon	323 Marion St	New Haven, CT 06511
032/ 0872/ 01700	Bailey Kessler & Mary A & Surv	475 Lighthouse Road	New Haven, CT 06512
014/ 0863/ 03300	Baker Thomas J & Pakula Elizabeth J	1 Townsend Av	New Haven, CT 06512
180-2010-003	Baldie Sanjay H	259 Kenneth St	East Haven, CT 06512
033/ 0862/ 01200	Baliki Gilbert	158 South End Rd	New Haven, CT 06512
030/ 0888/ 01100	Banick William James / Derosia-Banick Kristin Lorelei	94 Parker Pl	New Haven, CT 06511
150-1811-023	Barbetto Nicholas J Iii & Savo Toni A &	55 Osmond St	East Haven, CT 06512
060-0408-007	Barbieri Donna	709 Silver Sands Rd	East Haven, CT 06512
150-1910-005	Barbieri Paula	67 Juniper Dr	North Haven, CT 06473
028/ 0895/ 00300	Barile Amy	97 Burr St	New Haven, CT 06512
015/ 0876/ 01800	Baroncini Charlene	19 Townsend Av	New Haven, CT 06512
015/ 0876/ 01800	Baroncini Vincenza Est / C/O Barecchia Marie	53 Ridgewood Terr	North Haven, CT 06473
021/ 0920/ 02911	Barrett Barbara J	42 Laura La	New Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
Abutter List

Parcel ID	Owner Name	Mailing Address	City State Zip
021/ 0928/ 01500	Barrett Barbara J	42 Laura La	New Haven, CT 06512
180-2010-001	Barrett Michael	84 Landing Place	East Haven, CT 06512
014/ 0863/ 03400	Barry Padraig	1B Townsend Ave	New Haven, CT 06512
060-0507-006	Basil Thomas A & Lisa & Sv	35 Roses Farm Rd	East Haven, CT 06512
029/ 0891/ 01400	Bavaro Gabriella & Masselli Barbara	273 Concord St	New Haven, CT 06512
060-0407-007	Baxter Phillip & Whitney & Sv	12 Roses Farm Rd	East Haven, CT 06512
031/ 0879/ 03800	Bayer Jason	127 Concord St	New Haven, CT 06512
028/ 0898/ 01300	Beales Charlotte Anne	75 Girard Av	New Haven, CT 06512
029/ 0889/ 01300	Beckford Keith	26 Nelson St	New Haven, CT 06511
033/ 0862/ 01900	Beecher Regina L	279 Marion St	New Haven, CT 06512
033/ 0862/ 02000	Beecher Regina L	279 Marion St	New Haven, CT 06512
050-0405-009	Beedle Vincent	15 Stoddard Rd	East Haven, CT 06512
200-2409-002	Bellelo Carl F L/U & Carla F	54 Forest St Ext	East Haven, CT 06512
029/ 0894/ 00100	Bellelo Kenneth R & Joanne	5 Elmer St	New Haven, CT 06512
150-1610-014	Benevento Matthew J & Debra L & Surv	67 Burgess St	East Haven, CT 06512
028/ 0897/ 02100	Bennett Dwight D	375 Concord St	New Haven, CT 06512
034/ 0852/ 00101	Bergeron Henry J Jr & Karen C	71 Meadow View Rd	New Haven, CT 06512
180-2208-004	Bermeo Pablo Leon & Grau Katia & Sv	60 Forest St Ext	East Haven, CT 06512
150-1710-001	Bermudez Waleska	33 Thompson Ave	East Haven, CT 06512
029/ 0891/ 01600	Bertsos Grigorios L & Nikolia G	281 Concord St	New Haven, CT 06512
150-1910-002	Beth Hamedrosh Hagodol Bnai Israel The	74 West Prospect St	New Haven, CT 06515
028/ 0898/ 03201	Bianco Gina M	74 Ley St	New Haven, CT 06512
050-0505-013	Bility Omar Ali	35 South End Rd	East Haven, CT 06512
031/ 0880/ 00300	Blomberg David J & Kyle L	78 Concord St	New Haven, CT 06512
060-0507-005	Boahemaa Nana A	36 Roses Farm Rd	East Haven, CT 06512
060-0507-001	Bonanno Leonard M & Jean A & Sv	20 Roses Farm Rd	East Haven, CT 06512
030/ 0888/ 00700	Bonilla Miguel A	47 Nelson St	New Haven, CT 06512
030/ 0888/ 00600	Bonilla Richard Ii	41 Nelson St	New Haven, CT 06512
014/ 0853/ 00600	Boumargoud Fatima Z & Robles Rolando	157 S End Rd	New Haven, CT 06512
033/ 0862/ 01800	Bowden Timothy J	265 Marion St	New Haven, CT 06512
027/ 0909/ 00200	Boyle Anna	41 Stewart St	New Haven, CT 06512
050-0406-009	Bradley Deborah E	84 South End Rd	East Haven, CT 06512
015/ 0876/ 01400	Bradley Jennifer L & Bradley Shane	11 Townsend Av	New Haven, CT 06512
029/ 0894/ 00900	Bradley Lee Angelo	118 Myron St	New Haven, CT 06512
032/ 0878/ 00200	Brady Amy & Scherstuhl Alan	70 Concord St	New Haven, CT 06512
029/ 0889/ 00900	Brasile Lisa	105 Summit St	North Branford, CT 06471
034/ 0852/ 02100	Brenes Jordan	7 Lighthouse Point Ter	New Haven, CT 06512
150-1910-008	Brereton Daniel J & Maria H & Sv	23 Duncan St	East Haven, CT 06512
150-1811-022	Bronson Charles Thomas & Elaine Simoes	122 Thompson Ave	East Haven, CT 06512
028/ 0898/ 03000	Bruno Diane R & Michael	94 Ley St	New Haven, CT 06512
028/ 0897/ 02200	Bruno Teresa (Lu)	383 Concord St	New Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
Abutter List

Parcel ID	Owner Name	Mailing Address	City State Zip
022/ 0928/ 00203	Brunson Jeffrey C & Brunson Cassandra	155 Huntington Rd	New Haven, CT 06511
150-1909-112	Bucci Joseph T & Grant Melodye & Sv	158 Warner St	Hamden, CT 06514
031/ 0880/ 00200	Burack Cheryl	80 Concord St	New Haven, CT 06512
150-1611-013	Burroughs Michael & Gina L & Surv	2 Edgar St	East Haven, CT 06512
150-1909-007	Burwell Lisa	10 Washington Ave	East Haven, CT 06512
200-2508-003	Burwell Nicole A	140 Burr St	East Haven, CT 06512
020/ 0917/ 00201	Burwood Hill Unitowners Assoc Inc	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00202	Burwood Hill Unitowners Assoc Inc	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00203	Burwood Hill Unitowners Assoc Inc	23 Mulligan Dr	Wallingford, CT 06492
028/ 0898/ 01800	Bussey Tavares	105 Girard Av	New Haven, CT 06512
030/ 0888/ 01000	Cable Allen & Gail	100 Parker Pl	New Haven, CT 06512
180-2108-009	Cabrera Cabrera Luis	277 Dodge Ave	East Haven, CT 06512
031/ 0879/ 01400	Cabrera Carmen E & Gina L	44 Morris Cswy	New Haven, CT 06512
150-1611-024	Cacioppo Michael	14 Edgar St	East Haven, CT 06512
015/ 0876/ 00400	Cakir Emirhan R	31 Morris Causeway	New Haven, CT 06512
150-1910-014	Calamita Beverly Trustee	242 Kenneth St	East Haven, CT 06512
180-2308-007	Calle Sandra M	102 Forest St Ext	East Haven, CT 06512
033/ 0862/ 03100	Callender Gillian & Akeem L	341 Marion St	New Haven, CT 06512
180-2309-016	Calonico Jennifer & Leo M & Surv	116 Forest St Ext	East Haven, CT 06512
050-0505-003	Calonico Leo Jr	21 Stoddard Rd	East Haven, CT 06512
032/ 0878/ 00500	Camaplan Administrator FBO / Lark Hesbacher-Tyler Ira	122 E Butler Ave Ste 100	Ambler, PA 19002
180-2009-003	Campoverde Alex Atiencia	14 Mckinley Ave	East Haven, CT 06512
050-0406-002	Camputaro Pasquale & Louise & Surv	85 South End Rd	East Haven, CT 06512
034/ 0852/ 01800	Canali Barbara J Barbara J Canali 1/2	19 Lighthouse Point Ter	New Haven, CT 06512
050-0406-006	Canavan Paul S & Doreen J & Surv	64 South End Rd	East Haven, CT 06512
027/ 0913/ 00900	Candela Rocco A & Jeanne Ann	159 Hall St	New Haven, CT 06512
027/ 0904/ 00900	Candido John	60 Killdeer Rd	Hamden, CT 06517
034/ 0852/ 00700	Cangiano Family LLC	90 South End Rd	New Haven, CT 06512
034/ 0852/ 00900	Cangiano Family LLC	90 South End Rd	New Haven, CT 06512
031/ 0879/ 02200	Caraballo Alice	43 Concord St	New Haven, CT 06512
033/ 0862/ 01300	Carangelo Paul & Rodriguez Lucretia	144 South End Rd	New Haven, CT 06512
027/ 0913/ 01900	Carbone Curt M	530 Fort Hale Rd	New Haven, CT 06512
029/ 0891/ 00100	Carbone Diane A (Ttee) / Wilbert & Raffaela Messley Trust	91 Myron St	New Haven, CT 06512
150-1810-010	Carfora Christine	89 Victor St	East Haven, CT 06512
031/ 0879/ 00101	Caro Erica & Samuel	25 Alden St	New Haven, CT 06512
028/ 0895/ 00800	Carr Mary Lou	1832 Dean St	New Haven, CT 06512
031/ 0883/ 00500	Carrano Grace A L/U & Kendall Diane M & Carrano George P Jr & Philip J	26 Eden St	New Haven, CT 06512
200-2407-016	Carreiro John Soares & Soares M Merces	158 Burr St	East Haven, CT 06512
020/ 0917/ 00500	Carreno Ronny & Velez Genny V	374 Burr St	New Haven, CT 06512
020/ 0917/ 02800	Carrillo Manuel Ramos	158 Townsend Ter	New Haven, CT 06512
031/ 0879/ 02400	Carter Stephan Karzair	55 Concord St	New Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
Abutter List

Parcel ID	Owner Name	Mailing Address	City State Zip
029/ 0889/ 00100	Casey Rebecca	257 Concord St	New Haven, CT 06512
020/ 0917/ 02600	Castelan-Jimenez Cindy	144 Townsend Ter	New Haven, CT 06512
150-1711-024	Castellano Joseph	4 Maturo Dr	East Haven, CT 06512
031/ 0879/ 01700	Castellanos Osiris Manrique	7 Concord St	New Haven, CT 06513
031/ 0881/ 00200	Castro Rafael	112 Southfield Ave #419	Stamford, CT 06902
027/ 0909/ 00900	Cavaliere Emiddio & Ann	569 Fort Hale Rd	New Haven, CT 06512
150-1910-015	Cawley Lorie Anne Suarez & Christopher	16 Gerald St	East Haven, CT 06512
180-2009-004	Celentano Robert	12 Washington Ave	East Haven, CT 06512
021/ 0928/ 00400	Celentano Vincent D	987 Hillsboro Mile	Hillsboro, FL 33062
021/ 0928/ 00500	Celentano Vincent D	987 Hillsboro Mile	Hillsboro Beach, FL 33062
150-1810-017	Cerrone Marcia	62 Osmond St	East Haven, CT 06512
150-1909-107	CFF of New Hampshire	637 Green Hill Rd	Madison, CT 06443
027/ 0904/ 00500	Chapin Thomas D Est / C/O Chapin Mark George Executor	1160 Green Holly Dr	Annapolis, MD 21409
031/ 0879/ 01500	Chavarria Marvin	38 Morris Cswy	New Haven, CT 06512
028/ 0898/ 01600	Chen Daniel H	95 Girard Av	New Haven, CT 06512
031/ 0882/ 00400	Cheng Miao & Dong Yan & Surv	14 Alden St	New Haven, CT 06512
150-1610-021	Chiaramonte Ralph S Iii & Mary & Sv	60 Edgar St	East Haven, CT 06512
150-1710-003	Chieppo Rosemary	96 Edgar St	East Haven, CT 06512
180-2309-014	Cianelli Madelyn Est & Lorello Alicia	182 Mclay Ave	East Haven, CT 06512
150-1612-003	Ciarleglio Michael	4 Waldo St	East Haven, CT 06512
200-2407-022	Ciarlelli Dolores	4 Laura Ln	East Haven, CT 06512
180-2308-014	Cifarelli Rosalie Johnson	12 Carmen St	East Haven, CT 06512
180-2309-019	Citizens Bank & Trust Company	111 Forest St Ext	East Haven, CT 06512
120-1409-001	City of New Haven	155 Burr St	New Haven, CT 06512
180-2208-006	City of New Haven	155 Burr St	New Haven, CT 06512
014/ 0853/ 00900	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 01000	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 01100	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 01200	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 01400	City of New Haven	165 Church St	New Haven, CT 06510
015/ 0875/ 00300	City of New Haven	165 Church St	New Haven, CT 06510
020/ 0917/ 00100	City of New Haven	165 Church St	New Haven, CT 06510
020/ 0917/ 01000	City of New Haven	165 Church St	New Haven, CT 06511
021/ 0919/ 00801	City of New Haven	165 Church St	New Haven, CT 06510
021/ 0920/ 02901	City of New Haven	165 Church St	New Haven, CT 06510
028/ 0895/ 02100	City of New Haven	165 Church St	New Haven, CT 06510
028/ 0898/ 02300	City of New Haven	165 Church St	New Haven, CT 06510
034/ 0851/ 00600	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 00700	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 01500	City of New Haven	165 Church St	New Haven, CT 06510
014/ 0863/ 02800	City of New Haven	165 Church St	New Haven, CT 06510

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
Abutter List

Parcel ID	Owner Name	Mailing Address	City State Zip
019/ 0900/ 00100	City of New Haven	165 Church St	New Haven, CT 06510
032/ 0872/ 00100	City of New Haven	165 Church St	New Haven, CT 06510
032/ 0873/ 00600	City of New Haven	165 Church St	New Haven, CT 06510
013/ 0853/ 00400	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
013/ 0853/ 00500	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 00800	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 02700	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 02800	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
014/ 0853/ 02900	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
015/ 0875/ 00100	City of New Haven Airport / City of New Haven	165 Church St	NEW HAVEN, CT 06510
015/ 0875/ 00200	City of New Haven Airport / City of New Haven	165 Church St	NEW HAVEN, CT 06510
019/ 0900/ 00200	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
020/ 0900/ 00100	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
020/ 0900/ 00200	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
028/ 0900/ 00100	City of New Haven Airport / City of New Haven	165 Church St	New Haven, CT 06510
032/ 0873/ 00700	City of New Haven Fire House 16 / City of New Haven	165 Church St	New Haven, CT 06510
027/ 0904/ 00800	City of New Haven Housing Authority / City of New Haven	P O Box 1912	New Haven, CT 06509
028/ 0895/ 00100	City of New Haven Housing Authority / City of New Haven	P O Box 1912	New Haven, CT 06509
032/ 0872/ 01000	City of New Haven Housing Authority / City of New Haven	P O Box 1917	New Haven, CT 06512
020/ 0917/ 00901	City of New Haven The	165 Church St	New Haven, CT 06510
032/ 0878/ 01700	City of New Haven The	165 Church St	New Haven, CT 06510
034/ 0851/ 00500	City of New Haven The	165 Church St	New Haven, CT 06510
014/ 0853/ 01300	City of New Haven	165 Church St	New Haven, CT 06510
027/ 0905/ 00100	Clark Vickiana	5 Stewart St	New Haven, CT 06512
150-1909-101	Cleary Paul	199 Totoket Rd	Branford, CT 06405
150-1711-012	Clince Michael T & Pamela Jo	49 Waldo St	East Haven, CT 06512
200-2408-007	Cloud Jessica V	35 Grove St	East Haven, CT 06513
015/ 0876/ 00500	CMS Realty 2 LLC	565 Ellsworth Ave	New Haven, CT 06511
028/ 0895/ 02000	Coaxum Latesha Shante	349 Concord St	New Haven, CT 06512
180-2307-007	Codner Myles	47 Holmes St	East Haven, CT 06512
050-0405-025	Cofrancesco Peter & Cofrancesco Jeffrey	31 Canna Dr	East Haven, CT 06512
030/ 0888/ 01800	Colavolpe Nicholas & Janet & Surv	223 Concord St	New Haven, CT 06512
029/ 0894/ 00500	Collaguazo Luis E	1800 Dean St	New Haven, CT 06512
050-0405-015	Collesano Carole B	3 Stoddard Rd	East Haven, CT 06512
150-1909-116	Collins James & Donna & Surv	47 First Ave	West Haven, CT 06516
027/ 0917/ 00900	Colombo Marie	180 Townsend Ter	New Haven, CT 06512
180-2308-006	Colon George H & Cesia & Sv	90 Forest Rd Ext	East Haven, CT 55344
033/ 0862/ 02800	Coman Daniel	329 Marion St	New Haven, CT 06512
028/ 0898/ 01900	Condon Laura A	115 Girard Ave	New Haven, CT 06511
150-1810-019	Conn Air Pilot Association	64 Thompson Ave	East Haven, CT 06512
032/ 0878/ 01500	Connecticut Real Estate Associates LLC	35 Townsend Av	New Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
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Parcel ID	Owner Name	Mailing Address	City State Zip
150-1711-002	Contreras Jefferson G Samaniego & Garcia	51 Edgar St	East Haven, CT 06512
180-2309-013	Conyers Shirley	88 Robert Dr	East Haven, CT 06512
060-0508-002	Coppola Renee	40 Roses Farm Rd	East Haven, CT 06512
030/ 0888/ 00800	Cordova Diana & Cordova Joseph	1610 Dean St	New Haven, CT 06512
032/ 0873/ 00500	Co-Rich LLC	67A Charter Oak Ave	East Haven, CT 06512
180-2209-003	Corris Gregory C & Ann M & Surv	24 Robert Dr	East Haven, CT 06512
200-2408-003	Corso Barbara Gaye	2 Carmen St	East Haven, CT 06512
050-0406-005	Coughlin Daniel	45 Canna Dr	East Haven, CT 06512
031/ 0883/ 01300	Coughlin Diane	17 Arden St	New Haven, CT 06512
200-2409-004	Coughlin James Neal Jr & Tescione	36 Forest St	East Haven, CT 06512
050-0505-006	Coyle Thomas J & Emily G & Surv	27 Stoddard Rd	East Haven, CT 06512
150-1909-105	Cozzolino Richard	270 Lane St	Hamden, CT 06514
150-1810-009	Craig Cerella S	93 Victor St	East Haven, CT 06512
180-2308-005	Crespo Vanessa	84 Forest St Ext	East Haven, CT 06512
120-1511-006	Cretella Dominic J & Michele L & Sv	10 Burgess St	East Haven, CT 06512
020/ 0917/ 01301	Cretella Maryann, Davia M & Dominic J	320 Burr St	New Haven, CT 06512
031/ 0882/ 00100	Crisco Mary Est / C/O Laracca Karen	91 Stemway Rd	New Haven, CT 06611
200-2508-004	Criscuolo Ann Marie	136 Burr St	East Haven, CT 06512
031/ 0881/ 00800	Criscuolo Daniel P & Louis J	36 Shoreham Rd	New Haven, CT 06512
150-1710-013	Criscuolo Joann C	83 Edgar St	East Haven, CT 06512
028/ 0896/ 00600	Criscuolo Susan	388 Concord St	New Haven, CT 06512
026/ 0903/ 01800	Criscuolo Zachary J	74 Hyde St	New Haven, CT 06512
028/ 0897/ 01400	Cruz Diane & Antrum Herbert Lee Jr	81 Ley St	New Haven, CT 06512
060-0407-008	Cruz Jahida Kimberly	16 Roses Farm Rd	East Haven, CT 06512
029/ 0889/ 00500	Cruz Yethcika E	29 Alfred St	New Haven, CT 06511
020/ 0917/ 00300	Cruz-Puskas Cristina / Llantin Javier	392 Burr St	New Haven, CT 06512
150-1909-118	CT Aero LLC	46 Crestview Dr	Woodbridge, CT 06535
032/ 0873/ 01500	CT Clinical Services Inc	189 Orange St	New Haven, CT 06510
020/ 0917/ 02200	Cuneo Michael	118 Townsend Ter	New Haven, CT 06512
034/ 0851/ 00302	Curnane James	709 N Greenbrier Dr	Orange, CT 06477
020/ 0917/ 01300	Cusack John J Jr & Rosemarie	330 Burr St	New Haven, CT 06512
030/ 0888/ 01400	Czarowski Kathryn A & Jerz John S	74 Parker Pl	New Haven, CT 06511
150-1612-001	Dabbraccio Michael F & Kathleen & S	62 Kenneth St	East Haven, CT 06512
060-0507-003	Dagostino Paula R	28 Roses Farm Rd	East Haven, CT 06512
200-2507-014	Dagostino Sherry	1D Charter Oak Ave	East Haven, TX 06512
180-2309-007	Dalbero Anthony A Jr	335 Upson Terrace	New Haven, CT 06512
032/ 0872/ 00900	Daniel Vincent & Donna	8 Townsend Av	New Haven, CT 06512
015/ 0876/ 01600	Daniels Robert N	15 Townsend Av	New Haven, CT 06512
033/ 0861/ 01000	Danna Richard & Karen	308 Marion St	New Haven, CT 06512
027/ 0917/ 00700	Dasilva Agostinho & Cynthia	180 Hall St	New Haven, CT 06512
150-1710-015	Davis Brian D & Renee M & Sv	60 Waldo St	East Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
180-2010-006	Davis Richard & Michelle & Surv	6 Mckinley Ave	East Haven, CT 06512
027/ 0913/ 01800	Davis Sean	9 Barnum Ave	Norwalk, CT 06851
150-1610-020	De Gante Juan Flores & Sosa Emma Rojas &	58 Edgar St	East Haven, CT 06512
032/ 0873/ 01700	De Jesus Arroyo Antonio	57 Morris Cove Rd	New Haven, CT 06512
016/ 1303/ 00900	Dean Holdings LLC	1366 Dean St	New Haven, CT 06512
031/ 0879/ 00200	Dean Holdings LLC	1366 Dean St	New Haven, CT 06512
150-1910-017	Debenedet Rheta	244 Kenneth St	East Haven, CT 06512
028/ 0898/ 01200	Debiase Richard M & Suraci Sara J	69 Girard Av	New Haven, CT 06512
030/ 0885/ 00300	Debille William F	123 Harral Av	Bridgeport, CT 06604-3003
050-0406-008	Dechane Richard A & Sylvia & Sv	78 South End Rd	East Haven, CT 06512
150-1611-021	Decrosta Steven & Dana & Sv	17 Edgar St	East Haven, CT 06512
050-0505-005	Defala Nicholas	25 Stoddard Rd	East Haven, CT 06512
021/ 0919/ 00200	Defelice Michael	427 Burr St	New Haven, CT 06512
200-2507-007	Defilippo Virginia C	10 Charter Oak Ave	East Haven, CT 06512
027/ 0909/ 01300	Delbasso Alphonse & Calcagni	220 Burr St	New Haven, CT 06512
028/ 0895/ 01100	Delecke Gerald D Jr	34 Elmer St	New Haven, CT 06512
021/ 0928/ 02000	Deleone Charlotte	10 Laura La	New Haven, CT 06511
060-0408-004	Delfavero Joseph & Ann Marie & Sv	689 Silver Sands Rd	East Haven, CT 06512
150-1810-004	Delfranco John T & Geane M & Sv	82 Victor St	East Haven, CT 06512
031/ 0879/ 02500	Delgado Marvin	61 Concord St	New Haven, CT 06512
180-2010-008	Delguidice Julius & Lynn & Felix & Rose	25 Church St	North Branford, CT 06471
180-2110-001	Delguidice Julius & Lynn & Felix & Rose	25 Church St	North Branford, CT 06471
180-2110-002	Delguidice Julius & Lynn & Felix & Rose	230 Dodge Ave	East Haven, CT 06512
027/ 0917/ 00500	Delieto Marotti Donna Ex	292 Burr St	New Haven, CT 06511
020/ 0917/ 01500	Delieto Victor F & Robin E	175 Townsend Ter	New Haven, CT 06512
021/ 0932/ 00600	Delillo Marianne & Moore Rosalie & Christopher	24 Carriage Hill Drive	Branford, CT 06405
015/ 0874/ 01300	Delmonaco Cristina	43 Tolli Terrace	New Haven, CT 06512
032/ 0878/ 01800	Delmonaco Marie - Life Use & Delmonaco Pasquale (Title)	450 Lighthouse Rd	New Haven, CT 06512
200-2407-014	Delucia Clement A & Linda	18 Bretton St	East Haven, CT 06512
020/ 0917/ 03200	Delvecchio Alfred / Del Vecchio Alfred	176 Townsend Ter	New Haven, CT 06512
031/ 0879/ 03500	Demaio Cory / Demaio Jeffrey	109 Concord St	New Haven, CT 06512
150-1710-014	Demartino James & Mary & Sv	79 Edgar St	East Haven, CT 06512
027/ 0909/ 00100	Dematteis Krystal M	35 Stewart St	New Haven, CT 06512
032/ 0878/ 01200	Dematteo Maureen	700 Townsend Av	New Haven, CT 06512
032/ 0878/ 01300	Dematteo Maureen	700 Townsend Av	New Haven, CT 06512
031/ 0880/ 00400	Demayo Ann	94 Concord St	New Haven, CT 06512
031/ 0881/ 00100	Demchak Anne L	51 Beecher Place	New Haven, CT 06512
027/ 0913/ 01000	Demichele Carmen Est	23 Christina Lane	Westbrook, CT 06448
031/ 0882/ 01100	Demilo Anthony M	15 Eden St	New Haven, CT 06512
028/ 0895/ 01800	Dempsey Joan G	337 Concord St	New Haven, CT 06512
028/ 0897/ 01200	Denny Kyle J & Donna L	71 Ley St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
150-1610-013	Depalma Richard & Gloria & Sv	82 Burgess St	East Haven, CT 06512
015/ 0874/ 00200	Depino Alex	17 Johnston St	New Haven, CT 06512
016/ 1303/ 00901	Depino Arlene M	29 Grieb Rd	Wallingford, CT 06492
033/ 0861/ 01300	Depino Dolores C	286 Marion St	New Haven, CT 06512
150-1910-007	Depukat Gina M	16 Duncan St	East Haven, CT 06512
150-1710-019	Derenzo Patricia E & Paul R & Sv	3 Francis St	East Haven, CT 06512
029/ 0894/ 00201	Derosa George T & Christine F	15 Elmer St	New Haven, CT 06512
200-2408-001	Desai Minesh	20 Carmen St	East Haven, CT 06512
015/ 0876/ 01500	Desert Investments Ii LLC	13 Townsend Av	New Haven, CT 06512
028/ 0898/ 03400	Desmond Melissa M	68 Ley St	New Haven, CT 06511
026/ 0903/ 01500	Desmond Michael L	87 Stuyvesant Av	New Haven, CT 06512
032/ 0872/ 01500	Diamantes Fred & Antigoni & Su	461 Lighthouse Road	New Haven, CT 06512
028/ 0898/ 02200	Diamonte, Evelyn & Salvatore & Surv.	133 Girard Av	New Haven, CT 06512
032/ 0873/ 01100	Diaz Kelly Ann	490 Lighthouse Rd	New Haven, CT 06512
020/ 0917/ 01800	Diaz Tania N, Diaz Carmen,Diaz Louis	135 Townsend Ter	New Haven, CT 06512
030/ 0885/ 01600	Didychuk Allison Louise & Hays Samuel M	193 Concord St	New Haven, CT 06512
031/ 0879/ 02100	Dielsi Ann M	37 Concord St	New Haven, CT 06512
180-2208-001	Digiusto Felix Jr	28 Kenny Ct	East Haven, CT 06512
180-2308-010	Dimatteo Antoinette	3 Carmen St	East Haven, CT 06512
180-2308-011	Dimatteo Carmen & Maria & Sv	9 Carmen St	East Haven, CT 06512
180-2308-019	Dimatteo Carmine & Maria & Surv	9 Carmen St	East Haven, CT 06512
150-1611-025	Diotaiuto Andrew M & Joanne & Surv	6 Edgar St	East Haven, CT 06512
180-2309-005	Dipetto Rosemary	21 Marie Dr	East Haven, CT 06512
032/ 1254/ 00100	Dippold Roland T	1 Douglass Av	New Haven, CT 06512
034/ 0852/ 00100	Dismuke Ryan William	75 Meadow View St	New Haven, CT 06512
180-2307-008	Doering Dawn A & Garrett B & Surv	57 Holmes St	East Haven, CT 06512
028/ 0895/ 01300	Dolores Greenspun Irrevocable Trust	24 Elmer St	New Haven, CT 06512
029/ 0889/ 01601	Draughn Shannon	245 Concord St	New Haven, CT 06512
200-2507-011	Duchimaza Justo & Gomez Jeanette & Sv	11 Charter Oak Ave	East Haven, CT 06512
032/ 0873/ 01400	Duenkel Sandra Lee	43 Morris Cove	New Haven, CT 06512
021/ 0928/ 01100	Dunn Mary S	62 Laura La	New Haven, CT 06512
032/ 0873/ 01200	Durso Anthony	482 Lighthouse Rd	New Haven, CT 06512
032/ 0878/ 01600	Durso Anthony	38 Townsend Av	New Haven, CT 06512
032/ 0873/ 01800	Durso Richard & Anthony	38 Townsend Ave	New Haven, CT 06512
032/ 0873/ 02200	Durso Richard A & Alesandra	38 Townsend Av	New Haven, CT 06512
032/ 0873/ 00100	Durso Richard A & Anthony	38 Townsend Av	New Haven, CT 06512
032/ 0873/ 00200	D'Urso Richard Anthony & Anthony Robert	38 Townsend Av	New Haven, CT 06512
050-0405-023	Duszynski Andrej & Joanna & Sv	30 Canna Dr	East Haven, CT 06512
024/ 0920/ 02701	East Shore Partners LLC	434 Forbes Ave	New Haven, CT 06512
024/ 0920/ 02900	East Shore Partners LLC	434 Forbes Ave	New Haven, CT 06512
028/ 0897/ 00800	Ebba Jamila A	45 Ley St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
029/ 0889/ 01400	Edenburn-Macqueen Emily E	20 Nelson St	New Haven, CT 06512
016/ 1303/ 00600	Eichorn Joan V & David W Sr	1274 Dean St	New Haven, CT 06512
031/ 0879/ 00800	Eichorn Joan V & David W Sr	1274 Dean St	New Haven, CT 06512
029/ 0889/ 00200	Elbastawisy Sameh H	554 Boston Post Rd Unit 301	Orange, CT 06477
150-1710-021	Ellis Tothlyn	63 Waldo St	East Haven, CT 06512
180-2307-012	Emond Peter & Connie & Surv	16 Bretton St	East Haven, CT 06512
150-1710-024	England George A & Tammy L & Surv	75 Burgess St	East Haven, CT 06512
120-1511-005	Espinoza Edwin	4 Burgess St	East Haven, CT 06512
150-1611-002	Esposito Anthony & Catherine M & Sv	26 Burgess St	East Haven, CT 06512
150-1911-002	Esposito Francis	188 Kenneth St	East Haven, CT 06512
180-2108-007	Esposito Maria	127 Prospect Rd	East Haven, CT 06512
150-1711-015	Esposito Nicholas Jr & Jennifer &	50 Victor St	East Haven, CT 06512
029/ 0891/ 01500	Eynon Elizabeth E	275 Concord St	New Haven, CT 06512
150-1708-001	FAA	10 Thompson Ave	East Haven, CT 06512
028/ 0898/ 01500	Fabish Kacian & Disturco Stephen Iii	89 Girard Av	New Haven, CT 06512
020/ 0917/ 02000	Fajardo Thomas	223 Hyde St	New Haven, CT 06512
020/ 0917/ 02300	Fajardo-Samaniego Milton Gerardo / Zhiminaicela-Loj Blanca I	126 Townsend Ter	New Haven, CT 06512
180-2308-003	Falcigno Robert W	29 William St	East Haven, CT 06512
060-0407-001	Fan-Chiang Wan-Li	722 Silver Sands Rd	East Haven, CT 06512
020/ 0917/ 00400	Farace Josephine C	384 Burr St	New Haven, CT 06512
028/ 0898/ 03100	Farez Marco Fabian Sanchez	90 Ley St	New Haven, CT 06512
027/ 0905/ 00400	Fazzino Michelle	143 Stuyvesant Av	New Haven, CT 06512
031/ 0879/ 02800	Feder Thomas S & Carol Sue	77 Concord St	New Haven, CT 06512
150-1811-004	Felix Laura	47 Victor St	East Haven, CT 06512
032/ 1254/ 00200	Ferraiolo Frank & Adeline & Survivor	2 Townsend Ave	New Haven, CT 06512
021/ 0932/ 00700	Ferrara Anthony G & Carole Ann	35 Laura La	New Haven, CT 06512
150-1710-022	Ferrara Salvatore M & Paula & Surv	57 Waldo St	East Haven, CT 06512
027/ 0909/ 01000	Ferraro Christine & Vincent A	585 Fort Hale Rd	New Haven, CT 06512
150-1611-016	Ferraro Elizabeth	46 Edgar St	East Haven, CT 06512
180-2209-010	Ferretti Albert F & Carlona Charlene	31 Robert Dr	East Haven, CT 06512
027/ 0904/ 00400	Ferrucci Julie / Marcucci Alec	85 Hyde St	New Haven, CT 06512
029/ 0889/ 01200	Fertig Stephen C	30 Nelson St	New Haven, CT 06512
020/ 0917/ 01400	Fico Pasquale A & Carmel A	310 Burr St	New Haven, CT 06512
150-1810-011	Figueroa Henry & Martinez Elizabeth & Sv	85 Victor St	East Haven, CT 06512
034/ 0852/ 00300	Figueroa Ramon & Santiago Isidra	120 South End Rd	New Haven, CT 06511
015/ 0876/ 00300	Filardi Barbara Tr / Barbara Filardi Revocable Living Trust	25 Morris Cswy	New Haven, CT 06512
029/ 0889/ 00700	Filipelli Egisto A Est / C/O Goldberg Daniel	545 Roselawn Ave W	Roseville, MN 55113
029/ 0889/ 00800	Filipelli Egisto A Est / C/O Goldberg Daniel	545 Roselawn Ave W	Roseville, MN 55113
034/ 0852/ 00200	Fiorillo Nina	79 Meadow View St	New Haven, CT 06512
028/ 0896/ 00700	Fisk Richard E & Maria D	66 Burr St	New Haven, CT 06512
031/ 0879/ 02700	Fitzgerald Edward M	71 Concord St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
020/ 0917/ 00900	Fitzgerald Edward P & Laura	348 Burr St	New Haven, CT 06512
033/ 0862/ 03300	Flanagan Richard & Flanagan Francine	Po Box 120463	East Haven, CT 06512
028/ 0898/ 02000	Florenzano Patricia A	119 Girard Ave	New Haven, CT 06512
200-2508-002	Flores Julio & Ortiz Mayra & Sv	146 Burr St	East Haven, CT 06512
028/ 0896/ 00801	Flores Melba & Flores Sandy	60 Burr St	New Haven, CT 06512
032/ 0872/ 01200	Floyd Joanne	8 Douglass Av	New Haven, CT 06512
028/ 0895/ 01700	Flynn Edward & Renee S	331 Concord St	New Haven, CT 06512
031/ 0879/ 03600	Folkes Oakleigh	111 Concord St	New Haven, CT 06512
180-2209-002	Follo Salvatore & Pamela & Surv	14 Kenny Ct	East Haven, CT 06512
032/ 0878/ 01400	Formanski Realty Holdings LLC	106 Edgewood Dr	North Branford, CT 06471
150-1611-015	Forsythe Hannah A	16 Edgar St	East Haven, CT 06512
014/ 0863/ 03000	Foster Mark J & Lori W	24 Uriah St	New Haven, CT 06512
180-2309-002	Fox Alden & Dejesus Natalie & Sv	62 Robert Dr	East Haven, CT 06512
150-1710-020	Fraenza John Iii & Rose	73 Thompson Ave	East Haven, CT 06512
027/ 0917/ 00600	Franco Avelino Jr	286 Burr St	New Haven, CT 06512
031/ 0883/ 01500	Franco Patricia Admn	33 Arden St	New Haven, CT 06511
031/ 0879/ 04000	Frank Esposito And Jo Ann B / Esposito Irrevocable Trust	17 Alden St	New Haven, CT 06512
150-1610-009	Freedman Real Estate Holdings LLC	142 Summer Ln	North Haven, CT 06473
150-1810-007	Fritsch Walter S Jr & Raffaella M	96 Victor St	East Haven, CT 06512
031/ 0883/ 01200	FSG LLC	415 Lido Blvd	Lido Beach, NY 11561
180-2108-001	Fucci Patrick J	300 Dodge Ave	East Haven, CT 06512
014/ 0863/ 00200	Funaro Edward J & Paula M & Su	11 Douglass Ave	New Haven, CT 06512
050-0405-012	Funaro Frank M Jr & Diane & Surv	9 Stoddard Rd	East Haven, CT 06512
027/ 0909/ 01500	Funaro Mark A & Lisa M	150 Stuyvesant Av	New Haven, CT 06512
200-2407-011	Furgalack Anne C	25 Bretton St	East Haven, CT 06513
180-2307-001	Fusco Annette T	25 Holmes St	New Haven, CT 06512
020/ 0918/ 00300	Fusco Annette T Ttee / Fusco Family Trust	25 Holmes St	New Haven, CT 06512
180-2308-016	Fusco Peter	55 Parker Pl	New Haven, CT 06512
033/ 0862/ 02300	Fusco Thomas G E & Elizabeth	309 Marion St	New Haven, CT 06512
028/ 0897/ 02001	Gabriel Donna	365 Concord St	New Haven, CT 06511
150-1811-003	Gagliardi Anthony & Maria & Surv	51 Victor St	East Haven, CT 06512
028/ 0895/ 00700	Gagliardi Vincent M & Susan L	1836 Dean St	New Haven, CT 06512
150-1610-010	Gagner Kevin	60 Burgess St	East Haven, CT 06512
027/ 0904/ 00600	Gallicchio Joseph A	97 Hyde St	New Haven, CT 06512
033/ 0862/ 01400	Gallo David L	180 Meadow View St	New Haven, CT 06511
050-0405-021	Gambardella Elizabeth Angela & Elizabeth	22 Canna Dr	East Haven, CT 06512
150-1910-010	Garayua Lilliam L/U & Silva Elizabeth	216 Kenneth St	East Haven, CT 06512
034/ 0852/ 00400	Garcia Rosa E Perez	110 South End Rd	New Haven, CT 06512
150-1909-006	Gargone William Anthony Iii	64 Church Ln	Madison, CT 06443
150-1909-003	Garitta Jean	122 Victor St	East Haven, CT 06512
029/ 0894/ 01200	Gates Roy T & Uzzo Concetta & Surv	100 Myron St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
027/ 0905/ 00600	Gaudino Rita & Jason T	204 Burr St	New Haven, CT 06512
027/ 0908/ 01500	Gayle Kristen Shari	44 Stewart St	New Haven, CT 06511
150-1711-017	Gearity James E	34 Victor St	East Haven, CT 06512
150-1810-002	Gentile Joseph A	70 Victor St	East Haven, CT 06512
050-0406-007	Gentile Stephanie	72 South End Rd	East Haven, CT 06512
027/ 0913/ 01200	Germe Anthony R & Angela A	274 Burr St	New Haven, CT 06512
150-1910-003	Giammattei Valerie & Gerald R	15 Duncan St	East Haven, CT 06512
180-2209-015	Giglio Simone J & Marilyn A & Surv	41 Robert Dr	East Haven, CT 06512
027/ 0905/ 00300	Ginnetti Antonia M	137 Stuyvesant Av	New Haven, CT 06512
020/ 0917/ 00205	Glen Meadow Realty LLC	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00206	Glen Meadow Realty LLC	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00207	Glen Meadow Realty LLC	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00208	Glen Meadow Realty LLC	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00209	Glen Meadow Realty LLC	23 Mulligan Dr	Wallingford, CT 06492
020/ 0917/ 00204	Glen Meadow Realty LLC / C/O Herman Dostie	23 Mulligan Dr	Wallingford, CT 06492
030/ 0888/ 00900	Glidden Paniel W.	110 Parker Pl	New Haven, CT 06512
150-1909-102	GMG Associates	85 Soundview Ave	Madison, CT 06443
031/ 0879/ 02000	Godfrey Scott D & Christyn Gregan	31 Concord St	New Haven, CT 06512
200-2507-009	Goering Robert T & Santana Goering	18 Haines St	East Haven, CT 06512
027/ 0917/ 00400	Gomes Angeliana Bento & Hedivelber Teixeira	296 Burr St	New Haven, CT 06512
180-2010-011	Gomez Romulo Ezequiel Rivera	1 Mckinley Ave	East Haven, CT 06512
200-2507-004	Gonzalez Carmen	108 Laura Ln	East Haven, CT 06512
021/ 0928/ 00100	Gonzalez Carmen	108 Laura La	New Haven, CT 06512
021/ 0932/ 01100	Goodwin Luci	11 Laura La	New Haven, CT 06511
021/ 0932/ 01200	Goodwin Walter (L/U) / Goodwin Walter Jr	5 Laura La	New Haven, CT 06512
200-2507-001	Goodwin Walter L/U & Walter Jr	5 Laura Ln	East Haven, CT 06512
200-2408-002	Goraieb Anthony & Elsie & Surv	44 Grove St	East Haven, CT 06512
027/ 0909/ 00800	Gosselin Wendy	555 Fort Hale Rd	New Haven, CT 06512
020/ 0917/ 00800	Grant Dennis D	354 Burr St	New Haven, CT 06512
015/ 0876/ 00600	Greater New Haven Water Pollution Control Authority	345 East Shore Pkwy	New Haven, CT 06512
015/ 0876/ 00700	Greater New Haven Water Polution Control	345 East Shore Parkway	New Haven, CT 06510
032/ 0878/ 00800	Gregorio Mark Anthony	16 Montoya Circle	Branford, CT 06405
050-0406-012	Grenier Ari K	727 Silver Sands Rd	East Haven, CT 06512
028/ 0898/ 03200	Griffin Debra	78 Ley St	New Haven, CT 06512
028/ 0895/ 00900	Griffith Lyle	1820 Dean St	New Haven, CT 06511
032/ 0872/ 00300	Grimes John	20 Townsend Av	New Haven, CT 06512
032/ 0872/ 00600	Gronkiewicz Urzula / Estate of Anna Pelechata	63 Fernwood Rd	Hamden, CT 06517
200-2408-009	Grove Ranch LLC	355 Sackett Point Rd	North Haven, CT 06473
180-2209-001	Gu Yiran	22 Kenny Ct	East Haven, CT 06512
029/ 0891/ 01300	Guerinot Marianne	263 Concord St	New Haven, CT 06512
014/ 0853/ 00200	Guest Craig C	181 South End Rd	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
031/ 0882/ 00200	Guglielmo Diane	1414 Dean St	New Haven, CT 06512
180-2108-006	Guglietti Vincent E & Wendy & Surv	289 Dodge Ave	East Haven, CT 06512
180-2310-001	Guido Pasquale F & Donna M & Surv	15 Marie Dr	East Haven, CT 06512
050-0405-018	Guidone Wayne D & Catherine S & Surv	6 Canna Dr	East Haven, CT 06512
020/ 0917/ 01700	Guilfoil John M Jr & Rose A	147 Townsend Terrace	New Haven, CT 06512
180-2309-008	Gunneson Nancy	77 Robert Dr	East Haven, CT 06512
032/ 0872/ 00400	Gur New Haven II Investments LLC	399 Whalley Ave	New Haven, CT 06511
021/ 0920/ 02909	Gutierrez Pedro N & Castro Maria Isabel	408 Burr St	New Haven, CT 06512
050-0505-001	Gutierrez Stacy E	17 Stoddard Rd	East Haven, CT 06512
027/ 0913/ 01400	Happy Days Holdings 6 LLC	240 Butler St	Hamden, CT 06517
030/ 0888/ 01200	Harlow Renee Michele	80 Parker Pl	New Haven, CT 06512
180-2209-008	Hartman Frederick & Imelda & Sv	11 Emma Rd	East Haven, CT 06512
033/ 0862/ 00100	Hartney Robert	435 Lighthouse Rd	New Haven, CT 06512
014/ 0853/ 00310	Hartoumbekis Alexandra & Hartoumbekis Haralambos	173 South End Rd	New Haven, CT 06512
021/ 0928/ 01000	Hartoumbekis Elias	68 Laura La	New Haven, CT 06512
200-2507-003	Hazel Earon	114 Laura Ln	East Haven, CT 06512
029/ 0891/ 00401	Hellyar Kevin & April & Surv	105 Myron St	New Haven, CT 06512
150-1611-010	Hemingway Christopher	19 Burgess St	East Haven, CT 06512
180-2307-014	Henao Juan Camilo Clavijo	17 Bretton St	East Haven, CT 06512
050-0405-019	Heras Heras Jhon	12 Canna Dr	East Haven, CT 06512
021/ 0928/ 01700	Hermanson Catherine, Carusone John J & Capuzzo Mary E	32 Laura La	New Haven, CT 06512
027/ 0909/ 00700	Hernandez Aneidy	535 Fort Hale Rd	New Haven, CT 06512
027/ 0913/ 02100	Hernandez Clariza	510 Fort Hale Rd	New Haven, CT 06512
032/ 0872/ 01601	Hernandez Hipolito & Knight Robin	471 Lighthouse Rd	New Haven, CT 06512
150-1910-018	Herrera Victor	255 Kenneth St	East Haven, CT 06512
034/ 0852/ 01000	Herrick Alice M	58 South End Rd	New Haven, CT 06512
034/ 0852/ 01100	Herrick Alice M	58 South End Rd	New Haven, CT 06512
034/ 0852/ 01500	Herrick Alice M	58 South End Rd	New Haven, CT 06512
034/ 0852/ 01600	Herrick Alice M	58 South End Rd	New Haven, CT 06512
034/ 0852/ 01700	Herrick Alice M	58 South End Rd	New Haven, CT 06512
180-2109-006	Hevrin Timothy P	16 Robert Dr	East Haven, CT 06512
027/ 0905/ 00900	Hibbard Richard M & Nusdeu Frank	132 Girard Av	New Haven, CT 06512
029/ 0894/ 01000	Higgins Linda C	112 Myron St	New Haven, CT 06512
031/ 0879/ 01200	Hill Maria	1224 Dean St	New Haven, CT 06512
015/ 0874/ 01400	Hines Donna	24 Douglass Av	New Haven, CT 06512
150-1711-016	Hodge Dienne Elizabeth	42 Victor St	East Haven, CT 06512
180-2209-012	Holmes Lawrence Raymond & June Elizabeth	7 Kenny Ct	East Haven, CT 06512
031/ 0882/ 00600	Holub Robert G & Merjave Corinne & Surv	135 Concord St	New Haven, CT 06512
200-2407-018	Hoo Austin & Sara & Sv	174 Burr St	East Haven, CT 06512
060-0407-006	Hood Carra Leah & Hanson Terranz	8 Roses Farm Rd	East Haven, CT 06512
180-2109-007	Horton Carol & Robert As Trustee For The	17 Robert Dr	East Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
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Parcel ID	Owner Name	Mailing Address	City State Zip
031/ 0880/ 00500	Houwari Anwar	90 Concord St	New Haven, CT 06512
031/ 0881/ 00700	Howard-Williams Shalona Alicia & Williams Jermaine	132 Concord St	New Haven, CT 06512
030/ 0885/ 00600	Hughes James P III	210 Reservoir Rd	Killingworth, CT 06419
200-2407-019	Huynh Cau & Chau & Sv	1 Charter Oak Ave	East Haven, CT 06512
028/ 0897/ 01700	Hyman Willard D III	110 Burr St	New Haven, CT 06512
150-1611-022	Iannaccone Jo-Ann & Longley Theresa R	10 Waldo St	East Haven, CT 06512
021/ 0928/ 01200	Idarola William A Iii & Rosemary	56 Laura La	New Haven, CT 06512
029/ 0891/ 01000	Inabinet Juakia C	28 Alfred St	New Haven, CT 06512
150-1910-001	Independent Vilner Lodge Assoc	10 Rock Hill Rd	Woodbridge, CT 06525
033/ 0862/ 00800	Ingraham Annitta Lee	194 South End Rd	New Haven, CT 06512
150-1910-019	Ingraham Robert 1/3 & Anthony 1/3 &	245 Kenneth St	East Haven, CT 06512
029/ 0891/ 01200	Izzo Joseph	16 Alfred St	New Haven, CT 06512
029/ 0894/ 00800	Jaekle Patrica M	124 Myron St	New Haven, CT 06512
021/ 0919/ 00900	Jarrin Jesus Ouidio	401 Burr St	New Haven, CT 06512
028/ 0897/ 01900	Jautz Sharon E & Jautz Ronald K	104 Burr St	New Haven, CT 06512
200-2407-002	Jimenez Maria Hortencia Jimenez	419 Burr St	New Haven, CT 06512
021/ 0919/ 00500	Jimenez Maria Hortencia Jimenez	419 Burr St	New Haven, CT 06512
033/ 0862/ 00700	Johnson Iris D	210 South End Rd	New Haven, CT 06512
030/ 0885/ 00100	Johnson James & Margolin Laura	201 Concord St	New Haven, CT 06512
027/ 0905/ 00800	Johnson Melinda	140 Girard Av	New Haven, CT 06511
150-1710-016	Johnson Robert J Jr	66 Waldo St	East Haven, CT 06512
180-2010-009	Jones Albert E & Betty A & Surv	9 Mckinley Ave	East Haven, CT 06512
150-1909-113	JTMRL LLC	41 Washington St	East Haven, CT 06512
033/ 0862/ 02400	Juliano Jay	747 Forest Rd	North Branford, CT 06472
033/ 0862/ 02500	Juliano Jay	315 Marion St	New Haven, CT 06512
028/ 0897/ 01300	Kalk Bruce H	77 Ley St	New Haven, CT 06512
027/ 0909/ 00500	Karavas Phyllis A	57 Stewart Street	New Haven, CT 06512
033/ 0862/ 01100	Karmelowicz Steve	132 Renees Way	Guilford, CT 06437
150-1609-008	Kay Thavy	90 Burgess St	East Haven, CT 06512
029/ 0894/ 01300	Kidd Leroy	96 Myron St	New Haven, CT 06512
014/ 0853/ 00400	Kilfeather Francis	165 South End Rd	New Haven, CT 06512
050-0406-011	Klein Lisa B Tr	735 Silver Sands Rd	East Haven, CT 06512
028/ 0897/ 01600	Kluth Deborah	95 Ley St	New Haven, CT 06512
029/ 0889/ 01100	Kluth Laura	40 Nelson St	New Haven, CT 06512
016/ 1303/ 00601	Klutsey Victor & Klutsey Belinda & Surv	1264 Dean St	New Haven, CT 06512
031/ 0879/ 00801	Klutsey Victor & Klutsey Belinda & Surv	1264 Dean St	New Haven, CT 06512
150-1611-003	Kohloff Jean	22 Burgess St	East Haven, CT 06512
014/ 0863/ 00100	Kozin Bohdan & Marilyn G & Surv	5 Douglass Ave	New Haven, CT 06512
150-1709-001	KR Robinson Associates LP	40 Thompson Ave	East Haven, CT 06512
150-1709-002	KR Robinson Associates LP	50 Thompson Ave	East Haven, CT 06512
150-1809-003	KR Robinson Associates LP	50 Thompson Ave	East Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
060-0407-005	Kraft John & Innocenti Joelle M & Sv	717 Silver Sands Rd	East Haven, CT 06512
029/ 0894/ 01600	Kryvoruchko Andrii & Velbytska Iryna & Surv	307 Concord St	New Haven, CT 06512
026/ 0903/ 01700	Lachat Arthur	82 Hyde St	New Haven, CT 06512
029/ 0889/ 01600	Laird Kathryn M	239 Concord St	New Haven, CT 06512
180-2307-011	Lall Parmanand G	409 Burr St	East Haven, CT 06512
021/ 0919/ 00800	Lall Parmanand G	409 Burr St	New Haven, CT 06512
150-1611-007	Lane Kenneth H	35 Burgess St	East Haven, CT 06512
150-1611-019	Lang Nicholas	18 Amsterdam Ave #3	Bridgeport, CT 06606
028/ 0895/ 01500	Langello Anthony L	44 Lookout Dr	Colchester, CT 06415
150-1611-009	Lapointe Michael E & Rebecca & Sv	25 Burgess St	East Haven, CT 06512
180-2209-014	Larch Jordan	519 Stonecreek Dr	Charleston, SC 29414
180-2307-009	Laudano Angelina L/U & John & Donato &	67 Holmes St	East Haven, CT 06512
150-1811-011	Laudano Celia F	34 Osmond St	East Haven, CT 06512
180-2209-016	Lauria Anthony J Iii & Kimberly E	47 Robert Dr	East Haven, CT 06512
027/ 0909/ 01200	Lauria Arlene	226 Burr St	New Haven, CT 06512
032/ 0878/ 00300	Lema Fernando Carrasco	66 Concord St	New Haven, CT 06511
180-2309-018	Lemos Debora G & Toral Juan P & Sv	108 Forest St Ext	East Haven, CT 06512
027/ 0913/ 01100	Leonetti Frank J & Dolores	175 Hall St	New Haven, CT 06512
029/ 0894/ 00600	LH Development Group LLC	401 Ryland St Suite 200-A	Reno, NV 89502
029/ 0894/ 00701	LH Development Group LLC	401 Ryland St Suite 200-A	Reno, NV 89502
060-0407-009	Liburd Nancy & Reuben & Sv	15 Roses Farm Rd	East Haven, CT 06512
200-2408-010	Lima Jose Vicente	161 Burr St	East Haven, CT 06512
031/ 0882/ 00700	Limone Dana T	141 Concord St	New Haven, CT 06513
031/ 0880/ 00600	Locke Joseph & Kelly	88 Concord St	New Haven, CT 06512
150-1811-013	Loiseau Daphne	26 Osmond St	East Haven, CT 06512
180-2011-001	Long Gardens LLC	281 Chapel St	New Haven, CT 06513
033/ 0861/ 01400	Longobardi Fortunata R	280 Marion St	New Haven, CT 06512
021/ 0928/ 00800	Longobardi Gerald	76 Laura La	New Haven, CT 06512
028/ 0898/ 01100	Lopez Cecelia & Angulo Jocelyn & Surv	63 Girard Av	New Haven, CT 06512
031/ 0879/ 02600	Lopez Luis Eduardo	67 Concord St	New Haven, CT 06512
150-1909-117	Lopez Maximo	811 North High St	East Haven, CT 06512
060-0407-014	Lopez Yolanda	47 Roses Farm Rd	East Haven, CT 06512
180-2307-013	Loung Tai Ngoc & Thiem Thi	9 Bretton St	East Haven, CT 06512
060-0408-009	Lucatino Aldo & Lauren & Sv	56 Roses Farm Rd	East Haven, CT 06512
180-2308-013	Lucatino Vincent & Judite & Sv	39 Holmes St	East Haven, CT 06512
180-2209-005	Lucci Sandra P	23 Robert Dr	East Haven, CT 06512
200-2407-004	Lucibello Joseph	437 Burr St	New Haven, CT 06512
021/ 0919/ 00100	Lucibello Joseph	437 Burr St	New Haven, CT 06512
027/ 0904/ 00200	Lucibello Michael D & Marian	77 Hyde St	New Haven, CT 06512
150-1811-012	Lucibello Richard M Jr	30 Osmond St	East Haven, CT 06512
180-2010-005	Lugo Madeline & Ramos Juan	10 Mckinley Ave	East Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
150-1612-002	Luna Lisa J & Jorge & Sv	66 Kenneth St	East Haven, CT 06512
028/ 0897/ 00900	Luna Madeline	51 Ley St	New Haven, CT 06511
028/ 0898/ 01000	Lybeck Karen R	31 Surrey Lane	Branford, CT 06405
180-2309-006	Lynch Joanne	65 Robert Dr	East Haven, CT 06512
060-0407-012	Macdonald Jean M	62 Roses Farm Rd	East Haven, CT 06512
180-2307-015	Magbaleta Efran Delbert B & Arlene G	18 Holmes St	New Haven, CT 06512
021/ 0919/ 01000	Magbaleta Efren Delbert B & Arlene G	18 Holmes St	New Haven, CT 06512
031/ 0879/ 03400	Mahon Jeff / Mahon William	107 Concord St	New Haven, CT 06512
150-1810-015	Maio Kimberly	106 Thompson Ave	East Haven, CT 06512
029/ 0894/ 00700	Majors Shirley A	130 Myron St	NEW HAVEN, CT 06512
028/ 0895/ 00500	Makres Kimberly	109 Burr St	New Haven, CT 06512
034/ 0849/ 01000	Mancini George F & Sabetta Edythe S	143 Meadow View St	New Haven, CT 06511
150-1710-011	Manley Sean M & Heidi J & Surv	91 Edgar St	East Haven, CT 06512
150-1810-008	Manna Alfonse Jr & Francesca & Surv	100 Victor St	East Haven, CT 06512
180-2309-003	Mannochi Ralph F Jr & Dale D & Surv	70 Robert Dr	East Haven, CT 06512
200-2408-008	Mansingh Deo & Dhanmattie & Surv	41 Grove St	East Haven, CT 06512
150-1611-005	Marchitto John J Jr & Teresa & Surv	39 Burgess St	East Haven, CT 06512
180-2009-001	Marchitto Mia Noel	48 Washington Ave	East Haven, CT 06512
029/ 0894/ 00400	Marerro Jonathan	35 Elmer St	New Haven, CT 06512
033/ 0861/ 01200	Marin Yazmin Rosas	296 Marion St	New Haven, CT 06512
033/ 0861/ 00900	Marshall Letisha Ann & Anastasio Mindy (Trustees)	314 Marion St	New Haven, CT 06512
027/ 0904/ 00700	Martens Hollis A & Madelyn C	111 Stuyvesant Av	New Haven, CT 06512
033/ 0862/ 01701	Martineau Andrey Julian	168 Meadow View St	New Haven, CT 06512
029/ 0889/ 00400	Martino Gemma T Tr / Gemma T Martino Living Trust	23 Alfred St	New Haven, CT 06512
150-1611-014	Martone Joseph	10 Edgar St	East Haven, CT 06512
031/ 0883/ 00900	Martorelli Christina & Catherine	165 Concord St	New Haven, CT 06512
180-2309-011	Mascola Rosa	100 Robert Dr	East Haven, CT 06512
050-0405-013	Mase James F	7 Stoddard Rd	East Haven, CT 06512
050-0405-024	Maselli Gerald R & George	14 Virginia Rd	East Haven, CT 06512
029/ 0889/ 00600	Mason-Reinoso Giovanna & Reinoso Edwin	37 Alfred St	New Haven, CT 06512
014/ 0853/ 00500	Masud Syed A	161 South End Rd	New Haven, CT 06512
090-1010-001	Mavis Tire Supply LLC	100 Hillside Ave	White Plains, NY 10603
130-1414-001	Mavis Tire Supply LLC	100 Hillside Ave	White Plains, NY 10603
031/ 0883/ 01400	Mazzanti Gennaro & Mazzanti Natalie & Surv	31 Arden St	New Haven, CT 06512
180-2109-005	Mccaul Janet	369 Mansfield Grove Rd	East Haven, CT 06512
060-0507-002	Mcgovern John T & Sharleen & Surv	24 Roses Farm Rd	East Haven, CT 06512
027/ 0909/ 01400	Mchugh Laura S & Ventura Lisa C	210 Burr St	New Haven, CT 06512
032/ 0878/ 00900	Mcjunkin Booker T	38 Concord St	New Haven, CT 06512
027/ 0909/ 01100	Mclaughlin Kelly C & Julia K	230 Burr St	New Haven, CT 06512
033/ 0861/ 01100	Mcmanus Elizabeth	300 Marion St	New Haven, CT 06512
031/ 0880/ 00100	Mcnamara Kelly Marie	37 Shoreham Rd	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
200-2407-021	Melendez Yomaira E & Oyola Angle J W Wc	1B Charter Oak Ave	East Haven, CT 06512
032/ 0873/ 00800	Mendez Marcos Binicio Morocho	506 Lighthouse Rd	New Haven, CT 06512
028/ 0895/ 00200	Mendillo Jaimee	87 Burr St	New Haven, CT 06512
020/ 0917/ 02400	Mendoza Jimmy	132 Townsend Ter	New Haven, CT 06512
030/ 0888/ 01500	Merchen Alexander & Cavanaugh Patricia	72 Parker Pl	New Haven, CT 06512
031/ 0882/ 01000	Merjave Corinne / Rusieki Wanda Life Use	11 Eden St	New Haven, CT 06512
200-2408-006	Merola Lawrence & Gina R & Surv	29 Grove St	East Haven, CT 06512
015/ 0876/ 01900	Messek Carol Mangino	21 Townsend Av	New Haven, CT 06512
031/ 0879/ 03000	Messina Salvatore L & Laura E Trustees	85 Concord St	New Haven, CT 06512
027/ 0908/ 01600	Mi Casa Properties LLC	120 Stuyvesant Av	New Haven, CT 06512
060-0408-008	Mihaylov Ivailo & Valia	711 Silver Sands Rd	East Haven, CT 06512
200-2407-005	Miller Christopher William	191 Burr St	East Haven, CT 06512
021/ 0919/ 01100	Miller Christopher William	191 Burr St	East Haven, CT 06512
027/ 0913/ 01500	Miller Dashayla	250 Burr St	New Haven, CT 06512
030/ 0885/ 00500	Miller Derek Walter	95 Parker Pl	New Haven, CT 06511
200-2408-004	Mills Frederick	26 Grove St	East Haven, CT 06512
060-0408-010	Mino George J & Patricia A & Sv L/U &	52 Roses Farm Rd	East Haven, CT 06512
028/ 0898/ 03500	Miranda-Ramones Carla	64 Ley St	New Haven, CT 06512
033/ 0862/ 00600	Misiasz Patricia Ann	214 South End Rd	New Haven, CT 06511
200-2408-012	Misurale Anthony & Rhonda & Sv	151 Burr St	East Haven, CT 06512
028/ 0898/ 03300	Modine Michael J & Christy J A	70 Ley St	New Haven, CT 06512
200-2407-006	Moffett Jesse Allen	177 Burr St	East Haven, CT 06512
031/ 0882/ 00800	Mogollon Margarita	145 Concord St	New Haven, CT 06512
150-1610-022	Molster Randy	62 Burgess St	East Haven, CT 06512
026/ 0903/ 01900	Mongillo Harry V Sr & Linda	76 Girard Av	New Haven, CT 06511
031/ 0879/ 00600	Mongillo Joseph A & May	1294 Dean St	New Haven, CT 06512
050-0505-010	Monroe Property LLC	708 South Ave	New Canaan, CT 06840
021/ 0928/ 01800	Montagna Yvonne & Crespo Jose	24 Laura La	New Haven, CT 06512
031/ 0881/ 00400	Montorsi Tamira & Vanessa	146 Concord St	New Haven, CT 06511
030/ 0885/ 01500	Moore Leland John & Arthur Ashley	189 Concord St	New Haven, CT 06512
180-2108-008	Moras Richard	281 Dodge Ave	East Haven, CT 06512
200-2508-001	Moreno David A	141 Burr St	East Haven, CT 06512
200-2407-015	Morocho Jose H & Iniguez Elsa M & Sv	154 Burr St	East Haven, CT 06512
180-2110-003	Morra Joseph & Bimonte Joann & Sv	226 Dodge Ave	East Haven, CT 06512
180-2109-003	Morris Mary Elizabeth	269 Dodge Ave	East Haven, CT 06512
027/ 0917/ 01100	Morrison Myles K & Hie Troyanna M	158 Hall St	New Haven, CT 06512
032/ 0872/ 00500	Morston Sean	16 Townsend Av	New Haven, CT 06512
034/ 0851/ 00200	Mortgage Assets Management LLC	5720 Premier Park Dr	West Palm Beach, FL 33407
032/ 0872/ 00800	Moutamatai Jellout	42 Greenwood St	New Haven, CT 06519
027/ 0905/ 00700	Moye Patrick L Sr	174 Burr St	New Haven, CT 06512
020/ 0917/ 01600	Munoz Kimberly M / Munoz John F	155 Townsend Ter	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
030/ 0885/ 01300	Murphy Erin	12 Arden St	New Haven, CT 06512
031/ 0882/ 00300	Murphy Sharon E	30 Alden St	New Haven, CT 06512
020/ 0917/ 01100	Musgrove Janis M	340 Burr St	New Haven, CT 06512
014/ 0863/ 00300	Mykins Shannon Lynn	17 Douglass Av	New Haven, CT 06512
180-2208-005	NA	64 Forest St Ext	East Haven, CT 06512
150-1909-002	Nardone Richard & Louisa & Sv	118 Victor St	East Haven, CT 06512
015/ 0874/ 01500	Narracci Richard	20 Douglass Av	New Haven, CT 06511
032/ 0872/ 01300	Naylor Gary & Anna Marie	453 Lighthouse Rd	New Haven, CT 06512
180-2010-004	Nazario Alphonse V & Kathleen T & Sv	87 Landing Pl	East Haven, CT 06512
150-1710-005	Nazario Vanessa	86 Edgar St	East Haven, CT 06512
033/ 0862/ 00400	Negron Rosemary & Sanchez Eric	230 South End Rd	New Haven, CT 06511
034/ 0852/ 01300	New Haven Land Trust Inc	817 Grand Ave #102	New Haven, CT 06511
034/ 0852/ 01400	New Haven Land Trust Inc	817 Grand Ave #102	New Haven, CT 06511
150-1910-012	Nieves Yoland E	28 Duncan St	East Haven, CT 06512
200-2407-020	Nolan Orville & Walker Nolan Renae & Sv	1A Charter Oak Ave	East Haven, CT 06512
027/ 0917/ 01200	Norkawich Peter & Renee	148 Hall St	New Haven, CT 06512
150-1909-004	Northeast Ramp Cooperative Inc	74 Boston Post Rd	Madison, CT 06443
021/ 0932/ 00800	Novella Debra L	29 Laura La	New Haven, CT 06512
180-2209-004	Nunez Nelson	22 Robert Dr	East Haven, CT 06512
150-1910-009	Nuzzo Theresa A	65 Osmond St	East Haven, CT 06512
029/ 0891/ 00900	Obrien Sean C & Labonte Cherise	32 Alfred St	New Haven, CT 06512
033/ 0862/ 01500	Ocasio Katiria	174 Meadow View St	New Haven, CT 06512
027/ 0909/ 00400	Oconnell Dolores	49 Stewart Street	New Haven, CT 06512
031/ 0882/ 01200	Ogonowski Frank E Jr & Robert J	25 Eden St	New Haven, CT 06512
031/ 0882/ 01400	Ogonowski Frank Jr & Robert	25 Eden St	New Haven, CT 06512
050-0505-004	Olewicz Mariusz & Zivile & Sv	23 Stoddard Rd	East Haven, CT 06512
029/ 0894/ 00200	Olson Lisa A	7 Elmer St	New Haven, CT 06512
030/ 0885/ 00900	Olson Vernon G & Ruth A	28 Arden St	New Haven, CT 06512
150-1611-011	Orama Carina	13 Burgess St	East Haven, CT 06512
150-1811-007	Orozco Juan Luis	103 Thompson Ave	East Haven, CT 06512
028/ 0895/ 01400	Ortega Omar Juarez Sr	20 Elmer St	New Haven, CT 06512
150-1710-008	Ortiz Ivonne & Zhuzhingo Edwin & Sv	59 Thompson Ave	East Haven, CT 06512
033/ 0862/ 00900	Osborne Jennifer L	184 South End Rd	New Haven, CT 06512
030/ 0885/ 00200	Overland Jeffrey E	71 Parker Pl	New Haven, CT 06512
031/ 0879/ 01900	Ozkan Coskun & Hatice	27 Concord St	New Haven, CT 06512
150-1710-017	Palikuqi Iba	72 Waldo St	East Haven, CT 06512
180-2308-015	Pallazhco Fredy F	18 Carmen St	East Haven, CT 06512
014/ 0853/ 00300	Palmieri Robert Kenneth III	169 South End Rd	New Haven, CT 06512
027/ 0905/ 00200	Palmisano John Paul / Rosarbo Vincent Life Use	21 Stewart St	New Haven, CT 06511
021/ 0928/ 01600	Palumbo James J Jr	38 Laura La	New Haven, CT 06512
027/ 0913/ 00700	Panagrosso Mary (L/U), Giri Joanne, Panagrosso Felice & Mario	151 Hall St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
021/ 0928/ 00300	Pane Louis	34 Whalers Py Rd	EastT Haven, CT 06512
034/ 0851/ 00300	Paniss Luz M	16 Lighthouse Point Ter	New Haven, CT 06512
031/ 0883/ 00400	Passard Petrel Makeda	34 Eden St	New Haven, CT 06512
021/ 0932/ 00200	Pattinson-Chase Wendy Ann & Chase Timothy X	107 Laura La	New Haven, CT 06512
180-2309-015	Pauzano David	76 Robert Dr	East Haven, CT 06512
180-2009-002	Pazmino Wilson & Marcia & Sv	11 Landing Pl	East Haven, CT 06512
050-0505-007	Pecoraro William	29 Stoddard Rd	East Haven, CT 06512
180-2308-002	Pedraza Jose L	1522 Stratford Ave	Bridgeport, CT 06607
200-2407-012	Pel Rachny & Rachna & Prathna & Sv	21 Bretton St	East Haven, CT 06512
014/ 0863/ 00500	Pellegrino Nancy E	29 Douglass Av	New Haven, CT 06512
031/ 0883/ 00100	Pellot Ismarie	41 Arden St	New Haven, CT 06512
180-2209-017	Perdigoto Ana	34 Marie Dr	East Haven, CT 06512
028/ 0898/ 03600	Perez Celeni & Juan F	54 Ley St	New Haven, CT 06512
180-2208-003	Perez Guzman Carlos Javier	11 Kenny Ct	East Haven, CT 06512
014/ 0853/ 00100	Perez-Ramirez Noe Martin	199 South End Rd	New Haven, CT 06512
028/ 0898/ 01700	Pero Michael V & Carla C	99 Girard Av	New Haven, CT 06512
034/ 0851/ 00400	Perrotti William H & Marie V &	30 Lighthouse Point Ter	New Haven, CT 06512
150-1711-001	Perry Kimberly & Negron Antonio & Sv	75 Edgar St	East Haven, CT 06512
050-0506-001	Petonito Angelina Succ Trustee of The	331 Silver Sands Rd	East Haven, CT 06512
050-0405-011	Petonito Joseph	11 Stoddard Rd	East Haven, CT 06512
031/ 0883/ 00200	Petrillo Ronald A	518 Racebrook Rd	Orange, CT 06477
031/ 0883/ 00300	Petrillo Ronald A	518 Racebrook Rd	Orange, CT 06477
031/ 0879/ 01701	Petruzzelli Gloria	9 Concord St	New Haven, CT 06512
030/ 0885/ 01400	Pham Julie & Comia Joseph	173 Concord St	New Haven, CT 06512
060-0508-001	Pietrosimone Ralph Iii & Pietrosimone	44 Roses Farm Rd	East Haven, CT 06512
150-1710-002	Pine Suzanne & Aaron & Sv	100 Edgar St	East Haven, CT 06512
021/ 0932/ 00500	Piotrkowski Shannon & Eileen	87 Laura La	New Haven, CT 06512
150-1611-001	Pirraglia Kerry & Keith & Sv	38 Burgess St	East Haven, CT 06512
180-2108-002	Piscitelli Giuseppe Family Limited	331 Silver Sands Rd	East Haven, CT 06512
150-1711-003	Piscitelli Mario A & Rosemarie & Su	48 Waldo St	East Haven, CT 06512
021/ 0932/ 00400	Piscitelli Renne Ann	95 Laura La	New Haven, CT 06512
031/ 0879/ 00301	Pitsas Alexander	1354 Dean St	New Haven, CT 06512
150-1811-014	Plasencia Edy Ramiro Chiriboga	20 Osmond St	East Haven, CT 06512
031/ 0882/ 00900	Platt Victoria A	151 Concord St	New Haven, CT 06512
180-2109-004	Plaza Edwin	2 Robert Dr	East Haven, CT 06512
031/ 0883/ 00600	Po Marilyn	20 Eden St	Hamden, CT 06517
150-1909-104	Podgwaite Frank	78 Culver Ln	North Haven, CT 06473
015/ 0874/ 01600	Pompano Annette & Pepe Bernadette	3 Townsend Av	New Haven, CT 06512
022/ 0928/ 02000	Pompano John & Joseph & Robert	2 Charter Oak Av	East Haven, CT 06512
200-2507-005	Pompano John 1/3 & Joseph 1/3 &	2 Charter Oak Ave	East Haven, CT 06512
200-2507-006	Pompano John 1/3 & Joseph 1/3 &	6 Charter Oak Ave	East Haven, CT 06512

Tweed New Haven Regional Airport (HVN) Runway Extension and Terminal Expansion
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Parcel ID	Owner Name	Mailing Address	City State Zip
150-1910-004	Ponzillo Susan A	12 Gerald St	East Haven, CT 06512
031/ 0879/ 00302	Portillo Luis Adrian Garcia	1330 Dean St	New Haven, CT 06512
150-1611-020	Premier Specialty Foods LLC	25 Edgar St	East Haven, CT 06512
028/ 0898/ 01400	Premium Enterprises LLC	50 Washington St V-4	Norwalk, CT 06854
150-1610-016	Prete Jeffrey & Karen & Sv	65 Burgess St	East Haven, CT 06512
032/ 0878/ 01100	Pristine Capital	7-11 So Broadway Ste 210	White Plains, NY 10605
150-1810-018	Proto Ann	64 Osmond St	East Haven, CT 06512
033/ 0862/ 02200	Proto Joseph M & Dana M	309 Marion St	New Haven, CT 06512
028/ 0895/ 01000	Proto Michael Sr	40 Elmer St	New Haven, CT 06512
150-1810-006	Quezada Freddy Gustavo	90 Victor St	East Haven, CT 06512
030/ 0885/ 01100	Quilliam Patricia E	20 Arden St	New Haven, CT 06512
150-1811-009	Ragone Carmine & Marion & Surv	112 Thompson Ave	East Haven, CT 06512
150-1810-016	Ramirez Juana	56 Osmond St	East Haven, CT 06512
150-1710-018	Ranfone Patricia	76 Waldo St	East Haven, CT 06512
150-1810-014	Ranney Patricia M	102 Thompson Ave	East Haven, CT 06512
032/ 0873/ 01600	Raucci Salvatore Jr & Richo Kathleen M	33 Townsend Av	New Haven, CT 06512
050-0505-014	Ravert Donald D Jr	54 Wheaton Rd	East Haven, CT 06512
033/ 0862/ 01600	Reece Tyrone B Jr	170 Meadow View St	New Haven, CT 06511
021/ 0928/ 00700	Reed Marie Courtney	80 Laura Lane	New Haven, CT 06512
030/ 0888/ 01600	Regan William F Iv & Regan-Yttre Mary J & Surv	68 Parker Place	New Haven, CT 06512
150-1611-017	Regnere Brian K & Lesko Allison J & Sv	54 Edgar St	East Haven, CT 06512
050-0505-002	Reyes Carmelo	19 Stoddard Rd	East Haven, CT 06512
028/ 0895/ 01900	Reyes Teodomiro & Corina	341 Concord St	New Haven, CT 06512
027/ 0909/ 00600	Reynolds John & Sharon Mullen	515 Fort Hale Rd	New Haven, CT 06512
021/ 0928/ 02100	Riccio Armand G, Riccio Michael A & Rivard Elizabeth	4 Laura La	New Haven, CT 06512
031/ 0883/ 00800	Richards Ude	161 Concord St	New Haven, CT 06512
032/ 0872/ 01400	Riendeau David R	457 Lighthouse Rd	New Haven, CT 06512
150-1910-016	Rinaldi Maria	246 Kenneth St	East Haven, CT 06512
021/ 0920/ 02904	Rincon Yuly	412 Burr St	New Haven, CT 06512
050-0505-009	Rispoli Andrew	21 South End Rd	East Haven, CT 06512
031/ 0879/ 00100	Rivera Cesar	31 Alden St	New Haven, CT 06512
029/ 0894/ 01500	Rivera David & Judith	301 Concord St	New Haven, CT 06512
016/ 1303/ 00800	Rivera Frances	1305 Dean St	New Haven, CT 06511
031/ 0879/ 00300	Rivera Frances	1340 Dean St	New Haven, CT 06511
029/ 0889/ 01000	Rivera Ivan	1870 Pappas Ct	Bellmore, NY 11710
032/ 0872/ 01100	Rivera Lynn Hope	4 Townsend Av	New Haven, CT 06512
180-2308-008	Rivera Silverio	98 Forest St Ext	East Haven, CT 06512
180-2309-004	Rivera Vilma M & Chevalier Noel R & Sv	27 Marie Dr	East Haven, CT 06512
150-1909-109	Rocklen Howard	15 Cross Hollow Rd	Woodbridge, CT 06525
150-1909-119	Rocklen Howard W	15 Cross Hollow Rd	Woodbridge, CT 06525
029/ 0891/ 00400	Rodriguez Hector L	109 Myron St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
150-1710-004	Rodriguez Jose Anibal Santiago &	90 Edgar St	East Haven, CT 06512
020/ 0917/ 03100	Rodriguez Sammy & Marilyn	172 Townsend Ter	New Haven, CT 06512
014/ 0853/ 00101	Rodriguez William & Lysie	11 Uriah St	New Haven, CT 06512
200-2407-010	Roldan Crystal	171 Burr St	East Haven, CT 06512
027/ 0908/ 01200	Roldan Victor / Roldan Destiny	495 Fort Hale Rd	New Haven, CT 06512
150-1910-020	Roman Felix	237 Kenneth St	East Haven, CT 06512
031/ 0883/ 01100	Roman Mark & Denise M	11 Arden St	New Haven, CT 06512
027/ 0904/ 00300	Ronald W Grant Family Trust	81 Hyde St	New Haven, CT 06512
150-1909-005	Rondon Richard & Rafael & Sv	8 Gerald St	East Haven, CT 06512
027/ 0904/ 00100	Rosado Lysette	73 Hyde St	New Haven, CT 06512
150-1909-114	Rose John K & Nina	445 Vineyard Point Rd	Guilford, CT 06437
020/ 0917/ 02100	Ross Latoya	235 Hyde St	New Haven, CT 06512
031/ 0883/ 01000	Rowell Jody Lynn	721 Center St	Wallingford, CT 06492
150-1811-008	Rua Jamie A	97 Thompson Ave	East Haven, CT 06512
021/ 0928/ 00600	Ruggiero Irene Aka Irene A	86 Laura La	New Haven, CT 06512
030/ 0885/ 01000	Ruland Bao Chau	24 Arden St	New Haven, CT 06512
050-0405-010	Rushing Amy R & Uchendo Stacy N & Sv	13 Stoddard Rd	East Haven, CT 06512
150-1711-011	Russell Anthony A & Lorene M & Sv	45 Waldo St	East Haven, CT 06512
150-1811-010	Russo Thomas & Ferraro Sharon & Sv	105 Thompson Ave	East Haven, CT 06512
060-0408-006	Rustici Melinda & Neal Tina & Sv	705 Silver Sands Rd	East Haven, CT 06512
016/ 1303/ 00300	Ryan Maria, Luzzi Cheryl & Ryan Thomas R Jr	1236 Dean St	New Haven, CT 06512
031/ 0879/ 01100	Ryan Maria, Luzzi Cheryl & Ryan Thomas R Jr	1236 Dean St	New Haven, CT 06512
027/ 0913/ 00800	Sacco Frank P & Teresa J	155 Hall St	New Haven, CT 06512
200-2508-005	Salemme Ralph & Mary Ann	4155 Sanora Ln	Ormond Beach, FL 32174
029/ 0891/ 00800	Salinas Rene	38 Alfred St	New Haven, CT 06511
029/ 0891/ 00200	Salvatierra Juan & Vera Brenda & Surv	95 Myron St	New Haven, CT 06512
028/ 0897/ 01500	Salzo Ann & Rosa Paul D	89 Ley St	New Haven, CT 06512
150-1909-115	San Marco Andrew	Po Box 1357	Madison, CT 06443
031/ 0879/ 00500	Sanabria Roberto	1310 Dean St	New Haven, CT 06512
029/ 0889/ 01800	Sanchez Fausto Antonio	253 Concord St	New Haven, CT 06512
180-2010-010	Sanchez Israel	5 Mckinley Ave	East Haven, CT 06512
180-2309-017	Sanchez Plutarco & Saavedra Rocio	112 Forest St Ext	East Haven, CT 06512
029/ 0894/ 00300	Santacroce Carol Ttee	25 Elmer St	New Haven, CT 06512
150-1910-011	Santiago Carlos & Rodriguez & Surv	22 Duncan St	East Haven, CT 06512
026/ 0903/ 02000	Santore Stephanie	31 Clark Ave	North Haven, CT 06473
060-0507-007	Santoro Francis John Jr	23 Roses Farm Rd	East Haven, CT 06512
032/ 0878/ 01000	Santos Agueda Delos & Arias Sergio E	30 Concord St	New Haven, CT 06512
014/ 0863/ 00400	Sapiente Alphonse Jr	23 Douglass Av	New Haven, CT 06512
021/ 0928/ 01900	Savage Stephen	5846 Conte Dr	Lothian, MD 20711
020/ 0918/ 00100	Savalgi Raghunandan	393 Burr St	New Haven, CT 06511
020/ 0917/ 01200	Savinelli John A & Patricia &	336 Burr St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
050-0505-015	Savino Peter J & Heather P & Surv	15 South End Rd	East Haven, CT 06512
180-2209-013	Savo Andrew J	44 Robert Dr	East Haven, CT 06512
150-1609-007	Scalesse Robert J Sr	19 Thompson Ave	East Haven, CT 06512
031/ 0881/ 00500	Scheneman Glenn F	140 Concord St	New Haven, CT 06512
180-2209-011	Schmidt Cheryl	3 Kenny Ct	East Haven, CT 06512
030/ 0888/ 01300	Schuerfeld Tobie	76 Parker Place	New Haven, CT 06512
200-2507-010	Schwarzer Romona & Horst & Surv	7 Charter Oak Ave	East Haven, CT 06512
031/ 0879/ 03100	Scott Aston L III	91 Concord St	New Haven, CT 06511
027/ 0904/ 01000	Scott Shirlene	104 Girard Av	New Haven, CT 06512
027/ 0904/ 01200	Scott Shirlene	104 Girard Av	New Haven, CT 06512
033/ 0861/ 01600	SCS Real Estate Holding LLC	40 Tolli Terrrace	New Haven, CT 06512
029/ 0891/ 01100	Seales Celeste / Salmon Shemar	18 Alfred St	New Haven, CT 06512
060-0408-011	Segovia Javier O & Claudia Z & Sv	48 Roses Farm Rd	East Haven, CT 06512
034/ 0852/ 00600	Seiden Richard N	100 South End Rd	New Haven, CT 06512
032/ 0873/ 01300	Selitte Louis A & Susan N & Surv	35 Morris Cove Rd	New Haven, CT 06512
150-1811-020	Serio Andrew & Theresa & Sv	31 Osmond St	East Haven, CT 06512
180-2109-002	Serio Danielle	273 Dodge Ave	East Haven, CT 06512
150-1710-023	Shah Noshaba J & Warda J & Iqra J	39 Thompson Ave	East Haven, CT 06512
031/ 0881/ 00300	Shea Janet S	399 Strong St	East Haven, CT 06512
050-0405-020	Sheehy Marion E Tr	1121-2E Waterbury Rd	Cheshire, CT 06410
150-1811-005	Shnan Mohamed	43 Victor St	East Haven, CT 06512
030/ 0888/ 00300	Short Garland	15 Nelson St	New Haven, CT 06512
028/ 0895/ 00600	Shumway Kim B & Donna M	1840 Dean St	New Haven, CT 06512
029/ 0894/ 01100	Sibley Laurel Ann	106 Myron St	New Haven, CT 06512
010-0306-013	Silver Sand LLC	774 Silver Sands Rd	East Haven, CT 06512
020-0107-008	Silver Sands LLC	388 Orange St	New Haven, CT 06511
028/ 0897/ 01000	Silvestro Rita	57 Ley St	New Haven, CT 06512
021/ 0928/ 01400	Silvestro Robert J & Anna T &	46 Laura La	New Haven, CT 06512
180-2109-001	Sim Lev Properties LLC	33 Dixwell Ave Suite 321	New Haven, CT 06511
180-2010-002	Sime Manuel P	261 Kenneth St	East Haven, CT 06512
021/ 0932/ 01000	Singer Norman H	17 Laura La	New Haven, CT 06512
027/ 0905/ 00500	Skerritt Paul & Yolanda	145 Stuyvesant Av	New Haven, CT 06512
030/ 0885/ 01200	Smith Cassie Lee & Jason Marc	14 Arden St	New Haven, CT 06512
150-1909-110	Snider Tim	P.O. Box 3341	Branford, CT 06405
150-1811-021	Snowden Christopher	111 Thompson Ave	East Haven, CT 06512
024/ 0920/ 01300	Sobko Family Trust Agreement Et Al	102 Townsend Ter	New Haven, CT 06512
031/ 0879/ 01800	Solli Ralph & Sandra	23 Concord St	New Haven, CT 06512
021/ 0932/ 00100	Solomine Patrick J & Shelly A	115 Laura La	East Haven, CT 06512
200-2507-002	Solomine Patrick J & Shelly A & Sv	115 Laura Ln	East Haven, CT 06512
032/ 0878/ 02700	Sparks Shane	75 Townsend Av	New Haven, CT 06512
050-0405-022	Stefko Rosemary	26 Canna Dr	East Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
033/ 0862/ 02100	Stellato Stephen J	307 Marion St	New Haven, CT 06512
032/ 0872/ 01900	Stemler Lana	542 W Wakefield Blvd	Winsted, CT 06098
180-2010-007	Stewart Keisha	2 Mckinley Ave	East Haven, CT 06512
180-2208-002	Stewart Steven M	15 Kenny Ct	East Haven, CT 06512
050-0505-011	Stone Stephen S	42 Canna Dr	East Haven, CT 06512
150-1710-006	Sullivan Amanda E & Schneider Charles H	62 Edgar St	East Haven, CT 06512
030/ 0885/ 00400	Sullivan John C	91 Parker Pl	New Haven, CT 06512
032/ 0873/ 00400	Sullo Margaret 1 3 Et Al	254 Bradley St	New Haven, CT 06511
032/ 0873/ 02100	Sullo Margaret 1/3 Margaret Sullo Tr 1/3	254 Bradley St	New Haven, CT 06511
029/ 0894/ 01400	Sundwall Lisa	297 Concord St	New Haven, CT 06511
020/ 0917/ 03300	Swane Sarah Est	400 Burr St	New Haven, CT 06512
150-1711-014	Switaj Christine R	52 Victor St	East Haven, CT 06512
150-1810-003	Sygiel Patricia M	76 Victor St	East Haven, CT 06512
028/ 0898/ 02100	Tafuto Michael & Nancy S	125 Girard Av	New Haven, CT 06512
180-2308-012	Taneszio Phyllis A	17 Carmen St	East Haven, CT 06512
150-1811-024	Tapia Carlos F & Argudo Ana R & Sv	128 Thompson Ave	East Haven, CT 06512
150-1911-001	Tarantelli Lucille	61 Osmond St	East Haven, CT 06512
031/ 0882/ 00401	Targove Margaret W	20 Alden St	New Haven, CT 06512
060-0407-010	Tavares Brandon	9 Roses Farm Rd	East Haven, CT 06512
015/ 0874/ 01900	Taveras Sonia	7 Townsend Ave	New Haven, CT 06512
120-1212-003	Tenet Equity Funding SPE I LLC	7332 E Butherus Dr Suite 100	Scottsdale, AZ 85260
130-1314-001	Tenet Equity Funding SPE I LLC	7332 E Butherus Dr Suite 100	Scottsdale, AZ 85260
030/ 0888/ 00100	The Michael And Paula Deponte Living Trust	227 Concord St	New Haven, CT 06512
060-0508-003	Thermatool Corp	31 Commerce St	East Haven, CT 06512
031/ 0879/ 03700	Thomas Sarah Ann & Thomas Nicholas	121 Concord St	New Haven, CT 06512
027/ 0908/ 01400	Thomas Shronda	50 Stewart St	New Haven, CT 06512
016/ 1303/ 00200	Tobia Christopher	1224 Dean St	New Haven, CT 06512
031/ 0879/ 02900	Tolkin Jaclyn M & Tolkin Samuel	81 Concord St	New Haven, CT 06512
150-1610-011	Tordo Joshua Michael	64 Burgess St	East Haven, CT 06512
032/ 0873/ 01000	Toro Robert M	496 Lighthouse Rd	New Haven, CT 06512
150-1811-001	Torre Doris	56 Victor St	East Haven, CT 06512
021/ 0920/ 02902	Torres Ernesto Figueroa	404 Burr St	New Haven, CT 06512
150-1710-012	Torres Hector Jose Andrade	87 Edgar St	East Haven, CT 06512
150-1810-013	Torres Juan	77 Victor St	East Haven, CT 06512
021/ 0928/ 00900	Torres Kevin R	156 Read St	New Haven, CT 06511
032/ 0872/ 00700	Torres Mary	12 Townsend Av	New Haven, CT 06512
021/ 0932/ 00300	Torres Roberto & Angela	101 Laura La	New Haven, CT 06512
027/ 0913/ 01600	Tortora David J	570 Fort Hale Rd	New Haven, CT 06512
150-1610-008	Touch Rathana & Maneth & Sv	42 Burgess St	East Haven, CT 06512
060-0408-012	Town of East Haven	250 Main St	East Haven, CT 06512
060-0608-001	Town of East Haven	250 Main St	East Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
090-0911-001	Town of East Haven	250 Main St	East Haven, CT 06512
120-1412-001	Town of East Haven	250 Main St	East Haven, CT 06512
180-2308-017	Town of East Haven	250 Main St	East Haven, CT 06512
180-2308-018	Town of East Haven	250 Main St	East Haven, CT 06512
200-2407-003	Town of East Haven	250 Main St	East Haven, CT 06512
200-2407-007	Town of East Haven	250 Main St	East Haven, CT 06512
200-2407-008	Town of East Haven	250 Main St	East Haven, CT 06512
200-2407-013	Town of East Haven	250 Main St	East Haven, CT 06512
200-2409-001	Town of East Haven	250 Main St	East Haven, CT 06512
027/ 0913/ 01700	Tramont Sara Grace Yap	550 Fort Hale Rd	New Haven, CT 06512
031/ 0879/ 03200	Trevino-Ranalli Sandra	109 Concord St	New Haven, CT 06512
050-0506-002	Tropeano Jillian	288 East Main St Apt 23	Branford, CT 06405
034/ 0852/ 0200	Trotman Idris & Cleo	11 Lighthouse Point Ter	New Haven, CT 06512
021/ 0932/ 00900	Truhart John C	23 Laura La	New Haven, CT 06512
020/ 0917/ 02500	Truhart John C Jr & Truhart Dominique	140 Townsend Ter	New Haven, CT 06512
150-1610-018	Tuanthet Supatida	57 Burgess St	East Haven, CT 06512
033/ 0862/ 02600	Tucci Melissa	58 Arthur Rd	North Branford, CT 06471
150-1909-106	Tucker Aviation LLC	19 Queach Rd	Branford, CT 06405
150-1909-120	Tucker Aviation LLC	19 Queach Rd	Branford, CT 06405
150-1610-019	Turcio Charles	128 Thompson Ave	East Haven, CT 06512
200-2408-005	Turpin Phillip J	44 Duval St	East Haven, CT 06512
180-2307-004	Tweed New Haven Airport Auth	155 Burr St	New Haven, CT 06512
050-0606-001	Tweed New Haven Airport Authority	155 Burr St	New Haven, CT 06512
180-2108-004	Tweed New Haven Airport Authority	155 Burr St	New Haven, CT 06512
180-2108-005	Tweed New Haven Airport Authority	155 Burr St	New Haven, CT 06512
180-2307-002	Tweed New Haven Airport Authority	155 Burr St	New Haven, CT 06512
180-2307-006	Tweed New Haven Airport Authority	155 Burr St	New Haven, CT 06512
180-2308-001	Tweed New Haven Airport Authority	155 Burr St	New Haven, CT 06512
021/ 0920/ 02907	Tweed New Haven Airport Authority	434 Burr St	New Haven, CT 06511
021/ 0920/ 02910	Tweed New Haven Airport Authority	428 Burr St	New Haven, CT 06511
180-2307-005	Tweed New Haven Airport Authourity	155 Burr St	New Haven, CT 06512
020/ 0918/ 00200	Tweed New Haven Airport Authority of New Haven	155 Burr St	New Haven, CT 06512
150-1810-020	United States Air Force	62 Thompson Ave	East Haven, CT 06512
020/ 0917/ 00600	Urquhart Brian & Lisa A A/K/A Elizabeth A	366 Burr St	New Haven, CT 06512
150-1711-010	Usquiano Andrea	37 Waldo St	East Haven, CT 06512
180-2209-018	Valenti Mary	28 Marie Dr	East Haven, CT 06512
032/ 0878/ 00400	Valentino Antonio & Candela Theresa	60 Concord St	New Haven, CT 06512
200-2408-011	Valladolid Dennis	155 Burr St	East Haven, CT 06512
016/ 1303/ 00700	Vallombroso Robert T & Roseann	1284 Dean Street	New Haven, CT 06512
031/ 0879/ 00700	Vallombroso Roseann E	1284 Dean St	New Haven, CT 06512
031/ 0881/ 00600	Vamvakas Vasiliki & Ponagiotis & Surv	136 Concord St	New Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
031/ 0879/ 01300	Van Hoesen Joshua	50 Morris Cswy	New Haven, CT 06512
020/ 0917/ 03000	Vazquez Allies V	168 Townsend Ter	New Haven, CT 06512
032/ 0878/ 02100	Vazquez Alyssa	53 Townsend Av	New Haven, CT 06512
031/ 0879/ 02300	Vazquez Israel & Vargas Magdalena	49 Concord St	New Haven, CT 06512
027/ 0904/ 01100	Vega Marta	112 Girard Av	New Haven, CT 06512
200-2408-023	Veiras Sophia	152 Burr St	East Haven, CT 06512
060-0407-013	Velardi John & Laura & Sv	55 Roses Farm Rd	East Haven, CT 06512
050-0406-004	Verab Margaret	65 South End Rd	East Haven, CT 06512
033/ 0862/ 00500	Vergara Ledda	220 South End Rd	New Haven, CT 06512
020/ 0917/ 02900	Vergati Kevin J & Cynthia	189 Rose St Extension	East Haven, CT 06513
032/ 0873/ 00900	Viccari Benjamin Edmund	502 Lighthouse Rd	New Haven, CT 06512
015/ 0874/ 01700	Viscuso Dominique	3A Townsend Av	New Haven, CT 06512
200-2507-012	Vitello Patricia & Anthony & Sv	3 Charter Oak Ave	East Haven, CT 06512
028/ 0895/ 01200	Vitolo Francine A & Kuchta Eilieen	87 Honeypot Rd	West Haven, CT 06516
021/ 0920/ 02908	Vlake Ronald & Danielle	440 Burr St	New Haven, CT 06511
028/ 0895/ 00400	Void Lorna	103 Burr St	New Haven, CT 06512
027/ 0917/ 00701	Vollano Joseph	177 Townsend Ter	New Haven, CT 06512
027/ 0917/ 01101	Vollano Joseph	177 Townsend Ter	New Haven, CT 06512
030/ 0888/ 00200	Volpato Giuseppe And Bassani Lisa	11 Nelson St	New Haven, CT 06511
015/ 0876/ 00100	VPS Realty LLC	984 Route 9 Suite A9	Parlin, NJ 08859
028/ 0897/ 01800	Walker William R	888 Tularosa Dr	Sierra Vista, AZ 85635
029/ 0891/ 00300	Wall Jacob	99 Myron St	New Haven, CT 06512
030/ 0885/ 00800	Wallack Kerry E	40 Arden St	New Haven, CT 06511
027/ 0909/ 00300	Walter Angelica	43 Stewart St	New Haven, CT 06512
030/ 0888/ 00400	Ward William	177 West Park Av	New Haven, CT 06511
150-1909-103	Waters Denise & Pine Martin & Sv	136 East 61St St #2B	New York, NY 10021
029/ 0891/ 00500	Waters Jule & Darryl	115 Myron St	New Haven, CT 06512
027/ 0917/ 01000	Wengloski Jonathan Andrew	166 Hall St	New Haven, CT 06512
150-1811-006	West Ryan	110 Sea Hill Rd	North Branford, CT 06471
031/ 0879/ 03300	White Kenneth R	101 Concord St	New Haven, CT 06512
180-2209-009	Wilcox Leslie & Mark & Sv	15 Emma Rd	East Haven, CT 06512
180-2210-007	Willard Sharon E Aka Oertel Sharon E	1 Emma Rd	East Haven, CT 06512
029/ 0889/ 01700	Williams Donna	219 Concord St	New Haven, CT 06512
030/ 0888/ 01700	Williams Donna	219 Concord St	New Haven, CT 06512
031/ 0879/ 01600	Williams Luke	54 Florence Av	New Haven, CT 06512
150-1811-002	Williams Rachel Krenkel & Brian K & Sv	89 Thompson Ave	East Haven, CT 06512
180-2010-012	Williams Travis	218 Dodge Ave	East Haven, CT 06512
050-0405-014	Willsey Sarah	5 Stoddard Rd	East Haven, CT 06512
150-1611-012	Wolkovitz Michael P	7 Burgess St	East Haven, CT 06512
150-1711-013	Wolofsky Joseph Jr & Susan A & Sv	53 Waldo St	East Haven, CT 06512
050-0505-008	Woodin Justin	31 Stoddard Rd	East Haven, CT 06512

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Parcel ID	Owner Name	Mailing Address	City State Zip
060-0509-002	Woodward S Facilitator Corporation	31 Commerce St	East Haven, CT 06512
015/ 0876/ 00200	Wrightington Ernest C	19 Morris Cswy	New Haven, CT 06512
060-0407-011	Wu Yijin & Wang Haihua & Sv	5 Roses Farm Rd	East Haven, CT 06512
180-2309-001	Yaccarino David A	56 Robert Dr	East Haven, CT 06512
150-1910-006	Yanza Hernan & Sinchi Chunir Anna L	10 Duncan St	East Haven, CT 06512
021/ 0928/ 01300	Yitayew Fikadu & Nigatu Zewditu	50 Laura La	New Haven, CT 06512
029/ 0891/ 00600	Yohans Carl E Jr	131 Myron St	New Haven, CT 06512
029/ 0891/ 00700	Yohans Carl E Jr	131 Myron St	New Haven, CT 06512
027/ 0909/ 01600	Yoxall Petrina	146 Stuyvesant Av	New Haven, CT 06512
150-1810-012	Yu Carlin & Jadyn & Sv	81 Victor St	East Haven, CT 06512
150-1910-023	Zayas Betzaida M	17 Gerald St	East Haven, CT 06512
014/ 0863/ 03200	Zayas Rafael	1 Townsend Av	New Haven, CT 06512
150-1909-001	Zink Joan E L/U & Onofrio Linda S	110 Victor St	East Haven, CT 06512
021/ 0920/ 02905	Zuniga Adriana & Motyl Orest	416 Burr St	New Haven, CT 06512
200-2407-017	Zuniga Oswaldo E & Gina A & Surv	164 Burr St	East Haven, CT 06512
150-1610-015	Zuo Steven	63 Burgess St	East Haven, CT 06512
028/ 0895/ 00501	Zyla Eugeniuz & Dorota	1850 Dean St	New Haven, CT 06512

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 030/ 0885/ 00700	107 Parker Place LLC 154 Townsend Ave New Haven, CT 06512	$.69	$2.20	
2. 060-0407-003	1332 Chapel Associates LLC 7805 18Th Ave Brooklyn, NY 112214	$.69	$2.20	
3.028/ 0895/ 01600	139 Summit LLC 2341 Whitney Ave, 2nd Floor Hamden, CT 06518	$.69	$2.20	
4.060-0509-001	17 Commerce Street LLC 17 Commerce St East Haven, CT 06512	$.69	$2.20	
5.015/ 0876/ 01700	17 Townsend Avenue LLC 17 Townsend Av New Haven, CT 06512	$.69	$2.20	
6.150-1610-012	18 Wheelbarrow Lane LLC 4 Beverly Dr North Haven, CT 06473	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0862/ 01000	182 South End LLC 30 Hazel Terrace Woodbridge, CT 06525	$.69	$2.20	
2. 150-1909-108	234E Aviation LLC 41 Flying Point Rd Branford, CT 06405	$.69	$2.20	
3. 050-0405-026	25 Canna Dr LLC 201 N Rolling Acres Rd Cheshire, CT 06410	$.69	$2.20	
4. 033/ 0861/ 01500	272 Marion St LLC 54 Skyview Rd Orange, CT 06477	$.69	$2.20	
5. 032/ 0873/ 00300	30 Townsend Inc 120 Bloomingdale Rd, Suite 400 White Plains, NY 10605	$.69	$2.20	
6.032/ 0873/ 02000	30 Townsend Inc 120 Bloomingdale Rd, Suite 400 White Plains, NY 10605	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0406-003	305 South End Road LLC 305 South End Rd East Haven, CT 06512	$.69	$2.20	
2 .020/ 0917/ 00700	360 Burr Street LLC 360 Burr St New Haven, CT 06512	$.69	$2.20	
3. 032/ 0872/ 02000	491 Lighthouse Avenue LLC 450 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
4. 032/ 0872/ 02100	499 Lighthouse Associates LLC 499 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
5. 015/ 0874/ 01800	5 Townsend Avenue LLC 5 Townsend Av New Haven, CT 06512	$.69	$2.20	
6. 029/ 0893/ 00500	65 Burr Street LLC 15 Sandra Dr Branford, CT 06405	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		
	Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 016/ 1303/ 00100	Abbagnaro Est Joseph 265 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
2. 200-2507-015	Abreu Jorge 1C Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
3. 200-2507-016	Abreu Jorge 1C Charter Oak East Haven, CT 06512	$.69	$2.20	
4. 015/ 0874/ 00100	Acampora Frank 9 Townsend Ave New Haven, CT 06512	$.69	$2.20	
5. 028/ 0897/ 01100	Acampora Nicholas P 63 Ley St New Haven, CT 06512	$.69	$2.20	
6. 021/ 0928/ 00200	Aceto Pasquale & Rita & Surv / Robert M Errato 102 Laura La New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basil Deck	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0897/ 02000	Acri Ann 100 Burr St New Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 00900	Adinolfi Family 2023 Trust / Plaziak Janice A Tr, Adinolfi Joseph & Salvatore M 1254 Dean St New Haven, CT 06512	$.69	$2.20	
3. 016/ 1303/ 00500	Adinolfi Salvatore & Bette Jan 1254 Dean St New Haven, CT 06512	$.69	$2.20	
4. 016/ 1303/ 00400	Adinolfi Salvatore M Jr & Foss-Adinolfi Laura Jean 1244 Dean St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 01000	Adinolfi Salvatore M Jr & Foss-Adinolfi Laura Jean 1244 Dean St New Haven, CT 06512	$.69	$2.20	
6. 014/ 0863/ 03100	Adorno Rafaella Panay 577 Whalley Ave New Haven, CT 06511	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0862/ 03000	Affinito Steven P & Kathy L & Constantine 337 Marion St New Haven, CT 06512	$.69	$2.20	
2. 024/ 0920/ 01200	Agnellino Giuseppe A, Celia D, Joseph E, Anastasio Ann Marie 110 Townsend Ter New Haven, CT 06512	$.69	$2.20	
3. 150-1710-007	Agosto Domingo Delgado & Cruz 103 Edgar St East Haven, CT 06512	$.69	$2.20	
4. 032/ 0872/ 00200	Aiardo Anthony P 9 Depot St Milford, CT 06460	$.69	$2.20	
5. 032/ 0872/ 00201	Aiardo Anthony P 9 Depot St Milford, CT 06460	$.69	$2.20	
6. 032/ 0872/ 01800	Aiardo Anthony P 9 Depot St Milford, CT 06460	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1611-008	Aiksnoras Kimberly A 29 Burgess St East Haven, CT 06512	$.69	$2.20	
2. 021/ 0920/ 02906	Albanese Rose Marie & Rosa Jose A 420 Burr St New Haven, CT 06512	$.69	$2.20	
3. 150-1611-026	Albano Paul & Rose & Surv 16 Burgess St East Haven, CT 06512	$.69	$2.20	
4. 050-0505-012	Albe Donna M 38 Canna Dr East Haven, CT 06512	$.69	$2.20	
5. 027/ 0913/ 02000	Albino Michele M 520 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
6. 026/ 0903/ 01600	Alem Joseph A & Mitchell Micheala L 88 Hyde St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basil Deek		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0913/ 01300	Alvarez Myreya 266 Burr St New Haven, CT 06512	$.69	$2.20	
2. 150-1610-017	Amaro Vitor R 34 Hall St New Haven, CT 06512	$.69	$2.20	
3. 060-0507-004	Amato Donna M 32 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 00400	Amodio Gloria Tr / Gloria Amodio Revocable Trust 1320 Dean St New Haven, CT 06512	$.69	$2.20	
5. 034/ 0851/ 00100	Anastasio Anita M 10 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
6. 034/ 0849/ 01100	Anastasio Donald & Diane 6 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	

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	Basil D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 034/ 0852/ 00701	Anastasio Vincent Jr & Anastasio Laurie Lopez 21 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
2. 028/ 0898/ 02900	Anaya Diana M 100 Ley St New Haven, CT 06512	$.69	$2.20	
3. 180-2210-005	Andreozzi Nicholas 7 Emma Rd East Haven, CT 06512	$.69	$2.20	
4. 029/ 0889/ 00300	Andrews Melinda 19 Alfred St New Haven, CT 06512	$.69	$2.20	
5. 150-1810-001	Angelino Guiseppe & Emma & Surv 77 Thompson Ave East Haven, CT 06512	$.69	$2.20	
6. 029/ 0889/ 01500	Annan Vernonica N 16 Nelson St New Haven, CT 06511	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 020/ 0917/ 02700	Ansley Camille 150 Townsend Ter New Haven, CT 06512	$.69	$2.20	
2. 034/ 0852/ 01202	Aponte Avimael & Emily 44 South End Rd New Haven, CT 06512	$.69	$2.20	
3. 034/ 0852/ 01201	Aponte Avimael & Emily 44 South End Rd New Haven, CT 06512	$.69	$2.20	
4. 150-1611-004	Appi Lorraine 41 Burgess St East Haven, CT 06512	$.69	$2.20	
5. 033/ 0862/ 01700	Arcos Antonio L 116 Morris St New Haven, CT 06519	$.69	$2.20	
6. 031/ 0883/ 00700	Aretis Tamara 14 Eden St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2109-009	Argento Agnes J & John J & Anna P & Sv 3 Robert Dr East Haven, CT 06512	$.69	$2.20	
2. 180-2109-008	Argento John L 11 Robert Dr East Haven, CT 06512	$.69	$2.20	
3. 027/ 0917/ 00800	Arminio John P 174 Hall St New Haven, CT 06512	$.69	$2.20	
4. 032/ 0878/ 00600	Arotsky Marvin A 50 Concord St New Haven, CT 06512	$.69	$2.20	
5. 150-1611-018	Arsenault Frances 45 Edgar St East Haven, CT 06512	$.69	$2.20	
6. 180-2309-012	Asaolu Temitope Olubunmi & Ayodele 94 Robert Dr East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1909-111	Astmann Roger 11 Mansfield Rd North Haven, CT 06473	$.69	$2.20	
2. 150-1810-005	Avila Israel & Tara & Sv 86 Victor St East Haven, CT 06512	$.69	$2.20	
3. 027/ 0908/ 01300	Azevedo Ann & Manuel (L/U) & Mattei Judith Ann 54 Stewart St New Haven, CT 06512	$.69	$2.20	
4. 033/ 0862/ 02700	Baez Ramon 323 Marion St New Haven, CT 06511	$.69	$2.20	
5. 032/ 0872/ 01700	Bailey Kessler & Mary A & Surv 475 Lighthouse Road New Haven, CT 06512	$.69	$2.20	
6. 014/ 0863/ 03300	Baker Thomas J & Pakula Elizabeth J 1 Townsend Av New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2010-003	Baldie Sanjay H 259 Kenneth St East Haven, CT 06512	$.69	$2.20	
2. 033/ 0862/ 01200	Baliki Gilbert 158 South End Rd New Haven, CT 06512	$.69	$2.20	
3. 030/ 0888/ 01100	Banick William James / Derosia-Banick Kristin Lorelei 94 Parker Pl New Haven, CT 06511	$.69	$2.20	
4. 150-1811-023	Barbetto Nicholas J Iii & Savo Toni A & 55 Osmond St East Haven, CT 06512	$.69	$2.20	
5. 060-0408-007	Barbieri Donna 709 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
5. 150-1910-005	Barbieri Paula 67 Juniper Dr North Haven, CT 06473	$.69	$2.20	

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1. 028/ 0895/ 00300	Barile Amy 97 Burr St New Haven, CT 06512	$.69	$2.20	
2. 015/ 0876/ 01800	Baroncini Charlene 19 Townsend Av New Haven, CT 06512	$.69	$2.20	
3. 015/ 0876/ 01800	Baroncini Vincenza Est / C/O Barecchia Marie 53 Ridgewood Terr North Haven, CT 06473	$.69	$2.20	
4. 021/ 0920/ 02911	Barrett Barbara J 42 Laura La New Haven, CT 06512	$.69	$2.20	
5. 021/ 0928/ 01500	Barrett Barbara J 42 Laura La New Haven, CT 06512	$.69	$2.20	
6.180-2010-001	Barrett Michael 84 Landing Place East Haven, CT 06512	$.69	$2.20	

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1. 014/ 0863/ 03400	Barry Padraig 1B Townsend Ave New Haven, CT 06512	$.69	$2.20	
2. 060-0507-006	Basil Thomas A & Lisa & Sv 35 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
3. 029/ 0891/ 01400	Bavaro Gabriella & Masselli Barbara 273 Concord St New Haven, CT 06512	$.69	$2.20	
4. 060-0407-007	Baxter Phillip & Whitney & Sv 12 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 03800	Bayer Jason 127 Concord St New Haven, CT 06512	$.69	$2.20	
6. 028/ 0898/ 01300	Beales Charlotte Anne 75 Girard Av New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0889/ 01300	Beckford Keith 26 Nelson St New Haven, CT 06511	$.69	$2.20	
2. 033/ 0862/ 01900	Beecher Regina L 279 Marion St New Haven, CT 06512	$.69	$2.20	
3. 033/ 0862/ 02000	Beecher Regina L 279 Marion St New Haven, CT 06512	$.69	$2.20	
4. 050-0405-009	Beedle Vincent 15 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
5. 200-2409-002	Bellelo Carl F L/U & Carla F 54 Forest St Ext East Haven, CT 06512	$.69	$2.20	
6. 029/ 0894/ 00100	Bellelo Kenneth R & Joanne 5 Elmer St New Haven, CT 06512	$.69	$2.20	

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1. 150-1610-014	Benevento Matthew J & Debra L & Surv 67 Burgess St East Haven, CT 06512	$.69	$2.20	
2. 028/ 0897/ 02100	Bennett Dwight D 375 Concord St New Haven, CT 06512	$.69	$2.20	
3. 034/ 0852/ 00101	Bergeron Henry J Jr & Karen C 71 Meadow View Rd New Haven, CT 06512	$.69	$2.20	
4. 180-2208-004	Bermeo Pablo Leon & Grau Katia & Sv 60 Forest St Ext East Haven, CT 06512	$.69	$2.20	
5. 150-1710-001	Bermudez Waleska 33 Thompson Ave East Haven, CT 06512	$.69	$2.20	
6. 029/ 0891/ 01600	Bertsos Grigorios L & Nikolia G 281 Concord St New Haven, CT 06512	$.69	$2.20	

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1. 150-1910-002	Beth Hamedrosh Hagodol Bnai Israel The 74 West Prospect St New Haven, CT 06515	$.69	$2.20	
2. 028/ 0898/ 03201	Bianco Gina M 74 Ley St New Haven, CT 06512	$.69	$2.20	
3. 050-0505-013	Bility Omar Ali 35 South End Rd East Haven, CT 06512	$.69	$2.20	
4. 031/ 0880/ 00300	Blomberg David J & Kyle L 78 Concord St New Haven, CT 06512	$.69	$2.20	
5. 060-0507-005	Boahemaa Nana A 36 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
6. 060-0507-001	Bonanno Leonard M & Jean A & Sv 20 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 030/ 0888/ 00700	Bonilla Miguel A 47 Nelson St New Haven, CT 06512	$.69	$2.20	
2. 030/ 0888/ 00600	Bonilla Richard Ii 41 Nelson St New Haven, CT 06512	$.69	$2.20	
3. 014/ 0853/ 00600	Boumargoud Fatima Z & Robles Rolando 157 S End Rd New Haven, CT 06512	$.69	$2.20	
4. 033/ 0862/ 01800	Bowden Timothy J 265 Marion St New Haven, CT 06512	$.69	$2.20	
5. 027/ 0909/ 00200	Boyle Anna 41 Stewart St New Haven, CT 06512	$.69	$2.20	
6. 050-0406-009	Bradley Deborah E 84 South End Rd East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		
	Basil D		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 015/ 0876/ 01400	Bradley Jennifer L & Bradley Shane 11 Townsend Av New Haven, CT 06512	$.69	$2.20	
2. 029/ 0894/ 00900	Bradley Lee Angelo 118 Myron St New Haven, CT 06512	$.69	$2.20	
3. 032/ 0878/ 00200	Brady Amy & Scherstuhl Alan 70 Concord St New Haven, CT 06512	$.69	$2.20	
4. 029/ 0889/ 00900	Brasile Lisa 105 Summit St North Branford, CT 06471	$.69	$2.20	
5. 034/ 0852/ 02100	Brenes Jordan 7 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
6. 150-1910-008	Brereton Daniel J & Maria H & Sv 23 Duncan St East Haven, CT 06512	$.69	$2.20	

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	Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1811-022	Bronson Charles Thomas & Elaine Simoes 122 Thompson Ave East Haven, CT 06512	$.69	$2.20	
2. 028/ 0898/ 03000	Bruno Diane R & Michael 94 Ley St New Haven, CT 06512	$.69	$2.20	
3. 028/ 0897/ 02200	Bruno Teresa (Lu) 383 Concord St New Haven, CT 06512	$.69	$2.20	
4. 022/ 0928/ 00203	Brunson Jeffrey C & Brunson Cassandra 155 Huntington Rd New Haven, CT 06511	$.69	$2.20	
5. 150-1909-112	Bucci Joseph T & Grant Melodye & Sv 158 Warner St Hamden, CT 06514	$.69	$2.20	
6. 031/ 0880/ 00200	Burack Cheryl 80 Concord St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Boxed D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1611-013	Burroughs Michael & Gina L & Surv 2 Edgar St East Haven, CT 06512	$.69	$2.20	
2. 150-1909-007	Burwell Lisa 10 Washington Ave East Haven, CT 06512	$.69	$2.20	
3. 200-2508-003	Burwell Nicole A 140 Burr St East Haven, CT 06512	$.69	$2.20	
4. 020/ 0917/ 00201	Burwood Hill Unitowners Assoc Inc 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
5. 020/ 0917/ 00202	Burwood Hill Unitowners Assoc Inc 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
6. 020/ 0917/ 00203	Burwood Hill Unitowners Assoc Inc 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	

See Reverse for Instructions

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0898/ 01800	Bussey Tavares 105 Girard Av New Haven, CT 06512	$.69	$2.20	
2. 030/ 0888/ 01000	Cable Allen & Gail 100 Parker Pl New Haven, CT 06512	$.69	$2.20	
3. 180-2108-009	Cabrera Cabrera Luis 277 Dodge Ave East Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 01400	Cabrera Carmen E & Gina L 44 Morris Cswy New Haven, CT 06512	$.69	$2.20	
5. 150-1611-024	Cacioppo Michael 14 Edgar St East Haven, CT 06512	$.69	$2.20	
6. 015/ 0876/ 00400	Cakir Emirhan R 31 Morris Causeway New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1910-014	Calamita Beverly Trustee 242 Kenneth St East Haven, CT 06512	$.69	$2.20	
2. 180-2308-007	Calle Sandra M 102 Forest St Ext East Haven, CT 06512	$.69	$2.20	
3. 033/ 0862/ 03100	Callender Gillian & Akeem L 341 Marion St New Haven, CT 06512	$.69	$2.20	
4. 180-2309-016	Calonico Jennifer & Leo M & Surv 116 Forest St Ext East Haven, CT 06512	$.69	$2.20	
5. 050-0505-003	Calonico Leo Jr 21 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
6. 032/ 0878/ 00500	Camaplan Administrator FBO / Lark Hesbacher-Tyler Ira 122 E Butler Ave Ste 100 Ambler, PA 19002	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2009-003	Campoverde Alex Atiencia 14 Mckinley Ave East Haven, CT 06512	$.69	$2.20	
2. 050-0406-002	Camputaro Pasquale & Louise & Surv 85 South End Rd East Haven, CT 06512	$.69	$2.20	
3. 034/ 0852/ 01800	Canali Barbara J Barbara J Canali 1/2 19 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
4. 050-0406-006	Canavan Paul S & Doreen J & Surv 64 South End Rd East Haven, CT 06512	$.69	$2.20	
5. 027/ 0913/ 00900	Candela Rocco A & Jeanne Ann 159 Hall St New Haven, CT 06512	$.69	$2.20	
6. 027/ 0904/ 00900	Candido John 60 Killdeer Rd Hamden, CT 06517	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 034/ 0852/ 00700	Cangiano Family LLC 90 South End Rd New Haven, CT 06512	$.69	$2.20	
2. 034/ 0852/ 00900	Cangiano Family LLC 90 South End Rd New Haven, CT 06512	$.69	$2.20	
3. 031/ 0879/ 02200	Caraballo Alice 43 Concord St New Haven, CT 06512	$.69	$2.20	
4. 033/ 0862/ 01300	Carangelo Paul & Rodriguez Lucretia 144 South End Rd New Haven, CT 06512	$.69	$2.20	
5. 027/ 0913/ 01900	Carbone Curt M 530 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
6. 029/ 0891/ 00100	Carbone Diane A (Ttee) / Wilbert & Raffaela Messley Tr 91 Myron St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1810-010	Carfora Christine 89 Victor St East Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 00101	Caro Erica & Samuel 25 Alden St New Haven, CT 06512	$.69	$2.20	
3. 028/ 0895/ 00800	Carr Mary Lou 1832 Dean St New Haven, CT 06512	$.69	$2.20	
4. 031/ 0883/ 00500	Carrano Grace A L/U & Kendall Diane M & Carrano George P Jr & Philip J 26 Eden St New Haven, CT 06512	$.69	$2.20	
5. 200-2407-016	Carreiro John Soares & Soares M Merces 158 Burr St East Haven, CT 06512	$.69	$2.20	
6. 020/ 0917/ 00500	Carreno Ronny & Velez Genny V 374 Burr St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 020/ 0917/ 02800	Carrillo Manuel Ramos 158 Townsend Ter New Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 02400	Carter Stephan Karzair 55 Concord St New Haven, CT 06512	$.69	$2.20	
3. 029/ 0889/ 00100	Casey Rebecca 257 Concord St New Haven, CT 06512	$.69	$2.20	
4. 020/ 0917/ 02600	Castelan-Jimenez Cindy 144 Townsend Ter New Haven, CT 06512	$.69	$2.20	
5. 150-1711-024	Castellano Joseph 4 Maturo Dr East Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 01700	Castellanos Osiris Manrique 7 Concord St New Haven, CT 06513	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0881/ 00200	Castro Rafael 112 Southfield Ave #419 Stamford, CT 06902	$.69	$2.20	
2. 027/ 0909/ 00900	Cavaliere Emiddio & Ann 569 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
3. 150-1910-015	Cawley Lorie Anne Suarez & Christopher 16 Gerald St East Haven, CT 06512	$.69	$2.20	
4. 180-2009-004	Celentano Robert 12 Washington Ave East Haven, CT 06512	$.69	$2.20	
5. 021/ 0928/ 00400	Celentano Vincent D 987 Hillsboro Mile Hillsboro, FL 33062	$.69	$2.20	
6. 021/ 0928/ 00500	Celentano Vincent D 987 Hillsboro Mile Hillsboro Beach, FL 33062	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1810-017	Cerrone Marcia 62 Osmond St East Haven, CT 06512	$.69	$2.20	
2. 150-1909-107	CFF of New Hampshire 637 Green Hill Rd Madison, CT 06443	$.69	$2.20	
3. 027/ 0904/ 00500	Chapin Thomas D Est / C/O Chapin Mark George Executor 1160 Green Holly Dr Annapolis, MD 21409	$.69	$2.20	
4. 031/ 0879/ 01500	Chavarria Marvin 38 Morris Cswy New Haven, CT 06512	$.69	$2.20	
5. 028/ 0898/ 01600	Chen Daniel H 95 Girard Av New Haven, CT 06512	$.69	$2.20	
6. 031/ 0882/ 00400	Cheng Miao & Dong Yan & Surv 14 Alden St New Haven, CT 06512	$.69	$2.20	

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	Basil Deek		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1610-021	Chiaramonte Ralph S Iii & Mary & Sv 60 Edgar St East Haven, CT 06512	$.69	$2.20	
2. 150-1710-003	Chieppo Rosemary 96 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 180-2309-014	Cianelli Madelyn Est & Lorello Alicia 182 Mclay Ave East Haven, CT 06512	$.69	$2.20	
4. 150-1612-003	Ciarleglio Michael 4 Waldo St East Haven, CT 06512	$.69	$2.20	
5. 200-2407-022	Ciarlelli Dolores 4 Laura Ln East Haven, CT 06512	$.69	$2.20	
6. 180-2308-014	Cifarelli Rosalie Johnson 12 Carmen St East Haven, CT 06512	$.69	$2.20	

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	Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2309-019	Citizens Bank & Trust Company 111 Forest St Ext East Haven, CT 06512	$.69	$2.20	
2. 120-1409-001	City of New Haven 155 Burr St New Haven, CT 06512	$.69	$2.20	
3. 180-2208-006	City of New Haven 155 Burr St New Haven, CT 06512	$.69	$2.20	
4. 014/ 0853/ 00900	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 014/ 0853/ 01000	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
6 .014/ 0853/ 01100	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	

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1. 014/ 0853/ 01200	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
2. 014/ 0853/ 01400	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
3. 015/ 0875/ 00300	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
4. 020/ 0917/ 00100	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 020/ 0917/ 01000	City of New Haven 165 Church St New Haven, CT 06511	$.69	$2.20	
6. 021/ 0919/ 00801	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	

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1. 021/ 0920/ 02901	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
2. 028/ 0895/ 02100	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
3. 028/ 0898/ 02300	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
4. 034/ 0851/ 00600	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 014/ 0853/ 00700	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
6. 014/ 0853/ 01500	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	

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1. 014/ 0863/ 02800	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
2. 019/ 0900/ 00100	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
3. 032/ 0872/ 00100	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
4. 032/ 0873/ 00600	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 013/ 0853/ 00400	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
6. 013/ 0853/ 00500	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	

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1. 014/ 0853/ 00800	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
2. 014/ 0853/ 02700	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
3. 014/ 0853/ 02800	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
4. 014/ 0853/ 02900	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 015/ 0875/ 00100	City of New Haven Airport / City of New Haven 165 Church St NEW HAVEN, CT 06510	$.69	$2.20	
6. 015/ 0875/ 00200	City of New Haven Airport / City of New Haven 165 Church St NEW HAVEN, CT 06510	$.69	$2.20	

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1. 019/ 0900/ 00200	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
2. 020/ 0900/ 00100	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
3. 020/ 0900/ 00200	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
4. 028/ 0900/ 00100	City of New Haven Airport / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 032/ 0873/ 00700	City of New Haven Fire House 16 / City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	
6. 027/ 0904/ 00800	City of New Haven Housing Authority / City of New Haven P O Box 1912 New Haven, CT 06509	$.69	$2.20	

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1. 028/ 0895/ 00100	City of New Haven Housing Authority / City of New Haven P O Box 1912 New Haven, CT 06509	$.69	$2.20	
2. 032/ 0872/ 01000	City of New Haven Housing Authority / City of New Haven P O Box 1917 New Haven, CT 06512	$.69	$2.20	
3. 020/ 0917/ 00901	City of New Haven The 165 Church St New Haven, CT 06510	$.69	$2.20	
4. 032/ 0878/ 01700	City of New Haven The 165 Church St New Haven, CT 06510	$.69	$2.20	
5. 034/ 0851/ 00500	City of New Haven The 165 Church St New Haven, CT 06510	$.69	$2.20	
6. 014/ 0853/ 01300	City of New Haven 165 Church St New Haven, CT 06510	$.69	$2.20	

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1. 027/ 0905/ 00100	Clark Vickiana 5 Stewart St New Haven, CT 06512	$.69	$2.20	
2. 150-1909-101	Cleary Paul 199 Totoket Rd Branford, CT 06405	$.69	$2.20	
3. 150-1711-012	Clince Michael T & Pamela Jo 49 Waldo St East Haven, CT 06512	$.69	$2.20	
4. 200-2408-007	Cloud Jessica V 35 Grove St East Haven, CT 06513	$.69	$2.20	
5. 015/ 0876/ 00500	CMS Realty 2 LLC 565 Ellsworth Ave New Haven, CT 06511	$.69	$2.20	
6. 028/ 0895/ 02000	Coaxum Latesha Shante 349 Concord St New Haven, CT 06512	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2307-007	Codner Myles 47 Holmes St East Haven, CT 06512	$.69	$2.20	
2. 050-0405-025	Cofrancesco Peter & Cofrancesco Jeffrey 31 Canna Dr East Haven, CT 06512	$.69	$2.20	
3. 030/ 0888/ 01800	Colavolpe Nicholas & Janet & Surv 223 Concord St New Haven, CT 06512	$.69	$2.20	
4. 029/ 0894/ 00500	Collaguazo Luis E 1800 Dean St New Haven, CT 06512	$.69	$2.20	
5. 050-0405-015	Collesano Carole B 3 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
6. 150-1909-116	Collins James & Donna & Surv 47 First Ave West Haven, CT 06516	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0917/ 00900	Colombo Marie 180 Townsend Ter New Haven, CT 06512	$.69	$2.20	
2. 180-2308-006	Colon George H & Cesia & Sv 90 Forest Rd Ext East Haven, CT 55344	$.69	$2.20	
3. 033/ 0862/ 02800	Coman Daniel 329 Marion St New Haven, CT 06512	$.69	$2.20	
4. 028/ 0898/ 01900	Condon Laura A 115 Girard Ave New Haven, CT 06511	$.69	$2.20	
5. 150-1810-019	Conn Air Pilot Association 64 Thompson Ave East Haven, CT 06512	$.69	$2.20	
6. 032/ 0878/ 01500	Connecticut Real Estate Associates LLC 35 Townsend Av New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1711-002	Contreras Jefferson G Samaniego & Garcia 51 Edgar St East Haven, CT 06512	$.69	$2.20	
2. 180-2309-013	Conyers Shirley 88 Robert Dr East Haven, CT 06512	$.69	$2.20	
3. 060-0508-002	Coppola Renee 40 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
4. 030/ 0888/ 00800	Cordova Diana & Cordova Joseph 1610 Dean St New Haven, CT 06512	$.69	$2.20	
5. 032/ 0873/ 00500	Co-Rich LLC 67A Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
6. 180-2209-003	Corris Gregory C & Ann M & Surv 24 Robert Dr East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 200-2408-003	Corso Barbara Gaye 2 Carmen St East Haven, CT 06512	$.69	$2.20	
2. 050-0406-005	Coughlin Daniel 45 Canna Dr East Haven, CT 06512	$.69	$2.20	
3. 031/ 0883/ 01300	Coughlin Diane 17 Arden St New Haven, CT 06512	$.69	$2.20	
4. 200-2409-004	Coughlin James Neal Jr & Tescione 36 Forest St East Haven, CT 06512	$.69	$2.20	
5. 050-0505-006	Coyle Thomas J & Emily G & Surv 27 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
6. 150-1909-105	Cozzolino Richard 270 Lane St Hamden, CT 06514	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basil Deek	

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1810-009	Craig Cerella S 93 Victor St East Haven, CT 06512	$.69	$2.20	
2. 180-2308-005	Crespo Vanessa 84 Forest St Ext East Haven, CT 06512	$.69	$2.20	
3. 120-1511-006	Cretella Dominic J & Michele L & Sv 10 Burgess St East Haven, CT 06512	$.69	$2.20	
4. 020/ 0917/ 01301	Cretella Maryann, Davia M & Dominic J 320 Burr St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0882/ 00100	Crisco Mary Est / C/O Laracca Karen 91 Stemway Rd New Haven, CT 06611	$.69	$2.20	
6. 200-2508-004	Criscuolo Ann Marie 136 Burr St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0881/ 00800	Criscuolo Daniel P & Louis J 36 Shoreham Rd New Haven, CT 06512	$.69	$2.20	
2. 150-1710-013	Criscuolo Joann C 83 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 028/ 0896/ 00600	Criscuolo Susan 388 Concord St New Haven, CT 06512	$.69	$2.20	
4. 026/ 0903/ 01800	Criscuolo Zachary J 74 Hyde St New Haven, CT 06512	$.69	$2.20	
5. 028/ 0897/ 01400	Cruz Diane & Antrum Herbert Lee Jr 81 Ley St New Haven, CT 06512	$.69	$2.20	
6. 060-0407-008	Cruz Jahida Kimberly 16 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0889/ 00500	Cruz Yethcika E 29 Alfred St New Haven, CT 06511	$.69	$2.20	
2. 020/ 0917/ 00300	Cruz-Puskas Cristina / Llantin Javier 392 Burr St New Haven, CT 06512	$.69	$2.20	
3. 150-1909-118	CT Aero LLC 46 Crestview Dr Woodbridge, CT 06535	$.69	$2.20	
4. 032/ 0873/ 01500	CT Clinical Services Inc 189 Orange St New Haven, CT 06510	$.69	$2.20	
5. 020/ 0917/ 02200	Cuneo Michael 118 Townsend Ter New Haven, CT 06512	$.69	$2.20	
6. 034/ 0851/ 00302	Curnane James 709 N Greenbrier Dr Orange, CT 06477	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basil Deek	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 020/ 0917/ 01300	Cusack John J Jr & Rosemarie 330 Burr St New Haven, CT 06512	$.69	$2.20	
2. 030/ 0888/ 01400	Czarowski Kathryn A & Jerz John S 74 Parker Pl New Haven, CT 06511	$.69	$2.20	
3. 150-1612-001	Dabbraccio Michael F & Kathleen & S 62 Kenneth St East Haven, CT 06512	$.69	$2.20	
4. 060-0507-003	Dagostino Paula R 28 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
5. 200-2507-014	Dagostino Sherry 1D Charter Oak Ave East Haven, TX 06512	$.69	$2.20	
6. 180-2309-007	Dalbero Anthony A Jr 335 Upson Terrace New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 032/ 0872/ 00900	Daniel Vincent & Donna 8 Townsend Av New Haven, CT 06512	$.69	$2.20	
2. 015/ 0876/ 01600	Daniels Robert N 15 Townsend Av New Haven, CT 06512	$.69	$2.20	
3. 033/ 0861/ 01000	Danna Richard & Karen 308 Marion St New Haven, CT 06512	$.69	$2.20	
4. 027/ 0917/ 00700	Dasilva Agostinho & Cynthia 180 Hall St New Haven, CT 06512	$.69	$2.20	
5. 150-1710-015	Davis Brian D & Renee M & Sv 60 Waldo St East Haven, CT 06512	$.69	$2.20	
6. 180-2010-006	Davis Richard & Michelle & Surv 6 Mckinley Ave East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0913/ 01800	Davis Sean 9 Barnum Ave Norwalk, CT 06851	$.69	$2.20	
2. 150-1610-020	De Gante Juan Flores & Sosa Emma Rojas & 58 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 032/ 0873/ 01700	De Jesus Arroyo Antonio 57 Morris Cove Rd New Haven, CT 06512	$.69	$2.20	
4. 016/ 1303/ 00900	Dean Holdings LLC 1366 Dean St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 00200	Dean Holdings LLC 1366 Dean St New Haven, CT 06512	$.69	$2.20	
6. 150-1910-017	Debenedet Rheta 244 Kenneth St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0898/ 01200	Debiase Richard M & Suraci Sara J 69 Girard Av New Haven, CT 06512	$.69	$2.20	
2. 030/ 0885/ 00300	Debille William F 123 Harral Av Bridgeport, CT 06604-3003	$.69	$2.20	
3. 050-0406-008	Dechane Richard A & Sylvia & Sv 78 South End Rd East Haven, CT 06512	$.69	$2.20	
4. 150-1611-021	Decrosta Steven & Dana & Sv 17 Edgar St East Haven, CT 06512	$.69	$2.20	
5. 050-0505-005	Defala Nicholas 25 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
6. 021/ 0919/ 00200	Defelice Michael 427 Burr St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 200-2507-007	Defilippo Virginia C 10 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
2. 027/ 0909/ 01300	Delbasso Alphonse & Calcagni 220 Burr St New Haven, CT 06512	$.69	$2.20	
3. 028/ 0895/ 01100	Delecke Gerald D Jr 34 Elmer St New Haven, CT 06512	$.69	$2.20	
4. 021/ 0928/ 02000	Deleone Charlotte 10 Laura La New Haven, CT 06511	$.69	$2.20	
5. 060-0408-004	Delfavero Joseph & Ann Marie & Sv 689 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
6. 150-1810-004	Delfranco John T & Geane M & Sv 82 Victor St East Haven, CT 06512	$.69	$2.20	

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1. 031/ 0879/ 02500	Delgado Marvin 61 Concord St New Haven, CT 06512	$.69	$2.20	
2. 180-2010-008	Delguidice Julius & Lynn & Felix & Rose 25 Church St North Branford, CT 06471	$.69	$2.20	
3. 180-2110-001	Delguidice Julius & Lynn & Felix & Rose 25 Church St North Branford, CT 06471	$.69	$2.20	
4. 180-2110-002	Delguidice Julius & Lynn & Felix & Rose 230 Dodge Ave East Haven, CT 06512	$.69	$2.20	
5. 027/ 0917/ 00500	Delieto Marotti Donna Ex 292 Burr St New Haven, CT 06511	$.69	$2.20	
6. 020/ 0917/ 01500	Delieto Victor F & Robin E 175 Townsend Ter New Haven, CT 06512	$.69	$2.20	

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1. 021/ 0932/ 00600	Delillo Marianne & Moore Rosalie & Christopher 24 Carriage Hill Drive Branford, CT 06405	$.69	$2.20	
2. 015/ 0874/ 01300	Delmonaco Cristina 43 Tolli Terrace New Haven, CT 06512	$.69	$2.20	
3. 032/ 0878/ 01800	Delmonaco Marie - Life Use & Delmonaco Pasquale (Title) 450 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
4. 200-2407-014	Delucia Clement A & Linda 18 Bretton St East Haven, CT 06512	$.69	$2.20	
5. 020/ 0917/ 03200	Delvecchio Alfred / Del Vecchio Alfred 176 Townsend Ter New Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 03500	Demaio Cory / Demaio Jeffrey 109 Concord St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1710-014	Demartino James & Mary & Sv 79 Edgar St East Haven, CT 06512	$.69	$2.20	
2. 027/ 0909/ 00100	Dematteis Krystal M 35 Stewart St New Haven, CT 06512	$.69	$2.20	
3. 032/ 0878/ 01200	Dematteo Maureen 700 Townsend Av New Haven, CT 06512	$.69	$2.20	
4. 032/ 0878/ 01300	Dematteo Maureen 700 Townsend Av New Haven, CT 06512	$.69	$2.20	
5. 031/ 0880/ 00400	Demayo Ann 94 Concord St New Haven, CT 06512	$.69	$2.20	
6. 031/ 0881/ 00100	Demchak Anne L 51 Beecher Place New Haven, CT 06512	$.69	$2.20	

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1. 027/ 0913/ 01000	Demichele Carmen Est 23 Christina Lane Westbrook, CT 06448	$.69	$2.20	
2. 031/ 0882/ 01100	Demilo Anthony M 15 Eden St New Haven, CT 06512	$.69	$2.20	
3. 028/ 0895/ 01800	Dempsey Joan G 337 Concord St New Haven, CT 06512	$.69	$2.20	
4. 028/ 0897/ 01200	Denny Kyle J & Donna L 71 Ley St New Haven, CT 06512	$.69	$2.20	
5. 150-1610-013	Depalma Richard & Gloria & Sv 82 Burgess St East Haven, CT 06512	$.69	$2.20	
6. 015/ 0874/ 00200	Depino Alex 17 Johnston St New Haven, CT 06512	$.69	$2.20	

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1. 016/ 1303/ 00901	Depino Arlene M 29 Grieb Rd Wallingford, CT 06492	$.69	$2.20	
2. 033/ 0861/ 01300	Depino Dolores C 286 Marion St New Haven, CT 06512	$.69	$2.20	
3. 150-1910-007	Depukat Gina M 16 Duncan St East Haven, CT 06512	$.69	$2.20	
4. 150-1710-019	Derenzo Patricia E & Paul R & Sv 3 Francis St East Haven, CT 06512	$.69	$2.20	
5. 029/ 0894/ 00201	Derosa George T & Christine F 15 Elmer St New Haven, CT 06512	$.69	$2.20	
6. 200-2408-001	Desai Minesh 20 Carmen St East Haven, CT 06512	$.69	$2.20	

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1. 015/ 0876/ 01500	Desert Investments Ii LLC 13 Townsend Av New Haven, CT 06512	$.69	$2.20	
2. 028/ 0898/ 03400	Desmond Melissa M 68 Ley St New Haven, CT 06511	$.69	$2.20	
3. 026/ 0903/ 01500	Desmond Michael L 87 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
4. 032/ 0872/ 01500	Diamantes Fred & Antigoni & Su 461 Lighthouse Road New Haven, CT 06512	$.69	$2.20	
5. 028/ 0898/ 02200	Diamonte, Evelyn & Salvatore & Surv. 133 Girard Av New Haven, CT 06512	$.69	$2.20	
6. 032/ 0873/ 01100	Diaz Kelly Ann 490 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	

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1. 020/ 0917/ 01800	Diaz Tania N, Diaz Carmen,Diaz Louis 135 Townsend Ter New Haven, CT 06512	$.69	$2.20	
2. 030/ 0885/ 01600	Didychuk Allison Louise & Hays Samuel M 193 Concord St New Haven, CT 06512	$.69	$2.20	
3. 031/ 0879/ 02100	Dielsi Ann M 37 Concord St New Haven, CT 06512	$.69	$2.20	
4. 180-2208-001	Digiusto Felix Jr 28 Kenny Ct East Haven, CT 06512	$.69	$2.20	
5. 180-2308-010	Dimatteo Antoinette 3 Carmen St East Haven, CT 06512	$.69	$2.20	
6. 180-2308-011	Dimatteo Carmen & Maria & Sv 9 Carmen St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2308-019	Dimatteo Carmine & Maria & Surv 9 Carmen St East Haven, CT 06512	$.69	$2.20	
2. 150-1611-025	Diotaiuto Andrew M & Joanne & Surv 6 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 180-2309-005	Dipetto Rosemary 21 Marie Dr East Haven, CT 06512	$.69	$2.20	
4. 032/ 1254/ 00100	Dippold Roland T 1 Douglass Av New Haven, CT 06512	$.69	$2.20	
5. 034/ 0852/ 00100	Dismuke Ryan William 75 Meadow View St New Haven, CT 06512	$.69	$2.20	
6. 180-2307-008	Doering Dawn A & Garrett B & Surv 57 Holmes St East Haven, CT 06512	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0895/ 01300	Dolores Greenspun Irrevocable Trust 24 Elmer St New Haven, CT 06512	$.69	$2.20	
2. 029/ 0889/ 01601	Draughn Shannon 245 Concord St New Haven, CT 06512	$.69	$2.20	
3. 200-2507-011	Duchimaza Justo & Gomez Jeanette & Sv 11 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
4. 032/ 0873/ 01400	Duenkel Sandra Lee 43 Morris Cove New Haven, CT 06512	$.69	$2.20	
5. 021/ 0928/ 01100	Dunn Mary S 62 Laura La New Haven, CT 06512	$.69	$2.20	
6. 032/ 0873/ 01200	Durso Anthony 482 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 032/ 0878/ 01600	Durso Anthony 38 Townsend Av New Haven, CT 06512	$.69	$2.20	
2. 032/ 0873/ 01800	Durso Richard & Anthony 38 Townsend Ave New Haven, CT 06512	$.69	$2.20	
3. 032/ 0873/ 02200	Durso Richard A & Alesandra 38 Townsend Av New Haven, CT 06512	$.69	$2.20	
4. 032/ 0873/ 00100	Durso Richard A & Anthony 38 Townsend Av New Haven, CT 06512	$.69	$2.20	
5. 032/ 0873/ 00200	D'Urso Richard Anthony & Anthony Robert 38 Townsend Av New Haven, CT 06512	$.69	$2.20	
6. 050-0405-023	Duszynski Andrej & Joanna & Sv 30 Canna Dr East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 024/ 0920/ 02701	East Shore Partners LLC 434 Forbes Ave New Haven, CT 06512	$.69	$2.20	
2. 024/ 0920/ 02900	East Shore Partners LLC 434 Forbes Ave New Haven, CT 06512	$.69	$2.20	
3. 028/ 0897/ 00800	Ebba Jamila A 45 Ley St New Haven, CT 06512	$.69	$2.20	
4. 029/ 0889/ 01400	Edenburn-Macqueen Emily E 20 Nelson St New Haven, CT 06512	$.69	$2.20	
5. 016/ 1303/ 00600	Eichorn Joan V & David W Sr 1274 Dean St New Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 00800	Eichorn Joan V & David W Sr 1274 Dean St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0889/ 00200	Elbastawisy Sameh H 554 Boston Post Rd Unit 301 Orange, CT 06477	$.69	$2.20	
2. 150-1710-021	Ellis Tothlyn 63 Waldo St East Haven, CT 06512	$.69	$2.20	
3. 180-2307-012	Emond Peter & Connie & Surv 16 Bretton St East Haven, CT 06512	$.69	$2.20	
4. 150-1710-024	England George A & Tammy L & Surv 75 Burgess St East Haven, CT 06512	$.69	$2.20	
5. 120-1511-005	Espinoza Edwin 4 Burgess St East Haven, CT 06512	$.69	$2.20	
6. 150-1611-002	Esposito Anthony & Catherine M & Sv 26 Burgess St East Haven, CT 06512	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1911-002	Esposito Francis 188 Kenneth St East Haven, CT 06512	$.69	$2.20	
2. 180-2108-007	Esposito Maria 127 Prospect Rd East Haven, CT 06512	$.69	$2.20	
3. 150-1711-015	Esposito Nicholas Jr & Jennifer & 50 Victor St East Haven, CT 06512	$.69	$2.20	
4. 029/ 0891/ 01500	Eynon Elizabeth E 275 Concord St New Haven, CT 06512	$.69	$2.20	
5. 150-1708-001	FAA 10 Thompson Ave East Haven, CT 06512	$.69	$2.20	
6. 028/ 0898/ 01500	Fabish Kacian & Disturco Stephen Iii 89 Girard Av New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 020/ 0917/ 02000	Fajardo Thomas 223 Hyde St New Haven, CT 06512	$.69	$2.20	
2. 020/ 0917/ 02300	Fajardo-Samaniego Milton Gerardo Zhiminaicela-Loj Blanca I 126 Townsend Ter New Haven, CT 06512	$.69	$2.20	
3. 180-2308-003	Falcigno Robert W 29 William St East Haven, CT 06512	$.69	$2.20	
4. 060-0407-001	Fan-Chiang Wan-Li 722 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
5. 020/ 0917/ 00400	Farace Josephine C 384 Burr St New Haven, CT 06512	$.69	$2.20	
6. 028/ 0898/ 03100	Farez Marco Fabian Sanchez 90 Ley St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0905/ 00400	Fazzino Michelle 143 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 02800	Feder Thomas S & Carol Sue 77 Concord St New Haven, CT 06512	$.69	$2.20	
3. 150-1811-004	Felix Laura 47 Victor St East Haven, CT 06512	$.69	$2.20	
4. 032/ 1254/ 00200	Ferraiolo Frank & Adeline & Survivor 2 Townsend Ave New Haven, CT 06512	$.69	$2.20	
5. 021/ 0932/ 00700	Ferrara Anthony G & Carole Ann 35 Laura La New Haven, CT 06512	$.69	$2.20	
6. 150-1710-022	Ferrara Salvatore M & Paula & Surv 57 Waldo St East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		
	Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0909/ 01000	Ferraro Christine & Vincent A 585 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
2. 150-1611-016	Ferraro Elizabeth 46 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 180-2209-010	Ferretti Albert F & Carlona Charlene 31 Robert Dr East Haven, CT 06512	$.69	$2.20	
4. 027/ 0904/ 00400	Ferrucci Julie / Marcucci Alec 85 Hyde St New Haven, CT 06512	$.69	$2.20	
5. 029/ 0889/ 01200	Fertig Stephen C 30 Nelson St New Haven, CT 06512	$.69	$2.20	
6. 020/ 0917/ 01400	Fico Pasquale A & Carmel A 310 Burr St New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basel Deck		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1810-011	Figueroa Henry & Martinez Elizabeth & Sv 85 Victor St East Haven, CT 06512	$.69	$2.20	
2. 034/ 0852/ 00300	Figueroa Ramon & Santiago Isidra 120 South End Rd New Haven, CT 06511	$.69	$2.20	
3. 015/ 0876/ 00300	Filardi Barbara Tr / Barbara Filardi Revocable Living Trust 25 Morris Cswy New Haven, CT 06512	$.69	$2.20	
4. 029/ 0889/ 00700	Filipelli Egisto A Est / C/O Goldberg Daniel 545 Roselawn Ave W Roseville, MN 55113	$.69	$2.20	
5. 029/ 0889/ 00800	Filipelli Egisto A Est / C/O Goldberg Daniel 545 Roselawn Ave W Roseville, MN 55113	$.69	$2.20	
6. 034/ 0852/ 00200	Fiorillo Nina 79 Meadow View St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0896/ 00700	Fisk Richard E & Maria D 66 Burr St New Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 02700	Fitzgerald Edward M 71 Concord St New Haven, CT 06512	$.69	$2.20	
3. 020/ 0917/ 00900	Fitzgerald Edward P & Laura 348 Burr St New Haven, CT 06512	$.69	$2.20	
4. 033/ 0862/ 03300	Flanagan Richard & Flanagan Francine Po Box 120463 East Haven, CT 06512	$.69	$2.20	
5. 028/ 0898/ 02000	Florenzano Patricia A 119 Girard Ave New Haven, CT 06512	$.69	$2.20	
6. 200-2508-002	Flores Julio & Ortiz Mayra & Sv 146 Burr St East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		
	Boscl D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0896/ 00801	Flores Melba & Flores Sandy 60 Burr St New Haven, CT 06512	$.69	$2.20	
2. 032/ 0872/ 01200	Floyd Joanne 8 Douglass Av New Haven, CT 06512	$.69	$2.20	
3. 028/ 0895/ 01700	Flynn Edward & Renee S 331 Concord St New Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 03600	Folkes Oakleigh 111 Concord St New Haven, CT 06512	$.69	$2.20	
5. 180-2209-002	Follo Salvatore & Pamela & Surv 14 Kenny Ct East Haven, CT 06512	$.69	$2.20	
6. 032/ 0878/ 01400	Formanski Realty Holdings LLC 106 Edgewood Dr North Branford, CT 06471	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1611-015	Forsythe Hannah A 16 Edgar St East Haven, CT 06512	$.69	$2.20	
2. 014/ 0863/ 03000	Foster Mark J & Lori W 24 Uriah St New Haven, CT 06512	$.69	$2.20	
3. 180-2309-002	Fox Alden & Dejesus Natalie & Sv 62 Robert Dr East Haven, CT 06512	$.69	$2.20	
4. 150-1710-020	Fraenza John Iii & Rose 73 Thompson Ave East Haven, CT 06512	$.69	$2.20	
5. 027/ 0917/ 00600	Franco Avelino Jr 286 Burr St New Haven, CT 06512	$.69	$2.20	
6. 031/ 0883/ 01500	Franco Patricia Admn 33 Arden St New Haven, CT 06511	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0879/ 04000	Frank Esposito And Jo Ann B / Esposito Irrevocable Trust 17 Alden St New Haven, CT 06512	$.69	$2.20	
2. 150-1610-009	Freedman Real Estate Holdings LLC 142 Summer Ln North Haven, CT 06473	$.69	$2.20	
3. 150-1810-007	Fritsch Walter S Jr & Raffaella M 96 Victor St East Haven, CT 06512	$.69	$2.20	
4. 031/ 0883/ 01200	FSG LLC 415 Lido Blvd Lido Beach, NY 11561	$.69	$2.20	
5. 180-2108-001	Fucci Patrick J 300 Dodge Ave East Haven, CT 06512	$.69	$2.20	
6. 014/ 0863/ 00200	Funaro Edward J & Paula M & Su 11 Douglass Ave New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0405-012	Funaro Frank M Jr & Diane & Surv 9 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
2. 027/ 0909/ 01500	Funaro Mark A & Lisa M 150 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
3. 200-2407-011	Furgalack Anne C 25 Bretton St East Haven, CT 06513	$.69	$2.20	
4. 180-2307-001	Fusco Annette T 25 Holmes St New Haven, CT 06512	$.69	$2.20	
5. 020/ 0918/ 00300	Fusco Annette T Ttee / Fusco Family Trust 25 Holmes St New Haven, CT 06512	$.69	$2.20	
6. 180-2308-016	Fusco Peter 55 Parker Pl New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0862/ 02300	Fusco Thomas G E & Elizabeth 309 Marion St New Haven, CT 06512	$.69	$2.20	
2. 028/ 0897/ 02001	Gabriel Donna 365 Concord St New Haven, CT 06511	$.69	$2.20	
3. 150-1811-003	Gagliardi Anthony & Maria & Surv 51 Victor St East Haven, CT 06512	$.69	$2.20	
4. 028/ 0895/ 00700	Gagliardi Vincent M & Susan L 1836 Dean St New Haven, CT 06512	$.69	$2.20	
5. 150-1610-010	Gagner Kevin 60 Burgess St East Haven, CT 06512	$.69	$2.20	
6. 027/ 0904/ 00600	Gallicchio Joseph A 97 Hyde St New Haven, CT 06512	$.69	$2.20	

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1. 033/ 0862/ 01400	Gallo David L 180 Meadow View St New Haven, CT 06511	$.69	$2.20	
2. 050-0405-021	Gambardella Elizabeth Angela & Elizabeth 22 Canna Dr East Haven, CT 06512	$.69	$2.20	
3. 150-1910-010	Garayua Lilliam L/U & Silva Elizabeth 216 Kenneth St East Haven, CT 06512	$.69	$2.20	
4. 034/ 0852/ 00400	Garcia Rosa E Perez 110 South End Rd New Haven, CT 06512	$.69	$2.20	
5. 150-1909-006	Gargone William Anthony Iii 64 Church Ln Madison, CT 06443	$.69	$2.20	
6. 150-1909-003	Garitta Jean 122 Victor St East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basil D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0894/ 01200	Gates Roy T & Uzzo Concetta & Surv 100 Myron St New Haven, CT 06512	$.69	$2.20	
2. 027/ 0905/ 00600	Gaudino Rita & Jason T 204 Burr St New Haven, CT 06512	$.69	$2.20	
3. 027/ 0908/ 01500	Gayle Kristen Shari 44 Stewart St New Haven, CT 06511	$.69	$2.20	
4. 150-1711-017	Gearity James E 34 Victor St East Haven, CT 06512	$.69	$2.20	
5. 150-1810-002	Gentile Joseph A 70 Victor St East Haven, CT 06512	$.69	$2.20	
6. 050-0406-007	Gentile Stephanie 72 South End Rd East Haven, CT 06512	$.69	$2.20	

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1. 027/ 0913/ 01200	Germe Anthony R & Angela A 274 Burr St New Haven, CT 06512	$.69	$2.20	
2. 150-1910-003	Giammattei Valerie & Gerald R 15 Duncan St East Haven, CT 06512	$.69	$2.20	
3. 180-2209-015	Giglio Simone J & Marilyn A & Surv 41 Robert Dr East Haven, CT 06512	$.69	$2.20	
4. 027/ 0905/ 00300	Ginnetti Antonia M 137 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
5. 020/ 0917/ 00205	Glen Meadow Realty LLC 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
6. 020/ 0917/ 00206	Glen Meadow Realty LLC 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 020/ 0917/ 00207	Glen Meadow Realty LLC 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
2. 020/ 0917/ 00208	Glen Meadow Realty LLC 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
3. 020/ 0917/ 00209	Glen Meadow Realty LLC 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
4. 020/ 0917/ 00204	Glen Meadow Realty LLC / C/O Herman Dostie 23 Mulligan Dr Wallingford, CT 06492	$.69	$2.20	
5. 030/ 0888/ 00900	Glidden Paniel W. 110 Parker Pl New Haven, CT 06512	$.69	$2.20	
6. 150-1909-102	GMG Associates 85 Soundview Ave Madison, CT 06443	$.69	$2.20	

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Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0879/ 02000	Godfrey Scott D & Christyn Gregan 31 Concord St New Haven, CT 06512	$.69	$2.20	
2. 200-2507-009	Goering Robert T & Santana Goering 18 Haines St East Haven, CT 06512	$.69	$2.20	
3. 027/ 0917/ 00400	Gomes Angeliana Bento & Hedivelber Teixeira 296 Burr St New Haven, CT 06512	$.69	$2.20	
4. 180-2010-011	Gomez Romulo Ezequiel Rivera 1 Mckinley Ave East Haven, CT 06512	$.69	$2.20	
5. 200-2507-004	Gonzalez Carmen 108 Laura Ln East Haven, CT 06512	$.69	$2.20	
6. 021/ 0928/ 00100	Gonzalez Carmen 108 Laura La New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0932/ 01100	Goodwin Luci 11 Laura La New Haven, CT 06511	$.69	$2.20	
2. 021/ 0932/ 01200	Goodwin Walter (L/U) / Goodwin Walter Jr 5 Laura La New Haven, CT 06512	$.69	$2.20	
3. 200-2507-001	Goodwin Walter L/U & Walter Jr 5 Laura Ln East Haven, CT 06512	$.69	$2.20	
4. 200-2408-002	Goraieb Anthony & Elsie & Surv 44 Grove St East Haven, CT 06512	$.69	$2.20	
5. 027/ 0909/ 00800	Gosselin Wendy 555 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
6. 020/ 0917/ 00800	Grant Dennis D 354 Burr St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel Deek		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 015/ 0876/ 00600	Greater New Haven Water Pollution Control Authority 345 East Shore Pkwy New Haven, CT 06512	$.69	$2.20	
2. 015/ 0876/ 00700	Greater New Haven Water Polution Control 345 East Shore Parkway New Haven, CT 06510	$.69	$2.20	
3. 032/ 0878/ 00800	Gregorio Mark Anthony 16 Montoya Circle Branford, CT 06405	$.69	$2.20	
4. 050-0406-012	Grenier Ari K 727 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
5. 028/ 0898/ 03200	Griffin Debra 78 Ley St New Haven, CT 06512	$.69	$2.20	
6. 028/ 0895/ 00900	Griffith Lyle 1820 Dean St New Haven, CT 06511	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 032/ 0872/ 00300	Grimes John 20 Townsend Av New Haven, CT 06512	$.69	$2.20	
2. 032/ 0872/ 00600	Gronkiewicz Urzula / Estate of Anna Pelechata 63 Fernwood Rd Hamden, CT 06517	$.69	$2.20	
3. 200-2408-009	Grove Ranch LLC 355 Sackett Point Rd North Haven, CT 06473	$.69	$2.20	
4. 180-2209-001	Gu Yiran 22 Kenny Ct East Haven, CT 06512	$.69	$2.20	
5. 029/ 0891/ 01300	Guerinot Marianne 263 Concord St New Haven, CT 06512	$.69	$2.20	
6. 014/ 0853/ 00200	Guest Craig C 181 South End Rd New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0882/ 00200	Guglielmo Diane 1414 Dean St New Haven, CT 06512	$.69	$2.20	
2. 180-2108-006	Guglietti Vincent E & Wendy & Surv 289 Dodge Ave East Haven, CT 06512	$.69	$2.20	
3. 180-2310-001	Guido Pasquale F & Donna M & Surv 15 Marie Dr East Haven, CT 06512	$.69	$2.20	
4. 050-0405-018	Guidone Wayne D & Catherine S & Surv 6 Canna Dr East Haven, CT 06512	$.69	$2.20	
5. 020/ 0917/ 01700	Guilfoil John M Jr & Rose A 147 Townsend Terrace New Haven, CT 06512	$.69	$2.20	
6. 180-2309-008	Gunneson Nancy 77 Robert Dr East Haven, CT 06512	$.69	$2.20	

See Reverse for Instructions

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basil Deek		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 032/ 0872/ 00400	Gur New Haven II Investments LLC 399 Whalley Ave New Haven, CT 06511	$.69	$2.20	
2. 021/ 0920/ 02909	Gutierrez Pedro N & Castro Maria Isabel 408 Burr St New Haven, CT 06512	$.69	$2.20	
3. 050-0505-001	Gutierrez Stacy E 17 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
4. 027/ 0913/ 01400	Happy Days Holdings 6 LLC 240 Butler St Hamden, CT 06517	$.69	$2.20	
5. 030/ 0888/ 01200	Harlow Renee Michele 80 Parker Pl New Haven, CT 06512	$.69	$2.20	
6. .180-2209-008	Hartman Frederick & Imelda & Sv 11 Emma Rd East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basil, Deel	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0862/ 00100	Hartney Robert 435 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
2. 014/ 0853/ 00310	Hartoumbekis Alexandra & Hartoumbekis Haralambos 173 South End Rd New Haven, CT 06512	$.69	$2.20	
3. 021/ 0928/ 01000	Hartoumbekis Elias 68 Laura La New Haven, CT 06512	$.69	$2.20	
4. 200-2507-003	Hazel Earon 114 Laura Ln East Haven, CT 06512	$.69	$2.20	
5. 029/ 0891/ 00401	Hellyar Kevin & April & Surv 105 Myron St New Haven, CT 06512	$.69	$2.20	
6. 150-1611-010	Hemingway Christopher 19 Burgess St East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel Deek		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2307-014	Henao Juan Camilo Clavijo 17 Bretton St East Haven, CT 06512	$.69	$2.20	
2. 050-0405-019	Heras Heras Jhon 12 Canna Dr East Haven, CT 06512	$.69	$2.20	
3. 021/ 0928/ 01700	Hermanson Catherine, Carusone John J & Capuzzo Mary E 32 Laura La New Haven, CT 06512	$.69	$2.20	
4. 027/ 0909/ 00700	Hernandez Aneidy 535 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
5. 027/ 0913/ 02100	Hernandez Clariza 510 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
6. 032/ 0872/ 01601	Hernandez Hipolito & Knight Robin 471 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		
	Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1910-018	Herrera Victor 255 Kenneth St East Haven, CT 06512	$.69	$2.20	
2. 034/ 0852/ 01000	Herrick Alice M 58 South End Rd New Haven, CT 06512	$.69	$2.20	
3. 034/ 0852/ 01100	Herrick Alice M 58 South End Rd New Haven, CT 06512	$.69	$2.20	
4. 034/ 0852/ 01500	Herrick Alice M 58 South End Rd New Haven, CT 06512	$.69	$2.20	
5. 034/ 0852/ 01600	Herrick Alice M 58 South End Rd New Haven, CT 06512	$.69	$2.20	
6. 034/ 0852/ 01700	Herrick Alice M 58 South End Rd New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Barb D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2109-006	Hevrin Timothy P 16 Robert Dr East Haven, CT 06512	$.69	$2.20	
2. 027/ 0905/ 00900	Hibbard Richard M & Nusdeu Frank 132 Girard Av New Haven, CT 06512	$.69	$2.20	
3. 029/ 0894/ 01000	Higgins Linda C 112 Myron St New Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 01200	Hill Maria 1224 Dean St New Haven, CT 06512	$.69	$2.20	
5. 015/ 0874/ 01400	Hines Donna 24 Douglass Av New Haven, CT 06512	$.69	$2.20	
6. 150-1711-016	Hodge Dienne Elizabeth 42 Victor St East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION

Postmaster, per *(name of receiving employee)*

Basil Deek

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2209-012	Holmes Lawrence Raymond & June Elizabeth 7 Kenny Ct East Haven, CT 06512	$.69	$2.20	
2. 031/ 0882/ 00600	Holub Robert G & Merjave Corinne & Surv 135 Concord St New Haven, CT 06512	$.69	$2.20	
3. 200-2407-018	Hoo Austin & Sara & Sv 174 Burr St East Haven, CT 06512	$.69	$2.20	
4. 060-0407-006	Hood Carra Leah & Hanson Terranz 8 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
5. 180-2109-007	Horton Carol & Robert As Trustee For The 17 Robert Dr East Haven, CT 06512	$.69	$2.20	
6. 031/ 0880/ 00500	Houwari Anwar 90 Concord St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0881/ 00700	Howard-Williams Shalona Alicia & Williams Jermaine 132 Concord St New Haven, CT 06512	$.69	$2.20	
2. 030/ 0885/ 00600	Hughes James P III 210 Reservoir Rd Killingworth, CT 06419	$.69	$2.20	
3. 200-2407-019	Huynh Cau & Chau & Sv 1 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
4. 028/ 0897/ 01700	Hyman Willard D III 110 Burr St New Haven, CT 06512	$.69	$2.20	
5. 150-1611-022	Iannaccone Jo-Ann & Longley Theresa R 10 Waldo St East Haven, CT 06512	$.69	$2.20	
6. 021/ 0928/ 01200	Idarola William A Iii & Rosemary 56 Laura La New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0891/ 01000	Inabinet Juakia C 28 Alfred St New Haven, CT 06512	$.69	$2.20	
2. 150-1910-001	Independent Vilner Lodge Assoc 10 Rock Hill Rd Woodbridge, CT 06525	$.69	$2.20	
3. 033/ 0862/ 00800	Ingraham Annitta Lee 194 South End Rd New Haven, CT 06512	$.69	$2.20	
4. 150-1910-019	Ingraham Robert 1/3 & Anthony 1/3 & 245 Kenneth St East Haven, CT 06512	$.69	$2.20	
5. 029/ 0891/ 01200	Izzo Joseph 16 Alfred St New Haven, CT 06512	$.69	$2.20	
6. 029/ 0894/ 00800	Jaekle Patrica M 124 Myron St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0919/ 00900	Jarrin Jesus Ouidio 401 Burr St New Haven, CT 06512	$.69	$2.20	
2. 028/ 0897/ 01900	Jautz Sharon E & Jautz Ronald K 104 Burr St New Haven, CT 06512	$.69	$2.20	
3. 200-2407-002	Jimenez Maria Hortencia Jimenez 419 Burr St New Haven, CT 06512	$.69	$2.20	
4. 021/ 0919/ 00500	Jimenez Maria Hortencia Jimenez 419 Burr St New Haven, CT 06512	$.69	$2.20	
5. 033/ 0862/ 00700	Johnson Iris D 210 South End Rd New Haven, CT 06512	$.69	$2.20	
6. 030/ 0885/ 00100	Johnson James & Margolin Laura 201 Concord St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0905/ 00800	Johnson Melinda 140 Girard Av New Haven, CT 06511	$.69	$2.20	
2. 150-1710-016	Johnson Robert J Jr 66 Waldo St East Haven, CT 06512	$.69	$2.20	
3. 180-2010-009	Jones Albert E & Betty A & Surv 9 Mckinley Ave East Haven, CT 06512	$.69	$2.20	
4. 150-1909-113	JTMRL LLC 41 Washington St East Haven, CT 06512	$.69	$2.20	
5. 033/ 0862/ 02400	Juliano Jay 747 Forest Rd North Branford, CT 06472	$.69	$2.20	
6. 033/ 0862/ 02500	Juliano Jay 315 Marion St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0897/ 01300	Kalk Bruce H 77 Ley St New Haven, CT 06512	$.69	$2.20	
2. 027/ 0909/ 00500	Karavas Phyllis A 57 Stewart Street New Haven, CT 06512	$.69	$2.20	
3. 033/ 0862/ 01100	Karmelowicz Steve 132 Renees Way Guilford, CT 06437	$.69	$2.20	
4. 150-1609-008	Kay Thavy 90 Burgess St East Haven, CT 06512	$.69	$2.20	
5. 029/ 0894/ 01300	Kidd Leroy 96 Myron St New Haven, CT 06512	$.69	$2.20	
6. 014/ 0853/ 00400	Kilfeather Francis 165 South End Rd New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0406-011	Klein Lisa B Tr 735 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
2. 028/ 0897/ 01600	Kluth Deborah 95 Ley St New Haven, CT 06512	$.69	$2.20	
3. 029/ 0889/ 01100	Kluth Laura 40 Nelson St New Haven, CT 06512	$.69	$2.20	
4. 016/ 1303/ 00601	Klutsey Victor & Klutsey Belinda & Surv 1264 Dean St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 00801	Klutsey Victor & Klutsey Belinda & Surv 1264 Dean St New Haven, CT 06512	$.69	$2.20	
6. 150-1611-003	Kohloff Jean 22 Burgess St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 014/ 0863/ 00100	Kozin Bohdan & Marilyn G & Surv 5 Douglass Ave New Haven, CT 06512	$.69	$2.20	
2. 150-1709-001	KR Robinson Associates LP 40 Thompson Ave East Haven, CT 06512	$.69	$2.20	
3. 150-1709-002	KR Robinson Associates LP 50 Thompson Ave East Haven, CT 06512	$.69	$2.20	
4. 150-1809-003	KR Robinson Associates LP 50 Thompson Ave East Haven, CT 06512	$.69	$2.20	
5. 060-0407-005	Kraft John & Innocenti Joelle M & Sv 717 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
6. 029/ 0894/ 01600	Kryvoruchko Andrii & Velbytska Iryna & Surv 307 Concord St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 026/ 0903/ 01700	Lachat Arthur 82 Hyde St New Haven, CT 06512	$.69	$2.20	
2. 029/ 0889/ 01600	Laird Kathryn M 239 Concord St New Haven, CT 06512	$.69	$2.20	
3. 180-2307-011	Lall Parmanand G 409 Burr St East Haven, CT 06512	$.69	$2.20	
4. 021/ 0919/ 00800	Lall Parmanand G 409 Burr St New Haven, CT 06512	$.69	$2.20	
5. 150-1611-007	Lane Kenneth H 35 Burgess St East Haven, CT 06512	$.69	$2.20	
6. 150-1611-019	Lang Nicholas 18 Amsterdam Ave #3 Bridgeport, CT 06606	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0895/ 01500	Langello Anthony L 44 Lookout Dr Colchester, CT 06415	$.69	$2.20	
2. 150-1611-009	Lapointe Michael E & Rebecca & Sv 25 Burgess St East Haven, CT 06512	$.69	$2.20	
3. 180-2209-014	Larch Jordan 519 Stonecreek Dr Charleston, SC 29414	$.69	$2.20	
4. 180-2307-009	Laudano Angelina L/U & John & Donato & 67 Holmes St East Haven, CT 06512	$.69	$2.20	
5. 150-1811-011	Laudano Celia F 34 Osmond St East Haven, CT 06512	$.69	$2.20	
6. 180-2209-016	Lauria Anthony J Iii & Kimberly E 47 Robert Dr East Haven, CT 06512	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0909/ 01200	Lauria Arlene 226 Burr St New Haven, CT 06512	$.69	$2.20	
2. 032/ 0878/ 00300	Lema Fernando Carrasco 66 Concord St New Haven, CT 06511	$.69	$2.20	
3. 180-2309-018	Lemos Debora G & Toral Juan P & Sv 108 Forest St Ext East Haven, CT 06512	$.69	$2.20	
4. 027/ 0913/ 01100	Leonetti Frank J & Dolores 175 Hall St New Haven, CT 06512	$.69	$2.20	
5. 029/ 0894/ 00600	LH Development Group LLC 401 Ryland St Suite 200-A Reno, NV 89502	$.69	$2.20	
6. 029/ 0894/ 00701	LH Development Group LLC 401 Ryland St Suite 200-A Reno, NV 89502	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 060-0407-009	Liburd Nancy & Reuben & Sv 15 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
2. 200-2408-010	Lima Jose Vicente 161 Burr St East Haven, CT 06512	$.69	$2.20	
3. 031/ 0882/ 00700	Limone Dana T 141 Concord St New Haven, CT 06513	$.69	$2.20	
4. 031/ 0880/ 00600	Locke Joseph & Kelly 88 Concord St New Haven, CT 06512	$.69	$2.20	
5. 150-1811-013	Loiseau Daphne 26 Osmond St East Haven, CT 06512	$.69	$2.20	
6. 180-2011-001	Long Gardens LLC 281 Chapel St New Haven, CT 06513	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basil Deek		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0861/ 01400	Longobardi Fortunata R 280 Marion St New Haven, CT 06512	$.69	$2.20	
2. 021/ 0928/ 00800	Longobardi Gerald 76 Laura La New Haven, CT 06512	$.69	$2.20	
3. 028/ 0898/ 01100	Lopez Cecelia & Angulo Jocelyn & Surv 63 Girard Av New Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 02600	Lopez Luis Eduardo 67 Concord St New Haven, CT 06512	$.69	$2.20	
5. 150-1909-117	Lopez Maximo 811 North High St East Haven, CT 06512	$.69	$2.20	
6. 060-0407-014	Lopez Yolanda 47 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	

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Board Desk

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2307-013	Loung Tai Ngoc & Thiem Thi 9 Bretton St East Haven, CT 06512	$.69	$2.20	
2. 060-0408-009	Lucatino Aldo & Lauren & Sv 56 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
3. 180-2308-013	Lucatino Vincent & Judite & Sv 39 Holmes St East Haven, CT 06512	$.69	$2.20	
4. 180-2209-005	Lucci Sandra P 23 Robert Dr East Haven, CT 06512	$.69	$2.20	
5. 200-2407-004	Lucibello Joseph 437 Burr St New Haven, CT 06512	$.69	$2.20	
6. 021/ 0919/ 00100	Lucibello Joseph 437 Burr St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0904/ 00200	Lucibello Michael D & Marian 77 Hyde St New Haven, CT 06512	$.69	$2.20	
2. 150-1811-012	Lucibello Richard M Jr 30 Osmond St East Haven, CT 06512	$.69	$2.20	
3. 180-2010-005	Lugo Madeline & Ramos Juan 10 Mckinley Ave East Haven, CT 06512	$.69	$2.20	
4. 150-1612-002	Luna Lisa J & Jorge & Sv 66 Kenneth St East Haven, CT 06512	$.69	$2.20	
5. 028/ 0897/ 00900	Luna Madeline 51 Ley St New Haven, CT 06511	$.69	$2.20	
6. 028/ 0898/ 01000	Lybeck Karen R 31 Surrey Lane Branford, CT 06405	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2309-006	Lynch Joanne 65 Robert Dr East Haven, CT 06512	$.69	$2.20	
2. 060-0407-012	Macdonald Jean M 62 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
3. 180-2307-015	Magbaleta Efran Delbert B & Arlene G 18 Holmes St New Haven, CT 06512	$.69	$2.20	
4. 021/ 0919/ 01000	Magbaleta Efren Delbert B & Arlene G 18 Holmes St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 03400	Mahon Jeff / Mahon William 107 Concord St New Haven, CT 06512	$.69	$2.20	
6. 150-1810-015	Maio Kimberly 106 Thompson Ave East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0894/ 00700	Majors Shirley A 130 Myron St NEW HAVEN, CT 06512	$.69	$2.20	
2. 028/ 0895/ 00500	Makres Kimberly 109 Burr St New Haven, CT 06512	$.69	$2.20	
3. 034/ 0849/ 01000	Mancini George F & Sabetta Edythe S 143 Meadow View St New Haven, CT 06511	$.69	$2.20	
4. 150-1710-011	Manley Sean M & Heidi J & Surv 91 Edgar St East Haven, CT 06512	$.69	$2.20	
5. 150-1810-008	Manna Alfonse Jr & Francesca & Surv 100 Victor St East Haven, CT 06512	$.69	$2.20	
6. 180-2309-003	Mannochi Ralph F Jr & Dale D & Surv 70 Robert Dr East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 200-2408-008	Mansingh Deo & Dhanmattie & Surv 41 Grove St East Haven, CT 06512	$.69	$2.20	
2. 150-1611-005	Marchitto John J Jr & Teresa & Surv 39 Burgess St East Haven, CT 06512	$.69	$2.20	
3. 180-2009-001	Marchitto Mia Noel 48 Washington Ave East Haven, CT 06512	$.69	$2.20	
4. 029/ 0894/ 00400	Marerro Jonathan 35 Elmer St New Haven, CT 06512	$.69	$2.20	
5. 033/ 0861/ 01200	Marin Yazmin Rosas 296 Marion St New Haven, CT 06512	$.69	$2.20	
6. 033/ 0861/ 00900	Marshall Letisha Ann & Anastasio Mindy (Trustees) 314 Marion St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0904/ 00700	Martens Hollis A & Madelyn C 111 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
2. 033/ 0862/ 01701	Martineau Andrey Julian 168 Meadow View St New Haven, CT 06512	$.69	$2.20	
3. 029/ 0889/ 00400	Martino Gemma T Tr / Gemma T Martino Living Trust 23 Alfred St New Haven, CT 06512	$.69	$2.20	
4. 150-1611-014	Martone Joseph 10 Edgar St East Haven, CT 06512	$.69	$2.20	
5. 031/ 0883/ 00900	Martorelli Christina & Catherine 165 Concord St New Haven, CT 06512	$.69	$2.20	
6. 180-2309-011	Mascola Rosa 100 Robert Dr East Haven, CT 06512	$.69	$2.20	

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1. 050-0405-013	Mase James F 7 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
2. 050-0405-024	Maselli Gerald R & George 14 Virginia Rd East Haven, CT 06512	$.69	$2.20	
3. 029/ 0889/ 00600	Mason-Reinoso Giovanna & Reinoso Edwin 37 Alfred St New Haven, CT 06512	$.69	$2.20	
4. 014/ 0853/ 00500	Masud Syed A 161 South End Rd New Haven, CT 06512	$.69	$2.20	
5. 090-1010-001	Mavis Tire Supply LLC 100 Hillside Ave White Plains, NY 10603	$.69	$2.20	
6. 130-1414-001	Mavis Tire Supply LLC 100 Hillside Ave White Plains, NY 10603	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0883/ 01400	Mazzanti Gennaro & Mazzanti Natalie & Surv 31 Arden St New Haven, CT 06512	$.69	$2.20	
2. 180-2109-005	Mccaul Janet 369 Mansfield Grove Rd East Haven, CT 06512	$.69	$2.20	
3. 060-0507-002	Mcgovern John T & Sharleen & Surv 24 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
4. 027/ 0909/ 01400	Mchugh Laura S & Ventura Lisa C 210 Burr St New Haven, CT 06512	$.69	$2.20	
5. 032/ 0878/ 00900	Mcjunkin Booker T 38 Concord St New Haven, CT 06512	$.69	$2.20	
6. 027/ 0909/ 01100	Mclaughlin Kelly C & Julia K 230 Burr St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0861/ 01100	Mcmanus Elizabeth 300 Marion St New Haven, CT 06512	$.69	$2.20	
2. 031/ 0880/ 00100	Mcnamara Kelly Marie 37 Shoreham Rd New Haven, CT 06512	$.69	$2.20	
3. 200-2407-021	Melendez Yomaira E & Oyola Angle J W Wc 1B Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
4. 032/ 0873/ 00800	Mendez Marcos Binicio Morocho 506 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
5. 028/ 0895/ 00200	Mendillo Jaimee 87 Burr St New Haven, CT 06512	$.69	$2.20	
6. 020/ 0917/ 02400	Mendoza Jimmy 132 Townsend Ter New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 030/ 0888/ 01500	Merchen Alexander & Cavanaugh Patricia 72 Parker Pl New Haven, CT 06512	$.69	$2.20	
2. 031/ 0882/ 01000	Merjave Corinne / Rusieki Wanda Life Use 11 Eden St New Haven, CT 06512	$.69	$2.20	
3. 200-2408-006	Merola Lawrence & Gina R & Surv 29 Grove St East Haven, CT 06512	$.69	$2.20	
4. 015/ 0876/ 01900	Messek Carol Mangino 21 Townsend Av New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 03000	Messina Salvatore L & Laura E Trustees 85 Concord St New Haven, CT 06512	$.69	$2.20	
6. 027/ 0908/ 01600	Mi Casa Properties LLC 120 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	

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1. 060-0408-008	Mihaylov Ivailo & Valia 711 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
2. 200-2407-005	Miller Christopher William 191 Burr St East Haven, CT 06512	$.69	$2.20	
3. 021/ 0919/ 01100	Miller Christopher William 191 Burr St East Haven, CT 06512	$.69	$2.20	
4. 027/ 0913/ 01500	Miller Dashayla 250 Burr St New Haven, CT 06512	$.69	$2.20	
5. 030/ 0885/ 00500	Miller Derek Walter 95 Parker Pl New Haven, CT 06511	$.69	$2.20	
6. 200-2408-004	Mills Frederick 26 Grove St East Haven, CT 06512	$.69	$2.20	

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1. 060-0408-010	Mino George J & Patricia A & Sv L/U & 52 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
2. 028/ 0898/ 03500	Miranda-Ramones Carla 64 Ley St New Haven, CT 06512	$.69	$2.20	
3. 033/ 0862/ 00600	Misiasz Patricia Ann 214 South End Rd New Haven, CT 06511	$.69	$2.20	
4. 200-2408-012	Misurale Anthony & Rhonda & Sv 151 Burr St East Haven, CT 06512	$.69	$2.20	
5. 028/ 0898/ 03300	Modine Michael J & Christy J A 70 Ley St New Haven, CT 06512	$.69	$2.20	
6. 200-2407-006	Moffett Jesse Allen 177 Burr St East Haven, CT 06512	$.69	$2.20	

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1. 031/ 0882/ 00800	Mogollon Margarita 145 Concord St New Haven, CT 06512	$.69	$2.20	
2. 150-1610-022	Molster Randy 62 Burgess St East Haven, CT 06512	$.69	$2.20	
3. 026/ 0903/ 01900	Mongillo Harry V Sr & Linda 76 Girard Av New Haven, CT 06511	$.69	$2.20	
4. 031/ 0879/ 00600	Mongillo Joseph A & May 1294 Dean St New Haven, CT 06512	$.69	$2.20	
5. 050-0505-010	Monroe Property LLC 708 South Ave New Canaan, CT 06840	$.69	$2.20	
6. 021/ 0928/ 01800	Montagna Yvonne & Crespo Jose 24 Laura La New Haven, CT 06512	$.69	$2.20	

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1. 031/ 0881/ 00400	Montorsi Tamira & Vanessa 146 Concord St New Haven, CT 06511	$.69	$2.20	
2. 030/ 0885/ 01500	Moore Leland John & Arthur Ashley 189 Concord St New Haven, CT 06512	$.69	$2.20	
3. 180-2108-008	Moras Richard 281 Dodge Ave East Haven, CT 06512	$.69	$2.20	
4. 200-2508-001	Moreno David A 141 Burr St East Haven, CT 06512	$.69	$2.20	
5. 200-2407-015	Morocho Jose H & Iniguez Elsa M & Sv 154 Burr St East Haven, CT 06512	$.69	$2.20	
6. 180-2110-003	Morra Joseph & Bimonte Joann & Sv 226 Dodge Ave East Haven, CT 06512	$.69	$2.20	

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1. 180-2109-003	Morris Mary Elizabeth 269 Dodge Ave East Haven, CT 06512	$.69	$2.20	
2. 027/ 0917/ 01100	Morrison Myles K & Hie Troyanna M 158 Hall St New Haven, CT 06512	$.69	$2.20	
3. 032/ 0872/ 00500	Morston Sean 16 Townsend Av New Haven, CT 06512	$.69	$2.20	
4. 034/ 0851/ 00200	Mortgage Assets Management LLC 5720 Premier Park Dr West Palm Beach, FL 33407	$.69	$2.20	
5. 032/ 0872/ 00800	Moutamatai Jellout 42 Greenwood St New Haven, CT 06519	$.69	$2.20	
6. 027/ 0905/ 00700	Moye Patrick L Sr 174 Burr St New Haven, CT 06512	$.69	$2.20	

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1. 020/ 0917/ 01600	Munoz Kimberly M / Munoz John F 155 Townsend Ter New Haven, CT 06512	$.69	$2.20	
2. 030/ 0885/ 01300	Murphy Erin 12 Arden St New Haven, CT 06512	$.69	$2.20	
3. 031/ 0882/ 00300	Murphy Sharon E 30 Alden St New Haven, CT 06512	$.69	$2.20	
4. 020/ 0917/ 01100	Musgrove Janis M 340 Burr St New Haven, CT 06512	$.69	$2.20	
5. 014/ 0863/ 00300	Mykins Shannon Lynn 17 Douglass Av New Haven, CT 06512	$.69	$2.20	
6. 180-2208-005	NA 64 Forest St Ext East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basil D	

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1909-002	Nardone Richard & Louisa & Sv 118 Victor St East Haven, CT 06512	$.69	$2.20	
2. 015/ 0874/ 01500	Narracci Richard 20 Douglass Av New Haven, CT 06511	$.69	$2.20	
3. 032/ 0872/ 01300	Naylor Gary & Anna Marie 453 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
4.180-2010-004	Nazario Alphonse V & Kathleen T & Sv 87 Landing Pl East Haven, CT 06512	$.69	$2.20	
5. 150-1710-005	Nazario Vanessa 86 Edgar St East Haven, CT 06512	$.69	$2.20	
6. 033/ 0862/ 00400	Negron Rosemary & Sanchez Eric 230 South End Rd New Haven, CT 06511	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basil D	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 034/ 0852/ 01300	New Haven Land Trust Inc 817 Grand Ave #102 New Haven, CT 06511	$.69	$2.20	
2. 034/ 0852/ 01400	New Haven Land Trust Inc 817 Grand Ave #102 New Haven, CT 06511	$.69	$2.20	
3. 150-1910-012	Nieves Yoland E 28 Duncan St East Haven, CT 06512	$.69	$2.20	
4. 200-2407-020	Nolan Orville & Walker Nolan Renae & Sv 1A Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
5. 027/ 0917/ 01200	Norkawich Peter & Renee 148 Hall St New Haven, CT 06512	$.69	$2.20	
6. 150-1909-004	Northeast Ramp Cooperative Inc 74 Boston Post Rd Madison, CT 06443	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0932/ 00800	Novella Debra L 29 Laura La New Haven, CT 06512	$.69	$2.20	
2. 180-2209-004	Nunez Nelson 22 Robert Dr East Haven, CT 06512	$.69	$2.20	
3. 150-1910-009	Nuzzo Theresa A 65 Osmond St East Haven, CT 06512	$.69	$2.20	
4. 029/ 0891/ 00900	Obrien Sean C & Labonte Cherise 32 Alfred St New Haven, CT 06512	$.69	$2.20	
5. 033/ 0862/ 01500	Ocasio Katiria 174 Meadow View St New Haven, CT 06512	$.69	$2.20	
6. 027/ 0909/ 00400	Oconnell Dolores 49 Stewart Street New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Boad Deck		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0882/ 01200	Ogonowski Frank E Jr & Robert J 25 Eden St New Haven, CT 06512	$.69	$2.20	
2. 031/ 0882/ 01400	Ogonowski Frank Jr & Robert 25 Eden St New Haven, CT 06512	$.69	$2.20	
3. 050-0505-004	Olewicz Mariusz & Zivile & Sv 23 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
4. 029/ 0894/ 00200	Olson Lisa A 7 Elmer St New Haven, CT 06512	$.69	$2.20	
5. 030/ 0885/ 00900	Olson Vernon G & Ruth A 28 Arden St New Haven, CT 06512	$.69	$2.20	
6. 150-1611-011	Orama Carina 13 Burgess St East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Base/D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1811-007	Orozco Juan Luis 103 Thompson Ave East Haven, CT 06512	$.69	$2.20	
2. 028/ 0895/ 01400	Ortega Omar Juarez Sr 20 Elmer St New Haven, CT 06512	$.69	$2.20	
3. 150-1710-008	Ortiz Ivonne & Zhuzhingo Edwin & Sv 59 Thompson Ave East Haven, CT 06512	$.69	$2.20	
4. 033/ 0862/ 00900	Osborne Jennifer L 184 South End Rd New Haven, CT 06512	$.69	$2.20	
5. 030/ 0885/ 00200	Overland Jeffrey E 71 Parker Pl New Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 01900	Ozkan Coskun & Hatice 27 Concord St New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1710-017	Palikuqi Iba 72 Waldo St East Haven, CT 06512	$.69	$2.20	
2. 180-2308-015	Pallazhco Fredy F 18 Carmen St East Haven, CT 06512	$.69	$2.20	
3. 014/ 0853/ 00300	Palmieri Robert Kenneth III 169 South End Rd New Haven, CT 06512	$.69	$2.20	
4. 027/ 0905/ 00200	Palmisano John Paul / Rosarbo Vincent Life Use 21 Stewart St New Haven, CT 06511	$.69	$2.20	
5. 021/ 0928/ 01600	Palumbo James J Jr 38 Laura La New Haven, CT 06512	$.69	$2.20	
6. 027/ 0913/ 00700	Panagrosso Mary (L/U), Giri Joanne Panagrosso Felice & Mario 151 Hall St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0928/ 00300	Pane Louis 34 Whalers Py Rd EastT Haven, CT 06512	$.69	$2.20	
2. 034/ 0851/ 00300	Paniss Luz M 16 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
3. 031/ 0883/ 00400	Passard Petrel Makeda 34 Eden St New Haven, CT 06512	$.69	$2.20	
4. 021/ 0932/ 00200	Pattinson-Chase Wendy Ann & Chase Timothy X 107 Laura La New Haven, CT 06512	$.69	$2.20	
5. 180-2309-015	Pauzano David 76 Robert Dr East Haven, CT 06512	$.69	$2.20	
6. 180-2009-002	Pazmino Wilson & Marcia & Sv 11 Landing Pl East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0505-007	Pecoraro William 29 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
2. 180-2308-002	Pedraza Jose L 1522 Stratford Ave Bridgeport, CT 06607	$.69	$2.20	
3. 200-2407-012	Pel Rachny & Rachna & Prathna & Sv 21 Bretton St East Haven, CT 06512	$.69	$2.20	
4. 014/ 0863/ 00500	Pellegrino Nancy E 29 Douglass Av New Haven, CT 06512	$.69	$2.20	
5. 031/ 0883/ 00100	Pellot Ismarie 41 Arden St New Haven, CT 06512	$.69	$2.20	
6. 180-2209-017	Perdigoto Ana 34 Marie Dr East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0898/ 03600	Perez Celeni & Juan F 54 Ley St New Haven, CT 06512	$.69	$2.20	
2. 180-2208-003	Perez Guzman Carlos Javier 11 Kenny Ct East Haven, CT 06512	$.69	$2.20	
3. 014/ 0853/ 00100	Perez-Ramirez Noe Martin 199 South End Rd New Haven, CT 06512	$.69	$2.20	
4. 028/ 0898/ 01700	Pero Michael V & Carla C 99 Girard Av New Haven, CT 06512	$.69	$2.20	
5. 034/ 0851/ 00400	Perrotti William H & Marie V & 30 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
6. 150-1711-001	Perry Kimberly & Negron Antonio & Sv 75 Edgar St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0506-001	Petonito Angelina Succ Trustee of The 331 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
2. 050-0405-011	Petonito Joseph 11 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
3. 031/ 0883/ 00200	Petrillo Ronald A 518 Racebrook Rd Orange, CT 06477	$.69	$2.20	
4. 031/ 0883/ 00300	Petrillo Ronald A 518 Racebrook Rd Orange, CT 06477	$.69	$2.20	
5. 031/ 0879/ 01701	Petruzzelli Gloria 9 Concord St New Haven, CT 06512	$.69	$2.20	
6. 030/ 0885/ 01400	Pham Julie & Comia Joseph 173 Concord St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 060-0508-001	Pietrosimone Ralph Iii & Pietrosimone 44 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
2. 150-1710-002	Pine Suzanne & Aaron & Sv 100 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 021/ 0932/ 00500	Piotrkowski Shannon & Eileen 87 Laura La New Haven, CT 06512	$.69	$2.20	
4. 150-1611-001	Pirraglia Kerry & Keith & Sv 38 Burgess St East Haven, CT 06512	$.69	$2.20	
5. 180-2108-002	Piscitelli Giuseppe Family Limited 331 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
6. 150-1711-003	Piscitelli Mario A & Rosemarie & Su 48 Waldo St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0932/ 00400	Piscitelli Renne Ann 95 Laura La New Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 00301	Pitsas Alexander 1354 Dean St New Haven, CT 06512	$.69	$2.20	
3. 150-1811-014	Plasencia Edy Ramiro Chiriboga 20 Osmond St East Haven, CT 06512	$.69	$2.20	
4. 031/ 0882/ 00900	Platt Victoria A 151 Concord St New Haven, CT 06512	$.69	$2.20	
5. 180-2109-004	Plaza Edwin 2 Robert Dr East Haven, CT 06512	$.69	$2.20	
6. 031/ 0883/ 00600	Po Marilyn 20 Eden St Hamden, CT 06517	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION

Postmaster, per *(name of receiving employee)* Basel D

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1909-104	Podgwaite Frank 78 Culver Ln North Haven, CT 06473	$.69	$2.20	
2. 015/ 0874/ 01600	Pompano Annette & Pepe Bernadette 3 Townsend Av New Haven, CT 06512	$.69	$2.20	
3. 022/ 0928/ 02000	Pompano John & Joseph & Robert 2 Charter Oak Av East Haven, CT 06512	$.69	$2.20	
4. 200-2507-005	Pompano John 1/3 & Joseph 1/3 & 2 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
5. 200-2507-006	Pompano John 1/3 & Joseph 1/3 & 6 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
6. 150-1910-004	Ponzillo Susan A 12 Gerald St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0879/ 00302	Portillo Luis Adrian Garcia 1330 Dean St New Haven, CT 06512	$.69	$2.20	
2. 150-1611-020	Premier Specialty Foods LLC 25 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 028/ 0898/ 01400	Premium Enterprises LLC 50 Washington St V-4 Norwalk, CT 06854	$.69	$2.20	
4. 150-1610-016	Prete Jeffrey & Karen & Sv 65 Burgess St East Haven, CT 06512	$.69	$2.20	
5. 032/ 0878/ 01100	Pristine Capital 7-11 So Broadway Ste 210 White Plains, NY 10605	$.69	$2.20	
6. 150-1810-018	Proto Ann 64 Osmond St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 033/ 0862/ 02200	Proto Joseph M & Dana M 309 Marion St New Haven, CT 06512	$.69	$2.20	
2. 028/ 0895/ 01000	Proto Michael Sr 40 Elmer St New Haven, CT 06512	$.69	$2.20	
3. 150-1810-006	Quezada Freddy Gustavo 90 Victor St East Haven, CT 06512	$.69	$2.20	
4. 030/ 0885/ 01100	Quilliam Patricia E 20 Arden St New Haven, CT 06512	$.69	$2.20	
5. 150-1811-009	Ragone Carmine & Marion & Surv 112 Thompson Ave East Haven, CT 06512	$.69	$2.20	
6. 150-1810-016	Ramirez Juana 56 Osmond St East Haven, CT 06512	$.69	$2.20	

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1. 150-1710-018	Ranfone Patricia 76 Waldo St East Haven, CT 06512	$.69	$2.20	
2. 150-1810-014	Ranney Patricia M 102 Thompson Ave East Haven, CT 06512	$.69	$2.20	
3. 032/ 0873/ 01600	Raucci Salvatore Jr & Richo Kathleen M 33 Townsend Av New Haven, CT 06512	$.69	$2.20	
4. 050-0505-014	Ravert Donald D Jr 54 Wheaton Rd East Haven, CT 06512	$.69	$2.20	
5. 033/ 0862/ 01600	Reece Tyrone B Jr 170 Meadow View St New Haven, CT 06511	$.69	$2.20	
6. 021/ 0928/ 00700	Reed Marie Courtney 80 Laura Lane New Haven, CT 06512	$.69	$2.20	

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1. 030/ 0888/ 01600	Regan William F Iv & Regan-Yttre Mary J & Surv 68 Parker Place New Haven, CT 06512	$.69	$2.20	
2. 150-1611-017	Regnere Brian K & Lesko Allison J & Sv 54 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 050-0505-002	Reyes Carmelo 19 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
4. 028/ 0895/ 01900	Reyes Teodomiro & Corina 341 Concord St New Haven, CT 06512	$.69	$2.20	
5. 027/ 0909/ 00600	Reynolds John & Sharon Mullen 515 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
6. 021/ 0928/ 02100	Riccio Armand G, Riccio Michael A & Rivard Elizabeth 4 Laura La New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0883/ 00800	Richards Ude 161 Concord St New Haven, CT 06512	$.69	$2.20	
2. 032/ 0872/ 01400	Riendeau David R 457 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
3. 150-1910-016	Rinaldi Maria 246 Kenneth St East Haven, CT 06512	$.69	$2.20	
4. 021/ 0920/ 02904	Rincon Yuly 412 Burr St New Haven, CT 06512	$.69	$2.20	
5. 050-0505-009	Rispoli Andrew 21 South End Rd East Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 00100	Rivera Cesar 31 Alden St New Haven, CT 06512	$.69	$2.20	

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1. 029/ 0894/ 01500	Rivera David & Judith 301 Concord St New Haven, CT 06512	$.69	$2.20	
2. 016/ 1303/ 00800	Rivera Frances 1305 Dean St New Haven, CT 06511	$.69	$2.20	
3. 031/ 0879/ 00300	Rivera Frances 1340 Dean St New Haven, CT 06511	$.69	$2.20	
4. 029/ 0889/ 01000	Rivera Ivan 1870 Pappas Ct Bellmore, NY 11710	$.69	$2.20	
5. 032/ 0872/ 01100	Rivera Lynn Hope 4 Townsend Av New Haven, CT 06512	$.69	$2.20	
6. 180-2308-008	Rivera Silverio 98 Forest St Ext East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Base 1 D	

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2309-004	Rivera Vilma M & Chevalier Noel R & Sv 27 Marie Dr East Haven, CT 06512	$.69	$2.20	
2. 150-1909-109	Rocklen Howard 15 Cross Hollow Rd Woodbridge, CT 06525	$.69	$2.20	
3. 150-1909-119	Rocklen Howard W 15 Cross Hollow Rd Woodbridge, CT 06525	$.69	$2.20	
4. 029/ 0891/ 00400	Rodriguez Hector L 109 Myron St New Haven, CT 06512	$.69	$2.20	
5. 150-1710-004	Rodriguez Jose Anibal Santiago & 90 Edgar St East Haven, CT 06512	$.69	$2.20	
6. 020/ 0917/ 03100	Rodriguez Sammy & Marilyn 172 Townsend Ter New Haven, CT 06512	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 014/ 0853/ 00101	Rodriguez William & Lysie 11 Uriah St New Haven, CT 06512	$.69	$2.20	
2. 200-2407-010	Roldan Crystal 171 Burr St East Haven, CT 06512	$.69	$2.20	
3. 027/ 0908/ 01200	Roldan Victor / Roldan Destiny 495 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
4. 150-1910-020	Roman Felix 237 Kenneth St East Haven, CT 06512	$.69	$2.20	
5. 031/ 0883/ 01100	Roman Mark & Denise M 11 Arden St New Haven, CT 06512	$.69	$2.20	
6. 027/ 0904/ 00300	Ronald W Grant Family Trust 81 Hyde St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1909-005	Rondon Richard & Rafael & Sv 8 Gerald St East Haven, CT 06512	$.69	$2.20	
2. 027/ 0904/ 00100	Rosado Lysette 73 Hyde St New Haven, CT 06512	$.69	$2.20	
3. 150-1909-114	Rose John K & Nina 445 Vineyard Point Rd Guilford, CT 06437	$.69	$2.20	
4. 020/ 0917/ 02100	Ross Latoya 235 Hyde St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0883/ 01000	Rowell Jody Lynn 721 Center St Wallingford, CT 06492	$.69	$2.20	
6. 150-1811-008	Rua Jamie A 97 Thompson Ave East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Basil D		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0928/ 00600	Ruggiero Irene Aka Irene A 86 Laura La New Haven, CT 06512	$.69	$2.20	
2. 030/ 0885/ 01000	Ruland Bao Chau 24 Arden St New Haven, CT 06512	$.69	$2.20	
3. 050-0405-010	Rushing Amy R & Uchendo Stacy N & Sv 13 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
4. 150-1711-011	Russell Anthony A & Lorene M & Sv 45 Waldo St East Haven, CT 06512	$.69	$2.20	
5. 150-1811-010	Russo Thomas & Ferraro Sharon & Sv 105 Thompson Ave East Haven, CT 06512	$.69	$2.20	
6. 060-0408-006	Rustici Melinda & Neal Tina & Sv 705 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 016/ 1303/ 00300	Ryan Maria, Luzzi Cheryl & Ryan Thomas R Jr 1236 Dean St New Haven, CT 06512	$.69	$2.20	
2. 031/ 0879/ 01100	Ryan Maria, Luzzi Cheryl & Ryan Thomas R Jr 1236 Dean St New Haven, CT 06512	$.69	$2.20	
3. 027/ 0913/ 00800	Sacco Frank P & Teresa J 155 Hall St New Haven, CT 06512	$.69	$2.20	
4. 200-2508-005	Salemme Ralph & Mary Ann 4155 Sanora Ln Ormond Beach, FL 32174	$.69	$2.20	
5. 029/ 0891/ 00800	Salinas Rene 38 Alfred St New Haven, CT 06511	$.69	$2.20	
6. 029/ 0891/ 00200	Salvatierra Juan & Vera Brenda & Surv 95 Myron St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)* Base ID		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 028/ 0897/ 01500	Salzo Ann & Rosa Paul D 89 Ley St New Haven, CT 06512	$.69	$2.20	
2. 150-1909-115	San Marco Andrew Po Box 1357 Madison, CT 06443	$.69	$2.20	
3. 031/ 0879/ 00500	Sanabria Roberto 1310 Dean St New Haven, CT 06512	$.69	$2.20	
4. 029/ 0889/ 01800	Sanchez Fausto Antonio 253 Concord St New Haven, CT 06512	$.69	$2.20	
5. 180-2010-010	Sanchez Israel 5 Mckinley Ave East Haven, CT 06512	$.69	$2.20	
6. 180-2309-017	Sanchez Plutarco & Saavedra Rocio 112 Forest St Ext East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0894/ 00300	Santacroce Carol Ttee 25 Elmer St New Haven, CT 06512	$.69	$2.20	
2. 150-1910-011	Santiago Carlos & Rodriguez & Surv 22 Duncan St East Haven, CT 06512	$.69	$2.20	
3. 026/ 0903/ 02000	Santore Stephanie 31 Clark Ave North Haven, CT 06473	$.69	$2.20	
4. 060-0507-007	Santoro Francis John Jr 23 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
5. 032/ 0878/ 01000	Santos Agueda Delos & Arias Sergio E 30 Concord St New Haven, CT 06512	$.69	$2.20	
6. 014/ 0863/ 00400	Sapiente Alphonse Jr 23 Douglass Av New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0928/ 01900	Savage Stephen 5846 Conte Dr Lothian, MD 20711	$.69	$2.20	
2. 020/ 0918/ 00100	Savalgi Raghunandan 393 Burr St New Haven, CT 06511	$.69	$2.20	
3. 020/ 0917/ 01200	Savinelli John A & Patricia & 336 Burr St New Haven, CT 06512	$.69	$2.20	
4. 050-0505-015	Savino Peter J & Heather P & Surv 15 South End Rd East Haven, CT 06512	$.69	$2.20	
5. 180-2209-013	Savo Andrew J 44 Robert Dr East Haven, CT 06512	$.69	$2.20	
6. 150-1609-007	Scalesse Robert J Sr 19 Thompson Ave East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0881/ 00500	Scheneman Glenn F 140 Concord St New Haven, CT 06512	$.69	$2.20	
2. 180-2209-011	Schmidt Cheryl 3 Kenny Ct East Haven, CT 06512	$.69	$2.20	
3. 030/ 0888/ 01300	Schuerfeld Tobie 76 Parker Place New Haven, CT 06512	$.69	$2.20	
4. 200-2507-010	Schwarzer Romona & Horst & Surv 7 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 03100	Scott Aston L III 91 Concord St New Haven, CT 06511	$.69	$2.20	
6. 027/ 0904/ 01000	Scott Shirlene 104 Girard Av New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 027/ 0904/ 01200	Scott Shirlene 104 Girard Av New Haven, CT 06512	$.69	$2.20	
2. 033/ 0861/ 01600	SCS Real Estate Holding LLC 40 Tolli Terrrace New Haven, CT 06512	$.69	$2.20	
3. 029/ 0891/ 01100	Seales Celeste / Salmon Shemar 18 Alfred St New Haven, CT 06512	$.69	$2.20	
4. 060-0408-011	Segovia Javier O & Claudia Z & Sv 48 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
5. 034/ 0852/ 00600	Seiden Richard N 100 South End Rd New Haven, CT 06512	$.69	$2.20	
6. 032/ 0873/ 01300	Selitte Louis A & Susan N & Surv 35 Morris Cove Rd New Haven, CT 06512	$.69	$2.20	

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	Basel D		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1811-020	Serio Andrew & Theresa & Sv 31 Osmond St East Haven, CT 06512	$.69	$2.20	
2. 180-2109-002	Serio Danielle 273 Dodge Ave East Haven, CT 06512	$.69	$2.20	
3. 150-1710-023	Shah Noshaba J & Warda J & Iqra J 39 Thompson Ave East Haven, CT 06512	$.69	$2.20	
4. 031/ 0881/ 00300	Shea Janet S 399 Strong St East Haven, CT 06512	$.69	$2.20	
5. 050-0405-020	Sheehy Marion E Tr 1121-2E Waterbury Rd Cheshire, CT 06410	$.69	$2.20	
6. 150-1811-005	Shnan Mohamed 43 Victor St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 030/ 0888/ 00300	Short Garland 15 Nelson St New Haven, CT 06512	$.69	$2.20	
2. 028/ 0895/ 00600	Shumway Kim B & Donna M 1840 Dean St New Haven, CT 06512	$.69	$2.20	
3. 029/ 0894/ 01100	Sibley Laurel Ann 106 Myron St New Haven, CT 06512	$.69	$2.20	
4. 010-0306-013	Silver Sand LLC 774 Silver Sands Rd East Haven, CT 06512	$.69	$2.20	
5. 020-0107-008	Silver Sands LLC 388 Orange St New Haven, CT 06511	$.69	$2.20	
6. 028/ 0897/ 01000	Silvestro Rita 57 Ley St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0928/ 01400	Silvestro Robert J & Anna T & 46 Laura La New Haven, CT 06512	$.69	$2.20	
2. 180-2109-001	Sim Lev Properties LLC 33 Dixwell Ave Suite 321 New Haven, CT 06511	$.69	$2.20	
3. 180-2010-002	Sime Manuel P 261 Kenneth St East Haven, CT 06512	$.69	$2.20	
4. 021/ 0932/ 01000	Singer Norman H 17 Laura La New Haven, CT 06512	$.69	$2.20	
5. 027/ 0905/ 00500	Skerritt Paul & Yolanda 145 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
5. 030/ 0885/ 01200	Smith Cassie Lee & Jason Marc 14 Arden St New Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1909-110	Snider Tim P.O. Box 3341 Branford, CT 06405	$.69	$2.20	
2. 150-1811-021	Snowden Christopher 111 Thompson Ave East Haven, CT 06512	$.69	$2.20	
3. 024/ 0920/ 01300	Sobko Family Trust Agreement Et Al 102 Townsend Ter New Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 01800	Solli Ralph & Sandra 23 Concord St New Haven, CT 06512	$.69	$2.20	
5. 021/ 0932/ 00100	Solomine Patrick J & Shelly A 115 Laura La East Haven, CT 06512	$.69	$2.20	
6. 200-2507-002	Solomine Patrick J & Shelly A & Sv 115 Laura Ln East Haven, CT 06512	$.69	$2.20	

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1. 032/ 0878/ 02700	Sparks Shane 75 Townsend Av New Haven, CT 06512	$.69	$2.20	
2. 050-0405-022	Stefko Rosemary 26 Canna Dr East Haven, CT 06512	$.69	$2.20	
3. 033/ 0862/ 02100	Stellato Stephen J 307 Marion St New Haven, CT 06512	$.69	$2.20	
4. 032/ 0872/ 01900	Stemler Lana 542 W Wakefield Blvd Winsted, CT 06098	$.69	$2.20	
5. 180-2010-007	Stewart Keisha 2 Mckinley Ave East Haven, CT 06512	$.69	$2.20	
6. 180-2208-002	Stewart Steven M 15 Kenny Ct East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0505-011	Stone Stephen S 42 Canna Dr East Haven, CT 06512	$.69	$2.20	
2. 150-1710-006	Sullivan Amanda E & Schneider Charles H 62 Edgar St East Haven, CT 06512	$.69	$2.20	
3. 030/ 0885/ 00400	Sullivan John C 91 Parker Pl New Haven, CT 06512	$.69	$2.20	
4. 032/ 0873/ 00400	Sullo Margaret 1 3 Et Al 254 Bradley St New Haven, CT 06511	$.69	$2.20	
5. 032/ 0873/ 02100	Sullo Margaret 1/3 Margaret Sullo Tr 1/3 254 Bradley St New Haven, CT 06511	$.69	$2.20	
6. 029/ 0894/ 01400	Sundwall Lisa 297 Concord St New Haven, CT 06511	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 020/ 0917/ 03300	Swane Sarah Est 400 Burr St New Haven, CT 06512	$.69	$2.20	
2. 150-1711-014	Switaj Christine R 52 Victor St East Haven, CT 06512	$.69	$2.20	
3. 150-1810-003	Sygiel Patricia M 76 Victor St East Haven, CT 06512	$.69	$2.20	
4. 028/ 0898/ 02100	Tafuto Michael & Nancy S 125 Girard Av New Haven, CT 06512	$.69	$2.20	
5. 180-2308-012	Taneszio Phyllis A 17 Carmen St East Haven, CT 06512	$.69	$2.20	
6. 150-1811-024	Tapia Carlos F & Argudo Ana R & Sv 128 Thompson Ave East Haven, CT 06512	$.69	$2.20	

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1. 150-1911-001	Tarantelli Lucille 61 Osmond St East Haven, CT 06512	$.69	$2.20	
2. 031/ 0882/ 00401	Targove Margaret W 20 Alden St New Haven, CT 06512	$.69	$2.20	
3. 060-0407-010	Tavares Brandon 9 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
4. 015/ 0874/ 01900	Taveras Sonia 7 Townsend Ave New Haven, CT 06512	$.69	$2.20	
5. 120-1212-003	Tenet Equity Funding SPE I LLC 7332 E Butherus Dr Suite 100 Scottsdale, AZ 85260	$.69	$2.20	
6. 130-1314-001	Tenet Equity Funding SPE I LLC 7332 E Butherus Dr Suite 100 Scottsdale, AZ 85260	$.69	$2.20	

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1. 030/ 0888/ 00100	The Michael And Paula Deponte Living Trust 227 Concord St New Haven, CT 06512	$.69	$2.20	
2. 060-0508-003	Thermatool Corp 31 Commerce St East Haven, CT 06512	$.69	$2.20	
3. 031/ 0879/ 03700	Thomas Sarah Ann & Thomas Nicholas 121 Concord St New Haven, CT 06512	$.69	$2.20	
4. 027/ 0908/ 01400	Thomas Shronda 50 Stewart St New Haven, CT 06512	$.69	$2.20	
5. 016/ 1303/ 00200	Tobia Christopher 1224 Dean St New Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 02900	Tolkin Jaclyn M & Tolkin Samuel 81 Concord St New Haven, CT 06512	$.69	$2.20	

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1. 150-1610-011	Tordo Joshua Michael 64 Burgess St East Haven, CT 06512	$.69	$2.20	
2. 032/ 0873/ 01000	Toro Robert M 496 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
3. 150-1811-001	Torre Doris 56 Victor St East Haven, CT 06512	$.69	$2.20	
4. 021/ 0920/ 02902	Torres Ernesto Figueroa 404 Burr St New Haven, CT 06512	$.69	$2.20	
5. 150-1710-012	Torres Hector Jose Andrade 87 Edgar St East Haven, CT 06512	$.69	$2.20	
6. 150-1810-013	Torres Juan 77 Victor St East Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basil D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0928/ 00900	Torres Kevin R 156 Read St New Haven, CT 06511	$.69	$2.20	
2. 032/ 0872/ 00700	Torres Mary 12 Townsend Av New Haven, CT 06512	$.69	$2.20	
3. 021/ 0932/ 00300	Torres Roberto & Angela 101 Laura La New Haven, CT 06512	$.69	$2.20	
4. 027/ 0913/ 01600	Tortora David J 570 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
5. 150-1610-008	Touch Rathana & Maneth & Sv 42 Burgess St East Haven, CT 06512	$.69	$2.20	
6. 060-0408-012	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	

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Certificate of Mailing — Firm

Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basil Deek		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 060-0608-001	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
2. 090-0911-001	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
3. 120-1412-001	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
4. 180-2308-017	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
5. 180-2308-018	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
6. 200-2407-003	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	

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Name and Address of Sender	TOTAL NO. of Pieces Listed by Sender	TOTAL NO. of Pieces Received at Post Office™	Affix Stamp Here *Postmark with Date of Receipt.*
Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basil Deek	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 200-2407-007	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
2. 200-2407-008	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
3. 200-2407-013	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
4. 200-2409-001	Town of East Haven 250 Main St East Haven, CT 06512	$.69	$2.20	
5. 027/ 0913/ 01700	Tramont Sara Grace Yap 550 Fort Hale Rd New Haven, CT 06512	$.69	$2.20	
6. 031/ 0879/ 03200	Trevino-Ranalli Sandra 109 Concord St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 050-0506-002	Tropeano Jillian 288 East Main St Apt 23 Branford, CT 06405	$.69	$2.20	
2. 034/ 0852/ 0200	Trotman Idris & Cleo 11 Lighthouse Point Ter New Haven, CT 06512	$.69	$2.20	
3. 021/ 0932/ 00900	Truhart John C 23 Laura La New Haven, CT 06512	$.69	$2.20	
4. 020/ 0917/ 02500	Truhart John C Jr & Truhart Dominique 140 Townsend Ter New Haven, CT 06512	$.69	$2.20	
5. 150-1610-018	Tuanthet Supatida 57 Burgess St East Haven, CT 06512	$.69	$2.20	
6. 033/ 0862/ 02600	Tucci Melissa 58 Arthur Rd North Branford, CT 06471	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 150-1909-106	Tucker Aviation LLC 19 Queach Rd Branford, CT 06405	$.69	$2.20	
2. 150-1909-120	Tucker Aviation LLC 19 Queach Rd Branford, CT 06405	$.69	$2.20	
3. 150-1610-019	Turcio Charles 128 Thompson Ave East Haven, CT 06512	$.69	$2.20	
4. 200-2408-005	Turpin Phillip J 44 Duval St East Haven, CT 06512	$.69	$2.20	
5. 180-2307-004	Tweed New Haven Airport Auth 155 Burr St New Haven, CT 06512	$.69	$2.20	
6. 050-0606-001	Tweed New Haven Airport Authority 155 Burr St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2108-004	Tweed New Haven Airport Authority 155 Burr St New Haven, CT 06512	$.69	$2.20	
2. 180-2108-005	Tweed New Haven Airport Authority 155 Burr St New Haven, CT 06512	$.69	$2.20	
3. 180-2307-002	Tweed New Haven Airport Authority 155 Burr St New Haven, CT 06512	$.69	$2.20	
4. 180-2307-006	Tweed New Haven Airport Authority 155 Burr St New Haven, CT 06512	$.69	$2.20	
5. 180-2308-001	Tweed New Haven Airport Authority 155 Burr St New Haven, CT 06512	$.69	$2.20	
6. 021/ 0920/ 02907	Tweed New Haven Airport Authority 434 Burr St New Haven, CT 06511	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0920/ 02910	Tweed New Haven Airport Authority 428 Burr St New Haven, CT 06511	$.69	$2.20	
2. 180-2307-005	Tweed New Haven Airport Authourity 155 Burr St New Haven, CT 06512	$.69	$2.20	
3. 020/ 0918/ 00200	Tweed New Haven Airport Authority of New Haven 155 Burr St New Haven, CT 06512	$.69	$2.20	
4. 150-1810-020	United States Air Force 62 Thompson Ave East Haven, CT 06512	$.69	$2.20	
5. 020/ 0917/ 00600	Urquhart Brian & Lisa A A/K/A Elizabeth A 366 Burr St New Haven, CT 06512	$.69	$2.20	
6. 150-1711-010	Usquiano Andrea 37 Waldo St East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2209-018	Valenti Mary 28 Marie Dr East Haven, CT 06512	$.69	$2.20	
2. 032/ 0878/ 00400	Valentino Antonio & Candela Theresa 60 Concord St New Haven, CT 06512	$.69	$2.20	
3. 200-2408-011	Valladolid Dennis 155 Burr St East Haven, CT 06512	$.69	$2.20	
4. 016/ 1303/ 00700	Vallombroso Robert T & Roseann 1284 Dean Street New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 00700	Vallombroso Roseann E 1284 Dean St New Haven, CT 06512	$.69	$2.20	
6. 031/ 0881/ 00600	Vamvakas Vasiliki & Ponagiotis & Surv 136 Concord St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 031/ 0879/ 01300	Van Hoesen Joshua 50 Morris Cswy New Haven, CT 06512	$.69	$2.20	
2. 020/ 0917/ 03000	Vazquez Allies V 168 Townsend Ter New Haven, CT 06512	$.69	$2.20	
3. 032/ 0878/ 02100	Vazquez Alyssa 53 Townsend Av New Haven, CT 06512	$.69	$2.20	
4. 031/ 0879/ 02300	Vazquez Israel & Vargas Magdalena 49 Concord St New Haven, CT 06512	$.69	$2.20	
5. 027/ 0904/ 01100	Vega Marta 112 Girard Av New Haven, CT 06512	$.69	$2.20	
6. 200-2408-023	Veiras Sophia 152 Burr St East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 060-0407-013	Velardi John & Laura & Sv 55 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
2. 050-0406-004	Verab Margaret 65 South End Rd East Haven, CT 06512	$.69	$2.20	
3. 033/ 0862/ 00500	Vergara Ledda 220 South End Rd New Haven, CT 06512	$.69	$2.20	
4. 020/ 0917/ 02900	Vergati Kevin J & Cynthia 189 Rose St Extension East Haven, CT 06513	$.69	$2.20	
5. 032/ 0873/ 00900	Viccari Benjamin Edmund 502 Lighthouse Rd New Haven, CT 06512	$.69	$2.20	
6. 015/ 0874/ 01700	Viscuso Dominique 3A Townsend Av New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 200-2507-012	Vitello Patricia & Anthony & Sv 3 Charter Oak Ave East Haven, CT 06512	$.69	$2.20	
2. 028/ 0895/ 01200	Vitolo Francine A & Kuchta Eilieen 87 Honeypot Rd West Haven, CT 06516	$.69	$2.20	
3. 021/ 0920/ 02908	Vlake Ronald & Danielle 440 Burr St New Haven, CT 06511	$.69	$2.20	
4. 028/ 0895/ 00400	Void Lorna 103 Burr St New Haven, CT 06512	$.69	$2.20	
5. 027/ 0917/ 00701	Vollano Joseph 177 Townsend Ter New Haven, CT 06512	$.69	$2.20	
6. 027/ 0917/ 01101	Vollano Joseph 177 Townsend Ter New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 030/ 0888/ 00200	Volpato Giuseppe And Bassani Lisa 11 Nelson St New Haven, CT 06511	$.69	$2.20	
2. 015/ 0876/ 00100	VPS Realty LLC 984 Route 9 Suite A9 Parlin, NJ 08859	$.69	$2.20	
3. 028/ 0897/ 01800	Walker William R 888 Tularosa Dr Sierra Vista, AZ 85635	$.69	$2.20	
4. 029/ 0891/ 00300	Wall Jacob 99 Myron St New Haven, CT 06512	$.69	$2.20	
5. 030/ 0885/ 00800	Wallack Kerry E 40 Arden St New Haven, CT 06511	$.69	$2.20	
6. 027/ 0909/ 00300	Walter Angelica 43 Stewart St New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)* Basil Deek		

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 030/ 0888/ 00400	Ward William 177 West Park Av New Haven, CT 06511	$.69	$2.20	
2. 150-1909-103	Waters Denise & Pine Martin & Sv 136 East 61St St #2B New York, NY 10021	$.69	$2.20	
3. 029/ 0891/ 00500	Waters Jule & Darryl 115 Myron St New Haven, CT 06512	$.69	$2.20	
4. 027/ 0917/ 01000	Wengloski Jonathan Andrew 166 Hall St New Haven, CT 06512	$.69	$2.20	
5. 150-1811-006	West Ryan 110 Sea Hill Rd North Branford, CT 06471	$.69	$2.20	
6. 031/ 0879/ 03300	White Kenneth R 101 Concord St New Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	~~1~~,044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basil D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2209-009	Wilcox Leslie & Mark & Sv 15 Emma Rd East Haven, CT 06512	$.69	$2.20	
2. 180-2210-007	Willard Sharon E Aka Oertel Sharon E 1 Emma Rd East Haven, CT 06512	$.69	$2.20	
3. 029/ 0889/ 01700	Williams Donna 219 Concord St New Haven, CT 06512	$.69	$2.20	
4. 030/ 0888/ 01700	Williams Donna 219 Concord St New Haven, CT 06512	$.69	$2.20	
5. 031/ 0879/ 01600	Williams Luke 54 Florence Av New Haven, CT 06512	$.69	$2.20	
6. 150-1811-002	Williams Rachel Krenkel & Brian K & Sv 89 Thompson Ave East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 180-2010-012	Williams Travis 218 Dodge Ave East Haven, CT 06512	$.69	$2.20	
2. 050-0405-014	Willsey Sarah 5 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
3. 150-1611-012	Wolkovitz Michael P 7 Burgess St East Haven, CT 06512	$.69	$2.20	
4. 150-1711-013	Wolofsky Joseph Jr & Susan A & Sv 53 Waldo St East Haven, CT 06512	$.69	$2.20	
5. 050-0505-008	Woodin Justin 31 Stoddard Rd East Haven, CT 06512	$.69	$2.20	
6. 060-0509-002	Woodward S Facilitator Corporation 31 Commerce St East Haven, CT 06512	$.69	$2.20	

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USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 015/ 0876/ 00200	Wrightington Ernest C 19 Morris Cswy New Haven, CT 06512	$.69	$2.20	
2. 060-0407-011	Wu Yijin & Wang Haihua & Sv 5 Roses Farm Rd East Haven, CT 06512	$.69	$2.20	
3. 180-2309-001	Yaccarino David A 56 Robert Dr East Haven, CT 06512	$.69	$2.20	
4. 150-1910-006	Yanza Hernan & Sinchi Chunir Anna L 10 Duncan St East Haven, CT 06512	$.69	$2.20	
5. 021/ 0928/ 01300	Yitayew Fikadu & Nigatu Zewditu 50 Laura La New Haven, CT 06512	$.69	$2.20	
6. 029/ 0891/ 00600	Yohans Carl E Jr 131 Myron St New Haven, CT 06512	$.69	$2.20	

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	Postmaster, per *(name of receiving employee)*	Basil D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 029/ 0891/ 00700	Yohans Carl E Jr 131 Myron St New Haven, CT 06512	$.69	$2.20	
2. 027/ 0909/ 01600	Yoxall Petrina 146 Stuyvesant Av New Haven, CT 06512	$.69	$2.20	
3. 150-1810-012	Yu Carlin & Jadyn & Sv 81 Victor St East Haven, CT 06512	$.69	$2.20	
4. 150-1910-023	Zayas Betzaida M 17 Gerald St East Haven, CT 06512	$.69	$2.20	
5. 014/ 0863/ 03200	Zayas Rafael 1 Townsend Av New Haven, CT 06512	$.69	$2.20	
6. 150-1909-001	Zink Joan E L/U & Onofrio Linda S 110 Victor St East Haven, CT 06512	$.69	$2.20	

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Hoyle, Tanner & Associates, Inc. 150 Dow Street Manchester, NH 03101	1,044	1044	MANCHESTER, NH 03101 APR 25 2025 USPS DOWNTOWN STATION
	Postmaster, per *(name of receiving employee)*	Basel D	

USPS® Tracking Number / Firm-specific Identifier	Address (Name, Street, City, State, and ZIP Code™)	Postage	Fee	Parcel Airlift
1. 021/ 0920/ 02905	Zuniga Adriana & Motyl Orest 416 Burr St New Haven, CT 06512	$.69	$2.20	
2. 200-2407-017	Zuniga Oswaldo E & Gina A & Surv 164 Burr St East Haven, CT 06512	$.69	$2.20	
3. 150-1610-015	Zuo Steven 63 Burgess St East Haven, CT 06512	$.69	$2.20	
4. 028/ 0895/ 00501	Zyla Eugeniuz & Dorota 1850 Dean St New Haven, CT 06512	$.69	$2.20	
5. Chief Elected Official – City of New Haven	Justin Elicker, Mayor City of New Haven 165 Church Street New Haven, CT 06510	$.69	$2.20	
6. Chief Elected Official – Town of East Haven	Joseph Carfora, Mayor Town of East Haven 250 Main Street East Haven, CT 06512	$.69	$2.20	

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 4 – APPLICATION COPY TO MUNICIPALITY

Coon, Deb L.

From: Coon, Deb L.
Sent: Friday, April 25, 2025 3:51 PM
To: jmccarthy@newhavenct.gov; MayorElicker@newhavenct.gov; leslie.radcliffe@sbcglobal.net; mayorsoffice@easthaven-ct.gov; jbodwell@easthaven-ct.gov
Cc: Peace, Kimberly R.
Subject: Tweed New Haven Regional Airport - Wetland Permit Application

Tracking:

Recipient	Delivery
jmccarthy@newhavenct.gov	
MayorElicker@newhavenct.gov	
leslie.radcliffe@sbcglobal.net	
mayorsoffice@easthaven-ct.gov	
jbodwell@easthaven-ct.gov	
Peace, Kimberly R.	Delivered: 4/25/2025 3:51 PM
dc64978b-0d3a-47c3-a62c-57f451b7c87e.metaPublish	

Hello

Tweed New Haven Airport Authority and The New HVN LLC, co-applicants, are submitting a tidal wetland permit application to CT DEEP for a project at Tweed New Haven Regional Airport entitled “Runway Extension and Terminal Expansion”. There will be unavoidable tidal wetland impacts as a result of the project. In accordance with CGS section 22a-32 we are providing you with a copy of the permit application that is being submitted to CT DEEP for these impacts. Due to file size, this application package is available for you to download on our SharePoint site and can be accessed through this link: Tweed New Haven Airport - CT DEEP Wetland Permit Application

Should you have any difficulties accessing the site or downloading the application please feel free to contact me.

Thank you

HOYLE TANNER

Deb Coon
Associate / Environmental Coordinator
dcoon@hoyletanner.com

T: 603-460-5154 • **F**: 603-669-4168
Hoyle Tanner • 150 Dow Street Manchester, NH 03101 • hoyletanner.com

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Coon, Deb L.

From: Microsoft Outlook <MicrosoftExchange329e71ec88ae4615bbc36ab6ce41109e@hoyletanner.com>
To: jmccarthy@newhavenct.gov; MayorElicker@newhavenct.gov; leslie.radcliffe@sbcglobal.net; mayorsoffice@easthaven-ct.gov; jbodwell@easthaven-ct.gov
Sent: Friday, April 25, 2025 3:51 PM
Subject: Relayed: Tweed New Haven Regional Airport - Wetland Permit Application

Delivery to these recipients or groups is complete, but no delivery notification was sent by the destination server:

jmccarthy@newhavenct.gov (jmccarthy@newhavenct.gov)

MayorElicker@newhavenct.gov (MayorElicker@newhavenct.gov)

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Subject: Tweed New Haven Regional Airport - Wetland Permit Application



Tweed New Haven Regional ...

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 7 – EXECUTIVE SUMMARY AND SUPPLEMENTAL NARRATIVE

Introduction

The Tweed New Haven Airport Authority (TNHAA) was created in 1998 by the State of Connecticut (CGS 15-120i) to manage and operate Tweed New Haven Regional Airport (HVN). TNHAA is a public instrumentality and political subdivision of the State. It is the role of TNHAA to maintain and improve HVN as an important economic development asset for the south-central Connecticut region. TNHAA's primary duty is to manage, maintain, supervise and operate HVN and do all things necessary to maintain working relationships with the state, municipalities and persons, and conduct the business of a regional airport, in accordance with applicable statutes and regulations. TNHAA has full control of the operation and management of the airport, including land, buildings and easements by virtue of a lease to the authority by the City of New Haven, which owns the airport. On August 19, 2022, the Authority entered into a long-term Lease & Development Agreement with The New HVN, LLC. TNHAA and The New HVN LLC are co-applicants for this project.

Purpose and Need

The purpose of the project is to improve airfield and terminal area facilities at HVN to accommodate existing and reasonably foreseeable aircraft operations and passenger volumes. The goal of the project is to enhance efficiency and terminal area capacity and alleviate the operational constraints at HVN while ensuring the Airport continues to develop in order to provide an airport facility that reliably and safely offers consistent and adequate level of service for the forecasted demand. The project would allow HVN to respond effectively and efficiently to current needs, future changes, and air service improvements in southern Connecticut. Specifically, the project would address operational constraints through the runway extension and replacement of the existing terminal with a new East Terminal. This would include associated landside (parking and roadways) infrastructure and aircraft parking areas in a manner that efficiently utilizes the available land within the airport developed footprint.

The applicants have identified multiple needs for the project:

- There is a need for increased runway length, apron area and taxilane space. HVN is currently incurring payload / weight penalties due to the existing runway length and taxiway configuration. The proposed changes would reduce costs for existing and anticipated aircraft while complying with FAA safety and design standards.
- There is a need to address and reduce incompatible land use immediately surrounding the terminal area in an effort to mitigate the impact of terminal operations on nearby residential areas.
- There is a need for modern and resilient terminal facilities to comfortably accommodate passenger needs with sufficient gate and apron capacity to efficiently manage existing and forecasted passenger demand and aircraft movement.
- There is a need for efficient and safe terminal roadways and curb frontages within the existing airport boundary to comply with TSA recommendations.
- There is a need to provide sufficient curbside access, adequate parking, and improved traffic flow.
- There is a need to utilize existing Airport property, to avoid land use impacts and environmental impacts to the extent necessary, to accomplish the project.

Project Description

The applicants propose the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways.

The proposed runway improvements (extension and drainage) include:

- Extension of Runway 02-20, which entails approximately an additional 639 feet at the Runway 02 end and 336 feet at the Runway 20 end.
- Adjusting the runway cross-section and profile to be compliant with FAA standards.
- Strengthen the existing runway to meet pavement design requirements of the existing aircraft fleet.
- Incidental grading, stormwater drainage and markings.
- Adjusting and calibrating navigation aids for both runway ends.
- Installing runway edge lighting, guidance signs, and other accessory features to fully comply with FAA design standards.

The proposed East Terminal development includes:

- New East Terminal Building
    - Construction of a new terminal building ("East Terminal") on the east side of the Airport with an approximate gross square footage (SF) (functional area) of 80,000 SF, with four gates and two additional boarding positions (6 total, all ground boarding).
    - Installation/relocation of security fencing and an access gate.
    - Incidental site work, including grading, stormwater management system and connection to existing on-site utilities such as electricity, water, wastewater, telephone and internet, and site work activities.

- New Apron at East Terminal
    - Construction of a new aircraft apron, with an area of approximately 450,000 SF, including ancillary site elements, that would include two Remain Overnight (RON) parking positions and six gate parking positions.
    - Construction of two access taxilanes from the terminal apron to an extended Taxiway A.
    - Incidental site work, including deicing pads, blast deflector fence, grading, stormwater management system and utilities.
    - Removal of a FAA-owned, decommissioned very high frequency omni-directional range (VOR).

- New Vehicle Parking and Access Road
    - Construction of approximately 2,000 new parking spaces with an approximate footprint of 1,042,000 SF, including building support areas, to serve the new East Terminal.
    - Construction of a causeway and a new two-lane (with potential to expand to four lane) airport access road from Proto Drive and associated improvements.
    - Installation of electrical lighting, wayfinding, signage, landscaping associated with new parking.
    - Incidental site work including grading, a stormwater management system and utilities.

The project takes into consideration the Airport's location within the 100-year floodplain and would incorporate resiliency measures, such as raising the finished floor elevation above the 100-year flood elevation, placing key building mechanical systems in a raised mezzanine or roof top location where they would be above flood elevation, and site design considerations to promote drainage and make facilities flood resistant. The proposed East Terminal would be constructed on piers, raising the finished floor elevation above mean sea level. The space below the finished floor elevation would be left open to allow floodwater to pass. Additionally, the project would take place within the airport property and within an

existing airport dedicated easement. The new access road would connect with existing Proto Drive; therefore, minimal construction would occur within public rights of way, and impacted roads would be in the immediate vicinity of the Airport. No private property is intended to be acquired as part of the project.

Alternatives Analysis

An in-depth analysis was performed and is contained within the Environmental Assessment (EA) prepared by McFarland Johnson, dated December 2023. The EA details the alternatives considered, and the evaluation process that was used to select the preferred alternative/project that appropriately addresses the needed facility improvements. Below is a summary of the alternatives analysis for the project.

Runway Extension

The original Master Plan Updated concept for the Runway 02-20 extension considered a 699-foot extension with a 235-foot displaced threshold at the southern end of the runway (Runway 02 end), and a 336-foot extension with a 336-foot displaced threshold at the northern end of the runway (Runway 20 end). The originally proposed runway length took into consideration existing and proposed aircraft utilizing the Airport and FAA Advisory Circular 150/5300-13A design requirements.

During the drafting of the EA, it was determined that the original conceptual design of this alternative would impact approximately 0.44 acre of tidal wetlands near the Runway 02 end. Therefore, additional various concepts were considered for this alternative. The final concept prioritized reducing the length of the proposed runway extension in an effort to avoid direct impacts to tidal wetlands. The selected concept avoids extending the runway into the wetlands while maintaining the design intent of extending Runway 02-20.

After further review and analysis, it was determined that extension at the southern end of the runway (Runway 02 end) design would have an approximate 639-foot extension. For the extension at the northern end of the runway (Runway 20 end), the proposed design would have an approximate 336-foot extension with a 336-foot displaced runway end threshold. The total proposed runway length would be 6,575 feet, which results in a 60-foot reduction in length compared to the original proposal in the 2021 Master Plan Update and avoids direct impacts (0.44 acre) to tidal wetlands. The proposed extension would provide the minimum runway length to meet FAA design standards, remedy the current runway limitations and provide HVN with the necessary infrastructure to accommodate the forecasted operational growth.

Terminal Area Development

The EA analyzed the replacement of the aging terminal building that exists today on the west side of the Airport. Several concepts were considered for this and are as follows:

- Construction of a new off-site airport. This alternative is not feasible or practicable, and it would not address the Purpose and Need of the Proposed Action and would result in higher environmental impacts.

- Relocation of various facilities near the existing Robinson Aviation facilities. Under this scenario, general aviation hangars, maintenance, the airport fire station and the air traffic control tower could be relocated to the west side, and the new terminal area could be constructed in their current location. This was deemed not feasible and impractical due to the expense of relocating all of those facilities. Additionally, the resulting land area would not be sufficient to accommodate

the Proposed Action. Finally, passenger access to this location would most likely be along Thompson Ave., which is impractical (see Access Road discussion below).

HVN is surrounded by residential and commercial development. Undeveloped property adjacent to airport property is almost entirely inland and tidal wetlands. Acquisition of land to construct the new terminal and related facilities entirely in upland areas would require extensive acquisition of occupied residences, commercial developments and relocation of their inhabitants. The massive acquisition of residential communities and/or businesses to allow the Proposed Action to occur entirely in uplands is impractical in terms of the cost and socio-economic impacts on the community. The Purpose and Need for the Proposed Action includes accomplishing the Project without land acquisition. Based on the unacceptable impacts to the community and not meeting the Purpose and Need, acquisition of nearby upland areas to accomplish the project is not considered reasonable or practicable and would result in higher overall environmental impacts. It was not considered further.

The west side location of the existing terminal does not provide sufficient space to develop facilities that meet the Purpose and Need. Nor does it address the land use compatibility concerns of the existing terminal, which is an important element of the Purpose and Need. Redevelopment of the west side was deemed not practical for these reasons. Additionally, developing similar sized facilities (in terms of gross square footage) on the west side within the airport property would require impacting an estimated 3.5 acres of tidal wetlands south of the existing terminal and enclosing approximately 1,200 linear feet of Tuttle Brook. These actions would result in a higher environmental impact than the impacts on the low function and value wetlands affected by the preferred alternative.

Federal Aviation Regulation Part 77 Transitional Surface restricts the height of objects along the sides of Runway 02-20. In considering the west side terminal location alternative, the tail heights of aircraft parked on the terminal apron and height of the proposed terminal are the limiting factors for the location of the terminal apron and terminal building. The terminal and apron cannot move closer to the runway because of the Transitional Surface. Considering the above, the redevelopment of the west side terminal facilities is not reasonable or practical and was not considered further.

- Construction of an East-Side Terminal. The initial concepts for the proposed east side terminal began with the Master Plan Update that was completed in 2021. The Master Plan shows a new terminal and associated facilities, but it predated the addition of Avelo to HVN's airline servicing. Therefore, the proposed facilities in the Master Plan were sized for much smaller activity levels than HVN is currently experiencing. Airline activity at HVN has surged beyond what was forecast, and it has become clear that the original terminal area concepts were undersized to meet demand. A larger terminal, terminal apron, and additional parking are needed to accommodate the demand.

  The final concept presented prioritized focusing on the terminal area development within a previously graded and disturbed area that was formerly occupied by the airfield east of Runway 02-20. The proposed East Terminal site is on a fill section created during the original construction of the airport. Since the original construction in 1929-1931, HVN has been subject to frequent and continuous land disturbance. Most of the airport land was historically filled during construction which converted all disturbed land into uplands. Land disturbances (e.g., excavation, fill, grading, stormwater, and mowing) have included the former use as a runway and taxiway system. Since

the decommissioning of Runway 14-32, land disturbances have included mowing, grading, and other typical airfield maintenance activities. This concept avoids physical land disturbance to the relatively undisturbed land and wetlands surrounding the former airfield, except for a proposed wetland crossing for the new access road to Proto Drive.

New Terminal Access Road

The Runway Safety Area (RSA) associated with the Runway 02-20 end extends from the proposed runway end to the north edge of the airport property. Public roads are prohibited within the RSA; therefore, a publicly accessible ground transportation link between the east and west side on airport property is not feasible.

The only possible ground vehicle access to the west side would be via Dodge Ave and Thompson Ave from the north, or via a new access road from Proto Drive. Access via Thompson Avenue is impractical because it would require terminal area traffic to be routed through residential neighborhoods along Dodge Avenue, Thompson Avenue, and intersecting streets. Additionally, a park (Memorial Field) is located at the critical intersection (Dodge and Thompson Avenues) where most terminal traffic would be routed. It is likely that intersection improvements, including turning lanes, would be required to accommodate the volume of expected traffic). This would entail acquisition of residential land and/or impacts to the Memorial Field, which is a Section 4(f) resource. Finally, access to the terminal area at Thompson Avenue would be the sole means of ingress and egress during an emergency, and multiple paths would be highly preferable. Access via Proto Drive would provide primary access to the terminal area, with Thompson Avenue available for emergency services use.

Using Thompson Avenue as the primary access does not address a key element of the project Purpose and Need of improving land use compatibility with the terminal area. Thompson Avenue access would essentially relocate the access and land use compatibility issues that currently exist on the west side and create an Environmental Justice concern by directing the associated impacts to an Environmental Justice community. Providing public access to the proposed east side terminal area via Thompson Ave was deemed impractical and would result in higher environmental impacts.

The proposed access road from Proto Drive to the east side terminal area utilizes an existing right of way. This access route largely addresses the land use compatibility concerns on the west side and Thompson Avenue by routing airport traffic along Hemingway Avenue and Proto Drive. The predominant land use along this existing corridor is commercial and industrial. Other alternatives would require land acquisition, which is contradictory to the project's Purpose and Need. Additionally, the Tweed New Haven Airport Authority (TNHAA) does not have the ability to use eminent domain in the Town of East Haven to acquire land or right of way; therefore, constructing the access road outside the existing right of way would be entirely contingent on acquiring the land from a willing seller. No practical alternative location is available for the access road.

The concept development for the access road considered various means of crossing the wetland complex located between the proposed terminal area and Proto Drive. Given the site constraints, it was determined that an approximately 300' long causeway over the wetlands would provide the optimum access while minimizing wetland impacts to extent possible. The resulting impact to the freshwater wetland with the proposed alternative would be approximately 0.1 acre, This alternative includes the development of the associated airfield and landside development, including circulation roadways, aircraft apron, taxilanes and other supporting facilities. The terminal aircraft apron would incorporate modern collection infrastructure for spent de-icing fluid. De-icing of commercial aircraft would occur on the

terminal apron, rather than the existing de-icing apron. This alternative provides parking for approximately 4,000 vehicles.

Avoidance and Minimization

Reasonable and practicable development ("build") alternatives are severely limited by several constraints present on airport property. Airside improvements must meet FAA design standards, which dictate the configuration and spacing requirements for the airside facilities. Development alternatives are further limited by space constraints and physical constraints, because alternatives development must focus on the previously developed airfield and preference for minimizing environmental impacts by focusing the wetland impacts on those areas with lowest ecological function and value.

Wetlands

Construction of the new terminal on the east side was common to all of the concepts. The first terminal area concept that fully addressed the EA Purpose and Need was finalized in August 2021. That concept closely resembled the Proposed Action; however, it proposed a total of 11.4 acres of wetland impact, including 2.1 acres of impact to the higher function and value wetlands surrounding the former Runway 14-32 airfield facilities. That concept was modified by eliminating some of the open space between the various facilities and reconfiguring some of the parking. Estimated wetland impacts were reduced by 1.9 acres to a total of 9.5 acres. Additional adjustments were made, most notably by relocating the airport access road to the existing right of way and utilizing a bridge to cross the wetland to Proto Drive. The proposed extension to Runway 02-20 was also reduced by approximately 60 feet. This reduction in the proposed runway length eliminated fresh water and tidal wetland (e.g., fill) impacts.

The net result after reducing the runway extension, relocating the access road and associated modifications to the internal circulation roads was the Proposed Action's 9.31 acres of wetland impact, a reduction from the first concept that fully met the project Purpose and Need. The ecological importance of wetlands often described in terms of their Functions and Values. The Functions and Values of the impacted wetlands are described in the attached Wetland Delineation Report.

Compensatory wetland mitigation requirements are established based on replacing the Functions and Values "lost" due to the proposed wetland impacts. As described in Wetland Delineation Report, the lower Function and Value wetlands are those that have formed on filled, graded, and maintained grassy areas comprised of former airfield. The higher Function and Value wetlands are less disturbed and not maintained. The alternatives development focused on confining wetland impacts to the disturbed lower Function and Value wetlands and avoiding impacting the higher Function and Value wetlands. Impacts to the higher function and value wetlands were reduced as design progressed.

Air Quality

The proposed terminal and aircraft apron are positioned as close to the runway/taxiway system as possible, without violating FAR Part 77 standards to minimize aircraft taxi time. Minimizing taxi time reduces the fuel used during taxi operations and provides a corresponding reduction in emissions and greenhouse gas emissions, thus reducing environmental impacts for the Proposed Action.

Incompatible Use/Environmental Justice

The proposed terminal apron is positioned on the south side of the disturbed area that was the former location of Runway 14-32 to maximize the distance between the aircraft apron and the nearby residential community to the northeast. This positioning minimizes nuisance noise and fumes from terminal apron aircraft operations in the nearby residential community to the north. Additionally, positioning the proposed terminal and parking garage between the terminal apron and the nearby residential community

provides a visual and acoustic barrier between the terminal apron and the residences. The long axis of the proposed terminal building and parking garage are roughly parallel to Burgess Street to maximize the acoustic benefits.

The proposed access road from Proto Drive to the east side terminal area utilizes an existing right of way. This access route largely addresses the land use compatibility concerns on the west side and Thompson Avenue by airport traffic along Hemingway Avenue and Proto Drive. The predominant land use along this existing corridor is commercial and industrial. Other alternatives would require land acquisition, which is contradictory to the project's purpose and need. Additionally, the east terminal complex is located in the Town of East Haven. Constructing the access road in a different location from the proposed right of way would require acquisition of the necessary land. Furthermore, the Tweed New Haven Airport Authority (TNHAA) does not have the ability to use eminent domain in the Town of East Haven to acquire land or right of way; therefore, constructing the access road outside the existing right of way would be entirely contingent on acquiring the land from a willing seller. No practical alternative location is available for the access road.

The terminal building, terminal apron, and parking garage are sited to optimize efficient aircraft operations (reducing noise and air emissions) and provide a buffer between aircraft operations and the nearby neighborhood. The proposed configuration strikes a careful balance between avoidance and minimization of wetland impacts and minimizing other environmental consequences such as impacts to the surrounding community, minimizing air and noise emissions, and eliminating the need for land acquisition to construct the proposed facilities. The facilities meet the minimum size requirements to meet the Purpose and Need and are configured for efficient operations. By focusing impacts on the lowest function and value wetlands, the proposed configuration strikes the optimal balance between these competing environmental consequences.

Resource Identification and Delineation

The existing wetlands at the Project Site were delineated and classified by FHI Studio in 2021 (FHI 2021), McCue Environmental (McCue 2024), and supplemented with information publicly available from the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory mapper (NWI). The Cowardin classification system for wetland and deepwater habitats in the United States was used to classify the wetlands. Impact analysis has been developed based on the Cowardin classification of those wetlands as provided by the wetland scientists that identifies wetlands as freshwater (Inland Wetlands per CT regulations) or tidal/estuarine.

A Jurisdictional Determination was made by the US Army Corps of Engineers pursuant to Section 404 of the Clean Warer Act to identify the limits of jurisdiction for the project area. It was determined that wetlands identified as Wetland 4 and Wetland 5, which are infield wetlands, do not physically touch or abut jurisdictional water and do not have continuous surface connection to such waters via a non-jurisdictional conveyance; these wetlands are non-jurisdictional because they do not meet one or more categories of Waters of the US under 2023 Rule as amended. Wetland 6 was determined to be jurisdictional.

Connecticut state statutes from the 2012 Public Act No. 12-101 include a revision to the State's regulatory jurisdiction under CGS Section 22a-359 changing the regulatory jurisdiction limit from the "high tide line" to the area up to and including the elevation of the "coastal jurisdiction line" (CJL) as determined for the State's major tidal waterbodies. The CJL is not delineated in the field but is a set elevation for each municipality. It also states, "For any tidal, coastal or navigable waters of the state located upstream of a tide gate, weir, or other device that modifies the flow of tidal waters, the coastal jurisdiction line for such

tidal, coastal or navigable waters shall be the elevation of mean high water as found at the downstream location of such device".

A caveat to this statute exists for flood control structures, such as the tide gate on Morris Creek located approximately ¼ mile downstream of the airport to manipulate the flow of water through the tidal wetland system upstream of the tide gate and prevent flooding. In this case, mean high water (MHW) is used as the CJL when the purpose and function of an existing tide control structure reduces the normal reach of the tide upstream, as it does for the project site.

The MHW elevation for the project site was determined in 2008 when the alteration of the tide gate was permitted; since that time, for regulatory and permitting purposes, the agreed upon MHW and CJL for areas upstream of the tide gate within the airport boundary has been 3.5' NGVD which converts to 2.5' NAVD88.

Existing Watershed & Hydrology

The proposed activities lie within Connecticut's South Central Shoreline watershed, specifically in the Farm River local basin subregion. The surrounding water bodies include Morris Creek and Tuttle Brook. Morris Creek flows through a tide gate downstream of the Proposed Project Site before draining into Long Island Sound. The hydrology at the Proposed Project Site is affected by the existing tide gate, which regulates flow both into and out of the Airport's intertidal wetlands.

According to the CT DEEP Eco Viewer, the 12-digit Hydrologic Unit for the Watershed Boundary Dataset for the Proposed Project is: HUC12: 020302030000; Name: Long Island Sound Deep.

Wetlands

The existing salt marsh complex at the project site includes a wetland system with a network of excavated channels and marsh vegetation that is predominantly dominated by *Phragmites australis* (common reed), an invasive species that thrives in altered and low-salinity conditions. There is a limited expanse of mudflat habitat within the existing marsh complex.

According to the FHI 2021 delineation, seven wetlands were delineated within the project site at the Airport, six of which were determined to be inland wetlands, and one which is tidal, as depicted on attached plans. These wetlands provide various functions, including sediment retention, nutrient removal, and flood flow alteration. Some of the inland wetlands within the project site are constructed and linked to the Airport's drainage systems.

The wetland systems primarily drain as follows:

- Wetland 1 drains into Tuttle Brook, a tributary to Morris Creek, which ultimately leads to Long Island Sound.
- Wetlands 2-5 drain into Morris Creek, either through direct surface water or groundwater discharge, similarly leading to Long Island Sound.
- Wetland 7 is tidally influenced and drains directly into Morris Creek and Tuttle Brook, both of which are connected to Long Island Sound.

The following is a descriptive summary of the delineated wetland systems:

1. Wetland 1: Located at the northwestern limit of the Airport, Wetland 1 includes a reach of Tuttle Brook and associated vegetated wetlands. The brook runs through culverts under roads and service areas, and the surrounding wetlands are dominated by persistent emergent vegetation

like broadleaf cattail (*Typha latifolia*) and common reed (*Phragmites australis*). It provides functions such as sediment retention, nutrient removal, and wildlife habitat.

2. Wetland 2: Situated at the northeastern boundary of the Airport near the General Aviation parking area. This wetland includes a red maple (*Acer rubrum*) swamp adjacent to a ditched wetland system. It is seasonally flooded and dominated by stands of Phragmites. Functions include sediment retention and nutrient removal.
3. Wetland 3: A small, shallow basin wetland located between the Air Traffic Control Tower and the East Ramp. It mainly consists of palustrine emergent vegetation and collects runoff. The vegetation includes rushes and grasses, providing limited habitat but retaining water and sediments.
4. Wetland 4: This is a constructed shallow drainage area located near Runway 32 and Taxiways C and H. It consists of palustrine emergent vegetation and is primarily maintained as a mowed area. Its primary hydrological function is collecting runoff from the surrounding impervious surfaces. The wetland has limited ecological value.
5. Wetland 5: Similar to Wetland 4, Wetland 5 is also a shallow drainage area collecting sheet flow runoff. It is dominated by emergent vegetation and maintained as a lawn. Functions include stormwater retention and sediment control.
6. Wetland 6: This wetland has two distinct portions: 6A is a mowed palustrine emergent wetland, while 6B is a forested wetland bisected by Morris Creek. Wetland 6A has low ecological value due to regular mowing, while 6B, which includes more diverse vegetation and hydrology, has slightly higher ecological value.
7. Wetland 7: A large tidal wetland dominated by Phragmites. It is influenced by tidal waters from Morris Creek and Tuttle Brook and provides significant habitat for estuarine species. This wetland also serves important functions in flood flow alteration and fish/shellfish habitat.

In general, these wetlands provide various ecological functions within the salt marsh complex including water retention, nutrient removal, and wildlife habitat, although the more disturbed wetlands (such as Wetlands 4 and 5) have compromised ecological value. Refer to the wetland delineation reports for additional details on functions.

Project Impact

The unavoidable direct and indirect impacts that are under the jurisdiction of the State of Connecticut per Connecticut General Statutes Sections 22a-36 through Sec. 22a-45 and the USACE would result from the construction of the project are as follows:

Wetland #	NWI Classification Code	Impacts CT (acre)	Impacts USACE (acres)*
Wetlands 4, 5 and 6	PEM2J	8.74	4.94
Wetland 6	PSS	0.02	0.01
	PEM Phragmites	0.54	0.54
	PFO1E	0.01	0.01

Total		9.31	5.50

**Because USACE has determined that wetlands 4 and 5, which are PEM wetlands, are not Waters of the United States, the wetland impact that will require permitting under the USACE Individual Permit is 5.50 acres.*

Mitigation

The applicants are entering into Permittee Responsible Mitigation to mitigate for the impact of the proposed project. A Mitigation Plan has been prepared in accordance with the New England District Compensatory Mitigation Standard Operating Procedures dated December 29, 2020 (USACE, 2020) and in accordance with the requirements of 33 C.F.R. Parts 325 and 332, inclusive; it is included in the application package as Attachment 17.

Historically, mitigation has occurred within the airport boundary to address permit conditions from CTDEEP/OLISP permits #200003049-KZ, IW-2000-116, DIV-200003052 and WQC-20000305 within approximately 57 acres of tidal marsh on the west side of the airport along Dean Street and the east side of the airport south of Pig Farm Road as depicted on Figure 3 Prior Mitigation On-Site, that consisted of:

- Installation of approximately 6,700 linear feet of tidal channels that increased the functions of the restoration areas;
- Modification of the tide gate to allow for tidal flows up to 3.5' NGVD; and
- Spraying, cutting and mulching of Phragmites within the tidal restoration areas. In 2013, to address impacts to freshwater and tidal wetlands due to installation of a wildlife fence and installation of cross-culverts under Pig Farm Road, CTDEEP/OLISP Certificate of Permission (COP) #201304084-KZ included mitigation within the east side tidal wetland south of Pig farm Road by:
    - Installing 1,560 linear feet of new approximately 10' wide tidal finger channels; and
    - Tidal wetland enhancement and restoration of 3.8 acres of existing tidal wetlands by spraying, cutting and mulching Phragmites.

After reviewing the site's permitting history, CTDEEP determined that the proposed 28.5 acres of tidal wetland enhancement may be credited toward mitigation at a 5:1 ratio, offsetting 5.7 acres of impact. CTDEEP also determined that any remaining impact areas must be addressed through tidal wetland creation at a 1:1 ratio, resulting in an overall increase in wetland area. Proposed creation is 3.61 acres.

Construction and Erosion/Sediment Control Details

The Construction Sequences offered below are generalized – contractor means and methods may deviate slightly from what is below but plans specifically prohibit any changes that increase wetland impacts.

Construction Sequence – Runway

1. Install erosion control barriers, inlet protection barriers, check dams and construction entrances, prior to the start of any construction.
2. Strip topsoil and stockpile onsite. Install an erosion control perimeter around all stockpiles.
3. Remove existing utilities and protect utilities that will remain.
4. Construct and stabilize excavation and embankment.
5. Excavate pavement box.
6. Install all utilities including drainage and electrical.
7. Install select materials.

8. Inspect and maintain all erosion and sediment control measures. Minimize the extent and duration of exposure of disturbed areas.
9. Install paving course.
10. Install screened loam (4" min.) on all disturbed surfaces and apply permanent seeding.
11. Install pavement markings.
12. Remove trapped sediments from collector devices as appropriate and then remove temporary erosion control measures.
13. Restore contractor staging area and stockpile areas.

Construction Sequence - Terminal

1. Install erosion control barriers, inlet protection barriers, check dams and construction entrances, prior to the start of any construction.
2. Strip topsoil and stockpile onsite. Install an erosion control perimeter around all stockpiles.
3. Remove existing utilities and protect utilities that will remain.
4. Construct and stabilize excavation and embankment slopes
5. Excavate structure foundation.
6. Install foundation and structure.
7. Install all utilities including drainage, electrical and sewer.
8. Install select materials.
9. Inspect and maintain all erosion and sediment control measures. Minimize the extent and duration of exposure of disturbed areas.
10. Install paving course.
11. Install curbing and sidewalks.
12. Install screened loam (4" min.) on all disturbed surfaces and apply permanent seeding.
13. Install pavement markings.
14. Remove trapped sediments from collector devices as appropriate and then remove temporary erosion control measures.
15. Restore contractor staging area and stockpile areas.

Construction Sequence – Causeway

1. Install erosion control barriers, inlet protection barriers, check dams and construction entrances, prior to the start of any construction.
2. Strip topsoil and stockpile onsite. Install an erosion control perimeter around all stockpiles.
3. Remove existing utilities and protect utilities that will remain.
4. Install coffer dam from Proto Drive to midpoint between pad site.
5. Remove all material/soil down to existing sand layer.
6. Install sump and dewater to stilling basin on-site (through marsh).
7. Construct and stabilize excavation and embankment slopes.
8. Install temporary drainage culvert and associated structures.
9. Construct access road to subgrade.
10. Remove temporary sheet piling.
11. Repeat steps 4 through 10 from midpoint to pad site.
12. Install temporary coffer dam and excavate/remove temporary drainage culverts.
13. Install permanent culverts and headwall; remove temporary sheet piling.
14. Install all other utilities including drainage, electrical, sewer, comms, and security.
15. Install select materials.

16. Inspect and maintain all erosion and sediment control measures. Minimize the extent and duration of exposure of disturbed areas.
17. Install crushed aggregate and paving course.
18. Install curbing, sidewalks, and guiderail.
19. Install screened loam (4" min.) on all disturbed surfaces and apply permanent seeding.
20. Install pavement markings.
21. Install associated traffic signage.
22. Remove trapped sediments from collector devices as appropriate and then remove temporary erosion control measures.
23. Restore contractor staging area and stockpile areas.

Erosion and Sediment Controls have been developed for the project site as required to address the 2024 Connecticut Guidelines for Soil Erosion and Sediment Control, as revised, established pursuant to CGS section 22a-328. Those are shown on the plans provided in this application package.

List of Attachments to the Application Package for Form L and Form C:

ATTACHMENT 1 – NOTICE OF PERMIT APPLICATION
ATTACHMENT 3 – ADJACENT PARCEL NOTIFICATION
ATTACHMENT 4 – APPLICATION COPY TO MUNICIPALITY
ATTACHMENT 7 – EXECUTIVE SUMMARY
ATTACHMENT 10 – PHOTOGRAPHS
ATTACHMENT 14 – PROJECT PLANS
ATTACHMENT 15 – WETLAND REPORTS
ATTACHMENT 16 – WATER RESOURCE IMPACT TABLE
ATTACHMENT 17 – MITIGATION PLANS
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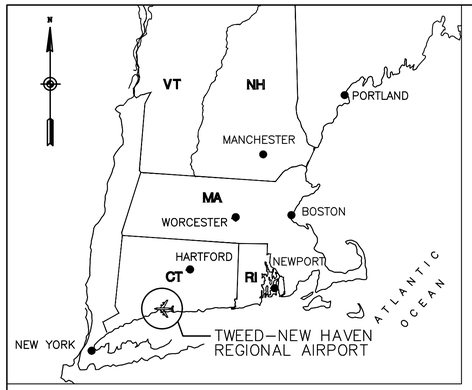
NOTE: attachments are numbered per the CTDEEP list of supporting documents for Form C and Form L; missing attachment numbers are not required for this particular permit application.

ATTACHMENT 10 – PHOTOGRAPHS

See Attached Wetland Reports for Photographs

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 14 – PROJECT PLANS

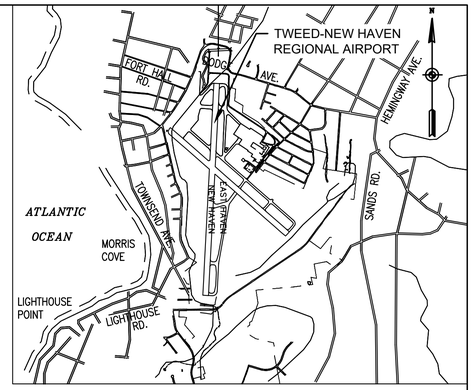


VICINITY MAP
NOT TO SCALE

TWEED NEW HAVEN AIRPORT AUTHORITY

HVN TWEED NEW HAVEN AIRPORT

The New HVN
MORE JOBS, MORE DESTINATIONS



LOCATION MAP
NOT TO SCALE

TWEED NEW HAVEN REGIONAL AIRPORT
NEW HAVEN, CONNECTICUT

RUNWAY EXTENSION AND TERMINAL EXPANSION

AIP PROJECT NO. 3-09-0013-0XX-2025

APRIL 2025

MAJOR ITEM QUANTITIES

ITEM NO	DESCRIPTION	QUANTITY
P-401-1	ASPHALT SURFACE COURSE	37,500 TON
P-403-1	ASPHALT MIXTURE BASE COURSE	37,000 TON

STATE OF CONNECTICUT · ROBERT M. FUSARO · No. 25193 · LICENSED PROFESSIONAL ENGINEER · 4/18/25

FOR RUNWAY EXTENSION PROJECT
SHEETS G1.1 - G1.3, G1.5, G1.7 - DE1.7
SHEETS GE1.1 - TG1.3
SHEETS MK1.1 - B1.6

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 16679 · LICENSED PROFESSIONAL ENGINEER

FOR TERMINAL EXPANSION PROJECT
SHEETS G0.01 - S8.01

PERMIT SUBMISSION

TWEED NEW HAVEN
AIRPORT AUTHORITY

JOHN PICARD, CHAIRMAN — DATE

FELIPE SURIEL, ASST. AIRPORT MANAGER — DATE

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
NEW ENGLAND REGION

APPROVED _____ PROJECT MANAGER

DATE _____

APPROVAL SUBJECT TO COMMENTS AND RECOMMENDATIONS IN LETTERS.

DATE _____

SPONSOR'S STATEMENT REGARDING COMPLIANCE

These plans and specifications have been prepared to the best of my knowledge and belief, in accordance with the list of current FAA Advisory Circulars for AIP and PFC projects 3/5/2025. Known deviations from FAA standards were approved by FAA letters dated NONE and are discussed in the project engineering report and/or other official project documents.

BY:_____ DATE:_____

REV.	DESCRIPTION	DR. BY	CKD. BY	APPD. BY	DATE
1	PERMIT SUBMISSION	CJM	NEG	RMF	4/18/25

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TWEED NEW HAVEN REGIONAL AIRPORT
NEW HAVEN, CONNECTICUT

TITLE SHEET

SCALE: NOT TO SCALE	PROJECT NO. 22.063201.00	DRAWING NO. G1.1
DATE: APRIL 2025	SHEET OF 1 174	

DES. BY	DR. BY	CHKD. BY
NEG	CJM	RMF

DWG: H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.1 - Title Sheet.dwg Apr 17, 2025 - 9:48am

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174	B1.6	BORING LOGS

NO.	SUBMISSIONS	DATE
1	PERMIT SUBMISSION	4/18/2025

REVISION HISTORY			
NO.	DESCRIPTION	DATE	SHEETS AFFECTED

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FUSCO No. 19858 LICENSED PROFESSIONAL ENGINEER

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CHECKED BY: RMF
DRAWN BY: CJM
DESIGNED BY: NEG
DATE: APRIL 2025

PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAWING INDEX

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3–09–0013–0XX–2025

DRAWING NO.
G1.2

SHEET 2 OF 174

LEGEND

TSA	TAXIWAY SAFETY AREA
TOFA	TAXIWAY OBJECT FREE AREA
RSA	RUNWAY SAFETY AREA
ROFA	RUNWAY OBJECT FREE AREA
	PROPOSED LIMIT OF WORK/GRADING
W	EXISTING WATER PIPE
UD	PROPOSED UNDERDRAIN
D	EXISTING DRAINAGE PIPE
D	PROPOSED DRAINAGE PIPE
S	EXISTING SEWER PIPE
E	EXISTING ELECTRIC CABLE
G	EXISTING GAS PIPE
X	EXISTING CHAIN LINK FENCE
SED	PROPOSED SEDIMENT CONTROL
	PROPOSED SAWCUT
	EXISTING AIRPORT PROPERTY BOUNDARY
100+00	EXISTING ALIGNMENT
	COASTAL JURISDICTION LINE
	LIMIT OF MODERATE WAVE ACTION
	FLOODWAY
	100-YEAR FLOOD LIMIT

B3	SOIL BORING
CBR1	CBR TEST PIT
	PROPOSED INLET PROTECTION
	EXISTING DRAINAGE MANHOLE
	PROPOSED DRAINAGE MANHOLE
	EXISTING CATCHBASIN
	PROPOSED CATCHBASIN
	EXISTING HYDRANT
	PROPOSED UNDERDRAIN CLEANOUT
	EXISTING SEWER MANHOLE
	PROPOSED SEWER MANHOLE
	REMOVE STRUCTURE OR PIPE
FF	FILL STRUCTURE OR PIPE WITH FLOWABLE FILL
	TIDAL WETLAND
	INLAND WETLAND
	BARRICADE
	CONTRACTOR HAUL ROUTE

ENGINEER'S SEAL

STATE OF CONNECTICUT
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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GENERAL LEGEND

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

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G1.3

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HTA 4/17/2025 7:25:28 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.3 - Legend.dwg

ABBREVIATIONS:

ϕ	PHASE
1/C	ONE CONDUCTOR
A	AMPERE(S) / ADJUSTED
ABAN	ABANDONED
AC	ADVISORY CIRCULAR OR ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
ALCMS	AIRFIELD LIGHTING CONTROL &MONITOR SYSTEM
ARFF	AIRCRAFT RESCUE AND FIREFIGHTING
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CCR	CONSTANT CURRENT REGULATOR
CONC	CONCRETE
CKT	CIRCUIT
℄	CENTERLINE
CLSM	CONTROLLED LOW STRENGTH MATERIAL
COMM	COMMUNICATION
CU	COPPER
DB	DIRECT BURIED
Ø, DIA	DIAMETER
DWG(S)	DRAWING(S)
EA	EACH
EL, ELEV	ELEVATION
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
EX	EXISTING
FAA	FEDERAL AVIATION ADMINISTRATION
F/O, FO	FIBER OPTIC
FOD	FOREIGN OBJECT DEBRIS
G, GND	GROUND
GALV	GALVANIZED
GRS	GALVANIZED RIGID STEEL CONDUIT
GS	GLIDE SLOPE ANTENNA
HH	HANDHOLE
ID	IDENTIFICATION NUMBER
ILS	INSTRUMENT LANDING SYSTEM
INC	INCANDESCENT
JB	JUNCTION BOX
kV	KILOVOLT
KW	KILOWATT
KVA	KILOVOLT-AMPERE(S)
LED	LIGHT-EMITTING DIODE
LF	LINEAR FEET
LFMC	LIQUID-TIGHT FLEXIBLE METALLIC CONDUIT
LS	LUMP SUM
MALSF	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH SEQUENCED FLASHERS
MH	MANHOLE
N/A	NOT AVAILABLE
NAVAIDS	NAVIGATIONAL AIDS
NEC	NATIONAL ELECTRIC CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
#, NO.	NUMBER
NOTAM	NOTICE TO AIRMEN
NTS	NOT TO SCALE
NWS	NATIONAL WEATHER SERVICE
OFA	OBJECT FREE AREA
PAPI	PRECISION APPROACH PATH INDICATOR
PR	PROPOSED
PT	POINT OF TANGENCY
PWR	POWER
R	TO BE REMOVED
REF, REFER	REFERENCE
RGS	RIGID GALVANIZED STEEL (RMC)
RLIM	RUNWAY LIGHT INTENSITY MONITOR
RMC	RIGID METALLIC CONDUIT
ROFA	RUNWAY OBJECT FREE AREA
RPR	RESIDENT PROJECT REPRESENTATIVE
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
RVR	RUNWAY VISUAL RANGE
RW, R/W	RUNWAY
SCH	SCHEDULE
TOFA	TAXIWAY OBJECT FREE AREA
TW, T/W	TAXIWAY
TSA	TAXIWAY SAFETY AREA
TVSS	TRANSIENT VOLTAGE SURGE PROTECTORS
TYP., (TYP)	TYPICAL
UNK	UNKNOWN
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VA	VOLT AMPERES
W	WATT(S)
XFMR	TRANSFORMER

SEE SPECIFICATION L-001 FOR ADDITIONAL ABBREVIATIONS NOT DEFINED ABOVE.

AIRFIELD ELECTRICAL SYMBOL LEGEND

(NOT ALL SYMBOLS MAY BE USED FOR THIS PROJECT)

EXISTING	NEW/DEMO	DEFINITION
	(XX) [#####] YY/YY	IN-PAVEMENT HIGH INTENSITY RUNWAY EDGE LIGHT (HIRL) FIXTURE; L-830 ISO XMFR; L-823 CONNECTORS; L-868B (12"Ø) CLASS 1A BASE; UON EXISTING= L-850C INC NEW= L-850C(L) LED
	(XX) [#####] YY/YY	HIGH INTENSITY ELEVATED RUNWAY EDGE LIGHT (HIRL) FIXTURE; L-830 ISO XMFR; L-823 CONNECTORS; L-867B (12"Ø) CLASS 1A BASE; UON EXISTING= L-862 INC NEW= L-862(L) LED
	(XX) [#####] YY/YY	HIGH INTENSITY BIDIRECTIONAL ELEVATED RUNWAY THRESHOLD/END LIGHT FIXTURE; L-830 ISO XMFR; L-823 CONNECTORS; L-867B (12"Ø) CLASS 1A BASE; UON EXISTING= L-862E INC NEW= L-862E(L) LED
	(XX) [#####] YY/YY	ELEVATED RUNWAY GUARD LIGHT FIXTURE; L-830 ISO XMFR; L-823 CONNECTORS; L-867B (12"Ø) CLASS 1A BASE; UON NEW= L-804(L) LED
	(XX) [#####] YY/YY	ELEVATED TAXIWAY EDGE LIGHT FIXTURE; L-830 ISO XMFR; L-823 CONNECTORS; L-867B (12"Ø) CLASS 1A BASE; UON EXISTING= L-861T NEW= L-861T(L) LED
	(XX) [#####]	STAKE MOUNTED TAXIWAY EDGE LIGHT; DIRECT BURIED L-830 ISO XFMR; UON EXISTING= L-861T
	(XX) [#####] YY/YY	L-853 TYPE II ELEVATED RETROREFLECTIVE TAXIWAY EDGE MARKER, UON
	(XX) [#####] S YY/YY	TEMPORARY SOLAR TAXIWAY EDGE LIGHT FIXTURE; MOUNTING TILE; UON NEW= L-863B(L) LED
	(XX) [#####] B	L-867B (12"Ø) CLASS 1A BASE AND FOUNDATION FOR FUTURE LIGHT FIXTURE, UON. 3/8" STEEL BASE COVER, GASKET, AND BOLTS, UON
[#####] LOCATION POINT	(XX) [#####]	INTERNALLY ILLUMINATED AIRFIELD GUIDANCE SIGN; L-830 ISO XMFR; L-823 CONNECTORS; CONCRETE FOUNDATION WITH L-867B (12"Ø) CLASS 1A BASE; UON. LETTERS A OR B INDICATES SIGN SIDE. LOCATION POINT = CENTER OF SIGN EDGE CLOSEST TO PAVEMENT EDGE EXISTING= L-858 NEW= L-858(L) LED
		WIND CONE ON CONCRETE FOUNDATION PRI = PRIMARY, L-807 SEC = SECONDARY, L-806
LOCATION POINT	(XX) [#####]	4 BOX PRECISION APPROACH PATH INDICATOR (PAPI) LIGHT HOUSING ASSEMBLY (LHA); INTEGRAL BAFFLES; L-867B (12"Ø) CLASS 1A BASE; UON. LOCATION POINT = CENTER OF PAPI LHA LENS. EXISTING= L-880 NEW= L-880(L) LED
	(XX) [#####] A YY	IN-PAVEMENT APPROACH LIGHT FIXTURE; L-868B (12"Ø) CLASS 1A BASE; UON MALSR = FAA-E-2968
	(XX) [#####] A YY	ELEVATED APPROACH LIGHT FIXTURE; STEADY BURNING EMT MOUNTED; L-867B (12"Ø) CLASS 1A BASE; UON MALSR = FAA-E-982J LAMPHOLDER 150W, 120V, PAR-38, WHITE 300W, 120V, PAR-56, GREEN (THRESHOLD)
	(XX)	5-LIGHT WHITE BARRETTE ELEVATED APPROACH LIGHT BAR STATION, STEADY BURNING WHITE, ON FRANGIBLE MG FIBERGLASS MAST OR MS FIBERGLASS MAST MOUNTED TO STEEL TOWER, UON
	(XX)	5-LIGHT WHITE BARRETTE ELEVATED APPROACH LIGHT BAR STATION, STEADY BURNING WHITE, ON FRANGIBLE MG FIBERGLASS MAST OR MS FIBERGLASS MAST MOUNTED TO STEEL TOWER WITH UNIDIRECTIONAL SEQUENCED FLASHING APPROACH LIGHT, UON

EXISTING	NEW/DEMO	DEFINITION
P	(XX) [#####] P	JUNCTION CAN BASE "PULLCAN"; SINGLE CONCRETE ENCASED L-867D (16"Ø), 24" DEEP, CLASS 1A BASE WITH BLANK COVER, UON.
	(XX) ZZ [#####] #	JUNCTION CAN PLAZA (JCP) "PULLCAN PLAZA"; MULTIPLE (#) CONCRETE ENCASED L-867D (16"Ø), 24" DEEP, CLASS 1A BASES WITH BLANK COVERS, UON. '#' = NUMBER OF BASE CANS. SUFFIX "ZZ": NO SUFFIX = JUNCTION TYPE 1 "J1" (DEFAULT) J1= JUNCTION TYPE 1 (DIAGONAL / STAGGERED) J2= JUNCTION TYPE 2 (ALIGNED / PASS THROUGH)
(XX) ZZZZ J	ZZZZ (XX) [#####] J	36"X36" COMPOSITE FIBERGLASS/CONCRETE TIER 22 JUNCTION PULL BOX AND CONCRETE MAINTENANCE COLLAR, UON SUFFIX "ZZZZ" NO SUFFIX = AIRFIELD LTG CKTS "AFL" (DEFAULT) AFL = AIRFIELD LTG CKTS COMM = TELECOMMUNICATIONS ELEC = ELECTRICAL FO = FIBER OPTIC HV = HIGH VOLTAGE
ZZZZ H	ZZZZ (XX) [#####] H	AIRCRAFT RATED ELECTRICAL HAND HOLE, UON SUFFIX "ZZZZ" NO SUFFIX = AIRFIELD LTG CKTS "AFL" (DEFAULT) AFL = AIRFIELD LTG CKTS COMM = TELECOMMUNICATIONS ELEC = ELECTRICAL FO = FIBER OPTIC HV = HIGH VOLTAGE
ZZZZ M	ZZZZ (XX) [#####] M	AIRCRAFT RATED ELECTRICAL MANHOLE, UON SUFFIX "ZZZZ" NO SUFFIX= AIRFIELD LTG CKTS "AFL" (DEFAULT) AFL = AIRFIELD LTG CKTS COMM = TELECOMMUNICATIONS ELEC = ELECTRICAL FO = FIBER OPTIC HV = HIGH VOLTAGE
CM	(XX) CM	CABLE/CONDUIT/DUCT TRENCH CABLE MARKER
		EXISTING TO NEW CONDUIT/DUCT BANK CONNECTION POINT
		EXISTING TO NEW CABLE SPLICE POINT
		DIRECT EARTH BURIED CABLE TRENCH, UON
		DIRECT EARTH BURIED CONDUIT TRENCH (1-2"PVC SCHEDULE 40), UON
		CONCRETE ENCASED DUCT BANK, UON
FAA	FAA	FAA CABLE/CONDUIT/DUCT BANK
		DRAINAGE CONDUIT CONNECTION TO DRAINAGE STRUCTURE. COORDINATE WITH CIVIL LAYOUT DRAWINGS
A	A	ABANDONED CONDUIT/CABLE
D	D	DRAINAGE CONDUIT (1-2"PVC SCHEDULE 40), UON
XXX XXX XXX		GENERAL FAA AREA DESIGNATIONS "XXX" DEFINITIONS RSA = RUNWAY SAFETY AREA ROFA = RUNWAY OBJECT FREE AREA TSA = TAXIWAY SAFETY AREA TOFA = TAXIWAY OBJECT FREE AREA GS CA = GLIDE SLOPE CRITICAL AREA LOC CA = LOCALIZER CRITICAL AREA RPZ = RUNWAY PROTECTED ZONE APCH = RUNWAY PROTECTED ZONE APPROACH DEP = RUNWAY PROTECTED ZONE DEPARTURE
XXX XXX XXX		PHASING AREA DESIGNATIONS "XXX" DEFINITIONS BB = BASE BID A1 = ALTERNATE 1 A2 = ALTERNATE 2 A# = ALTERNATE #

SYMBOL LEGEND NOTES

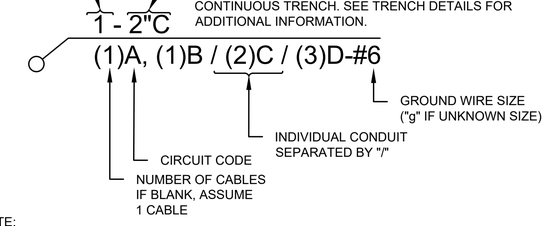
SUFFIXES "(XX)"
TYP TO ALL SYMBOLS, UON.
NO SUFFIX = "EX" (DEFAULT)
AA = ADJUST/MODIFY FIXTURE/SIGN; ADJUST/MODIFY FOUNDATION/BASE
EA = EXISTING FIXTURE/SIGN SALVAGED; RELOCATED TO ADJUSTED FOUNDATION/BASE
EN = EXISTING FIXTURE/SIGN SALVAGED; RELOCATED TO NEW FOUNDATION/BASE
ER = EXISTING FIXTURE/SIGN SALVAGED; REMOVE FOUNDATION/BASE
EX = EXISTING TO REMAIN
FN = NEW FOUNDATION/BASE PREPARED FOR FUTURE FIXTURE/SIGN
NA = NEW FIXTURE/SIGN ON ADJUSTED/MODIFIED FOUNDATION/BASE
NE = NEW FIXTURE/SIGN ON EXISTING FOUNDATION/BASE
NN = NEW FIXTURE/SIGN ON NEW FOUNDATION/BASE
RA = REMOVE FIXTURE/SIGN; ADJUST/MODIFY FOUNDATION/BASE
RE = REMOVE FIXTURE/SIGN ONLY; EXISTING FOUNDATION/BASE TO REMAIN
RR = REMOVE FIXTURE/SIGN & REMOVE FOUNDATION/BASE

COLOR CODE "YY" SUFFIX

WHITE	-	WH, W
RED	-	RD, R
GREEN	-	GN, G
YELLOW	-	YL, Y
BLUE	-	BL, B
BLANK/BLACK	-	BK, X
OBSCURED	-	OB, O
CLEAR	-	CR, C

SUFFIX "[#####]" = UNIQUE FIXTURE ID
- SURVEY NORTHING/EASTING OR BASELINE STATION/OFFSET LOCATION POINT IS CENTER OF SYMBOL, UON
- REFER TO E7.00 - DETAILS FOR DETAILS
- REFER TO E8.00 - SCHEDULES FOR SIGN SCHEDULES
- REFER TO CIVIL GENERAL SHEET(S) AND STANDARD NECA 100-2013 FOR SYMBOLS NOT DEFINED ON THIS SHEET

TRENCH / CONDUIT / DUCTBANK LABEL LEGEND



NOTE:
HEAVY OR DARK TEXT = NEW/DEMO
LIGHT OR HALFTONE TEXT = EXISTING TO REMAIN

CIRCUIT SCHEDULE

SYM	CIRCUIT & CABLE DESCRIPTION	TYPE	SIZE (AWG)	NOTES
RW2	RW 02-20 EDGE LIGHTS	20KV/5-STEP	#8	1, 2, 3
RW14	RW 14-32 EDGE LIGHTS	7.5KV/3-STEP	#8	1, 2
A	TW A EDGE LIGHTS	7.5KV/3-STEP	#8	1, 2, 3
B/E	TW B, E, AND J EDGE LIGHTS	10KV/3-STEP	#8	1, 2, 3
C1	TW C EAST EDGE LIGHTS	7.5KV/3-STEP	#8	1, 2, 3
C2	TW C WEST EDGE LIGHTS	7.5KV/3-STEP	#8	1, 2, 3
G	TW G EDGE LIGHTS	7.5KV/3-STEP	#8	1, 2
P02	PAPI RW 02 APPROACH	2.5KV/5-STEP	#8	1, 3
P20C	PAPI RW 20 APPROACH CONTROL	2 PAIR	#18	-
P20P	PAPI RW 20 LHA POWER	240V	#10	4
PCAP	PCA POWER	240V	#10	4
PCAPR	PCA REMOTE POWER	240V	#12	4
VC	VAULT COMMUNICATIONS COPPER	25 PAIR	#12	-
VF	VAULT COMMUNICATIONS FIBER	24 STRAND SINGLE MODE		5
*	EMPTY CONDUIT	-	-	6

1 = 5KV L-824 TYPE C (XLPE) WITH L-823 CONNECTORS
2 = 5KV CIRCUIT TO BE REMOVED COMPLETELY BACK TO CCR IN VAULT
3 = 5KV CIRCUIT TO BE PROVIDED WITH NEW CCR
4 = 600V XHHW-2 WITH RESIN ENCAPSULATED COMPRESSION TYPE SPLICES
5 = PROVIDE 3-CELL FIBER MESH INNERDUCT WITH TRACER WIRE AND PULL STRINGS (MAXCELL OR APPROVED EQUIVALENT)
6 = PROVIDE 1/4"Ø 300LB MIN TENSILE STRENGTH POLYPROPYLENE PULL ROPE

ENGINEER'S SEAL

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DESIGNED BY PAT | DRAWN BY CJM | CHECKED BY RMF

PROJECT DESIGNER HOYLE TANNER

Hoyle Tanner & Associates © 2023

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

ELECTRICAL LEGEND

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2023

DRAWING NO.
G1.4

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NOTE:

THESE NOTES ARE INTENDED TO HIGHLIGHT THE REQUIREMENTS SET FORTH IN THE PROJECT SPECIFICATIONS, BUT, IN ALL CASES, REQUIREMENTS OF THE PROJECT SPECIFICATIONS SHALL GOVERN.

AIRPORT OPERATIONS COORDINATOR

THE OWNER SHALL PROVIDE AN OPERATIONS COORDINATOR WHO SHALL HAVE THE AUTHORITY TO OPEN AND CLOSE FACILITIES, ISSUE AND REMOVE NOTICE TO AIRMEN (NOTAM'S), AND TO COORDINATE WITH AIRPORT USERS. COORDINATION WITH NOTAM ISSUANCE & CONSTRUCTION ACTIVITIES SHALL BE THROUGH THE HOYLE TANNER ENGINEER.

THE CONTRACTORS ATTENTION IS DIRECTED TO THE CONSTRUCTION SAFETY AND PHASING PLAN REGARDING ACCESS TO THE JOB SITE. THE CONTRACTOR SHALL BE RESPONSIBLE TO ADHERE TO THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS REGARDING AIRPORT SECURITY.

PAVEMENTS AND SAFETY AREAS. THE WORK VEHICLES ONCE INSIDE THE PERIMETER FENCING, SHALL REMAIN CLEAR OF THE ACTIVE RUNWAY, TAXIWAY AND SAFETY AREAS. WHEN NECESSARY, THE CONTRACTOR SHALL PROVIDE FLAGPERSONS AND RADIO CONTROL AS REQUIRED BY G-001 OF THE TECHNICAL SPECIFICATIONS. ALL HAUL ROUTES SHALL BE MAINTAINED PER SECTION "G-001 HAUL ROUTES" OF THE TECHNICAL SPECIFICATIONS.

NORMAL AIRPORT OPERATION WILL BE CONDUCTED ON THE AIRFIELD DURING CONSTRUCTION AND THE WORK SHALL BE CARRIED ON IN SUCH A MANNER AS NOT TO INTERFERE WITH THE NECESSARY OPERATION OF THE AIRPORT. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO ENSURE THE SAFETY OF OPERATING AIRCRAFT AS WELL AS HIS OWN EQUIPMENT AND PERSONNEL.

ALL AIRPORT PAVEMENTS SHALL BE KEPT CLEAR AND CLEAN AT ALL TIMES. THE CONTRACTOR SHALL HAVE A POWER VACUUM SWEEPER ON THE SITE WHEN REQUIRED TO SWEEP PAVEMENTS IN WORK AREAS AND HAUL ROUTES AS DIRECTED BY THE ENGINEER. SWEEPING WILL BE PERFORMED TO ELIMINATE ALL ROCKS, DIRT, MUD, AND OTHER DEBRIS CARRIED ONTO PAVEMENTS BY THE CONTRACTORS EQUIPMENT. THE CONTRACTORS EQUIPMENT CREATING THE FOD HAZARD MUST BE REPORTED TO THE ENGINEER OR THE AIRPORT OPERATIONS COORDINATOR. THE AIRPORT OPERATIONS COORDINATOR WILL THEN CLOSE THE AFFECTED AREA TO THE SATISFACTION OF THE AIRPORT OPERATIONS COORDINATOR.

AIRPORT SECURITY

THE CONTRACTOR SHALL COMPLY WITH ALL AIRPORT SECURITY REQUIREMENTS AS DIRECTED BY THE AIRPORT OPERATIONS COORDINATOR. WORK IN THE AIRPORT OPERATIONS AREA (AOA) WILL REQUIRE CRIMINAL BACKGROUND CHECKS. PARKING OF PERSONAL CARS AT THE WORK SITES WILL NOT BE PERMITTED. THE CONTRACTOR AS A SUBSIDIARY OBLIGATION, SHALL PROVIDE ADEQUATE AND SAFE TRANSPORTATION FROM THE WORK AREA. EMPLOYEES AND DRIVERS OF WORK VEHICLES WILL BE INSTRUCTED BY HIS/HER EMPLOYER FROM THE AREA WHERE THE CARS ARE PARKED, AS TO PROPER ACCESS ROADS AND WILL BE CAUTIONED THAT UNAUTHORIZED USE OF AIRCRAFT PAVEMENTS OR OTHER AREAS OUTSIDE THE DESIGNATED WORK AREA MAY LEAD TO THEIR ARREST AND SUBSEQUENT PAYMENT OF FINES. ALL ORDERS FOR MATERIAL SHALL INSTRUCT THE SUPPLIER OF THE PROCEDURES TO BE FOLLOWED.

THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER WITHIN 10 DAYS AFTER SIGNING OF THE CONTRACT A WRITTEN METHOD OF OPERATIONS DETAILING THE PRECAUTIONS HE/SHE PROPOSES FOR THE CONTROL OF VEHICLE TRAFFIC INCLUDING FLAGPERSONS, SIGNS, ESCORTS AND ANY OTHER MEASURES HE/SHE PROPOSES. AFTER APPROVAL OF HIS/HER OPERATING SCHEDULE, THE CONTRACTOR SHALL FOLLOW IT EXPLICITLY. THE OWNER MAY CLOSE THE WORK AREA AT ANY TIME THIS SCHEDULE IS VIOLATED SO AS NOT TO ENDANGER AIRPORT OR AIRCRAFT OPERATIONS. SUCH CLOSURE SHALL NOT BE CONSIDERED A VALID REASON FOR EXTENDING THE CONTRACT TIME OR FOR ANY CLAIM FOR EXTRAS BY THE CONTRACTOR. ALL SECURITY ARRANGEMENTS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER. THE CONTRACTOR'S PERSONNEL AND VEHICLES WILL NOT HAVE ACCESS TO THE ENTIRE AIRPORT, BUT SHALL BE LIMITED TO THE WORK AREA AND THE STAGING AREA.

AIRCRAFT OPERATIONS AREA

THE CONTRACTOR SHALL KEEP HIS/HER PERSONNEL AND EQUIPMENT AT LEAST 250 FEET FROM THE CENTERLINE OF ACTIVE RUNWAYS AND AT LEAST 130 FEET FROM THE CENTERLINE OF ACTIVE TAXIWAYS AND APRONS FOR AIRCRAFT MOVEMENTS UNLESS PRIOR APPROVAL HAS BEEN OBTAINED.

OPEN TRENCHES OR EXCAVATIONS

THE CONTRACTOR WILL NOT BE PERMITTED TO LEAVE ANY TRENCHES OR OTHER EXCAVATIONS OPEN WHEN THE CONTRACTOR IS NOT ON THE SITE. IN ADDITION, NO EXCAVATIONS EXCEEDING 3 INCHES IN DEPTH SHALL BE LEFT OPEN WITHIN THE RUNWAY AND TAXIWAY SAFETY AREAS WHILE THE RUNWAYS, TAXIWAYS, AND APRONS ARE IN USE. UNLESS THE EXCAVATIONS ARE COVERED WITH APPROVED PLATES. STEEL PLATES SHALL BE CAPABLE OF BEARING THE HEAVIEST AIRCRAFT/VEHICLE USING THE AIRPORT/ROADWAY OVER THE SPAN IN WHICH THEY ARE TO BE USED. THE CONTRACTOR SHALL KEEP THE LENGTH OF OPEN TRENCHES COVERED WITH STEEL PLATES TO A MINIMUM, BUT IN NO CASE SHALL THE LENGTH EXCEED THE DISTANCE BETWEEN TWO ADJACENT MANHOLES OR CATCH BASINS.

ALL EXCAVATIONS SHALL BE BACKFILLED AND THE PAVEMENT REPAIRED AND PROPERLY CURED PRIOR TO THE AREA BEING REOPENED TO TRAFFIC.

PRIOR TO THE CLOSE OF WORK EACH NIGHT, THE CONTRACTOR SHALL ENSURE THAT THE WORK AREAS ARE GRADED AWAY FROM THE PAVEMENTS AT A MAXIMUM SLOPE OF 5% AND SHALL BE LEFT IN SUCH A CONDITION THAT IT WILL DRAIN READILY AND EFFECTIVELY AND WILL NOT POSE A HAZARD TO VEHICLES OR AIRCRAFT. NO PILES OF SOIL SHALL BE LEFT UNSPREAD, NO SHARP CHANGES IN GRADE WILL BE PERMITTED, AND THE SURFACE SHALL BE THOROUGHLY COMPACTED.

DISPOSAL OF SURPLUS AND UNSUITABLE MATERIALS

ALL DRAINAGE STRUCTURES AND PIPES, ALL BITUMINOUS CONCRETE PAVEMENT AND ALL PORTLAND CEMENT CONCRETE PAVEMENT SHALL BE LEGALLY DISPOSED OF BY THE CONTRACTOR OFF AIRPORT PROPERTY.

SURPLUS EXCAVATION MATERIALS, SHALL BE INCIDENTAL TO THE COST OF THE ITEM THAT GENERATES THE MATERIAL.

ALL EQUIPMENT, MANPOWER, TRAFFIC CONTROL, FLAGPERSON, SIGNS, BARRICADES, GATES, LEGAL POLICE OFFICERS (IF REQUIRED) AND OTHER ITEMS NECESSARY FOR THE SAFE AND EFFICIENT HAULING OF EXCESS MATERIALS IS THE RESPONSIBILITY OF THE CONTRACTOR AND INCIDENTAL TO THE COST OF THE ITEM WHICH GENERATES THE MATERIAL.

ALL UNSUITABLE MATERIALS SHALL BE LEGALLY DISPOSED OF OFF AIRPORT PROPERTY BY THE CONTRACTOR. NO SEPARATE MEASUREMENT AND PAYMENT WILL BE MADE FOR THE DISPOSAL, BUT RATHER THE DISPOSAL SHALL BE INCIDENTAL TO THE ITEM THAT GENERATES THE MATERIAL TO BE DISPOSED OF.

UNDERGROUND UTILITIES AND CABLES

THE APPROXIMATE LOCATIONS OF KNOWN UTILITIES AND UNDERGROUND CABLES ARE SHOWN ON THE CONTRACT DRAWINGS. PRIOR TO COMMENCEMENT OF ANY EXCAVATION THE CONTRACTOR SHALL COORDINATE ALL WORK ON AND IN THE VICINITY OF THE UNDERGROUND UTILITIES AND CABLES WITH THE FOLLOWING AGENCIES AS APPROPRIATE.

CALL BEFORE YOU DIG		(800) 922-4455
SOUTHERN CT GAS		(800) 513-8898
SBC SNET (TELEPHONE)		(203) 238-7407
UNITED ILLUMINATION, INC. (ELECTRIC)		(800) 722-5584
CT REGIONAL WATER AUTHORITY		(203) 562-4020
GREATER NEW HAVEN REGIONAL WATER		(203) 562-4020
POLLUTION CONTROL AUTHORITY (GNHWPCA)		(203) 466-5280
NEW HAVEN UTILITIES ENGINEER		(203) 946-8099
NEW HAVEN PUBLIC WORKS DEPT		(203) 946-7700
THE FEDERAL AVIATION ADMINISTRATION AIRWAYS		(203) 562-4020
FACILITY SECTOR FIELD OFFICE	(203) 464-8897 OR	(203) 605-7512
OPERATIONS AND MAINTENANCE		(203) 469-7773

THE CONTRACTOR SHALL REPAIR, AT HIS/HER OWN EXPENSE, ANY UNDERGROUND CABLES OR UTILITIES DAMAGED BY HIS/HER OPERATIONS INCLUDING ANY DAMAGE DONE BY DRIVING HIS/HER EQUIPMENT OVER EXISTING UNDERGROUND CABLES OR UTILITIES. THE REPAIR OF FAA CABLES SHALL BE INSPECTED AND APPROVED BY THE FAA.

RADIO CONTROL

THE CONTRACTOR SHALL HAVE TWO-WAY RADIO COMMUNICATION BETWEEN THE RADIO CONTROL VEHICLE AND HIS/HER FIELD OFFICE, SUPERINTENDENT'S VEHICLE, FLAGPERSONS, AND ESCORT VEHICLES. NO FAA OR OTHER AIRPORT FREQUENCY WILL BE USED FOR THIS PURPOSE. THESE RADIOS SHALL BE PURCHASED, INSTALLED, MAINTAINED AND OPERATED AT THE CONTRACTOR'S EXPENSE.

RADIO CONTROL WILL BE REQUIRED WHENEVER THE CONTRACTOR IS WORKING IN OR ADJACENT TO THE AIRCRAFT OPERATIONS AREAS. RADIO CONTROL AND FLAGPERSONS WILL BE REQUIRED WHENEVER THE CONTRACTOR'S VEHICLE AND EQUIPMENT ARE ON OR CROSSING ACTIVE RUNWAYS, TAXIWAYS OR APRONS.

TWEED NEW HAVEN AIRPORT UNICOM FREQUENCY IS 122.950 MHz.

FLAGPERSON

THE CONTRACTOR SHALL PROVIDE FLAGPERSONS AT EACH ACTIVE RUNWAY, TAXIWAY AND APRON PAVEMENT BEING CROSSED BY HIS/HER EQUIPMENT TO ASSURE THAT MOVING AIRCRAFT ARE GIVEN THE RIGHT-OF-WAY AT ALL TIMES. FLAGPERSONS AND EQUIPMENT ARE TO MEET CURRENT MUTCD STANDARDS. AIRPORT RESERVES THE RIGHT TO SHUTDOWN WORK ACTIVITIES, WITHOUT PENALTY, FOR NON-CONFORMANCE TO REGULATIONS OR FOR UNSAFE CONTROLS. FLAGPERSONS SHALL ALSO BE REQUIRED WHEN VEHICLES ON A SERVICE ROAD ARE CROSSING THE APPROACH TO AN ACTIVE RUNWAY IN ADDITION TO PREVIOUSLY SPECIFIED RADIO CARS. THE FLAGPERSONS SHALL BE CAREFULLY SELECTED AND FULLY INSTRUCTED AS TO THEIR DUTIES IN REGULATING THE CONTRACTOR'S EQUIPMENT CROSSING THE AIRCRAFT PAVEMENT. THEY SHALL ALSO BE PROVIDED WITH BROOM, SHOVEL, AND BRUSH AND INSTRUCTED TO REMOVE ANY DEBRIS THAT MIGHT BE LEFT BY THE EQUIPMENT ON THE AIRCRAFT PAVEMENT WHERE IT MIGHT BE INGESTED BY AN AIRCRAFT ENGINE. EACH FLAGPERSON SHALL BE PROVIDED WITH, AND SHALL WEAR AT ALL TIMES THEY ARE DIRECTING TRAFFIC, AN APPROVED STRIPED VEST OF A TYPE SPECIFICALLY DESIGNED FOR USE BY TRAFFIC CONTROL PERSONNEL.

BARRICADES

THE CONTRACTOR SHALL FURNISH AND PLACE BARRICADES AS REQUIRED TO CLEARLY DEFINE AND CLOSE WORK AREAS TO AIRCRAFT OPERATIONS, SEE CONSTRUCTION PHASING AND SAFETY PLANS.

THE BARRICADES SHALL BE PLACED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE BARRICADES SHALL BE LOW PROFILE TYPE, AS LOW AS POSSIBLE TO THE GROUND, EASILY COLLAPSIBLE UPON CONTACT WITH AN AIRCRAFT, AND OF LOW MASS. THE BARRICADES SHALL BE BRIGHT ORANGE AND WHITE AND WHEN USED TO DEFINE HAZARDOUS AREAS AT NIGHT SHALL BE LIGHTED IN A MANNER APPROVED BY THE PROGRAM MANAGER AND OWNER. NO OPEN FLAME LIGHTING SHALL BE USED. ALL TEMPORARY LIGHTS AND BARRICADES SHALL BE WEIGHTED AGAINST JET BLASTS (100 MPH).

HAUL ROUTES

PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A PLAN SHOWING PROPOSED HAUL ROUTES FOR THE APPROVAL OF THE ENGINEER. WHEN A PUBLIC HIGHWAY MUST BE USED FOR HAUL ROUTES, IT WILL BECOME THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE PROPER PERMITS NEEDED FOR THIS FUNCTION AND TO OBEY RULES AND REGULATIONS PERTINENT TO THE PUBLIC HIGHWAYS.

HAUL ROUTES ON THE AIRPORT SHALL BE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL STAKE OR OTHERWISE DELINEATE THE HAUL ROUTES. THE CONTRACTOR'S VEHICLES AND EQUIPMENT SHALL OPERATE WITHIN THE LIMITS OF THE MARKED HAUL ROUTE. CONTRACTOR'S VEHICLES WILL NOT BE ALLOWED ACCESS TO PORTIONS OF THE AIRPORT OTHER THAN THE WORK AND STAGING AREAS.

ALL PAVED HAUL ROADS OR ACCESS ROADS SHALL BE KEPT CLEAN AT ALL TIMES TO PREVENT THE ACCUMULATION OF DIRT AND MUD AND THE GENERATION OF DUST BY SWEEPING, WASHING OR OTHER METHODS AS DIRECTED BY THE OWNER. UNPAVED HAUL ROADS, IF ANY, SHALL BE MAINTAINED BY BLADING AND FILLING WHEN DIRECTED BY THE OWNER AND DUST SHALL BE CONTROLLED AT ALL TIMES.

PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL TAKE AND DELIVER TO THE OWNER, PHOTOGRAPHS OF ALL PROPOSED HAUL ROUTES. VIEWS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER BEFORE THE CONTRACT WILL BE CONSIDERED COMPLETE. ALL RESTORATION AND DUST CONTROL ON HAUL ROADS SHALL BE AT THE CONTRACTOR'S EXPENSE.

AIRPORT OPERATIONS AND SAFETY REQUIREMENTS

THE CONTRACTOR SHALL STAKE AND PERMANENTLY MARK ON THE GROUND WITH A READILY RECOGNIZABLE MARKING (GRADE STAKES W/YELLOW ROPE, LIT BARRICADES) THE RESTRICTION LINES PARALLEL TO THE TAXIWAYS AND RUNWAYS ADJACENT TO THE WORK AND THE APPROACH ZONE LIMITS SO THAT PERSONNEL CAN READILY RECOGNIZE THE LIMITATIONS.

WHEN PERMISSION HAS BEEN GRANTED TO WORK INSIDE THESE LIMITS, NO EQUIPMENT SHALL BE LEFT WITHIN THE LINES WHEN NOT ACTUALLY WORKING. DURING BREAKS IN THE DAILY WORK SCHEDULE, NIGHTS, WEEKENDS, OR THE DAYS WHEN WORK IS NOT PERMITTED OR IS NOT PROGRESSING, THE EQUIPMENT SHALL BE LOCATED OUTSIDE OF THESE RESTRICTION LINES. ALL BOOMS SHALL BE LOWERED WHEN THE EQUIPMENT IS NOT IN OPERATION. NO CONSTRUCTION OPERATIONS, INCLUDING AN OPEN FLAME SUCH AS WELDING OR BURNING, SHALL BE CARRIED ON NEAR ANY AIRCRAFT.

EACH CONTRACTOR'S MOTORIZED VEHICLE OPERATING IN AN AIRCRAFT MOVEMENT AREA SHALL BE EQUIPPED WITH AN AMBER FLASHING LIGHT AND A 3-FOOT SQUARE FLAG CONSISTING OF INTERNATIONAL ORANGE AND WHITE SQUARES NOT LESS THAN ONE FOOT SQUARE DISPLAYED IN FULL VIEW ABOVE THE VEHICLE.

IN ADDITION, ALL CONTRACTOR'S VEHICLES SHALL HAVE THE COMPANY IDENTIFICATION PLAINLY VISIBLE ON BOTH SIDES OF THE VEHICLE IN ORDER TO IDENTIFY THE VEHICLE.

MAINTENANCE OF THE CONSTRUCTION SITE

THE CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE FREE OF PAPER, BOXES, CLOSED CONTAINERS AND OTHER DEBRIS WHICH COULD BE BLOWN ONTO THE RUNWAYS AND TAXIWAYS. LOOSE TRASH PLACED IN TRUCK BED IS PROHIBITED.

THE CONTRACTOR SHALL MAINTAIN, AT THE CONSTRUCTION SITE, THE EQUIPMENT FOR THE APPLICATION OF WATER TO CONTROL DUST WITHIN THE CONSTRUCTION SITE AND ON HAUL ROADS. THE EQUIPMENT SHALL BE EQUIPPED WITH A SHUT-OFF CONTROL VALVE, WHICH CAN BE OPERATED FROM THE CAB BY THE OPERATOR. THE CONTRACTOR SHALL APPLY WATER FOR DUST CONTROL AS NECESSARY TO PREVENT DUST FROM THE CONSTRUCTION SITE AND/OR HAUL ROADS FROM BEING A HAZARD TO AIRCRAFT AND FROM BEING A NUISANCE TO THE PUBLIC AND AS DIRECTED BY THE ENGINEER.

ENGINEER'S SEAL

STATE OF CONNECTICUT — ROBERT M. PURKEY — No. 24619 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER
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DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GENERAL NOTES

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.5

SHEET 5 OF 174

GENERAL AIRFIELD ELECTRICAL NOTES:

ITEMS AND REQUIREMENTS INCLUDED IN THESE ELECTRICAL NOTES ARE INCIDENTAL TO THE COST OF THIS PROJECT AND SHALL NOT BE CONSIDERED SEPARATE PAY ITEMS, UON.

1. THE ELECTRICAL UTILITY SERVICE PROVIDER IS THE UNITED ILLUMINATING COMPANY (UI). COORDINATE ALL WORK WITH UTILITY.

2. DARK OR HEAVY LINES AND SYMBOLS INDICATE ELECTRICAL MATERIALS AND EQUIPMENT TO BE FURNISHED, INSTALLED, PROVIDED, OR EXISTING ELECTRICAL INSTALLATION TO BE REMOVED, MODIFIED, ADJUSTED OR REINSTALLED. DARK OR HEAVY LINES AND SYMBOLS ALSO INDICATE EQUIPMENT SPECIFIED ON OTHER NON-ELECTRICAL DRAWINGS THAT SHALL BE INSTALLED, CONNECTED AND/OR COMMISSIONED PER ELECTRICAL DRAWINGS AND SPECIFICATIONS.

3. LIGHT OR HALFTONE LINE AND SYMBOLS INDICATE EXISTING ELECTRICAL MATERIALS AND EQUIPMENT TO REMAIN. NON-ELECTRICAL MATERIALS AND EQUIPMENT TO BE FURNISHED, INSTALLED, PROVIDED, OR DEMOLISHED UNDER THIS CONTRACT SHOWN ON OTHER DRAWINGS MAY NOT BE SHOWN OR SHOWN AS LIGHT / HALFTONE LINES AND SYMBOLS. REFER TO NON-ELECTRICAL DRAWINGS FOR ASSOCIATED SCOPE OF WORK.

4. UNLESS DIMENSIONED, LOCATIONS INDICATED FOR DEVICES AND EQUIPMENT ARE APPROXIMATE AND SHALL BE FIELD VERIFIED AND COORDINATED WITH THE ENGINEER. DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO INCLUDE EVERY DETAIL OF CONSTRUCTION, PHASING, MATERIALS, METHODS OF INSTALLATION, CIRCUITRY, EQUIPMENT, OR EXACT ROUTING OF CIRCUITRY. TAKE ACTUAL FIELD MEASUREMENTS AT THE JOB SITE IN LIEU OF SCALING THE DRAWINGS.

5. CIVIL DATA (BACKGROUNDS) SHOWN ON ELECTRICAL DRAWINGS FOR REFERENCE ONLY. REFER TO CIVIL DRAWINGS FOR DRAINAGE, PAVING DETAILS, PAVEMENT MARKING PLANS, ETC.

6. UPON REQUEST, SUBMIT TO THE ENGINEER DIMENSIONED INSTALLATION LAYOUT DRAWINGS FOR APPROVAL.

7. REPORT ALL CONFLICTS WITHIN THE CONTRACT DOCUMENTS OR WITH EXISTING CONDITIONS IN THE FIELD TO THE ENGINEER WITHIN 24 HOURS. SUBMIT PHOTOGRAPHS AND/OR SKETCHES TO CLARIFY CONDITIONS UPON REQUEST.

8. OBTAIN ALL PERMITS ASSOCIATED WITH THE WORK. PERMITS SHALL BE OBTAINED IN A TIMELY FASHION TO ENSURE NO NEGATIVE IMPACT ON THE CONSTRUCTION SCHEDULE. NOTIFY THE CODE ENFORCING AUTHORITIES AND SCHEDULE ALL REQUIRED INSPECTIONS WITH THE ALL AUTHORITIES HAVING JURISDICTION (E.G. FAA, STATE, COUNTY, CITY, LOCAL, ETC).

9. LIGHTING SYSTEMS FOR OPEN AIRCRAFT OPERATIONAL AREAS (AOA) SHALL REMAIN READY FOR OPERATION DURING INSTRUMENT FLIGHT RULES (IFR) WEATHER CONDITIONS AND FROM DUSK TO DAWN. COORDINATE AT LEAST 48 HOURS IN ADVANCE ANY AND ALL INTERRUPTIONS OF ELECTRICAL SERVICES TO ACTIVE LIGHTING CIRCUITS WITH THE RPR AND OWNER.

10. CONTACT UTILITIES PRIOR TO STARTING WORK AND UTILIZE A UTILITY LOCATING SERVICE TO IDENTIFY ALL UNDERGROUND SERVICES WITHIN THE LIMITS OF CONSTRUCTION. MAINTAIN ALL UTILITY MARKINGS WITHIN THE LIMITS OF CONSTRUCTION.INSTALLATIONS WITHIN FIVE (5) FEET OF ANY KNOWN OR SUSPECTED UNDERGROUND UTILITY SHALL BE HAND DUG.

11. ALL AIRFIELD LIGHT FIXTURES, SIGNS, CABLING, CONNECTORS AND OTHER APPLICABLE PRODUCTS SHALL BE LISTED ON LATEST EDITION OF THE FAA ADVISORY CIRCULAR 150/5345-53 ADDENDUM.

12. CONTRACTOR SHALL BE REQUIRED TO CONNECT TO EXISTING CONDUIT, LIGHT FIXTURES, SIGNS, PULLCANS, AND OTHER UNDERGROUND STRUCTURES. MAKE CONNECTION TO EXISTING STRUCTURES USING MANUFACTURED COUPLINGS.

13. PROVIDE THE INVENTORY OF SPARE FIXTURES OF 2 EACH TYPE OF LIGHT FIXTURE AND LENS COMBINATION. ALL EQUIPMENT NOT USED SHALL BE TURNED OVER TO THE OWNER TO SUPPLEMENT STOCK OF SALVAGED AND EXISTING EQUIPMENT. (INCIDENTAL TO RELATED PAY ITEMS L-125)

14. PROVIDE 5% BREAKAGE AND CONSUMABLES EXTRA PARTS FOR EACH TYPE AND SIZE OF LIGHT FIXTURE PROVIDED AND NO LESS THAN TWO (2) AS OUTLINED BELOW (INCIDENTAL TO RELATED PAY ITEMS L-125):

    - L-830 ISOLATION TRANSFORMERS OF EACH SIZE
    - LENS / GLASSWARE ASSEMBLY REPLACEMENT KITS
    - GASKETS, SEALS, AND O-RINGS
    - FRANGIBLE/BREAKABLE COUPLINGS FOR ELEVATED LIGHT FIXTURES
    - BASEPLATE FOR ELEVATED LIGHT FIXTURES
    - TRIM RING FOR IN-PAVEMENT FIXTURES
    - SPACERS OF EACH SIZE FOR IN-PAVEMENT FIXTURES
    - BASE CAN BOLTS AND LOCK WASHERS OF EACH TYPE
    - FLOOR FLANGES FOR SIGNS
    - LED MODULES AND PRINTED CIRCUIT BOARDS (PCB) FOR LED LIGHT FIXTURES
    - LIGHT ENGINE/DRIVER FOR LED SIGNS
    - POWER SUPPLY ASSEMBLY AND ACCESSORIES FOR LED SIGNS
    - LIGHT ENGINE TESTER FOR LED SIGNS

15. NEW AND EXISTING FIXTURE IDENTIFICATION NUMBERS SHALL BE ASSIGNED BY THE ENGINEER AND OWNER, UON. CONFIRM FIXTURE TAG LABELS WITH ENGINEER AND OWNER PRIOR TO ORDERING AND INSTALLATION.

16. CONDUCT INSULATION RESISTANCE TESTS (MEGGER) ON EACH CIRCUIT SCHEDULED TO BE ALTERED PRIOR TO COMMENCING WORK. SUBMIT TEST RESULTS TO THE ENGINEER IN ELECTRONIC PDF FORMAT. IMMEDIATELY NOTIFY THE OWNER AND ENGINEER IF ANY EXISTING CABLE MEGGER TESTS RETURN TEST BELOW 10 MEGOHMS. TESTS SHALL BE PERFORMED IN THE PRESENCE OF THE RPR.

17. DO NOT ROUTE CABLES WITH DIFFERENT VOLTAGE INSULATION RATINGS IN THE SAME CONDUIT. PROVIDE SEPARATE DUCTS FOR EACH CLASS OF CIRCUIT/CABLING:
    - ELECTRICAL: AIRFIELD CONSTANT CURRENT CIRCUITS (5KV)
    - ELECTRICAL: LOW VOLTAGE - VOLTAGE DRIVEN POWER CIRCUITS (<600V)
    - ELECTRICAL: MEDIUM VOLTAGE - VOLTAGE DRIVEN POWER CIRCUITS (5KV)
    - ELECTRICAL: MEDIUM VOLTAGE - VOLTAGE DRIVEN POWER CIRCUITS (15KV)
    - ELECTRICAL: MEDIUM VOLTAGE - VOLTAGE DRIVEN POWER CIRCUITS (25KV)
    - TELECOM: SIGNAL AND CONTROL CIRCUITS - COPPER
    - TELECOM: SIGNAL AND CONTROL CIRCUITS - FIBER

18. LOCATE UNDERGROUND ELECTRICAL STRUCTURES (MANHOLES, HAND HOLES, PULLCANS, ETC.) OUTSIDE THE SAFETY AREAS (RSA/TSA) WHERE POSSIBLE, UON. UNDERGROUND ELECTRICAL STRUCTURES WITHIN SAFETY AREAS MUST BE RATED FOR AIRCRAFT TRAFFIC LOADS (AC RATED).

19. COORDINATE LOCATIONS OF UNDERGROUND ELECTRICAL STRUCTURES (MANHOLES, HAND HOLES, PULLCANS, ETC.) WITH GRADING AND DRAINAGE PLANS TO AVOID INSTALLATION IN DRAINAGE SWALES, DITCHES, OR LOW ELEVATIONS WHERE WATER WILL POND ON TOP OF THE STRUCTURES.

20. VOLTAGE DRIVEN FEEDER AND BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED TO LIMIT VOLTAGE DROP TO A MAXIMUM OF 3% FOR BRANCH CIRCUITS AND A MAXIMUM OF 5% TOTAL VOLTAGE DROP ON THE COMPETE FEEDER AND BRANCH CIRCUIT PATH.

21. CONDUCTORS FOR FEEDERS AND BRANCH CIRCUITS SHALL BE ADJUSTED AS NECESSARY TO LIMIT VOLTAGE DROP TO 5% ON THE COMPLETE CIRCUIT PATH FROM A SEPARATELY DERIVED SOURCE TO THE FARTHEST POINT AND 3% ON BRANCH CIRCUITS CONDUCTORS. VERIFY VOLTAGE DROPS BASED ON THEIR PREFERRED CONDUIT AND WIRE ROUTING.
    - 240V BRANCH CIRCUIT CONDUCTORS SERVING A LOAD EXCEEDING 125 FEET FROM THE PANEL SHALL NOT BE SMALLER THAN #10AWG.
    - 120V BRANCH CIRCUIT CONDUCTORS SERVING A LOAD EXCEEDING 50 FEET FROM THE PANEL SHALL NOT BE SMALLER THAN #10AWG.

22. PRIOR TO INSTALLATION, FIELD STAKE AIRFIELD LIGHTS, AIRFIELD SIGNS, HAND HOLES, PULLCANS, AND OTHER EQUIPMENT FOR ENGINEER'S REVIEW. DISCREPANCIES IN ALIGNMENT OR LOCATION SHALL BE RESOLVED WITH THE ENGINEER PRIOR TO INSTALLATION. NOTIFY ENGINEER IMMEDIATELY IF STAKED ITEMS ARE LOCATED IN DRAINAGE SWALES OR DITCHES.

23. WHERE UNDERGROUND ELECTRICAL STRUCTURES (MANHOLES, HAND HOLES AND PULLCANS) ARE TO BE PLACED AT EXISTING DUCT OR CONDUIT CROSSINGS, THE DUCT SHALL BE EXTENDED TO THE NEW STRUCTURE. EXISTING CIRCUITS SHALL BE REROUTED THROUGH THE NEW UNDERGROUND STRUCTURE. CONDUIT AND CIRCUIT REROUTING SHALL BE INCIDENTAL TO THE COST OF THE NEW UNDERGROUND STRUCTURE.CONTRACTOR SHALL BE REQUIRED TO CONNECT TO EXISTING CONDUIT, MANHOLES, HAND HOLES, JUNCTION BOXES, PULLCANS, SIGNS, AND LIGHT FIXTURES, ETC. WORK NECESSARY TO COMPLETE EXISTING-NEW CONNECTIONS SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. CONNECT PROPOSED CIRCUITS TO THE EXISTING CIRCUITS AS SHOWN. ALL WORK REQUIRED TO MAKE THE CONNECTIONS TO EXISTING CIRCUITS SHALL BE INCIDENTAL TO THE PROJECT (I.E., PUNCHING INTO EXISTING MANHOLES FOR CONDUITS).

24. ALL AIRFIELD LIGHTS ASSOCIATED WITH A RUNWAY, TAXIWAY OR APPROACH LIGHTS SHALL LINE UP IN A STRAIGHT LINE. NOTIFY ENGINEER IMMEDIATELY IF VARIANCES DO NOT PERMIT LIGHTS TO BE INSTALLED IN A STRAIGHT LINE OR WHERE THERE IS DIFFICULTY MAINTAINING THE INSTALLATION TOLERANCES INDICATED.

25. AIRFIELD LIGHTING SETBACK AND TOLERANCES:
    - RW/TW EDGE LIGHTS - 10'-0" FROM OUTSIDE EDGE OF PAINT MARKING OR EDGE OF AIRCRAFT RATED PAVEMENT
        - ± 1□ LATERAL TOLERANCE
        - ± 1□ LONGITUDINAL TOLERANCE
        - ± 1□ HEIGHT TOLERANCE

26. INSTALL, POSITION AND ORIENT AIRFIELD LIGHT FIXTURES TO OBTAIN SPECIFIED VERTICAL ALIGNMENT, ROTATION, AND AZIMUTH ALIGNMENT PER FAA AC 150-5340-30.

27. CONFIRM THE LOCATION AND ALIGNMENT OF HOLD LINES PRIOR TO INSTALLATION OF AIRFIELD SIGNS. INSTALL SIGNS PERPENDICULAR TO THE RUNWAY OR TAXIWAY CENTERLINE, UON. SIGN STATIONS AND OFFSETS ARE REFERENCED TO THE CENTER OF THE SIDE CLOSEST TO THE EDGE OF PAVEMENT.

28. PRIOR TO PULLING CABLES, CLEAN/SWAB OUT EXISTING DUCTS OF DEBRIS USING A BRUSH AND DUCT MANDREL OR OTHER METHOD APPROVED BY THE ENGINEER. UTILIZE THE NEXT LARGER TRADE SIZE MANDREL TO PROVE EXISTING CONDUIT INTEGRITY

29. SEAL CONDUIT ENTERING L-867 AND L-868 LIGHT BASES WITH DUCT SEAL FROM THE INSIDE OF THE LIGHT BASE.

30. PROVIDE A MINIMUM OF 3'-0" CABLE SLACK FOR EACH CABLE ENTERING EACH PULLCAN AND LIGHT FIXTURE BASE CAN SUCH THAT EACH CONNECTION AND/OR FUTURE CONNECTION TO A CABLE MAY BE MADE OUTSIDE OF THE PULLCAN OR LIGHT FIXTURE BASE.

31. NO COMPONENT OF AIRFIELD LIGHTING CIRCUITS (E.G. CABLE, CONNECTOR, TRANSFORMER, ETC) SHALL BE INSTALLED EXPOSED ABOVE GROUND INCLUDING AT FIXTURES BETWEEN THE TRENCH, THE LIGHT FIXTURE BASE, AND WHERE THE CABLE ENTERS THE DEVICE. CABLES SHALL BE ENCLOSED IN LIQUID-TIGHT RIGID OR FLEXIBLE CONDUIT WITH FRANGIBLE COUPLING(S) AT GRADE OR HOUSING COVER.

32. PRIOR TO ENERGIZING, FEEDERS, SUB-FEEDERS AND SERVICE CONDUCTOR CABLES SHALL BE TESTED FOR ELECTRICAL CONTINUITY AND SHORT CIRCUITS. SUBMIT TESTS TO THE RPR, ENGINEER, AND OWNER.

33. TEST 600V RATED CABLES IN INSTALLED POSITION DISCONNECTED TO EQUIPMENT WITH A 500V MEGGER (PHASE-TO-PHASE AND PHASE-TO-GROUND) TO VERIFY INSULATION INTEGRITY. THIS WORK SHALL BE PERFORMED IN THE PRESENCE OF THE RPR. TEST RESULTS BELOW 25 MEGOHMS SHALL BE REPLACED BY THE CONTRACTOR AT NO COST. TROUBLESHOOT AND INSPECT FAILED SEGMENTS TO DETERMINE CAUSE OF LOW INSULATION READING AND LOG IN TESTING REPORT. SUBMIT TEST RESULTS TO THE ENGINEER IN ELECTRONIC PDF FORMAT.

34. EACH L-830 ISOLATION TRANSFORMER, L-823 CONNECTOR KIT, AND 5KV CABLE INSTALLED ON THIS PROJECT AS A COMPLETE OR PARTIAL CIRCUIT SHALL BE TESTED AS AN OPERABLE CIRCUIT SYSTEM. PROVIDE 1000V MEGGER INSULATION TEST ON EACH NEW AIRFIELD LIGHTING CIRCUIT SEGMENT AND TOTAL CIRCUIT SEGMENT. THIS WORK SHALL BE PERFORMED IN THE PRESENCE OF THE RPR. ANY NEW CABLE SEGMENT WITH TEST RESULTS BELOW 50 MEGOHMS SHALL BE REPLACED BY THE CONTRACTOR AT NO COST. TROUBLESHOOT AND INSPECT FAILED SEGMENTS TO DETERMINE CAUSE OF LOW INSULATION READING AND LOG IN TESTING REPORT. REFER TO FAA AC 150-5340-26 FOR ADDITIONAL INFORMATION ON TROUBLE SHOOTING 5KV CONSTANT CURRENT SERIES CIRCUITS. SUBMIT TEST RESULTS TO THE ENGINEER IN ELECTRONIC PDF FORMAT.

35. PROVIDE HEAVY DUTY 2 SINGLE CHANNEL CABLE GUARD FOR FULL LENGTH OF ALL TEMPORARY 5KV CABLING ROUTED OVER PAVEMENT. CABLE GUARD SHALL BE RATED TO WITHSTAND 19,000 LBS. OF LOAD BEARING CAPACITY PER TIRE. CABLE GUARD WILL BE TURNED OVER TO OWNER AT THE COMPLETION OF THE PROJECT. (ELASCO MIGHTYGUARD MG1200 OR APPROVED EQUIVALENT)

36. PROVIDE ROT AND MILDEW RESISTANT PULL ROPE (MINIMUM 300-POUND TEST) IN EMPTY UNDERGROUND CONDUITS.

37. THE CONTRACTOR MAY DIRECTIONAL DRILL ALL CONDUITS AT NO ADDITIONAL COST TO THE PROJECT. OPEN CUT HAND EXCAVATION IS REQUIRED IN THE LOCATION OF CONFLICTING UTILITIES.

38. TURN OVER COMPLETED MASTER MARKUP DRAWING SET TO THE ENGINEER.

39. THE OWNER WILL CONDUCT A COMMISSIONING FLIGHT INSPECTION ON ALL LIGHT SYSTEMS COVERED BY FAA ORDER 8200.1 FLIGHT INSPECTION MANUAL. THE CONTRACTOR SHALL BE PRESENT ON-SITE DURING FLIGHT INSPECTION. THE CONTRACTOR SHALL MAKE FIELD MODIFICATIONS AS REQUIRED DURING THE FLIGHT INSPECTION TO IMMEDIATELY ADDRESS DEFICIENCIES TO PREVENT THE NEED FOR ADDITIONAL FLIGHT INSPECTIONS. THE ENGINEER SHALL ESTABLISH RESPONSIBILITY FOR ANY DEFICIENCIES THAT CANNOT BE IMMEDIATELY ADDRESSED DURING FLIGHT INSPECTION. THE ENGINEER SHALL DEFINE CORRECTIVE ACTIONS REQUIRED BEFORE RELEASING THE CONTRACTOR AND COMPLETE ACCEPTANCE OF THE SYSTEM. THIS NOTATION APPLIES TO INSPECTION AND TESTING DURING CONSTRUCTION AND THE CONTRACTUAL ACCEPTANCE TESTS OF ALL INSTALLATIONS.

40. SUBMIT COMPLETE OPERATION AND MAINTENANCE (O&M) MANUALS OF ALL EQUIPMENT AND DEVICES IN ELECTRONIC PDF FORMAT AND HARDCOPY BOUND IN THREE-RING NOTEBOOKS. THE MANUALS SHALL CONTAIN THE FOLLOWING AS A MINIMUM:

    - AS-BUILT WIRING SCHEMATICS INCLUDING PARTS LIST AND DETAILED WIRING DIAGRAMS
    - EQUIPMENT SHOP DRAWING SUBMITTALS
    - MANUFACTURER'S EQUIPMENT INSTALLATION INSTRUCTIONS
    - MANUFACTURER'S START-UP AND OPERATION INSTRUCTIONS
    - MANUFACTURER'S PREVENTATIVE MAINTENANCE INSTRUCTIONS AND SCHEDULES
    - MANUFACTURER'S TROUBLESHOOTING INSTRUCTIONS
    - MANUFACTURER'S SAFETY INSTRUCTIONS
    - WARRANTIES
    - REPLACEMENT PARTS LIST (MANUFACTURER AND MODEL NUMBERS)
    - TRAINING DOCUMENTATION

ENGINEER'S SEAL

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CHECKED BY: RMF
DRAWN BY: CJM
DESIGNED BY: PAT

PROJECT DESIGNER
HOYLE TANNER

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

ELECTRICAL NOTES

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

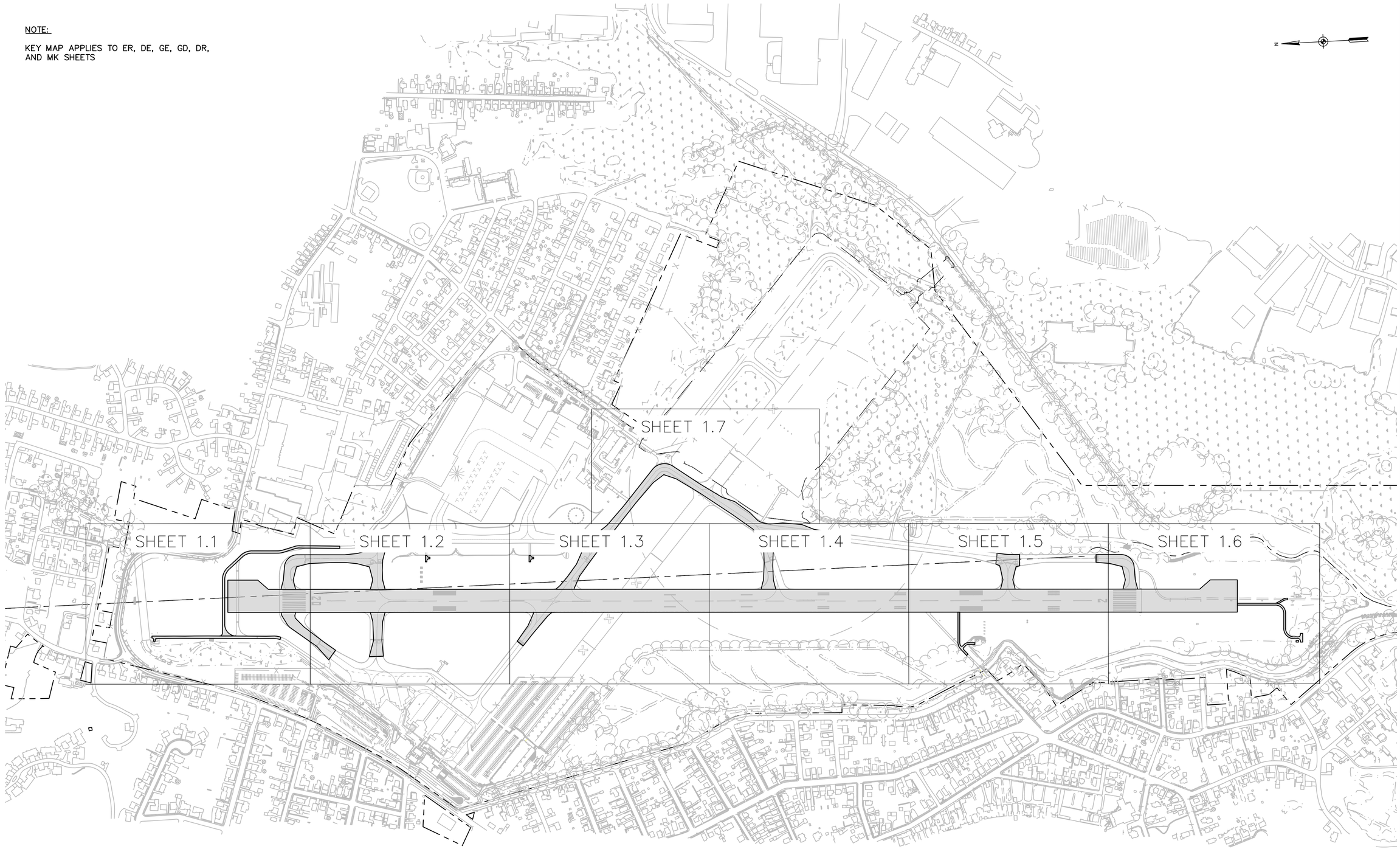
DRAWING NO.

G1.6

SHEET 6 OF 174

NOTE:

KEY MAP APPLIES TO ER, DE, GE, GD, DR, AND MK SHEETS



0 300 750 1500 FEET

1"=300'

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

KEY MAP

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

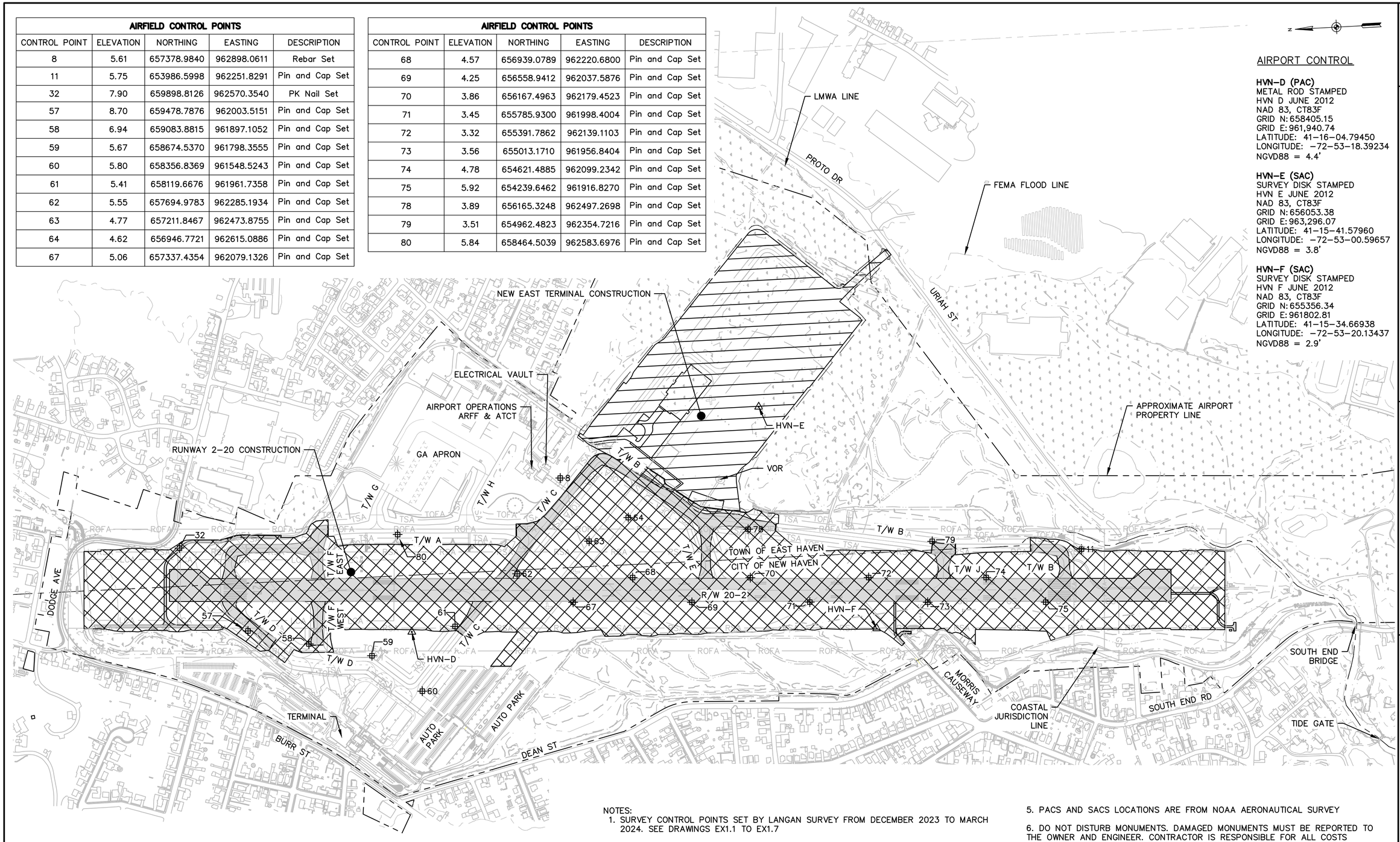
G1.7

SHEET 7 OF 174

HTA 4/17/2025 7:38:41 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.7 - Key Map.dwg

AIRFIELD CONTROL POINTS				
CONTROL POINT	ELEVATION	NORTHING	EASTING	DESCRIPTION
8	5.61	657378.9840	962898.0611	Rebar Set
11	5.75	653986.5998	962251.8291	Pin and Cap Set
32	7.90	659898.8126	962570.3540	PK Nail Set
57	8.70	659478.7876	962003.5151	Pin and Cap Set
58	6.94	659083.8815	961897.1052	Pin and Cap Set
59	5.67	658674.5370	961798.3555	Pin and Cap Set
60	5.80	658356.8369	961548.5243	Pin and Cap Set
61	5.41	658119.6676	961961.7358	Pin and Cap Set
62	5.55	657694.9783	962285.1934	Pin and Cap Set
63	4.77	657211.8467	962473.8755	Pin and Cap Set
64	4.62	656946.7721	962615.0886	Pin and Cap Set
67	5.06	657337.4354	962079.1326	Pin and Cap Set

AIRFIELD CONTROL POINTS				
CONTROL POINT	ELEVATION	NORTHING	EASTING	DESCRIPTION
68	4.57	656939.0789	962220.6800	Pin and Cap Set
69	4.25	656558.9412	962037.5876	Pin and Cap Set
70	3.86	656167.4963	962179.4523	Pin and Cap Set
71	3.45	655785.9300	961998.4004	Pin and Cap Set
72	3.32	655391.7862	962139.1103	Pin and Cap Set
73	3.56	655013.1710	961956.8404	Pin and Cap Set
74	4.78	654621.4885	962099.2342	Pin and Cap Set
75	5.92	654239.6462	961916.8270	Pin and Cap Set
78	3.89	656165.3248	962497.2698	Pin and Cap Set
79	3.51	654962.4823	962354.7216	Pin and Cap Set
80	5.84	658464.5039	962583.6976	Pin and Cap Set



AIRPORT CONTROL

HVN-D (PAC)
METAL ROD STAMPED
HVN D JUNE 2012
NAD 83, CT83F
GRID N: 658405.15
GRID E: 961,940.74
LATITUDE: 41-16-04.79450
LONGITUDE: -72-53-18.39234
NGVD88 = 4.4'

HVN-E (SAC)
SURVEY DISK STAMPED
HVN E JUNE 2012
NAD 83, CT83F
GRID N: 656053.38
GRID E: 963,296.07
LATITUDE: 41-15-41.57960
LONGITUDE: -72-53-00.59657
NGVD88 = 3.8'

HVN-F (SAC)
SURVEY DISK STAMPED
HVN F JUNE 2012
NAD 83, CT83F
GRID N: 655356.34
GRID E: 961802.81
LATITUDE: 41-15-34.66938
LONGITUDE: -72-53-20.13437
NGVD88 = 2.9'

NOTES:
1. SURVEY CONTROL POINTS SET BY LANGAN SURVEY FROM DECEMBER 2023 TO MARCH 2024. SEE DRAWINGS EX1.1 TO EX1.7
2. COORDINATES SHOWN ON THE PLANS ARE BASED ON CONNECTICUT STATE PLANE ZONE, US SURVEY FOOT NAD 83 PER AIRPORT CONTROL POINTS (HVN-D, HVN-E, AND HVN-F).
3. ELEVATIONS SHOWN ON THE PLANS ARE BASED ON NAVD88 PER AIRPORT CONTROL POINTS (HVN-D, HVN-E, HVN-F).
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY THAT ALL CONTROL POINTS SHOWN ON THIS PLAN ARE ACCURATE AND CONSISTENT WITH THE INFORATION PROVIDED, PER FAA GENERAL PROVISIONS SECTION 40 IN THE SPECIFICATIONS
5. PACS AND SACS LOCATIONS ARE FROM NOAA AERONAUTICAL SURVEY
6. DO NOT DISTURB MONUMENTS. DAMAGED MONUMENTS MUST BE REPORTED TO THE OWNER AND ENGINEER. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH RECTIFYING DISTURBED MONUMENTS

0 300 750 1500 FEET
1"=300'

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PROJECT DESIGNER HOYLE TANNER
DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GENERAL PLAN AND AIRFIELD SURVEY CONTROL

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.8

SHEET 8 OF 174

GENERAL CONSTRUCTION PHASING

1) RUNWAY 02-20 WILL BE SHUT DOWN FOR 70 CONSECUTIVE CALENDAR DAYS TO COMPLETE ALL WORK WITHIN THE RUNWAY SAFETY AREA.
2) THE CONTRACTOR SHALL PROVIDE ENOUGH RESOURCES TO COMPLETE ALL WORK WITHIN THE RUNWAY SAFETY AREA DURING THE 70-DAY RUNWAY SHUT DOWN
3) WORK OUTSIDE RUNWAY SAFETY AREAS MAY OCCUR WITH THE RUNWAY OPEN AND WITH CLOSE COORDINATION AIRPORT OPERATIONS TO ENSURE SAFE PASSAGE OF AIRCRAFT.
4) A SAMPLE WORK FLOW IS PROVIDED ON THIS DRAWING.
5) WORK IN ALL PHASES SHALL BE PERFORMED CONCURRENTLY.

GENERAL CONSTRUCTION PHASING AREAS

PHASE 1 - WORK WITHIN RUNWAY 02 RSA, SOUTH - DURATION 70 DAYS
1) AREA 1A - RUNWAY 02 RSA AND EXTENSION
2) AREA 1B - RUNWAY STA 256+00 TO 251+00, TAXIWAY B SOUTH
3) AREA 1C - RUNWAY STA 251+00 TO 240+00, TAXIWAY J
4) AREA 1D - RUNWAY STA 240+00 TO 229+50, TAXIWAY E TO RUNWAY 02 RSA LIMIT
5) AREA 1E - RUNWAY STA 213+00 TO 229+50, TAXIWAY C EAST FROM RUNWAY 20 TO RSA LIMIT, TAXIWAY C WEST FROM RUNWAY 20 TO RSA LIMIT

PHASE 2 - WORK WITHIN RUNWAY 20 RSA, NORTH - DURATION 70 DAYS
1) AREA 2X - RUNWAY 20 RSA AND EXTENSION
2) AREA 2Y - RUNWAY 20 STA 200+00 TO 204+50, TAXIWAY A FROM RUNWAY 20 TO TAXIWAY F, TAXIWAY D FROM RUNWAY 20 TO RSA LIMIT
3) AREA 2Z - RUNWAY STA 204+50 TO STA 213+00, TAXIWAY F EAST FROM RUNWAY 20 TO TAXIWAY A, TAXIWAY F WEST TO RSA LIMIT

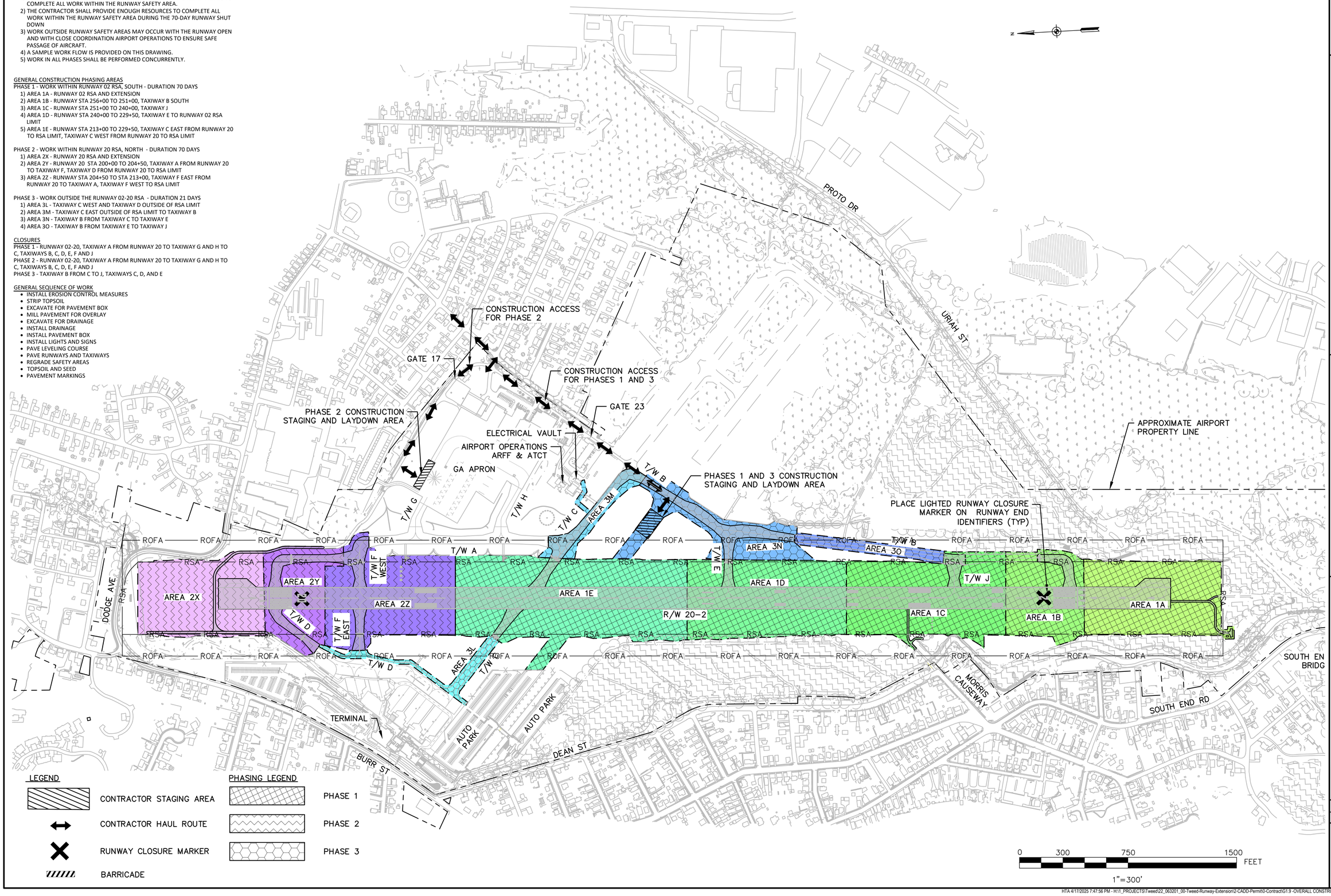
PHASE 3 - WORK OUTSIDE THE RUNWAY 02-20 RSA - DURATION 21 DAYS
1) AREA 3L - TAXIWAY C WEST AND TAXIWAY D OUTSIDE OF RSA LIMIT
2) AREA 3M - TAXIWAY C EAST OUTSIDE OF RSA LIMIT TO TAXIWAY B
3) AREA 3N - TAXIWAY B FROM TAXIWAY C TO TAXIWAY E
4) AREA 3O - TAXIWAY B FROM TAXIWAY E TO TAXIWAY J

CLOSURES

PHASE 1 - RUNWAY 02-20, TAXIWAY A FROM RUNWAY 20 TO TAXIWAY G AND H TO C, TAXIWAYS B, C, D, E, F AND J
PHASE 2 - RUNWAY 02-20, TAXIWAY A FROM RUNWAY 20 TO TAXIWAY G AND H TO C, TAXIWAYS B, C, D, E, F AND J
PHASE 3 - TAXIWAY B FROM C TO J, TAXIWAYS C, D, AND E

GENERAL SEQUENCE OF WORK

- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- EXCAVATE FOR PAVEMENT BOX
- MILL PAVEMENT FOR OVERLAY
- EXCAVATE FOR DRAINAGE
- INSTALL DRAINAGE
- INSTALL PAVEMENT BOX
- INSTALL LIGHTS AND SIGNS
- PAVE LEVELING COURSE
- PAVE RUNWAYS AND TAXIWAYS
- REGRADE SAFETY AREAS
- TOPSOIL AND SEED
- PAVEMENT MARKINGS



LEGEND

- CONTRACTOR STAGING AREA
- CONTRACTOR HAUL ROUTE
- RUNWAY CLOSURE MARKER
- BARRICADE

PHASING LEGEND

- PHASE 1
- PHASE 2
- PHASE 3

0 300 750 1500 FEET

1"=300'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. RUSSO No. 19858 LICENSED PROFESSIONAL ENGINEER

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PROJECT DESIGNER

DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

OVERALL CONSTRUCTION SAFETY AND PHASING PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/11/25	PERMIT SET	NEG

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AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.9

SHEET 9 OF 174

HTA 4/17/2025 7:47:56 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.9 -OVERALL CONSTRUCTION SAFETY AND PHASING PLAN.dwg

PHASE 1 NOTES

CONSTRUCTION PHASING AREAS
PHASE 1 - WORK WITHIN RUNWAY 02 RSA, SOUTH - DURATION 70 DAYS
1) AREA 1A - RUNWAY 02 RSA AND EXTENSION
2) AREA 1B - RUNWAY STA 256+00 TO 251+00, TAXIWAY B SOUTH
3) AREA 1C - RUNWAY STA 251+00 TO 240+00, TAXIWAY J
4) AREA 1D - RUNWAY STA 240+00 TO 229+50, TAXIWAY E TO RUNWAY 02 RSA LIMIT
5) AREA 1E - RUNWAY STA 213+00 TO 229+50, TAXIWAY C EAST FROM RUNWAY 20 TO RSA LIMIT, TAXIWAY C WEST FROM RUNWAY 20 TO RSA LIMIT

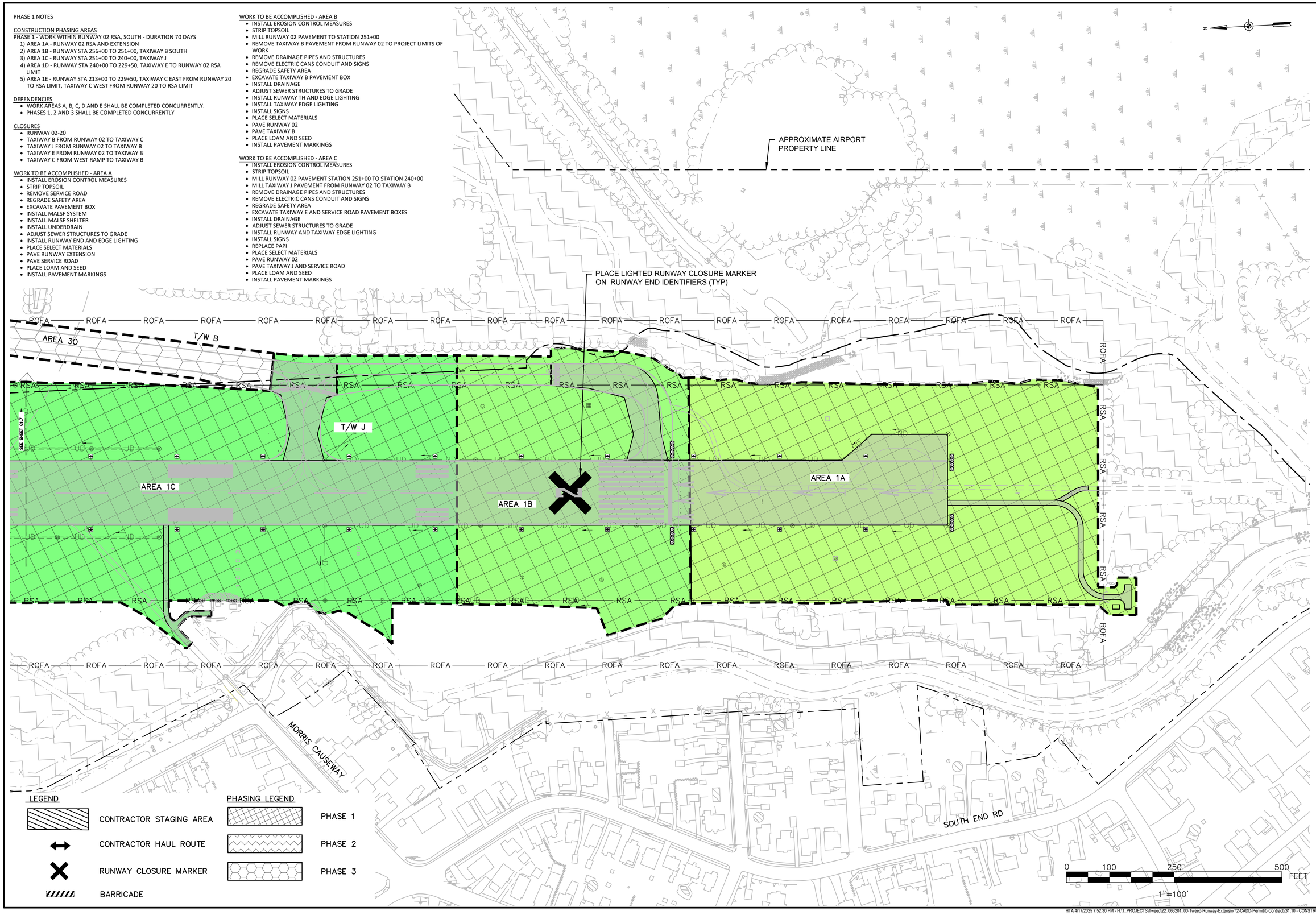
DEPENDENCIES
- WORK AREAS A, B, C, D AND E SHALL BE COMPLETED CONCURRENTLY.
- PHASES 1, 2 AND 3 SHALL BE COMPLETED CONCURRENTLY

CLOSURES
- RUNWAY 02-20
- TAXIWAY B FROM RUNWAY 02 TO TAXIWAY C
- TAXIWAY J FROM RUNWAY 02 TO TAXIWAY B
- TAXIWAY E FROM RUNWAY 02 TO TAXIWAY B
- TAXIWAY C FROM WEST RAMP TO TAXIWAY B

WORK TO BE ACCOMPLISHED - AREA A
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- REMOVE SERVICE ROAD
- REGRADE SAFETY AREA
- EXCAVATE PAVEMENT BOX
- INSTALL MALSF SYSTEM
- INSTALL MALSF SHELTER
- INSTALL UNDERDRAIN
- ADJUST SEWER STRUCTURES TO GRADE
- INSTALL RUNWAY END AND EDGE LIGHTING
- PLACE SELECT MATERIALS
- PAVE RUNWAY EXTENSION
- PAVE SERVICE ROAD
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA B
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- MILL RUNWAY 02 PAVEMENT TO STATION 251+00
- REMOVE TAXIWAY B PAVEMENT FROM RUNWAY 02 TO PROJECT LIMITS OF WORK
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE TAXIWAY B PAVEMENT BOX
- INSTALL DRAINAGE
- ADJUST SEWER STRUCTURES TO GRADE
- INSTALL RUNWAY TH AND EDGE LIGHTING
- INSTALL TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- PLACE SELECT MATERIALS
- PAVE RUNWAY 02
- PAVE TAXIWAY B
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA C
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- MILL RUNWAY 02 PAVEMENT STATION 251+00 TO STATION 240+00
- MILL TAXIWAY J PAVEMENT FROM RUNWAY 02 TO TAXIWAY B
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE TAXIWAY E AND SERVICE ROAD PAVEMENT BOXES
- INSTALL DRAINAGE
- ADJUST SEWER STRUCTURES TO GRADE
- INSTALL RUNWAY AND TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- REPLACE PAPI
- PLACE SELECT MATERIALS
- PAVE RUNWAY 02
- PAVE TAXIWAY J AND SERVICE ROAD
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS



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HOYLE TANNER

DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION SAFETY AND PHASING PLAN 1

REVISIONS

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	4/11/25	PERMIT SET	NEG

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SHEET 10 OF 174

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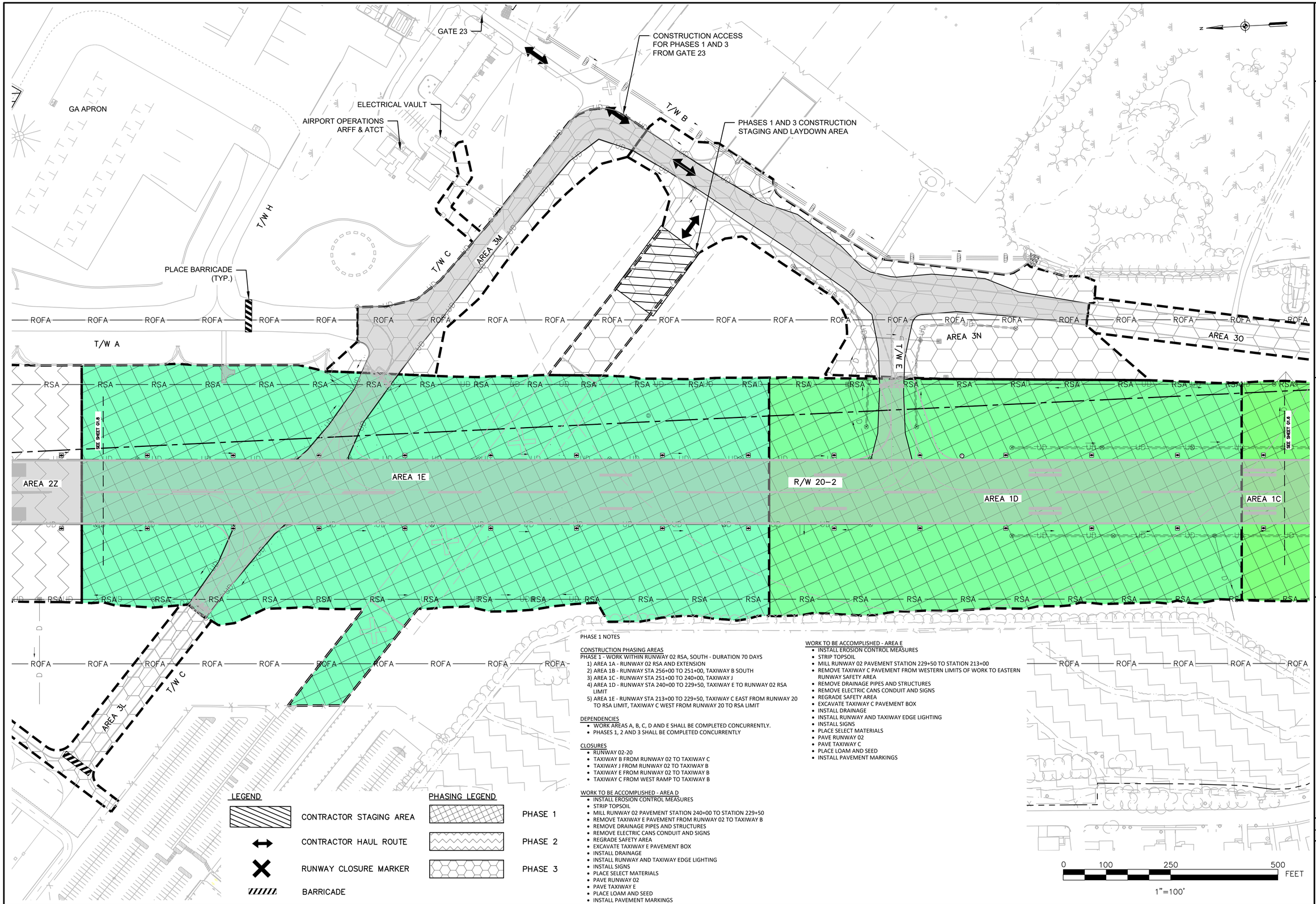

PHASE 1 NOTES

CONSTRUCTION PHASING AREAS

PHASE 1 - WORK WITHIN RUNWAY 02 RSA, SOUTH - DURATION 70 DAYS

1) AREA 1A - RUNWAY 02 RSA AND EXTENSION
2) AREA 1B - RUNWAY STA 256+00 TO 251+00, TAXIWAY B SOUTH
3) AREA 1C - RUNWAY STA 251+00 TO 240+00, TAXIWAY J
4) AREA 1D - RUNWAY STA 240+00 TO 229+50, TAXIWAY E TO RUNWAY 02 RSA LIMIT
5) AREA 1E - RUNWAY STA 213+00 TO 229+50, TAXIWAY C EAST FROM RUNWAY 20 TO RSA LIMIT, TAXIWAY C WEST FROM RUNWAY 20 TO RSA LIMIT

DEPENDENCIES

- WORK AREAS A, B, C, D AND E SHALL BE COMPLETED CONCURRENTLY.
- PHASES 1, 2 AND 3 SHALL BE COMPLETED CONCURRENTLY

CLOSURES

- RUNWAY 02-20
- TAXIWAY B FROM RUNWAY 02 TO TAXIWAY C
- TAXIWAY J FROM RUNWAY 02 TO TAXIWAY B
- TAXIWAY E FROM RUNWAY 02 TO TAXIWAY B
- TAXIWAY C FROM WEST RAMP TO TAXIWAY B

WORK TO BE ACCOMPLISHED - AREA D

- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- MILL RUNWAY 02 PAVEMENT STATION 240+00 TO STATION 229+50
- REMOVE TAXIWAY E PAVEMENT FROM RUNWAY 02 TO TAXIWAY B
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE TAXIWAY E PAVEMENT BOX
- INSTALL DRAINAGE
- INSTALL RUNWAY AND TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- PLACE SELECT MATERIALS
- PAVE RUNWAY 02
- PAVE TAXIWAY E
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA E

- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- MILL RUNWAY 02 PAVEMENT STATION 229+50 TO STATION 213+00
- REMOVE TAXIWAY C PAVEMENT FROM WESTERN LIMITS OF WORK TO EASTERN RUNWAY SAFETY AREA
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE TAXIWAY C PAVEMENT BOX
- INSTALL DRAINAGE
- INSTALL RUNWAY AND TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- PLACE SELECT MATERIALS
- PAVE RUNWAY 02
- PAVE TAXIWAY C
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION SAFETY AND PHASING PLAN 2

REVISIONS

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PHASE 2 NOTES

CONSTRUCTION PHASING AREAS
PHASE 2 - WORK WITHIN RUNWAY 20 RSA, NORTH - DURATION 70 DAYS
- AREA 2X - RUNWAY 20 RSA AND EXTENSION
- AREA 2Y - RUNWAY 20 STA 200+00 TO 204+50, TAXIWAY A FROM RUNWAY 20 TO TAXIWAY F, TAXIWAY D FROM RUNWAY 20 TO RSA LIMIT
- AREA 2Z - RUNWAY STA 204+50 TO STA 213+00, TAXIWAY F EAST FROM RUNWAY 20 TO TAXIWAY A, TAXIWAY F WEST TO RSA LIMIT

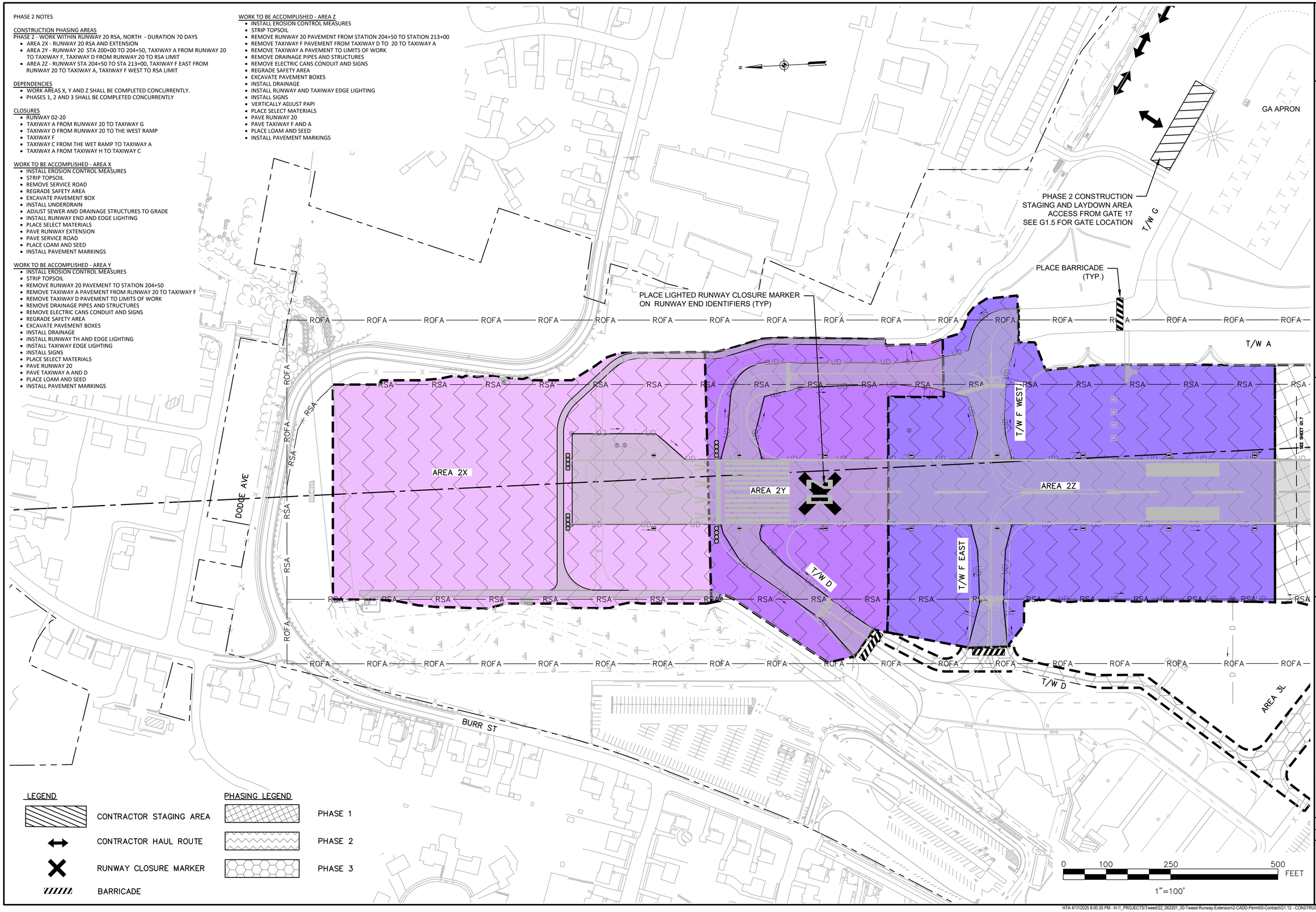
DEPENDENCIES
- WORK AREAS X, Y AND Z SHALL BE COMPLETED CONCURRENTLY.
- PHASES 1, 2 AND 3 SHALL BE COMPLETED CONCURRENTLY

CLOSURES
- RUNWAY 02-20
- TAXIWAY A FROM RUNWAY 20 TO TAXIWAY G
- TAXIWAY D FROM RUNWAY 20 TO THE WEST RAMP
- TAXIWAY F
- TAXIWAY C FROM THE WET RAMP TO TAXIWAY A
- TAXIWAY A FROM TAXIWAY H TO TAXIWAY C

WORK TO BE ACCOMPLISHED - AREA X
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- REMOVE SERVICE ROAD
- REGRADE SAFETY AREA
- EXCAVATE PAVEMENT BOX
- INSTALL UNDERDRAIN
- ADJUST SEWER AND DRAINAGE STRUCTURES TO GRADE
- INSTALL RUNWAY END AND EDGE LIGHTING
- PLACE SELECT MATERIALS
- PAVE RUNWAY EXTENSION
- PAVE SERVICE ROAD
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA Y
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- REMOVE RUNWAY 20 PAVEMENT TO STATION 204+50
- REMOVE TAXIWAY A PAVEMENT FROM RUNWAY 20 TO TAXIWAY F
- REMOVE TAXIWAY D PAVEMENT TO LIMITS OF WORK
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE PAVEMENT BOXES
- INSTALL DRAINAGE
- INSTALL RUNWAY TH AND EDGE LIGHTING
- INSTALL TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- PLACE SELECT MATERIALS
- PAVE RUNWAY 20
- PAVE TAXIWAY A AND D
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA Z
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- REMOVE RUNWAY 20 PAVEMENT FROM STATION 204+50 TO STATION 213+00
- REMOVE TAXIWAY F PAVEMENT FROM TAXIWAY D TO 20 TO TAXIWAY A
- REMOVE TAXIWAY A PAVEMENT TO LIMITS OF WORK
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE PAVEMENT BOXES
- INSTALL DRAINAGE
- INSTALL RUNWAY AND TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- VERTICALLY ADJUST PAPI
- PLACE SELECT MATERIALS
- PAVE RUNWAY 20
- PAVE TAXIWAY F AND A
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS



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DESIGNED BY: NEG
DATE: APRIL, 2025

PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION SAFETY AND PHASING PLAN 3

REVISIONS

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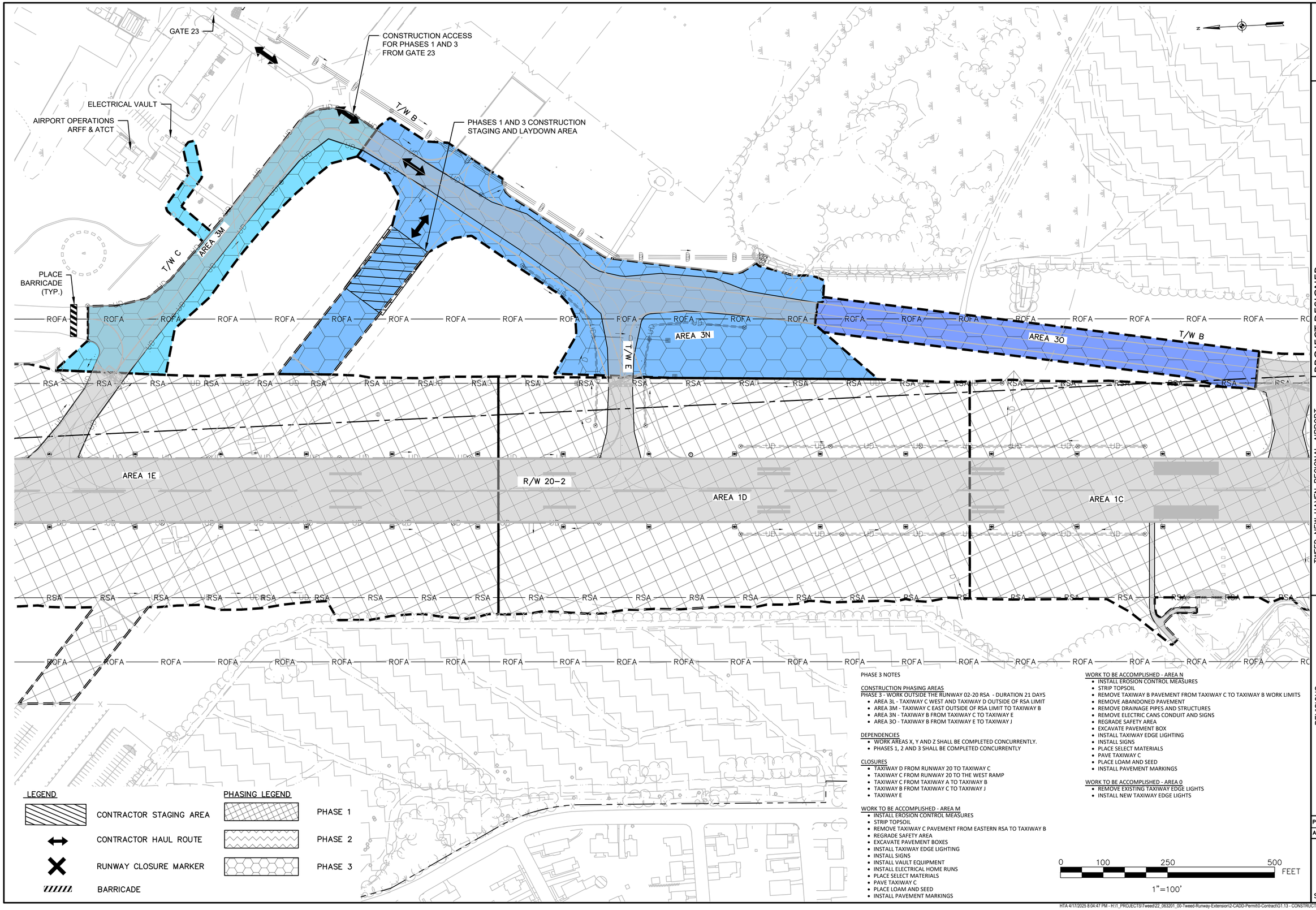

LEGEND

- CONTRACTOR STAGING AREA
- CONTRACTOR HAUL ROUTE
- RUNWAY CLOSURE MARKER
- BARRICADE

PHASING LEGEND

- PHASE 1
- PHASE 2
- PHASE 3

PHASE 3 NOTES

CONSTRUCTION PHASING AREAS

PHASE 3 - WORK OUTSIDE THE RUNWAY 02-20 RSA - DURATION 21 DAYS
- AREA 3L - TAXIWAY C WEST AND TAXIWAY D OUTSIDE OF RSA LIMIT
- AREA 3M - TAXIWAY C EAST OUTSIDE OF RSA LIMIT TO TAXIWAY B
- AREA 3N - TAXIWAY B FROM TAXIWAY C TO TAXIWAY E
- AREA 3O - TAXIWAY B FROM TAXIWAY E TO TAXIWAY J

DEPENDENCIES
- WORK AREAS X, Y AND Z SHALL BE COMPLETED CONCURRENTLY.
- PHASES 1, 2 AND 3 SHALL BE COMPLETED CONCURRENTLY

CLOSURES
- TAXIWAY D FROM RUNWAY 20 TO TAXIWAY C
- TAXIWAY C FROM RUNWAY 20 TO THE WEST RAMP
- TAXIWAY C FROM TAXIWAY A TO TAXIWAY B
- TAXIWAY B FROM TAXIWAY C TO TAXIWAY J
- TAXIWAY E

WORK TO BE ACCOMPLISHED - AREA M
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- REMOVE TAXIWAY C PAVEMENT FROM EASTERN RSA TO TAXIWAY B
- REGRADE SAFETY AREA
- EXCAVATE PAVEMENT BOXES
- INSTALL TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- INSTALL VAULT EQUIPMENT
- INSTALL ELECTRICAL HOME RUNS
- PLACE SELECT MATERIALS
- PAVE TAXIWAY C
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA N
- INSTALL EROSION CONTROL MEASURES
- STRIP TOPSOIL
- REMOVE TAXIWAY B PAVEMENT FROM TAXIWAY C TO TAXIWAY B WORK LIMITS
- REMOVE ABANDONED PAVEMENT
- REMOVE DRAINAGE PIPES AND STRUCTURES
- REMOVE ELECTRIC CANS CONDUIT AND SIGNS
- REGRADE SAFETY AREA
- EXCAVATE PAVEMENT BOX
- INSTALL TAXIWAY EDGE LIGHTING
- INSTALL SIGNS
- PLACE SELECT MATERIALS
- PAVE TAXIWAY C
- PLACE LOAM AND SEED
- INSTALL PAVEMENT MARKINGS

WORK TO BE ACCOMPLISHED - AREA O
- REMOVE EXISTING TAXIWAY EDGE LIGHTS
- INSTALL NEW TAXIWAY EDGE LIGHTS

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION SAFETY AND PHASING PLAN 4

REVISIONS

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AIP: 3-09-0013-0XX-2025

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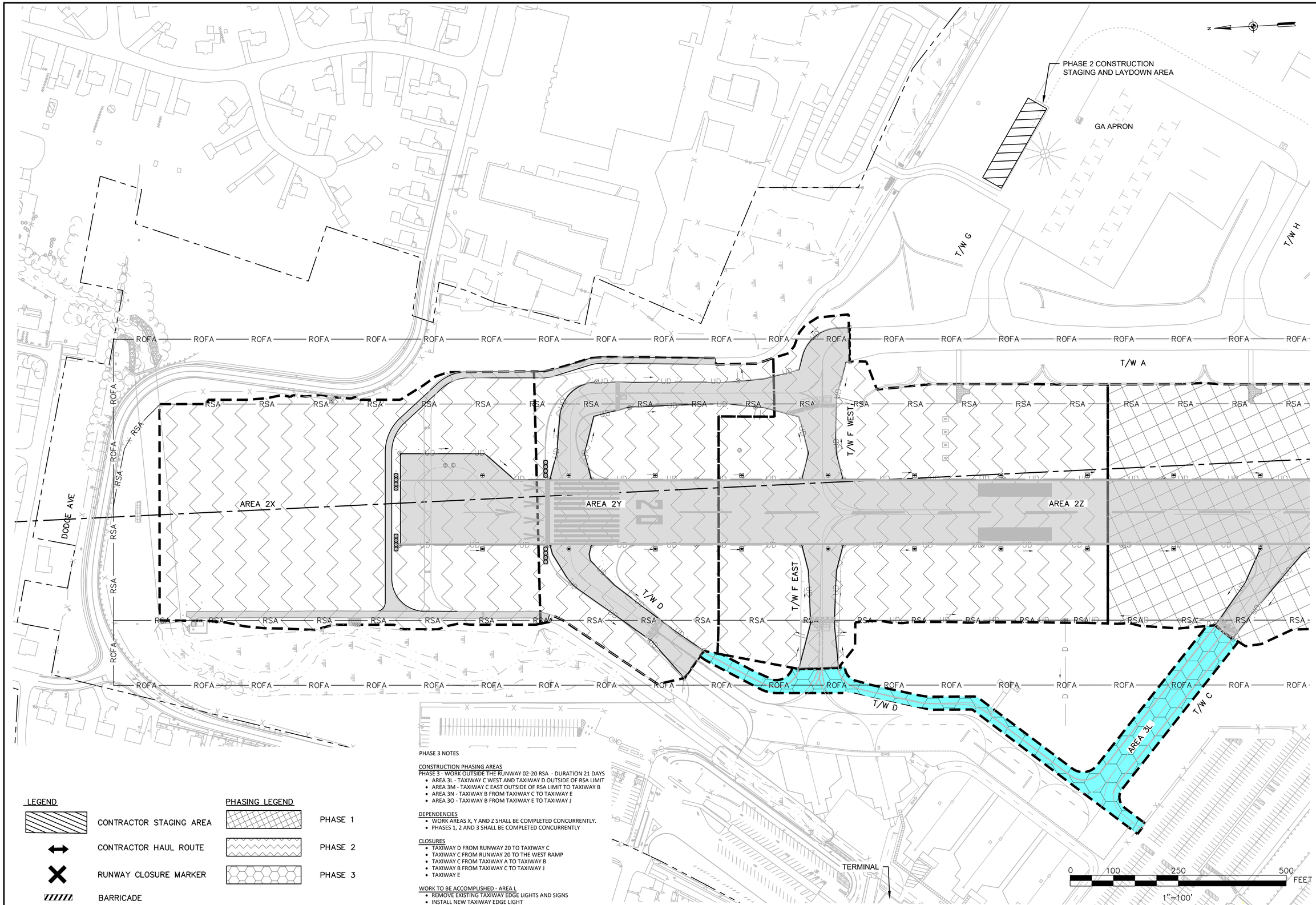

PHASE 3 NOTES

CONSTRUCTION PHASING AREAS

PHASE 3 - WORK OUTSIDE THE RUNWAY 02-20 RSA - DURATION 21 DAYS

- AREA 3L - TAXIWAY C WEST AND TAXIWAY D OUTSIDE OF RSA LIMIT
- AREA 3M - TAXIWAY C EAST OUTSIDE OF RSA LIMIT TO TAXIWAY B
- AREA 3N - TAXIWAY B FROM TAXIWAY C TO TAXIWAY E
- AREA 3O - TAXIWAY B FROM TAXIWAY E TO TAXIWAY J

DEPENDENCIES

- WORK AREAS X, Y AND Z SHALL BE COMPLETED CONCURRENTLY.
- PHASES 1, 2 AND 3 SHALL BE COMPLETED CONCURRENTLY

CLOSURES

- TAXIWAY D FROM RUNWAY 20 TO TAXIWAY C
- TAXIWAY C FROM RUNWAY 20 TO THE WEST RAMP
- TAXIWAY C FROM TAXIWAY A TO TAXIWAY B
- TAXIWAY B FROM TAXIWAY C TO TAXIWAY J
- TAXIWAY E

WORK TO BE ACCOMPLISHED - AREA L

- REMOVE EXISTING TAXIWAY EDGE LIGHTS AND SIGNS
- INSTALL NEW TAXIWAY EDGE LIGHT

LEGEND

- CONTRACTOR STAGING AREA
- CONTRACTOR HAUL ROUTE
- RUNWAY CLOSURE MARKER
- BARRICADE

PHASING LEGEND

- PHASE 1
- PHASE 2
- PHASE 3

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION AND SAFETY PHASING PLAN 5

REVISIONS

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SHEET 14 OF 174

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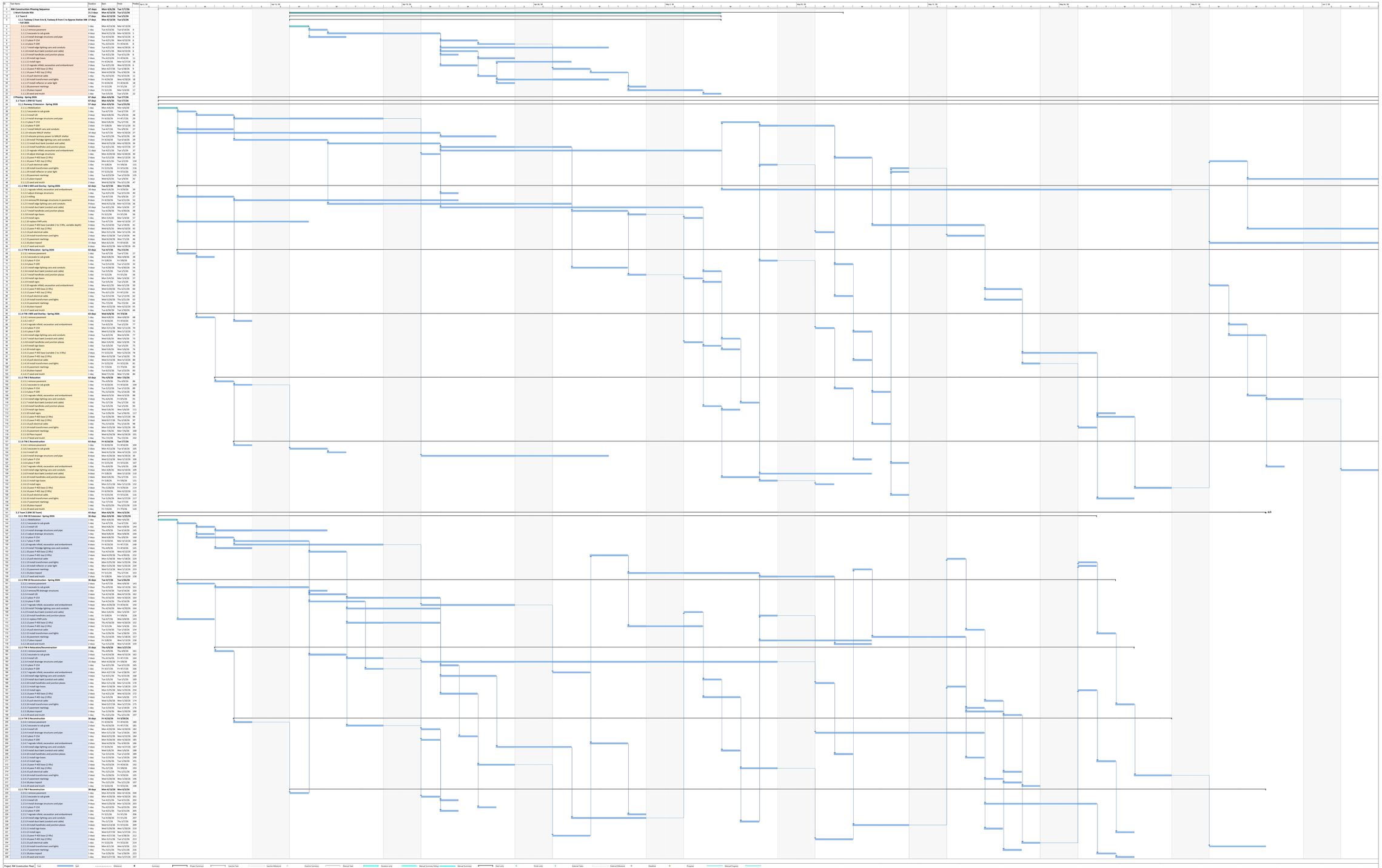
ID	Task Name	Duration	Start	Finish	Predec
1	**RW Construction Phasing Sequence**	**67 days**	**Mon 4/6/26**	**Tue 7/7/26**	
2	**1 Work Outside RSA**	**21.5 days**	**Mon 4/13/26**	**Tue 5/12/26**	
3	**1.1 Town 9**	**17 days**	**Mon 4/13/26**	**Tue 5/5/26**	
4	**1.1.1 Taxiway C from A to B, Taxiway B from C to Approx Station 50B**	**17 days**	**Mon 4/13/26**	**Tue 5/5/26**	
5	1.1.1.1 Mobilization	1 day	Mon 4/13/26	Mon 4/13/26	
6	1.1.1.2 remove pavement	1 day	Tue 4/14/26	Tue 5/14/26	4
7	1.1.1.3 excavate to sub grade	4 days	Wed 4/15/26	Mon 4/20/26	5
8	1.1.1.4 install drainage structures and pipe	2 days	Tue 4/14/26	Wed 4/15/26	4
9	1.1.1.5 grade P-209	2 days	Tue 4/14/26	Wed 4/15/26	4
10	1.1.1.6 place P-209	2 days	Thu 4/23/26	Fri 4/24/26	8
11	1.1.1.7 install edge lighting cans and conduits	7 days	Tue 4/21/26	Wed 4/29/26	6
12	1.1.1.8 install duct bank (conduit and cable)	2 days	Tue 4/21/26	Wed 4/22/26	6
13	1.1.1.9 install handholes and junction pluvas	1 day	Tue 4/21/26	Tue 5/21/26	6
14	1.1.1.10 install sign bases	1 day	Fri 4/24/26	Fri 4/24/26	9
15	1.1.1.11 install signs	2 days	Fri 4/24/26	Mon 4/27/26	14
16	1.1.1.12 regrade infield, excavation and embankment	2 days	Tue 4/21/26	Wed 4/22/26	6
17	1.1.1.13 pave P-401 layo (2 lifts)	2 days	Mon 4/27/26	Tue 5/26/26	9
18	1.1.1.14 pave P-401 lay (2 lifts)	2 days	Wed 4/29/26	Thu 4/30/26	16
19	1.1.1.15 pull electrical cables	1 day	Thu 4/23/26	Thu 4/23/26	11
20	1.1.1.16 install transformers and lights	4 days	Fri 4/24/26	Wed 4/29/26	18
21	1.1.1.17 install reflector or solar light	1 day	Tue 4/28/26	Tue 4/28/26	19
22	1.1.1.18 pavement markings	1 day	Fri 5/1/26	Fri 5/1/26	17
23	1.1.1.19 place topsoil	2 days	Fri 5/1/26	Mon 5/4/26	17
24	1.1.1.20 seed and mulch	1 day	Tue 5/5/26	Tue 5/5/26	22
25	**2 Phasing - Spring 2026**	**67 days**	**Mon 4/6/26**	**Tue 7/7/26**	
26	**2.1 Town 1 (RW 02 Team)**	**67 days**	**Mon 4/6/26**	**Tue 7/7/26**	
27	**2.1.1 Runway Reconstruction - Spring 2026**	**57 days**	**Mon 4/6/26**	**Tue 6/23/26**	
28	2.1.1.1 Mobilization	1 day	Mon 4/6/26	Mon 4/6/26	
29	2.1.1.2 excavate to sub grade	1 day	Tue 4/7/26	Tue 5/7/26	27
30	2.1.1.3 install UD	2 days	Wed 4/8/26	Thu 4/9/26	28
31	2.1.1.4 install drainage structures and pipe	4 days	Fri 4/10/26	Wed 4/15/26	29
32	2.1.1.5 place P-154	2 days	Wed 5/6/26	Thu 5/7/26	39
33	2.1.1.6 place P-209	2 days	Wed 5/6/26	Thu 5/7/26	39
34	2.1.1.7 install MALSF cans and conduits	5 days	Tue 4/7/26	Thu 4/9/26	27
35	2.1.1.8 relocate MALSF shelter	10 days	Tue 4/7/26	Mon 4/20/26	27
36	2.1.1.9 relocate primary power to MALSF shelter	3 days	Tue 4/21/26	Thu 4/23/26	34
37	2.1.1.10 install TH edge lighting cans and conduits	3 days	Fri 4/10/26	Tue 5/14/26	29
38	2.1.1.11 install duct bank (conduit and cable)	4 days	Wed 4/15/26	Mon 4/20/26	36
39	2.1.1.12 install handholes and junction pluvas	3 days	Tue 4/21/26	Mon 4/27/26	37
40	2.1.1.13 regrade infield, excavation and embankment	2 days	Tue 4/7/26	Wed 4/8/26	27
41	2.1.1.14 adjust drainage structures	1 day	Mon 4/20/26	Mon 4/20/26	30
42	2.1.1.15 pave P-401 base (2 lifts)	2 days	Tue 5/12/26	Wed 5/13/26	32
43	2.1.1.16 pave P-401 top (2 lifts)	2 days	Mon 6/1/26	Tue 6/2/26	134
44	2.1.1.17 pull electrical cables	1 day	Fri 5/8/26	Fri 5/8/26	131
45	2.1.1.18 install transformers and lights	1 day	Tue 5/19/26	Tue 5/19/26	135
46	2.1.1.19 install reflector or solar light	1 day	Fri 5/15/26	Fri 5/15/26	138
47	2.1.1.20 pavement markings	1 day	Tue 6/23/26	Tue 5/19/26	135
48	2.1.1.21 place topsoil	5 days	Wed 6/3/26	Tue 6/9/26	42
49	2.1.1.22 seed and mulch	2 days	Wed 6/10/26	Thu 5/11/26	47
50	**2.1.2 RW 2 Mill and Overlay - Spring 2026**	**42 days**	**Tue 5/7/26**	**Wed 7/1/26**	
51	2.1.2.1 regrade infield, excavation and embankment	18 days	Wed 5/6/26	Fri 5/29/26	39
52	2.1.2.2 remove/fill drainage structures	3 days	Tue 5/7/26	Thu 5/9/26	49
53	2.1.2.3 milling	3 days	Tue 4/7/26	Thu 4/9/26	27
54	2.1.2.4 remove/fill drainage structures in pavement	8 days	Fri 4/10/26	Tue 5/21/26	52
55	2.1.2.5 install edge lighting cans and conduits	9 days	Wed 4/15/26	Mon 4/27/26	36
56	2.1.2.6 install duct bank (conduit and cable)	10 days	Tue 4/21/26	Mon 5/4/26	37
57	2.1.2.7 install handholes and junction pluvas	1 day	Tue 5/5/26	Tue 5/5/26	54
58	2.1.2.8 install sign bases	1 day	Fri 5/1/26	Fri 5/1/26	48
59	2.1.2.9 install signs	1 day	Mon 5/4/26	Mon 5/4/26	57
60	2.1.2.10 replace PAPI units	1 day	Tue 4/7/26	Tue 4/7/26	27
61	2.1.2.11 pave P-401 base (variable 2 to 3 lifts, variable depth)	4 days	Thu 5/14/26	Tue 5/19/26	41
62	2.1.2.12 pave P-401 top (2 lifts)	4 days	Wed 6/3/26	Mon 6/8/26	42
63	2.1.2.13 pull electrical cables	1 day	Mon 5/11/26	Mon 5/11/26	43
64	2.1.2.14 install transformers and lights	1 day	Tue 5/12/26	Tue 5/12/26	63
65	2.1.2.15 pavement markings	4 days	Wed 6/24/26	Mon 7/1/26	46
66	2.1.2.16 place topsoil	15 days	Mon 6/1/26	Fri 6/19/26	50
67	2.1.2.17 seed and mulch	4 days	Mon 6/22/26	Mon 6/29/26	65
68	**2.1.3 TW 8 Relocation - Spring 2026**	**63 days**	**Tue 4/7/26**	**Thu 7/2/26**	
69	2.1.3.1 remove pavement	1 day	Tue 4/7/26	Tue 4/7/26	27
70	2.1.3.2 excavate to sub grade	1 day	Fri 4/24/26	Fri 4/24/26	69
71	2.1.3.3 place P-154	1 day	Wed 5/6/26	Wed 5/6/26	33
72	2.1.3.4 place P-209	1 day	Tue 5/12/26	Tue 5/12/26	62
73	2.1.3.5 install edge lighting cans and conduits	3 days	Tue 4/28/26	Thu 5/30/26	54
74	2.1.3.6 install duct bank (conduit and cable)	1 day	Tue 5/5/26	Tue 5/5/26	55
75	2.1.3.7 install handholes and junction pluvas	1 day	Fri 5/1/26	Fri 5/1/26	56
76	2.1.3.8 install sign bases	1 day	Fri 5/1/26	Fri 5/1/26	48
77	2.1.3.9 install signs	1 day	Tue 5/5/26	Tue 5/5/26	58
78	2.1.3.10 regrade infield, excavation and embankment	1 day	Mon 6/1/26	Mon 6/1/26	50
79	2.1.3.11 pave P-401 base (2 lifts)	2 days	Wed 5/20/26	Thu 5/21/26	60
80	2.1.3.12 pave P-401 top (2 lifts)	2 days	Thu 6/11/26	Fri 6/12/26	61
81	2.1.3.13 pull electrical cables	1 day	Tue 5/12/26	Tue 5/12/26	62
82	2.1.3.14 install transformers and lights	2 days	Wed 5/20/26	Thu 5/21/26	63
83	2.1.3.15 pavement markings	1 day	Fri 5/22/26	Fri 5/22/26	64
84	2.1.3.16 place topsoil	1 day	Wed 5/13/26	Wed 5/13/26	63
85	2.1.3.17 seed and mulch	1 day	Tue 6/30/26	Tue 5/26/26	66
86	**2.1.4 TW 1 Mill and Overlay - Spring 2026**	**63 days**	**Wed 4/8/26**	**Fri 7/3/26**	
87	2.1.4.1 remove pavement	1 day	Wed 4/8/26	Wed 4/8/26	68
88	2.1.4.2 excavate to sub grade	1 day	Fri 4/24/26	Fri 4/24/26	69
89	2.1.4.3 regrade infield, excavation and embankment	1 day	Tue 6/1/26	Tue 6/2/26	77
90	2.1.4.4 place P-154	1 day	Mon 5/11/26	Mon 5/11/26	70
91	2.1.4.5 place P-209	1 day	Wed 5/13/26	Wed 5/13/26	71
92	2.1.4.6 install edge lighting cans and conduits	2 days	Tue 6/2/26	Wed 6/3/26	77
93	2.1.4.7 install duct bank (conduit and cable)	1 day	Wed 5/6/26	Wed 5/6/26	73
94	2.1.4.8 install handholes and junction pluvas	1 day	Mon 5/4/26	Mon 5/4/26	74
95	2.1.4.9 install sign bases	1 day	Fri 5/1/26	Fri 5/1/26	48
96	2.1.4.10 install signs	1 day	Wed 5/6/26	Wed 5/6/26	75
97	2.1.4.11 pave P-401 base (variable 2 to 3 lifts)	2 days	Fri 5/22/26	Mon 5/25/26	78
98	2.1.4.12 pave P-401 top (2 lifts)	2 days	Mon 6/15/26	Tue 6/16/26	79
99	2.1.4.13 pull electrical cables	1 day	Wed 5/13/26	Wed 5/13/26	80
100	2.1.4.14 install transformers and lights	1 day	Thu 5/14/26	Thu 5/14/26	81
101	2.1.4.15 pavement markings	1 day	Fri 7/3/26	Fri 7/3/26	82
102	2.1.4.16 place topsoil	1 day	Tue 6/23/26	Tue 5/19/26	83
103	2.1.4.17 seed and mulch	1 day	Wed 7/1/26	Wed 7/1/26	84
104	**2.1.5 TW 5 Relocation**	**63 days**	**Thu 4/9/26**	**Mon 7/6/26**	
105	2.1.5.1 remove pavement	1 day	Thu 4/9/26	Thu 4/9/26	86
106	2.1.5.2 excavate to sub grade	1 day	Fri 4/10/26	Fri 4/10/26	108
107	2.1.5.3 place P-154	1 day	Wed 5/13/26	Wed 5/13/26	90
108	2.1.5.4 place P-209	1 day	Thu 5/14/26	Thu 5/14/26	90
109	2.1.5.5 regrade infield, excavation and embankment	1 day	Wed 6/3/26	Wed 6/3/26	88
110	2.1.5.6 install edge lighting cans and conduits	2 days	Thu 5/14/26	Fri 5/15/26	91
111	2.1.5.7 install duct bank (conduit and cable)	1 day	Thu 5/7/26	Thu 5/7/26	92
112	2.1.5.8 install handholes and junction pluvas	1 day	Fri 5/8/26	Fri 5/8/26	93
113	2.1.5.9 install sign bases	1 day	Wed 5/6/26	Wed 5/6/26	111
114	2.1.5.10 install signs	1 day	Tue 5/26/26	Tue 5/26/26	117
115	2.1.5.11 pave P-401 base (2 lifts)	2 days	Tue 5/26/26	Wed 5/27/26	96
116	2.1.5.12 pave P-401 top (2 lifts)	2 days	Wed 6/17/26	Thu 5/28/26	97
117	2.1.5.13 pull electrical cables	1 day	Thu 5/14/26	Thu 5/14/26	98
118	2.1.5.14 install transformers and lights	1 day	Mon 5/25/26	Mon 5/25/26	99
119	2.1.5.15 pavement markings	1 day	Tue 6/30/26	Tue 6/30/26	100
120	2.1.5.16 Place topsoil	1 day	Wed 6/24/26	Wed 5/26/26	103
121	2.1.5.17 Seed and mulch	1 day	Thu 7/2/26	Thu 7/2/26	102
122	**2.1.6 TW 1 Reconstruction**	**63 days**	**Fri 4/10/26**	**Tue 7/7/26**	
123	2.1.6.1 remove pavement	1 day	Fri 4/10/26	Fri 4/10/26	104
124	2.1.6.2 excavate to sub grade	2 days	Mon 4/13/26	Tue 4/14/26	105
125	2.1.6.3 install UD	1 day	Wed 4/15/26	Wed 4/15/26	107
126	2.1.6.4 install drainage structures and pipe	1 day	Wed 5/13/26	Wed 5/13/26	106
127	2.1.6.5 place P-154	1 day	Wed 5/13/26	Wed 5/13/26	107
128	2.1.6.6 place P-209	1 day	Fri 5/15/26	Fri 5/15/26	107
129	2.1.6.7 regrade infield, excavation and embankment	1 day	Thu 6/4/26	Thu 6/4/26	108
130	2.1.6.8 install edge lighting cans and conduits	3 days	Mon 4/8/26	Wed 4/10/26	109
131	2.1.6.9 install duct bank (conduit and cable)	2 days	Tue 5/5/26	Wed 5/6/26	110
132	2.1.6.10 install handholes and junction pluvas	1 day	Wed 5/6/26	Thu 5/7/26	111
133	2.1.6.11 install sign bases	1 day	Wed 5/20/26	Wed 5/20/26	210
134	2.1.6.12 install signs	1 day	Wed 5/27/26	Wed 5/27/26	211
135	2.1.6.13 pave P-401 base (2 lifts)	2 days	Mon 6/27/26	Tue 5/28/26	212
136	2.1.6.14 pave P-401 top (2 lifts)	2 days	Tue 6/30/26	Wed 7/1/26	213
137	2.1.6.15 pull electrical cables	1 day	Fri 5/22/26	Fri 5/22/26	214
138	2.1.6.16 install transformers and lights	1 day	Mon 6/1/26	Mon 6/1/26	215
139	2.1.6.17 pavement markings	1 day	Thu 5/21/26	Thu 5/21/26	216
140	2.1.6.18 place topsoil	1 day	Tue 5/26/26	Tue 5/26/26	223
141	2.1.6.19 seed and mulch	1 day	Wed 5/27/26	Wed 5/27/26	217
142	2.1.6.4 install drainage structures and pipe	8 days	Mon 4/20/26	Wed 4/29/26	30
143	2.1.6.5 place P-154	1 day	Wed 5/13/26	Wed 5/13/26	106
144	2.1.6.6 place P-209	1 day	Fri 5/15/26	Fri 5/15/26	107
145	2.1.6.7 regrade infield, excavation and embankment	1 day	Thu 6/4/26	Thu 6/4/26	108
146	2.1.6.8 install edge lighting cans and conduits	3 days	Mon 4/8/26	Wed 4/10/26	109
147	2.1.6.9 install duct bank (conduit and cable)	2 days	Tue 5/5/26	Wed 5/6/26	110
148	2.1.6.10 install handholes and junction pluvas	1 day	Wed 5/6/26	Thu 5/7/26	111
149	2.1.6.11 install sign bases	1 day	Fri 5/8/26	Fri 5/8/26	131
150	2.1.6.12 install signs	1 day	Mon 5/11/26	Mon 5/11/26	132
151	2.1.6.13 pave P-401 base (2 lifts)	2 days	Thu 5/28/26	Fri 5/29/26	114
152	2.1.6.14 pave P-401 top (2 lifts)	2 days	Mon 6/1/26	Tue 6/2/26	134
153	2.1.6.15 pull electrical cables	1 day	Fri 5/22/26	Fri 5/22/26	214
154	2.1.6.16 install transformers and lights	1 day	Mon 6/1/26	Mon 6/1/26	215
155	2.1.6.17 pavement markings	1 day	Thu 5/21/26	Thu 5/21/26	216
156	2.1.6.18 place topsoil	1 day	Tue 5/26/26	Tue 5/26/26	223
157	2.1.6.19 seed and mulch	1 day	Wed 5/27/26	Wed 5/27/26	217



Project: RW Construction Phasi
Date: Fri 2/21/25

Task | Split | Milestone | Summary | Project Summary | Inactive Task | Inactive Milestone | Inactive Summary | Manual Task | Duration-only | Manual Summary Rollup | Manual Summary | Start-only | Finish-only | External Tasks | External Milestone | Deadline | Progress | Manual Progress

Page 1

ENGINEER'S SEAL

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CHECKED BY: RMF
DRAWN BY: CJM
DESIGNED BY: NEG

PROJECT DESIGNER
HOYLE TANNER

DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION SCHEDULE

REV. NO.	DATE	DESCRIPTION	BY
	4/11/25	PERMIT SET	NEG

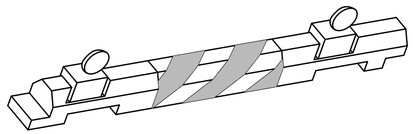
PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.15

SHEET 15 OF 174



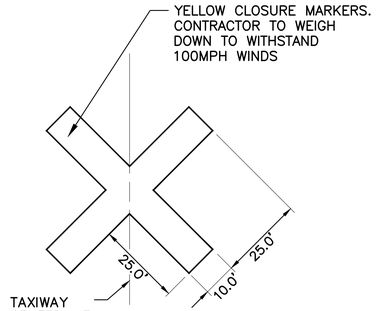
1. EACH BARRICADE IS MARKED WITH DIAGONAL, ALTERNATING ORANGE AND WHITE REFLECTIVE GRADE TAPE 6" WIDE. PROVIDE TWO SOLAR RED FLASHING LIGHTS FOR EACH BARRICADE. LIGHT SPACING SHALL NOT EXCEED 10' SPACING FROM LIGHT TO LIGHT.
2. ALL BARRICADES SHALL BE INTERLOCKED WITH NO GAPS.
3. BARRICADES CAN BE FILLED WITH WATER OR SAND.
4. DESIGNED TO THE MOST RECENT FAA AC 150/5340-1 & 150/5370-2 SPECIFICATIONS AND PERFORMANCE STANDARDS. REFER TO AC 150/5345-55A FOR BARRICADE REQUIREMENTS.
5. MADE OF DURABLE POLYETHYLENE PLASTIC.
6. DIMENSIONS: 6"(H) x 6"(W) x 8'(L).
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SETUP, MAINTENANCE AND OPERATION OF BARRICADES, INCLUDING REPLACING BATTERIES AND LIGHT BULBS IF NEEDED. ALL BARRICADES SHALL BE REMOVED FROM THE AIRPORT AT THE END OF THE PROJECT.
8. NO SEPARATE PAYMENT SHALL BE MADE FOR PROVIDING, MAINTAINING AND SET UP OF BARRICADES, WORK AREA SIGNS, OR OTHER SAFETY EQUIPMENT AS REQUIRED BY AIRPORT OPERATIONS AND THE ENGINEER. RATHER THEY WILL BE CONSIDERED INCIDENTAL TO THE CSPP COMPLIANCE PAY ITEM.

LOW-PROFILE BARRICADE
NOT TO SCALE

DO NOT ENTER

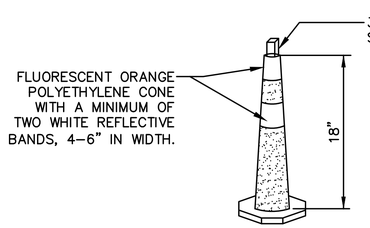
WORK AREA SIGN NOTES:
1. PLACE TEMPORARY 'DO NOT ENTER' SIGNS AT THE PERIMETER OF THE PROJECT LIMITS. LOCATION TO BE AT THE DISCRETION OF AIRPORT OPERATIONS AND THE ENGINEER.
2. SIGNS MUST BE SECURED AND WEIGHTED DOWN AS APPROVED BY THE ENGINEER AND AIRPORT OPERATIONS.

WORK AREA SIGNS
NOT TO SCALE



PROVIDED BY CONTRACTOR AND REMAIN CONTRACTOR'S PROPERTY AT END OF PROJECT

TAXIWAY CLOSURE MARKER
NOT TO SCALE



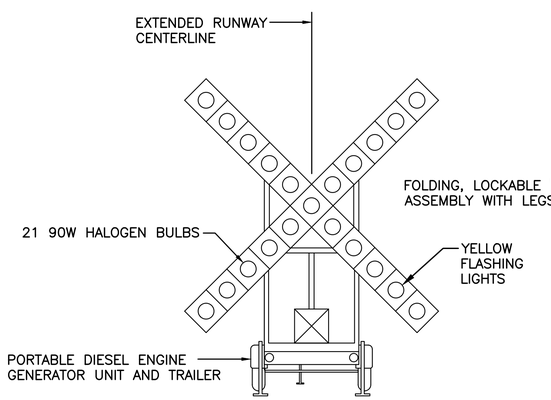
MARKER CONE NOTES:
1. MARKER CONES SHALL BE SPACED AT 25' ON CENTER TO PROTECT THE RUNWAY SAFETY AREA AND SHALL BE PLACED 150' FROM THE RUNWAY CENTERLINE.
2. CONTRACTOR SHALL MAKE FREQUENT INSPECTION OF THE MARKER CONES AND SHALL RELOCATE ANY CONES THAT ARE MISALIGNED.
3. TRAFFIC CONES SHALL BE ADEQUATELY SECURED TO WITHSTAND HIGH WINDS AND/OR JET BLAST USING GRADE STAKES AS SHOWN.

RSA DELINEATION MARKER
NOT TO SCALE

GENERAL PHASING NOTES:

1. SEE THE SPECIFICATIONS FOR REQUIREMENTS SET FORTH IN THE CONSTRUCTION SAFETY AND PHASING PLAN (CSPP) AND THE REQUIREMENT FOR THE CONTRACTOR TO SUBMIT A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) PRIOR TO CONSTRUCTION.
2. A SAFETY MEETING SHALL BE HELD BEFORE THE START OF EACH PHASE TO DISCUSS BARRICADE PLACEMENT, SAFETY AREAS, STOCKPILES, SAFETY AREAS, RUNWAY CLOSURE MARKER PLACEMENT, MARKING ERADICATION, OBSCURING SIGNS AND LIGHTS AND OTHER SAFETY ISSUES DIRECTED BY THE ENGINEER AND AIRPORT.
3. THE CONTRACTOR SHALL CALL AIRPORT OPERATIONS AT THE BEGINNING OF EACH DAY TO INFORM THEM OF THAT DAYS SCHEDULE AND CALL THEM A HOUR BEFORE LEAVING FOR THE DAY SO THEY CAN INSPECT THE WORK AREA. THE CONTRACTOR SHALL NOT LEAVE UNTIL OPERATIONS IS SATISFIED.
4. CONTRACTOR SHALL PROVIDE SUBMITTALS TO ENGINEER FOR APPROVAL OF STAGING AND STOCKPILE AREAS, DURATION, MATERIALS, HEIGHTS, ETC.
5. A GATE GUARD SHALL BE REQUIRED AT ACCESS GATE 17 & 23 DURING WORKING HOURS OF ALL PHASES. GATE SHALL REMAIN OPEN WHEN THE GATE IS BEING GUARDED. GATE SHALL BE LOCKED WHEN GATE GUARD IS NOT PRESENT.
6. ALL PHASES WILL REQUIRE ONE ESCORT AT A MINIMUM TO MOVE VEHICLES/EQUIPMENT FROM ONE FLAGGER POINT TO THE NEXT FLAGGER. ONE ESCORT VEHICLE CANNOT ESCORT MORE THAN 5 CONSTRUCTION VEHICLES AT A TIME.
7. ALL SIGNS AND LIGHTS LEADING TO AND WITHIN CLOSED AREAS SHALL BE OBSCURED BY REPLACING PANELS WITH BLANKS FOR SIGNS AND REMOVING BULBS IN EDGE LIGHTS, AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR SHALL PROVIDE A DETAILED DRAWING FOR EACH PHASE ON WHAT THEY PLAN TO OBSCURE.
8. THE CONTRACTOR SHALL BE AVAILABLE TO MOVE AND MAINTAIN BARRICADES AT ANY TIME (24/7) UPON REQUEST OF THE AIRPORT OR ENGINEER.
9. A PORTA-POTTY SHALL BE IN ALL WORK AREAS/PHASES TO LIMIT THE MOVEMENT OF CONTRACTOR VEHICLES.
10. DAYTIME WORK HOURS SHALL BE 6:30 AM TO 6:30 PM AND NIGHTTIME WORK HOURS SHALL 9:00 PM TO 7:00 AM UNLESS OTHERWISE AUTHORIZED BY THE AIRPORT. CONTRACTOR SHALL REQUEST WORKING SUNDAYS AND ANY HOLIDAYS.
11. CONTRACTOR SHALL HAVE ENGINEER'S FIELD OFFICE SET UP PER SPECIFICATIONS AND APPROVED BY THE ENGINEER BEFORE STARTING THE CONTRACT TIME.
12. THE CONTRACTOR SHALL INSPECT ALL SAFETY EQUIPMENT DAILY TO ENSURE THEY ARE POSITIONED AND WORKING PROPERLY.
13. DURING NIGHT WORK ALL LIGHTING EQUIPMENT SHALL BE CONTROLLED TO PREVENT STRAY LIGHT. THE CONTRACTOR SHALL DIRECT ALL LIGHTING AWAY FROM ADJACENT NEIGHBORHOODS AND IN A MANNER THAT DOES NOT INTERFERE WITH THE AIR TRAFFIC CONTROL TOWER AND AIRCRAFT OPERATIONS. THE CONTRACTOR SHALL PREPARE A LIGHTING PLAN TO BE REVIEWED AND APPROVED BY THE ENGINEER. THE ENGINEER SHALL APPROVE THE LOCATION AND OPERATION OF ALL LIGHTING EQUIPMENT.
14. THE CONTRACTOR SHALL HAVE A VACUUM SWEEPER AND/OR FOD RAZOR ON SITE AT ALL TIMES IN ORDER TO CLEAN HAUL ROUTES AND PRIVATE/PUBLIC ROUTES, UPON REQUEST FROM THE OWNER OR ENGINEER.
15. THE CONTRACTOR SHALL ATTEMPT TO AVOID ALL AIRFIELD MARKINGS OUTSIDE THE LIMIT OF WORK IN ORDER TO MINIMIZE THE NEED TO REPAINT THE MARKINGS.

LIGHTED RUNWAY CLOSURE MARKER MUST BE PRESENT & VISIBLE FROM THE AIR AT ALL TIMES DURING RUNWAY CLOSURE.



PORTABLE LIGHTED RUNWAY CLOSURE MARKER
NOT TO SCALE

RUNWAY CLOSURE MARKER NOTES:

1. CROSSES ARE REQUIRED AT ENDS OF CLOSED RUNWAYS. THE CROSSES SHALL BE LOCATED AND PLACED OVER THE RUNWAY NUMERALS OF THE RUNWAY INDICATED TO BE CLOSED UNLESS OTHERWISE SPECIFIED. THE CONTRACTOR SHALL BE ESCORTED BY THE RPR OR AIRPORT OPERATIONS TO PLACE OR ACCESS THE CLOSURE MARKERS.
2. THE CONTRACTOR SHALL SUPPLY THE LIGHTED 'X'. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SETUP, MAINTENANCE AND OPERATION INCLUDING PROVIDING FUEL AND REPLACEMENT LIGHT BULBS AS NECESSARY FOR THE ENTIRE TIME THE 'X' IS IN USE, INCLUDING HOURS WHEN THE CONTRACTOR IS NOT ON SITE.
3. RUNWAY CLOSURE MARKERS SHALL MEET THE REQUIREMENTS OF FAA AC 150/5345-55 (LATEST REVISION).

ENGINEER'S SEAL
STATE OF CONNECTICUT · ROBERT M. FUSCO · No. 19958 · LICENSED PROFESSIONAL ENGINEER

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PROJECT DESIGNER
HOYLE TANNER

DESIGNED BY: NEG
DRAWN BY: CJM
CHECKED BY: RMF
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

CONSTRUCTION SAFETY AND PHASING DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/11/25	PERMIT SET	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.16

SHEET 16 OF 174



ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTH
No. 25903
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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DESIGNED BY NEG
DRAWN BY JLC
CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROPERTY MAP

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△			
△			
△			
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.17

17 OF 174

HTA 4/17/2025 8:17:06 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.14 - Property Map.dwg

EAST HAVEN PARCEL DATA

PARCEL ID	SITE ADDESS	OWNER NAME
050-0505-009	21 SOUTH END RD	RISPOLI ANDREW
050-0505-010	25 SOUTH END RD	MONROE PROPERTY LLC
050-0505-013	35 SOUTH END RD	BILITY OMAR ALI
050-0505-014	9 SOUTH END RD	RAVERT DONALD D JR
050-0505-015	15 SOUTH END RD	SAVINO PETER J & HEATHER P & SURV
050-0506-001	52 SOUTH END RD	PETONITO ANGELINA SUCC TRUSTEE OF THE
050-0506-002	47 SOUTH END RD	TROPEANO JILLIAN
060-0407-003	721 SILVER SANDS RD	1332 CHAPEL ASSOCIATES LLC
060-0407-008	16 ROSES FARM RD	CRUZ JAHIDA KIMBERLY
060-0507-001	20 ROSES FARM RD	BONANNO LEONARD M & JEAN A & SV
060-0507-002	24 ROSES FARM RD	MCGOVERN JOHN T & SHARLEEN & SURV
060-0507-003	28 ROSES FARM RD	DAGOSTINO PAULA R
060-0507-004	32 ROSES FARM RD	AMATO DONNA M
060-0507-005	36 ROSES FARM RD	BOAHEMAA NANA A
060-0508-002	40 ROSES FARM RD	COPPOLA RENEE
060-0508-003	6 COMMERCE ST	THERMATOOL CORP
060-0509-001	17 COMMERCE ST	17 COMMERCE STREET LLC
090-1010-001	76 PROTO DR	MAVIS TIRE SUPPLY LLC
120-1212-003	123 PROTO DR	TENET EQUITY FUNDING SPE I LLC
120-1412-001	280 PROTO DR	TOWN OF EAST HAVEN
120-1511-005	4 BURGESS ST	ESPINOZA EDWIN
120-1511-006	10 BURGESS ST	CRETELLA DOMINIC J & MICHELE L & SV
130-1314-001	193 SILVER SANDS RD	TENET EQUITY FUNDING SPE I LLC
130-1414-001	460 COE AVE	MAVIS TIRE SUPPLY LLC
150-1609-007	19 THOMPSON AVE	SCALESSE ROBERT J SR
150-1609-008	90 BURGESS ST	KAY THAVY
150-1610-008	42 BURGESS ST	TOUCH RATHANA & MANETH & SV
150-1610-009	52 BURGESS ST	FREEDMAN REAL ESTATE HOLDINGS LLC
150-1610-010	60 BURGESS ST	GAGNER KEVIN
150-1610-011	64 BURGESS ST	TORDO JOSHUA MICHAEL
150-1610-012	76 BURGESS ST	18 WHEELBARROW LANE LLC
150-1610-013	82 BURGESS ST	DEPALMA RICHARD & GLORIA & SV
150-1611-001	38 BURGESS ST	PIRRAGLIA KERRY & KEITH & SV
150-1611-002	26 BURGESS ST	ESPOSITO ANTHONY & CATHERINE M & SV
150-1611-003	22 BURGESS ST	KOHLOFF JEAN
150-1611-026	16 BURGESS ST	ALBANO PAUL & ROSE & SURV
150-1710-001	33 THOMPSON AVE	BERMUDEZ WALESKA
150-1710-007	103 EDGAR ST	AGOSTO DOMINGO DELGADO & CRUZ
150-1710-008	59 THOMPSON AVE	ORTIZ IVONNE & ZHUZHINGO EDWIN & SV
150-1710-019	67 THOMPSON AVE	DERENZO PATRICIA E & PAUL R & SV
150-1710-020	73 THOMPSON AVE	FRAENZA JOHN III & ROSE
150-1710-023	39 THOMPSON AVE	SHAH NOSHABA J & WARDA J & IQRA J
150-1710-024	75 BURGESS ST	ENGLAND GEORGE A & TAMMY L & SURV
150-1810-001	77 THOMPSON AVE	ANGELINO GUISEPPE & EMMA & SURV
150-1810-002	70 VICTOR ST	GENTILE JOSEPH A
150-1810-003	76 VICTOR ST	SYGIEL PATRICIA M
150-1810-004	82 VICTOR ST	DELFRANCO JOHN T & GEANE M & SV
150-1810-005	86 VICTOR ST	AVILA ISRAEL & TARA & SV
150-1810-006	90 VICTOR ST	QUEZADA FREDDY GUSTAVO
150-1810-007	96 VICTOR ST	FRITSCH WALTER S JR & RAFFAELLA M
150-1810-008	100 VICTOR ST	MANNA ALFONSE JR & FRANCESCA & SURV
150-1909-001	110 VICTOR ST	ZINK JOAN E L/U & ONOFRIO LINDA S
150-1909-002	118 VICTOR ST	NARDONE RICHARD & LOUISA & SV
150-1909-003	122 VICTOR ST	GARITTA JEAN
150-1909-004	134 VICTOR ST	NORTHEAST RAMP COOPERATIVE INC
180-2009-004	12 WASHINGTON AVE	CELENTANO ROBERT
180-2108-001	300 DODGE AVE	FUCCI PATRICK J
180-2108-002	290 DODGE AVE	PISCITELLI GIUSEPPE FAMILY LIMITED
180-2108-006	289 DODGE AVE	GUGLIETTI VINCENT E & WENDY & SURV
180-2208-001	28 KENNY CT	DIGIUSTO FELIX JR
180-2208-002	15 KENNY CT	STEWART STEVEN M
180-2208-004	60 FOREST ST EXT	BERMEO PABLO LEON & GRAU KATIA & SV
180-2208-005	64 FOREST ST EXT	NA
180-2307-001	66 HOLMES ST	FUSCO ANNETTE T
180-2307-007	47 HOLMES ST	CODNER MYLES
180-2307-008	57 HOLMES ST	DOERING DAWN A & GARRETT B & SURV
180-2307-015	18 HOLMES ST	MAGBALETA EFRAN DELBERT B & ARLENE G
180-2307-009	67 HOLMES ST	LAUDANO ANGELINA L/U & JOHN & DONATO &
180-2307-015	18 HOLMES ST	MAGBALETA EFRAN DELBERT B & ARLENE G
180-2308-002	32 HOLMES ST	PEDRAZA JOSE L
180-2308-003	22 HOLMES ST	FALCIGNO ROBERT W
180-2308-005	84 FOREST ST EXT	CRESPO VANESSA
180-2308-013	39 HOLMES ST	LUCATINO VINCENT & JUDITE & SV
180-2308-015	18 CARMEN ST	PALLAZHCO FREDY F

NEW HAVEN PARCEL DATA

PARCEL ID	SITE ADDESS	OWNER NAME
014-0853-00100	199 SOUTH END RD	PEREZ-RAMIREZ NOE MARTIN
014-0853-00101	11 URIAH ST	RODRIGUEZ WILLIAM & LYSIE
014-0853-00200	181 SOUTH END RD	GUEST CRAIG C
014-0853-00300	169 SOUTH END RD	PALMIERI ROBERT KENNETH III
014-0853-00310	173 SOUTH END RD	HARTOUMBEKIS ALEXANDRA &
014-0853-00400	165 SOUTH END RD	KILFEATHER FRANCIS
014-0853-00500	161 SOUTH END RD	MASUD SYED A
014-0853-00600	157 SOUTH END RD	BOUMARGOUD FATIMA Z
014-0853-00700	153 SOUTH END RD	CITY OF NEW HAVEN
014-0853-00800	SOUTH END RD	CITY OF NEW HAVEN AIRPORT
014-0863-00500	29 DOUGLASS AV	PELLEGRINO NANCY E
014-0863-02800	32 URIAH ST	CITY OF NEW HAVEN
015-0874-00200	17 JOHNSTON ST	DEPINO ALEX
015-0874-01300	30 DOUGLASS AV	DELMONACO CRISTINA
015-0876-00100	25 TOWNSEND AV	VPS REALTY LLC
015-0876-00200	19 MORRIS CSWY	WRIGHTINGTON ERNEST C
015-0876-00300	25 MORRIS CSWY	FILARDI BARBARA TR
015-0876-00400	31 MORRIS CSWY	CAKIR EMIRHAN R
015-0876-00500	39 MORRIS CSWY	CMS REALTY 2 LLC
015-0876-00600	43 MORRIS CSWY	GREATER NEW HAVEN WATER *
015-0876-00700	49 MORRIS CSWY	GREATER NEW HAVEN WATER POLUTION CONTROL
015-0876-01400	11 TOWNSEND AV	BRADLEY JENNIFER L
015-0876-01500	13 TOWNSEND AV	DESERT INVESTMENTS II LLC
015-0876-01600	15 TOWNSEND AV	DANIELS ROBERT N
015-0876-01700	17 TOWNSEND AV	17 TOWNSEND AVENUE LLC
015-0876-01800	19 TOWNSEND AV	BARONCINI CHARLENE
015-0876-01800	19 TOWNSEND AV	BARONCINI VINCENZA EST
015-0876-01900	21 TOWNSEND AV	MESSEK CAROL MANGINO
016-1303-00100	1209 DEAN ST	ABBAGNARO EST JOSEPH
016-1303-00200	1227 DEAN ST	TOBIA CHRISTOPHER
016-1303-00300	1237 DEAN ST	RYAN MARIA, LUZZI CHERYL &
016-1303-00400	1251 DEAN ST	ADINOLFI SALVATORE M JR &
016-1303-00500	DEAN ST	ADINOLFI SALVATORE & BETTE JAN
016-1303-00600	1271 DEAN ST	EICHORN JOAN V & DAVID W SR
016-1303-00601	DEAN ST	KLUTSEY VICTOR & KLUTSEY BELINDA & SURV
016-1303-00700	1285 DEAN ST	VALLOMBROSO ROBERT T & ROSEANN
016-1303-00800	1305 DEAN ST	RIVERA FRANCES
016-1303-00900	1327 DEAN ST	DEAN HOLDINGS LLC
016-1303-00901	DEAN ST	DEPINO ARLENE M
020-0917-00201	400 BURR ST #1	BURWOOD HILL UNITOWNERS *
020-0917-00207	400 BURR ST #7	GLEN MEADOW REALTY LLC
020-0917- 00208	400 BURR ST #8	GLEN MEADOW REALTY LLC
020-0917-00300	392 BURR ST	CRUZ-PUSKAS CRISTINA
020-0917-00400	384 BURR ST	FARACE JOSEPHINE C
020-0917-00500	374 BURR ST	CARRENO RONNY & VELEZ GENNY V
020-0917-00600	366 BURR ST	URQUHART BRIAN & LISA A A/K/A*
020-0917-00700	360 BURR ST	360 BURR STREET LLC
020-0917-00800	354 BURR ST	GRANT DENNIS D
020-0917-00900	348 BURR ST	FITZGERALD EDWARD P & LAURA
020-0917-00901	344 BURR ST	CITY OF NEW HAVEN THE
020-0917-01100	340 BURR ST	MUSGROVE JANIS M
020-0917-01200	336 BURR ST	SAVINELLI JOHN A & PATRICIA &
020-0917-01300	330 BURR ST	CUSACK JOHN J JR & ROSEMARIE
020-0917-01301	320 BURR ST	CRETELLA MARYANN, DAVIA M &
020-0917-01400	310 BURR ST	FICO PASQUALE A & CARMEL A
020-0918-00300	25 HOLMES ST	FUSCO ANNETTE T TTEE
021-0919-00100	437 BURR ST	LUCIBELLO JOSEPH
021-0919-00900	401 BURR ST	JARRIN JESUS OUIDIO
021-0919-01000	18 HOLMES ST	MAGBALETA EFREN DELBERT B & ARLENE G
021-0920-02901	402 BURR ST	CITY OF NEW HAVEN
021-0920-02902	404 BURR ST	TORRES ERNESTO FIGUEROA
021-0920-02904	412 BURR ST	RINCON YULY
021-0920-02905	416 BURR ST	ZUNIGA ADRIANA
021-0920-02906	420 BURR ST	ALBANESE ROSE MARIE & ROSA JOSE A
021-0920-02908	440 BURR ST	VLAKE RONALD & DANIELLE
021-0920-02909	408 BURR ST	GUTIERREZ PEDRO N & CASTRO**
021-0920-02911	44 LAURA LA	BARRETT BARBARA J
021-0920-03202	675 TOWNSEND AV #117	ANDERSON STEPHANIE L
021-0928-01500	42 LAURA LA	BARRETT BARBARA J
021-0928-01600	38 LAURA LA	PALUMBO JAMES J JR
021-0928-01700	32 LAURA LA	HERMANSON CATHERINE, CARUSONE
021-0928-01800	24 LAURA LA	MONTAGNA YVONNE & CRESPO JOSE
021-0928-01900	16 LAURA LA	SAVAGE STEPHEN
027-0905-00600	204 BURR ST	GAUDINO RITA & JASON T

NEW HAVEN PARCEL DATA

PARCEL ID	SITE ADDESS	OWNER NAME
027-0905-00700	174 BURR ST	MOYE PATRICK L SR
027-0905-00800	140 GIRARD AV	JOHNSON MELINDA
027-0909-01000	585 FORT HALE RD	FERRARO CHRISTINE & VINCENT A
027-0909-01100	230 BURR ST	MCLAUGHLIN KELLY C & JULIA K
027-0909-01200	226 BURR ST	LAURIA ARLENE
027-0909-01300	220 BURR ST	DELBASSO ALPHONSE & CALCAGNI
027-0909-01400	210 BURR ST	MCHUGH LAURA S & VENTURA LISA C
027-0913-01200	274 BURR ST	GERME ANTHONY R & ANGELA A
027-0913-01300	266 BURR ST	ALVAREZ MYREYA
027-0913-01400	258 BURR ST	HAPPY DAYS HOLDINGS 6 LLC
027-0913-01500	250 BURR ST	MILLER DASHAYLA
027-0917-00400	296 BURR ST	GOMES ANGELIANA BENTO & HEDIVELBER**
027-0917-00500	292 BURR ST	DELIETO MAROTTI DONNA EX
027-0917-00600	286 BURR ST	FRANCO AVELINO JR
028- 0895- 00500	109 BURR ST	MAKRES KIMBERLY
028-0895-00501	1850 DEAN ST	ZYLA EUGENIUZ & DOROTA
028-0895-00600	1840 DEAN ST	SHUMWAY KIM B & DONNA M
028-0895-00700	1836 DEAN ST	GAGLIARDI VINCENT M & SUSAN L
028-0895-00800	1832 DEAN ST	CARR MARY LOU
028-0895-00900	1820 DEAN ST	GRIFFITH LYLE
028-0895-02100	BURR ST	CITY OF NEW HAVEN
028-0897-01700	110 BURR ST	HYMAN WILLARD D III
028-0898-01900	115 GIRARD AV	CONDON LAURA A
028-0898-02000	119 GIRARD AV	FLORENZANO PATRICIA A
028-0898-02100	125 GIRARD AV	TAFUTO MICHAEL & NANCY S
028-0898-02200	133 GIRARD AV	DIAMONTE, EVELYN & SALVATORE &
028-0898-02900	100 LEY ST	ANAYA DIANA M
029-0891-00600	131 MYRON ST	YOHANS CARL E JR
029-0891-00700	ALFRED ST	YOHANS CARL E JR
029-0891-00800	38 ALFRED ST	SALINAS RENE
029-0891-00900	32 ALFRED ST	OBRIEN SEAN C & LABONTE CHERISE
029-0894-00500	1800 DEAN ST	COLLAGUAZO LUIS E
029-0894-00600	1760 DEAN ST	LH DEVELOPMENT GROUP LLC
029-0894-00701	DEAN ST	LH DEVELOPMENT GROUP LLC
029-0894-00800	124 MYRON ST	JAEKLE PATRICA M
030-0885-00700	107 PARKER PL	107 PARKER PLACE LLC
030-0885-00800	40 ARDEN ST	WALLACK KERRY E
030-0888-00700	47 NELSON ST	BONILLA MIGUEL A
030-0888-00800	1610 DEAN ST	CORDOVA DIANA
031-0882-00100	35 EDEN ST	CRISCO MARY EST
031-0882-00200	1414 DEAN ST	GUGLIELMO DIANE
031-0883-00200	1500 DEAN ST	PETRILLO RONALD A
031-0883-00300	1490 DEAN ST	PETRILLO RONALD A
031-0883-00500	26 EDEN ST	CARRANO GRACE A L/U & KENDALL *
031-0883-01500	33 ARDEN ST	FRANCO PATRICIA ADMN
033-0862-01400	180 MEADOW VIEW ST	GALLO DAVID L
034-0852-00300	120 SOUTH END RD	FIGUEROA RAMON & SANTIAGO ISIDRA
034-0852-00400	110 SOUTH END RD	GARCIA ROSA E PEREZ
034-0852-00600	100 SOUTH END RD	SEIDEN RICHARD N
034-0852-00700	90 SOUTH END RD	CANGIANO FAMILY LLC
034-0852-00900	66 SOUTH END RD	CANGIANO FAMILY LLC
034-0852-01000	SOUTH END RD	HERRICK ALICE M
034-0852-01100	58 SOUTH END RD	HERRICK ALICE M
034-0852-01201	44 SOUTH END RD	APONTE AVIMAEL & EMILY
034-0852-01202	40 SOUTH END RD	APONTE AVIMAEL & EMILY
034-0852-01300	SOUTH END RD	NEW HAVEN LAND TRUST INC

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURSE
No. 19758
LICENSED
PROFESSIONAL ENGINEER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
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CHECKED BY: RMF
DRAWN BY: JLC
DESIGNED BY: NEG
DATE: APRIL 2025

PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PARCEL DATA

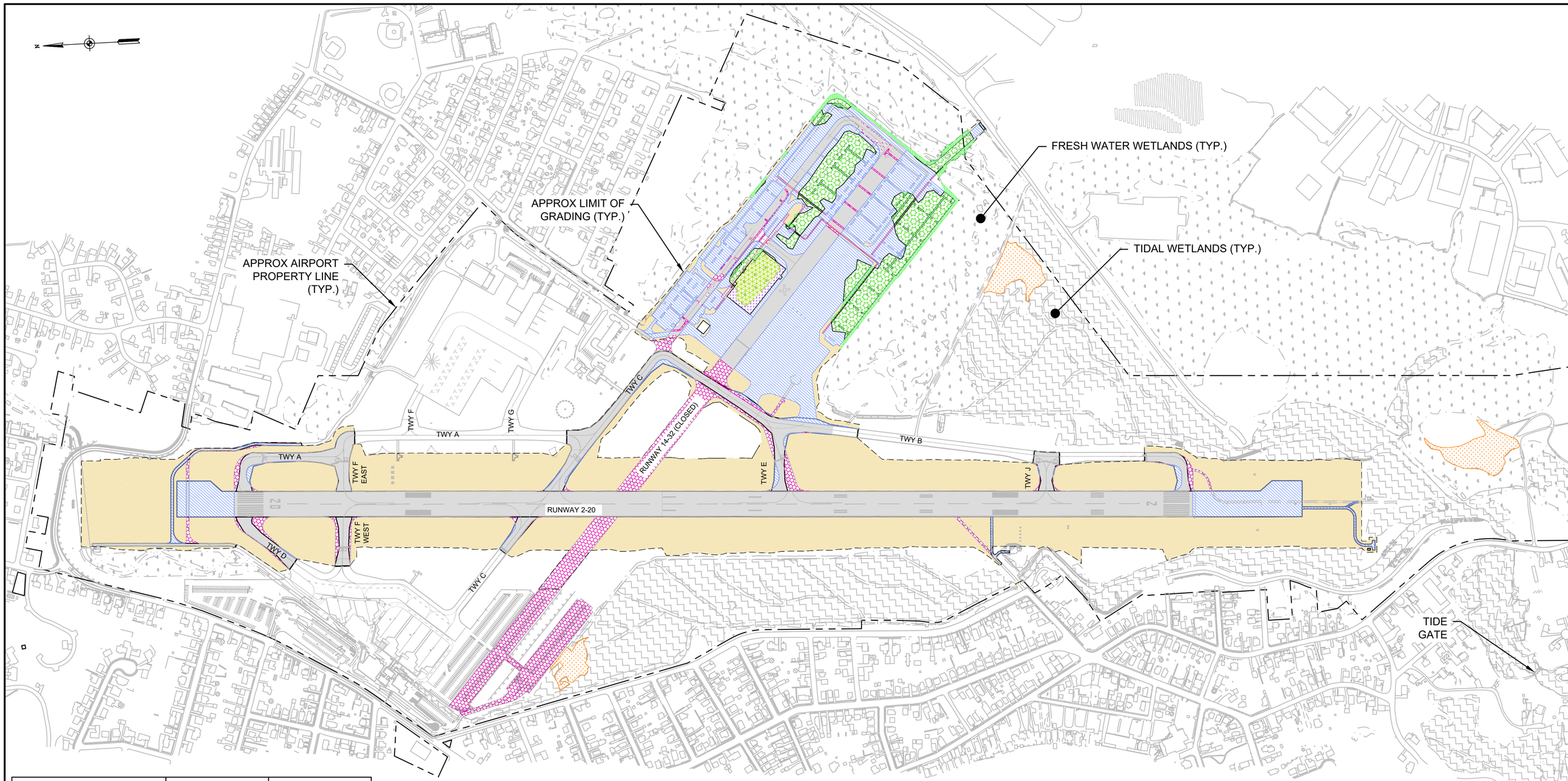
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.18

HTA 4/17/2025 8:17:13 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.14 - Property Map.dwg



DESCRIPTION	AREA (SF)	AREA (ACRES)
PAVEMENT TO PAVEMENT	1,446,568 SF	33.20 AC
TURF TO TURF	3,094,040 SF	71.0 AC
TURF TO PAVEMENT	1,073,598 SF	24.65 AC
TURF TO ROOFTOP	15,912 SF	0.37 AC
PAVEMENT TO TURF	414,388 SF	9.51 AC
WETLAND TO PAVEMENT	290,075 SF	6.66 AC
WETLAND TO ROOFTOP	45,265 SF	1.04 AC
WETLAND TO TURF	70,196 SF	1.62 AC
NET CHANGE IN IMPERVIOUS	1,010,462 SF	23.20 AC
NET CHANGE IN WETLANDS	(405,536) SF	(9.31) AC

DESCRIPTION	AREA (SF)	AREA (ACRES)
UPLAND TO WETLAND	157,424 SF	3.61 AC

TURF TO TURF
PAVEMENT TO PAVEMENT
TURF TO PAVEMENT
WETLAND TO PAVEMENT
TURF TO ROOFTOP
WETLAND TO ROOFTOP
PAVEMENT TO TURF
WETLAND TO TURF
UPLAND TO WETLAND

0 300 600 1200 FEET

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURST No. 25,933 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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DESIGNED BY NEG | DRAWN BY CJM | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

LAND CONVERSION PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.19

SHEET 19 OF 174

HTA 4/18/2025 4:45:22 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.15 - Land Conversion Plan.dwg



TEMPORARY IMPACT AREAS								
	PEM	PEM	PSS	PSS	PEM (PHRAGMITES)	PEM (PHRAGMITES)	TOTAL	TOTAL
DESCRIPTION	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)
TEMPORARY IMPACTS	670	0.02	194.00	0.01	10,777	0.25	11,641	0.27

PERMANENT IMPACT AREAS										
	CTDEEP									
	PEM	PEM	PSS	PSS	PFO	PFO	PEM (PHRAGMITES)	PEM (PHRAGMITES)	TOTAL	TOTAL
DESCRIPTION	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)
WETLAND TO PAVEMENT	276,465 SF	6.35 AC	402 SF	0.01 AC	0 SF	0.00 AC	12,815 SF	0.29 AC	289,682SF	6.65 AC
WETLAND TO ROOFTOP	45,418 SF	1.04 AC	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	45,418 SF	1.04 AC
WETLAND TO TURF	58,957 SF	1.35 AC	160 SF	0.01 AC	221 SF	0.01 AC	11,080 SF	0.25 AC	70,418 SF	1.62 AC
TOTALS	380,840 SF	8.74 AC	562 SF	0.02 AC	221 SF	0.01 AC	23,895 SF	0.54 AC	405,518 SF	9.31 AC
	ACOE									
	PEM	PEM	PSS	PSS	PFO	PFO	PEM (PHRAGMITES)	PEM (PHRAGMITES)	TOTAL	TOTAL
DESCRIPTION	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)
WETLAND TO PAVEMENT	163,042 SF	3.74 AC	402 SF	0.01 AC	0 SF	0.00 AC	12,815 SF	0.29 AC	176,259 SF	4.05 AC
WETLAND TO ROOFTOP	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	0.00 SF	0.00 AC
WETLAND TO TURF	52,050 SF	1.19 AC	160 SF	0.01 AC	221 SF	0.01 AC	11,080 SF	0.25 AC	63,511 SF	1.46 AC
TOTALS	215,092 SF	4.94 AC	562 SF	0.01 AC	221 SF	0.01 AC	23,895 SF	0.55 AC	239,770 SF	5.50 AC
	USACE– PEM IMPACTS FROM WETLAND 6 ONLY, WETLANDS 4 AND 5 ARE NON–JURISDICTIONAL									

WETLAND TO PAVEMENT

WETLAND TO ROOFTOP

WETLAND TO TURF

TEMPORARY IMPACTS

Cowardin et. al. classification

- PUB
- E1UBLx
- PEM
- E2EM
- PEM (Phragmites)
- E2EM (Phragmites)
- PSS
- PFO

0 80 160 FEET

1" = 80'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURTH No. 25503 LICENSED PROFESSIONAL ENGINEER

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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

WETLAND IMPACT PLAN 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.:22.063201.00

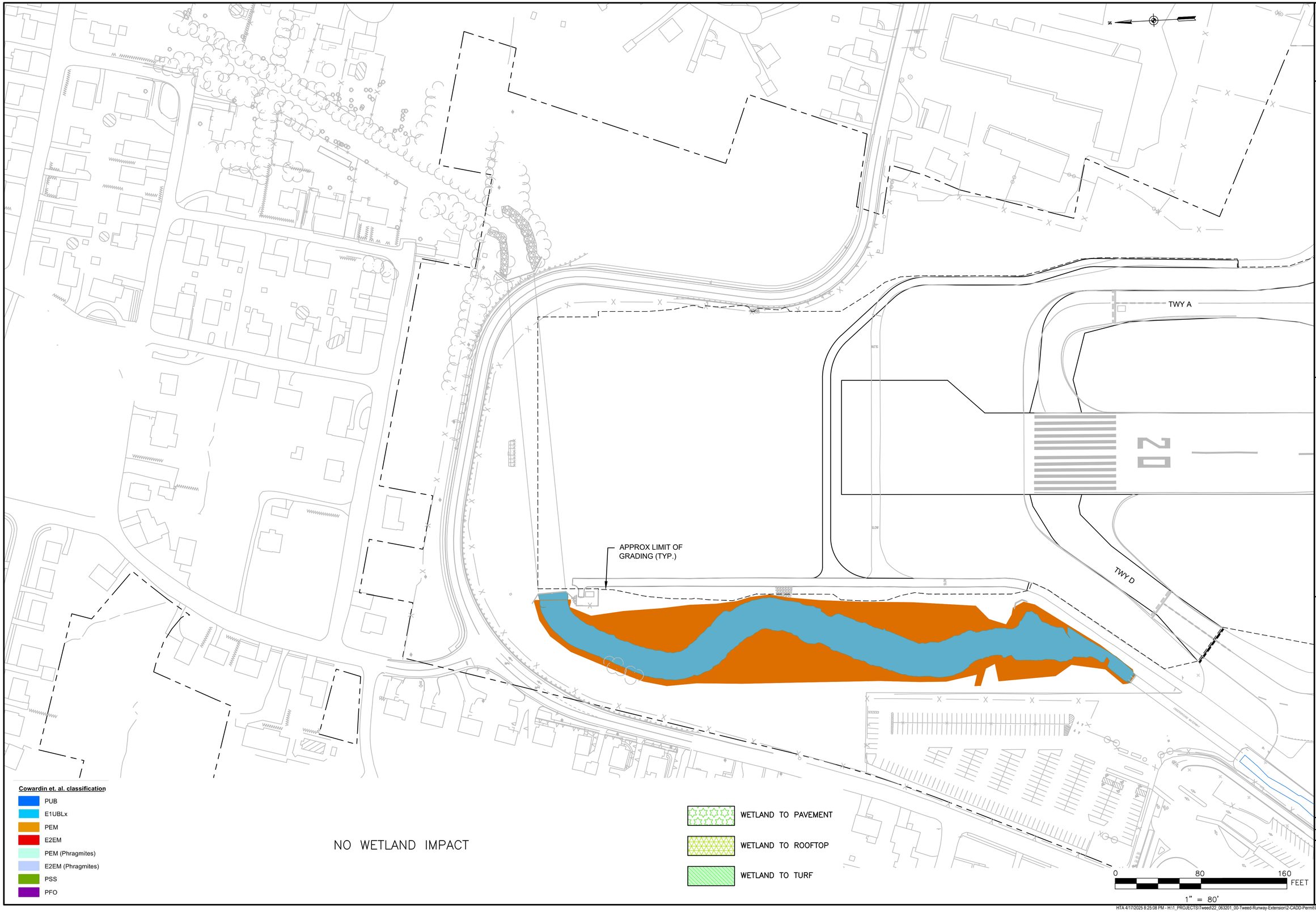
AIP:3–09–0013–0XX–2025

DRAWING NO.

G1.20

SHEET 20 OF 174

HTA 4/17/2025 8:22:42 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.16 Wetland Impact Plan.dwg



ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTH
No. 26903
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

WETLAND IMPACT PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

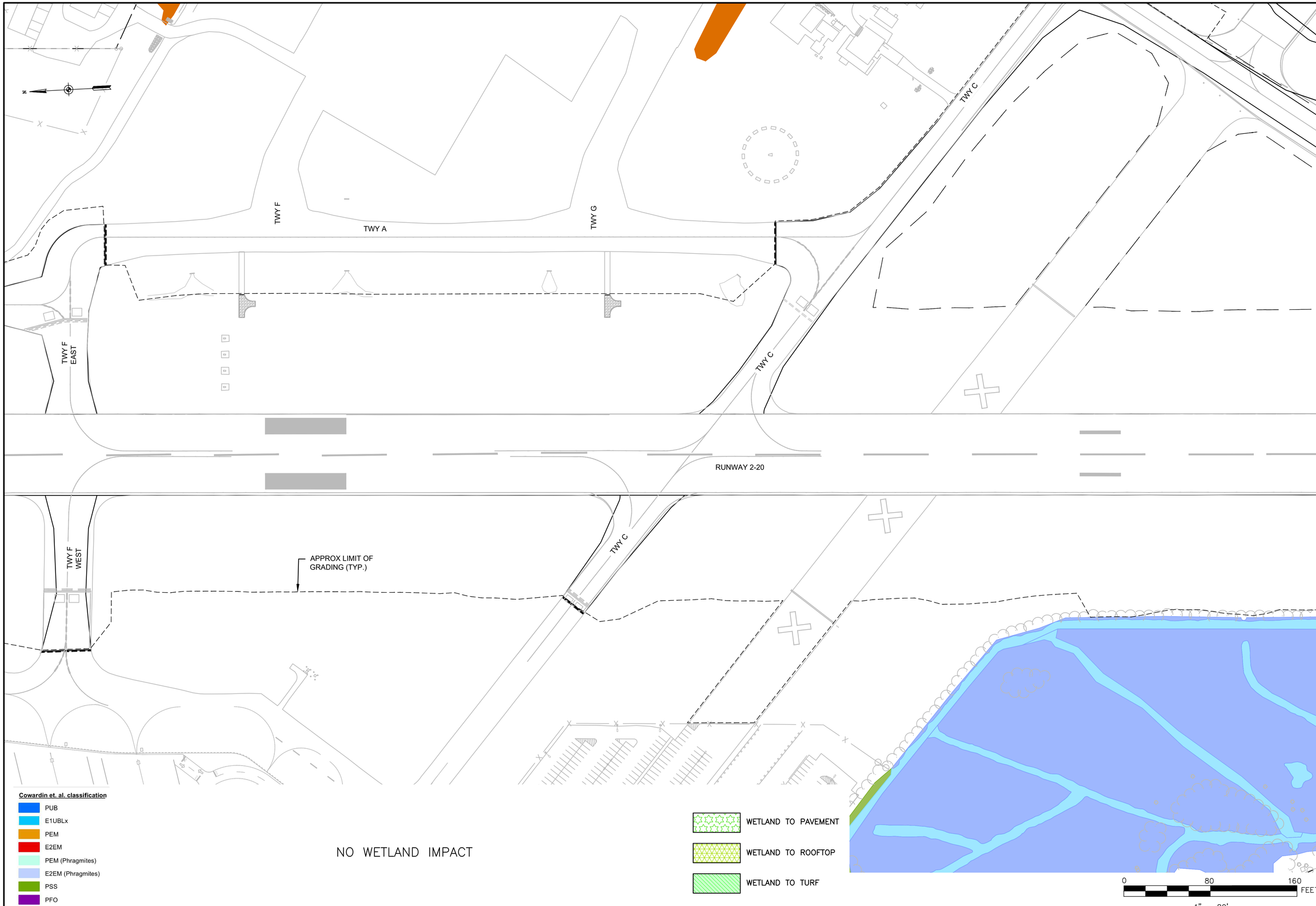
AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.21

SHEET 21 OF 174

HTA 4/17/2025 8:25:08 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.20 Wetland Impact Plan 2.dwg



ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTH
No. 25033
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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(603) 669-5555
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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

WETLAND IMPACT PLAN 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

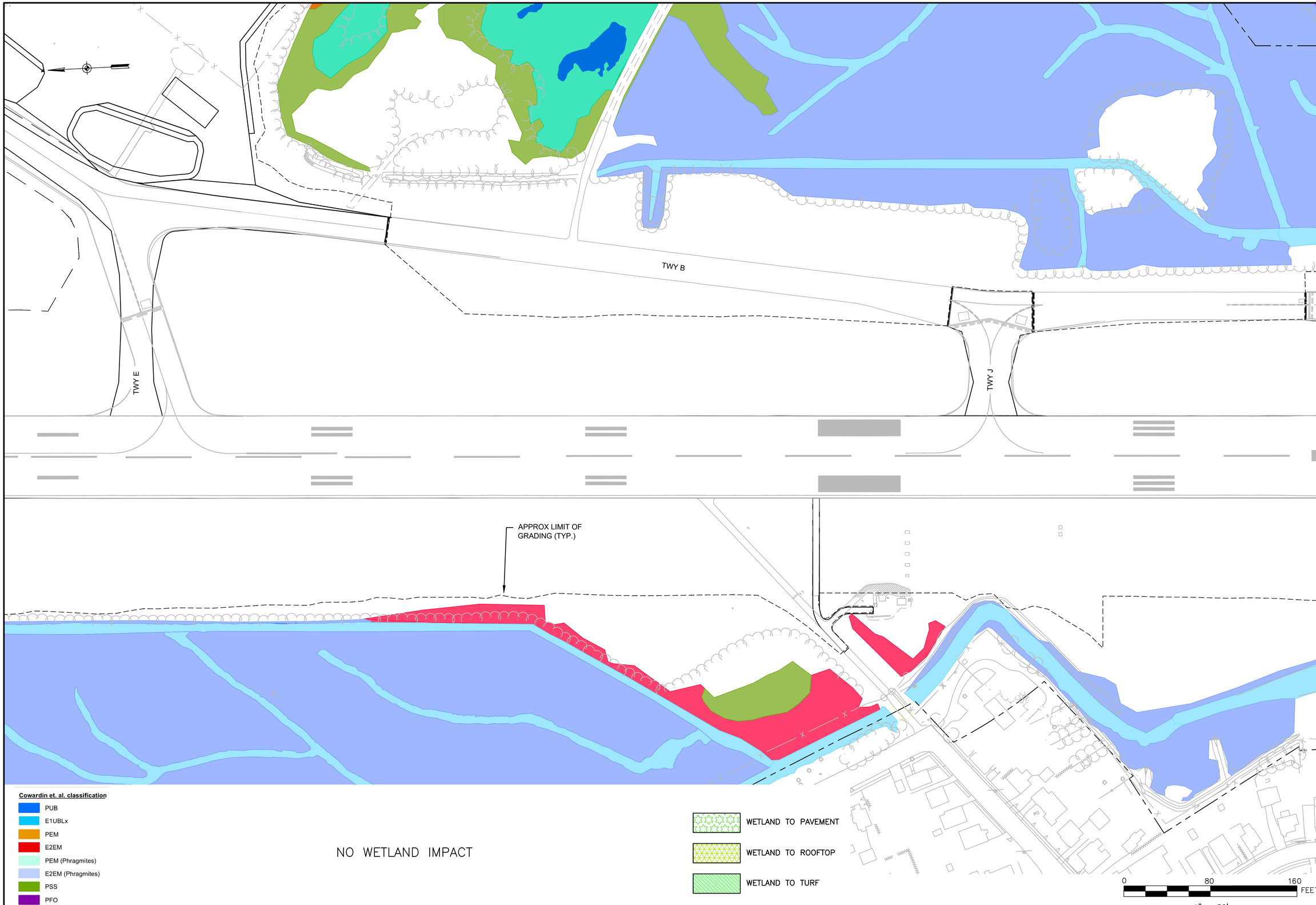
AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.22

SHEET 22 OF 174

HTA 4/17/2025 8:25:22 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\G1.20 Wetland Impact Plan 2.dwg



ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURBER
No. 25033
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

Hoyle Tanner & Associates © 2023

DESIGNED BY NEG | DRAWN BY CJM | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

WETLAND IMPACT PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.23

SHEET 23 OF 174

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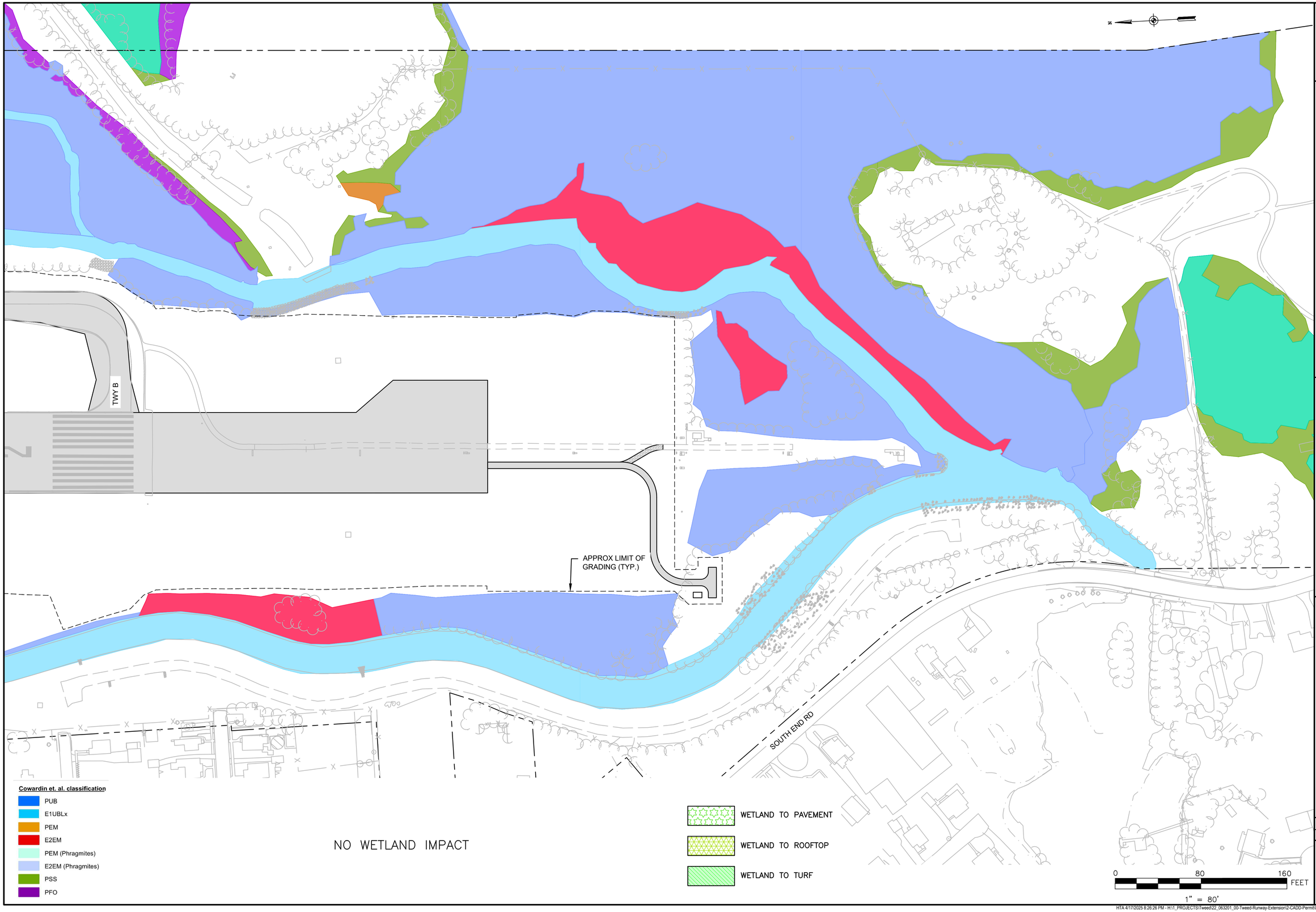

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURNEY
No. 25933
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

WETLAND IMPACT PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.24

SHEET 24 OF 174

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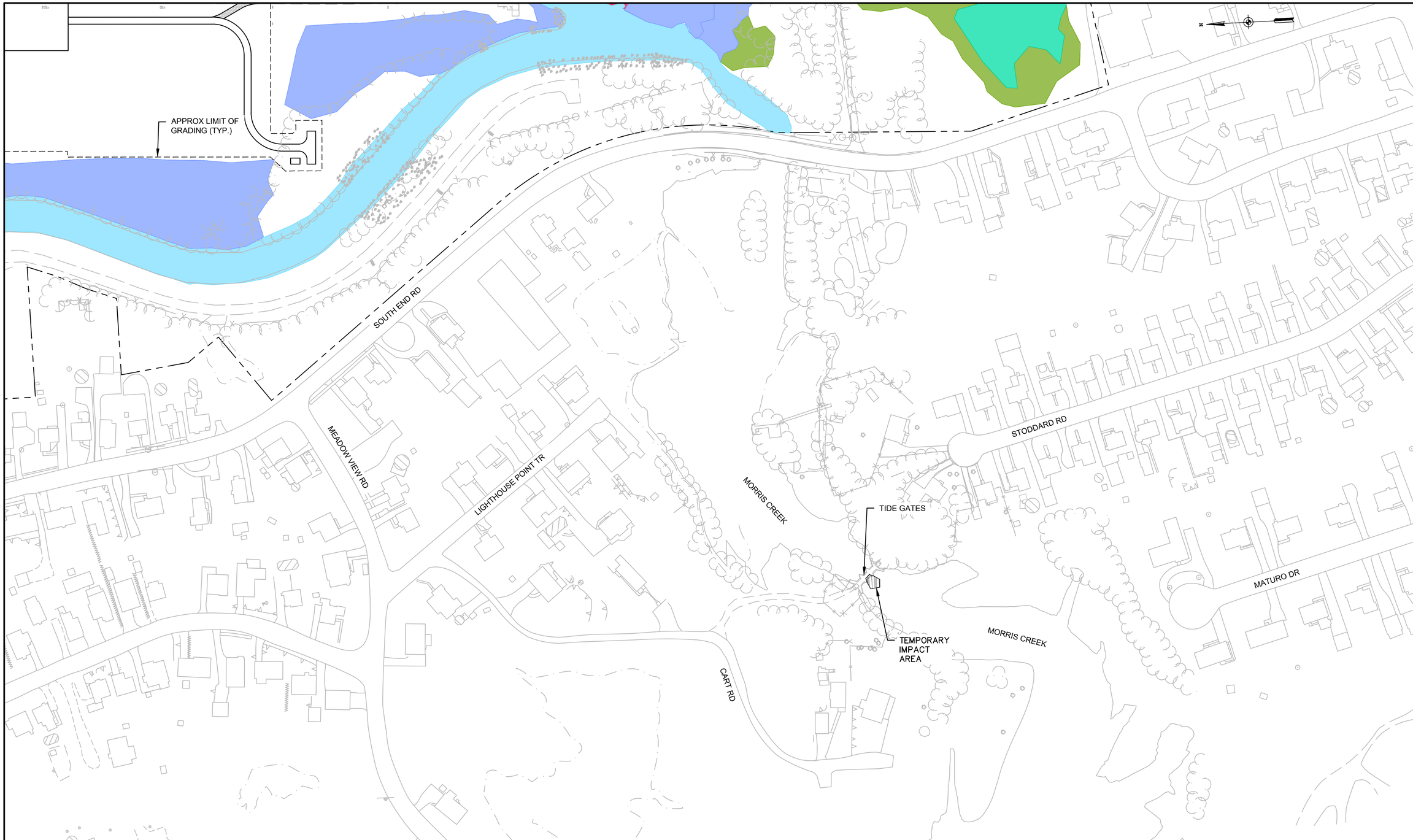

Cowardin et. al. classification

- PUB
- E1UBLx
- PEM
- E2EM
- PEM (Phragmites)
- E2EM (Phragmites)
- PSS
- PFO

NO WETLAND IMPACT

- WETLAND TO PAVEMENT
- WETLAND TO ROOFTOP
- WETLAND TO TURF

TEMPORARY IMPACT AREAS		
	OPEN WATER	OPEN WATER
DESCRIPTION	AREA (SF)	AREA (ACRES)
TEMPORARY IMPACTS	421	0.01

0 80 160 FEET

1" = 80'

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FUTEY
No. 25503
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

WETALND IMPACT PLAN 6

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

G1.25

SHEET 25 OF 174

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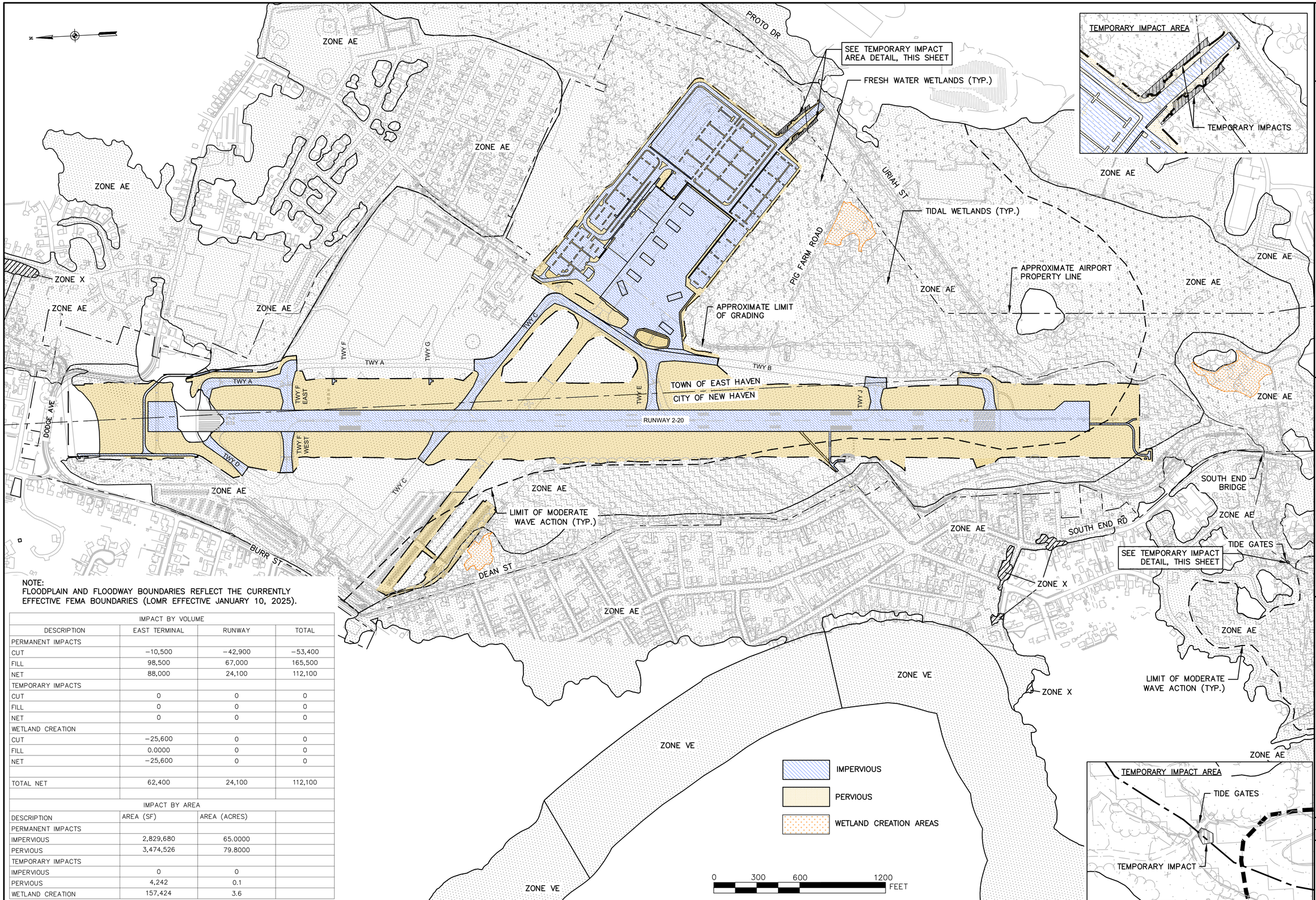

NOTE:
FLOODPLAIN AND FLOODWAY BOUNDARIES REFLECT THE CURRENTLY EFFECTIVE FEMA BOUNDARIES (LOMR EFFECTIVE JANUARY 10, 2025).

IMPACT BY VOLUME			
DESCRIPTION	EAST TERMINAL	RUNWAY	TOTAL
PERMANENT IMPACTS			
CUT	−10,500	−42,900	−53,400
FILL	98,500	67,000	165,500
NET	88,000	24,100	112,100
TEMPORARY IMPACTS			
CUT	0	0	0
FILL	0	0	0
NET	0	0	0
WETLAND CREATION			
CUT	−25,600	0	0
FILL	0.0000	0	0
NET	−25,600	0	0
TOTAL NET	62,400	24,100	112,100
IMPACT BY AREA			
DESCRIPTION	AREA (SF)	AREA (ACRES)	
PERMANENT IMPACTS			
IMPERVIOUS	2,829,680	65.0000	
PERVIOUS	3,474,526	79.8000	
TEMPORARY IMPACTS			
IMPERVIOUS	0	0	
PERVIOUS	4,242	0.1	
WETLAND CREATION	157,424	3.6	

ENGINEER'S SEAL

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY CJM | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

FLOODPLAIN IMPACT PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.26

SHEET 26 OF 167

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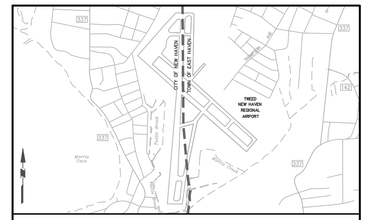
CT NAD 83

250 0 125 250

1 INCH = 250 FEET

VT-401 VT-402 VT-403 VT-404 VT-405 VT-406 VT-407 VT-408 VT-409 VT-410 VT-411 VT-412 VT-413



PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

NOTES

1. THIS SURVEY HAS BEEN PREPARED PURSUANT TO THE REGULATIONS OF CONNECTICUT STATE AGENCIES SECTIONS 20–300b–1 THROUGH 20–300b–20 AND THE "STANDARDS FOR SURVEYS AND MAPS IN THE STATE OF CONNECTICUT" AS ADOPTED BY THE CONNECTICUT ASSOCIATION OF LAND SURVEYORS, INC. ON SEPTEMBER 26, 1996.
   a. THIS SURVEY IS A PROPERTY SURVEY CONFORMING TO A HORIZONTAL ACCURACY OF A–2 AND A TOPOGRAPHIC SURVEY CONFORMING TO A T–2 ACCURACY. BOUNDARY INFORMATION PROVIDED BY OTHERS, APPROXIMATE LOCATION SHOWN. THE PURPOSE OF THIS SURVEY IS TO DEPICT SITE FEATURES FOR FUTURE SITE DEVELOPMENT.
2. THIS SURVEY IS BASED UPON EXISTING PHYSICAL CONDITIONS FOUND AT THE SUBJECT SITE, DEED INFORMATION AND THE FOLLOWING REFERENCES:
   A. MAP TITLED "PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY – TWEED AIRPORT – EAST HAVEN/NEW HAVEN – NEW HAVEN COUNTY, CONNECTICUT", SHEETS VB201 THROUGH VB208, SCALE: 1 INCH = 40 FEET, DATED: 5 MAY 2023, AS PREPARED BY: LANGAN CT, INC.
   B. MAP TITLED "LOTS 500–507 THOMPSON AVENUE GARDENS – SECTION 2 – BURGESS STREET AND THOMPSON AVENUE – EAST HAVEN, CONNECTICUT", SCALE: 1 INCH = 20 FEET, DATED: 31 JULY 1995, LAST REVISED: 28 DECEMBER 1995, AS PREPARED BY: CRISCUOLO SHEPARD ASSOCIATES, P.C. – BRANFORD, CONNECTICUT.
   C. MAP TITLED "EXHIBIT A – PROPERTY MAP – TWEED NEW HAVEN REGIONAL AIRPORT – AIRPORT PROPERTY LAYOUT", SCALE: VARIES, DATED: NOVEMBER 1989, LAST REVISED: 21 APRIL 2021, AS PREPARED BY: GREINER SURVEYING & MAPPING – WALLINGFORD, CONNECTICUT.
   D. MAP TITLED "TWEED NEW HAVEN AIRPORT AUTHORITY – CONSTRUCT RUNWAY 20 SAFETY AREA IMPROVEMENTS – AIR PROJECT NO. 3–09–0013–33–2008", SCALE: VARIES, DATED: MAY 2008, LAST REVISED: JULY 2010, AS PREPARED BY: HOYLE, TANNER & ASSOCIATES, INC. – MANCHESTER, NEW HAMPSHIRE.
   E. MAP TITLED "TWEED NEW HAVEN AIRPORT AUTHORITY – CONSTRUCT RUNWAY 2 SAFETY AREA, WETLAND MITIGATION AND TIDE GATE IMPROVEMENTS (BASE BID) – AIR PROJECT NO. 3–09–0013–33", SCALE: VARIES, DATED: AUGUST 2007, LAST REVISED: MARCH 2009, AS PREPARED BY: HOYLE, TANNER & ASSOCIATES, INC. – MANCHESTER, NEW HAMPSHIRE.
   F. MAP TITLED "AIRFIELD ELECTRICAL PLANS – TWEED–NEW HAVEN AIRPORT AUTHORITY – TWEED–NEW HAVEN AIRPORT – NEW HAVEN, CONNECTICUT", SCALE: VARIES, DATED: OCTOBER 2004, AS PREPARED BY: EDWARDS AND KELCEY – PROVIDENCE, RHODE ISLAND.
   G. MAP TITLED "TWEED–NEW HAVEN AIRPORT – RECONSTRUCT A PORTION OF R/W 32 – DRAINAGE PLAN", DRAWING NO. C4.2, SCALE: 1 INCH = 100 FEET, DATED: MARCH 2002, LAST REVISED: 15 JULY 2003, AS PREPARED BY: HOYLE, TANNER & ASSOCIATES, INC. – MANCHESTER, NEW HAMPSHIRE.
3. THE MERIDIAN OF THIS SURVEY IS REFERENCED TO CONNECTICUT STATE PLANE COORDINATE SYSTEM NAD 83 (EPOCH 2011). POSITION WAS DETERMINED BY GLOBAL NAVIGATION SATELLITE SYSTEMS (GNSS) AS PROVIDED BY HXGN SMARTNET CONTINUOUSLY OPERATED REFERENCE STATIONS (CORS).
4. ELEVATIONS SHOWN ARE REFERENCED TO NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) (GEOID 18) AS DETERMINED BY GNSS
5. PLANIMETRIC AND TOPOGRAPHIC INFORMATION SHOWN HEREON HAS BEEN OBTAINED FROM GROUND SURVEYS BY LANGAN CT, INC. FIELD WORK COMPLETED DURING THE MONTHS OF APRIL 2023, AND UPDATED IN DECEMBER THROUGH OCTOBER 2024.
6. AS PER THE NATIONAL FLOOD INSURANCE PROGRAM FIRM MAP ENTITLED "NEW HAVEN COUNTY, CONNECTICUT PANEL 444 OF 635, MAP NUMBER 09009C0444J, EFFECTIVE DATE JULY 8, 2013" THE PROJECT AREA IS PARTIALLY IN ZONE X (UNSHADED), PARTIALLY IN ZONE AE (EL11), PARTIALLY IN ZONE AE (EL12), AND PARTIALLY WITHIN THE LIMITS OF MODERATE WAVE ACTION.
7. UNLESS SPECIFICALLY NOTED HEREON, STORM AND SANITARY SEWER INFORMATION (INCLUDING PIPE INVERT, PIPE MATERIAL, AND PIPE SIZE) WAS OBSERVED AND MEASURED AT FIELD LOCATED STRUCTURES (MANHOLES/CATCH BASINS, ETC.). CONDITIONS CAN VARY FROM THOSE ENCOUNTERED AT THE TIMES WHEN AND LOCATIONS WHERE DATA IS OBTAINED. DESPITE MEETING THE REQUIRED STANDARD OF CARE, THE SURVEYOR CANNOT, AND DOES NOT WARRANT THAT PIPE MATERIAL AND/OR PIPE SIZE THROUGHOUT THE PIPE RUN ARE THE SAME AS THOSE OBSERVED AT EACH STRUCTURE, OR THAT THE PIPE RUN IS STRAIGHT BETWEEN THE LOCATED STRUCTURES.
8. ADDITIONAL UTILITY (WATER, GAS, ELECTRIC ETC.) DATA MAY BE SHOWN FROM FIELD LOCATED SURFACE MARKINGS (BY OTHERS), EXISTING STRUCTURES, AND/OR FROM EXISTING DRAWINGS.
9. UNLESS SPECIFICALLY NOTED HEREON, THE SURVEYOR HAS NOT EXCAVATED TO PHYSICALLY LOCATE THE UNDERGROUND UTILITIES. THE SURVEYOR MAKES NO GUARANTEES THAT THE SHOWN UNDERGROUND UTILITIES ARE EITHER IN SERVICE, ABANDONED OR SUITABLE FOR USE, NOR ARE IN THE EXACT LOCATION OR CONFIGURATION INDICATED HEREON.
10. ALL BUILDINGS AND STRUCTURES WERE LOCATED AND MEASURED AT GROUND LEVEL. THE SURVEYOR MAKES NO DETERMINATIONS OR GUARANTEES AS TO THE ABSENCE, EXISTENCE OR LOCATION OF UNDERGROUND STRUCTURES, FOUNDATIONS, FOOTINGS, PROJECTIONS, WALLS, TANKS, SEPTIC SYSTEMS, ETC. NO TEST PITS, EXCAVATIONS OR GROUND PENETRATING RADAR WERE PERFORMED AS PART OF THIS SURVEY.
11. PRIOR TO ANY DESIGN OR CONSTRUCTION, THE PROPER UTILITY AGENCIES MUST BE CONTACTED FOR VERIFICATION OF UTILITY TYPE AND FOR FIELD LOCATIONS.
12. THIS SURVEY IS NOT VALID WITHOUT THE EMBOSSED OR INKED SEAL OF THE PROFESSIONAL.

LEGEND

(NOT SHOWN TO SCALE)

AIR CONDITIONING UNIT		UNDERGROUND VAULT	
BOLLARD		VALVE UNKNOWN	
BORING HOLE		WATER METER	
COLUMN		WATER VALVE	
DOOR	X 262.3	SPOT ELEVATION	
DOUBLE DOOR	BIT	BITUMINOUS	
FLAG POLE	CONC	CONCRETE	
HANDICAP SYMBOL	CP	CONCRETE PAD	
MAILBOX	LSA	LANDSCAPED AREA	
MONITORING WELL	BW	BOTTOM OF WALL	
PARKING METER	BOH	BUILDING OVERHANG	
ROOF VENT	EP	EDGE OF PAVEMENT	
SIGN	EG	EDGE OF GRAVEL	
SHRUB	EW	EDGE OF WALK	
ROOF FAN	DW	DETECTABLE WARNING	
TEST PIT	BC	BITUMINOUS CURB	
TREE	CC	CONCRETE CURB	
WETLAND FLAG	GC	GRANITE CURB	
GROUND LIGHT	SG	SLOPED GRANITE CURB	
CABLE BOX HAND HOLE	SWS	SINGLE WHITE STRIPE	
CATCH BASIN	BWS	BROKEN WHITE STRIPE	
CLEANOUT	SYS	SINGLE YELLOW STRIPE	
ELECTRIC BOX	DYS	DOUBLE YELLOW STRIPE	
ELECTRIC METER		WOOD GUARD RAIL	
FILLER VALVE		STOCKADE FENCE	
FIRE HYDRANT		CHAINLINK FENCE	
FLARED END SECTION		IRON FENCE	
FUEL PUMP		TREE LINE	
GAS METER		OVERHEAD WIRE	
GAS VALVE		WETLAND LINE	
GUY POLE		EASEMENT LINE	
GUY WIRE		PROPERTY LINE	
HAND HOLE		RIGHT–OF–WAY LINE	
LIGHT POLE	322	CONTOUR LINE	
MANHOLE (TYPE AS LABELED)	FM	SANITARY FORCE MAIN	
POST INDICATOR VALVE	CATV	CABLE TV MARK OUT LINE	
POWER POLE	D	DRAINAGE MARK OUT LINE	
ROOF DRAIN	E	ELECTRIC MARK OUT LINE	
SATELLITE DISH	T	COMMUNICATION MARK OUT LINE	
SPRINKLER HEAD	G	GAS MARK OUT LINE	
STANDPIPE	S	SANITARY SEWER MARK OUT LINE	
TELEPHONE BOOTH	W	WATER MARK OUT LINE	
TELEPHONE BOX	ST	STEAM MARK OUT LINE	
TRAFFIC BOX	UNK	UNKNOWN MARK OUT LINE	
TRAFFIC SIGNAL	R*	REFERENCE UTILITY LINE (TYPE AS NOTED) – PLOTTED FROM EXISTING MAPPING	
TRAFFIC SIGNAL ARM			
TRAFFIC SIGNAL POLE			

STATE OF CONNECTICUT ANDREW G. IVES 18 No. 70286 LICENSED LAND SURVEYOR

Date	Description	No.

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No. 140237201	Drawing No. VT-400
Date 02 DECEMBER 2024	
Drawn By AJR	
Checked By AGI	Sheet 1 of 14

PROJECT NO. 140237201

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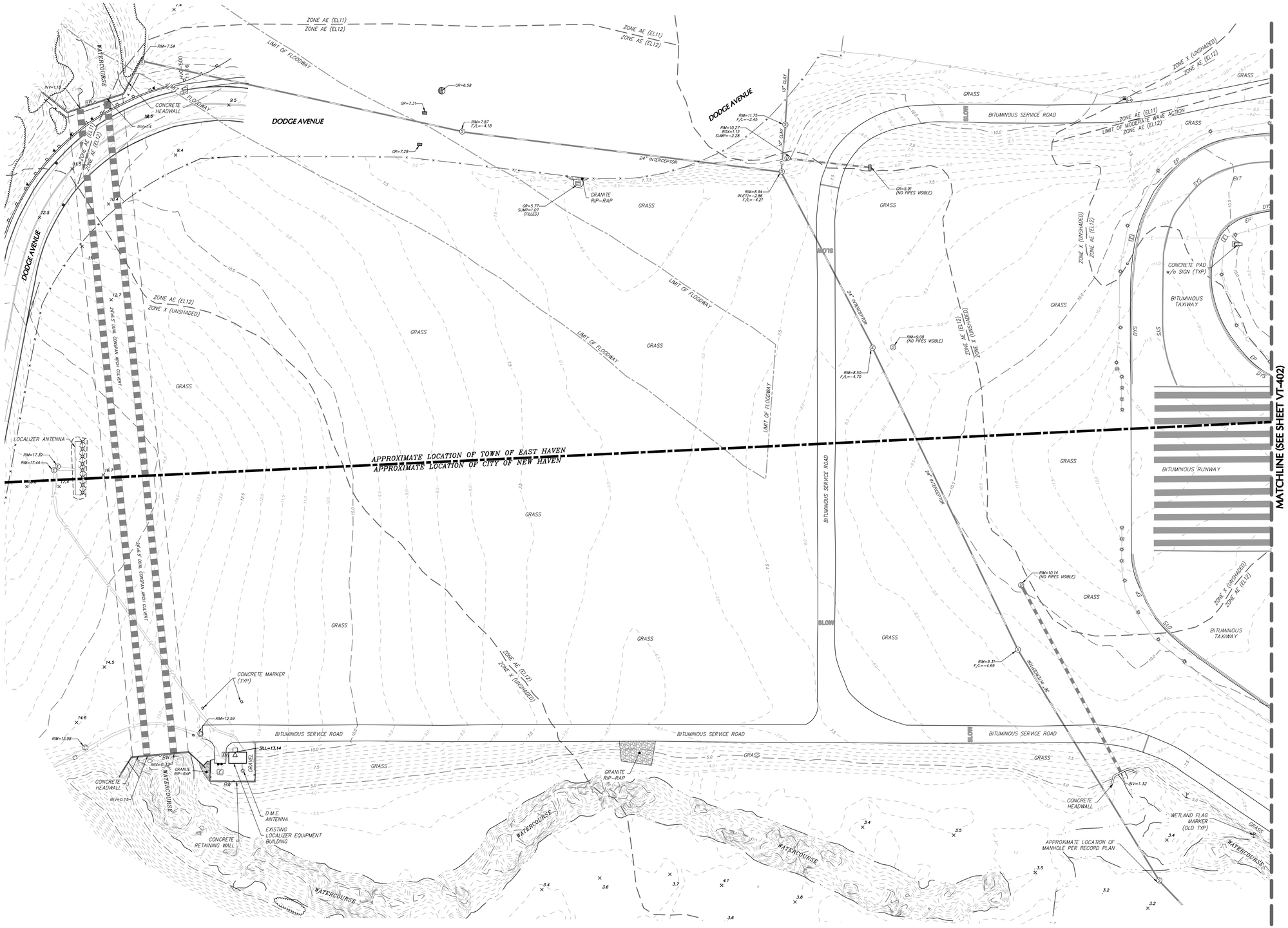

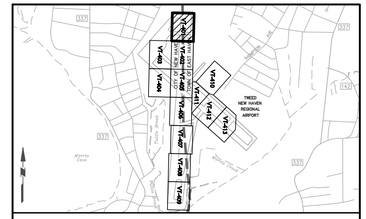

PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

PROJECT NO. 140237201

No.	Description	Date

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No. 140237201	Drawing No. VT-401
Date 02 DECEMBER 2024	
Drawn By AJR	
Checked By AGI	Sheet 2 of 14

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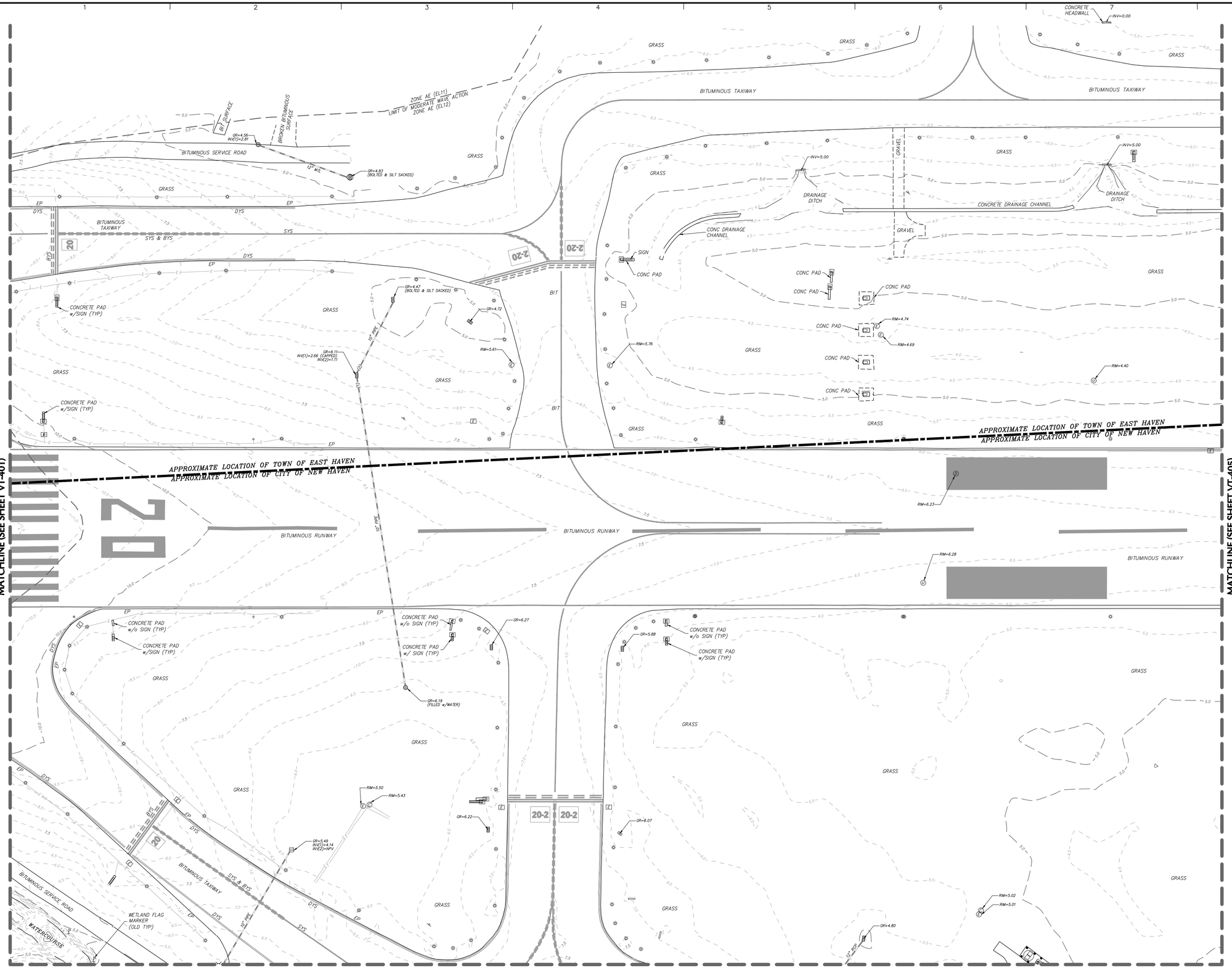
MATCHLINE (SEE SHEET VT-401)
MATCHLINE (SEE SHEET VT-405)
MATCHLINE (SEE SHEET VT-402)
APPROXIMATE LOCATION OF TOWN OF EAST HAVEN
APPROXIMATE LOCATION OF CITY OF NEW HAVEN
ZONE AE (EL11)
LIMIT OF MODERATE WAVE ACTION
ZONE AE (EL12)
BITUMINOUS SERVICE ROAD
BITUMINOUS TAXIWAY
BITUMINOUS RUNWAY
BROKEN BITUMINOUS SURFACE
BIT SURFACE
CONCRETE HEADWALL
INV=0.00
CONCRETE DRAINAGE CHANNEL
CONC DRAINAGE CHANNEL
DRAINAGE DITCH
GRAVEL
CONCRETE PAD w/SIGN (TYP)
CONCRETE PAD w/o SIGN (TYP)
CONCRETE PAD w/ SIGN (TYP)
CONC PAD
SIGN
WETLAND FLAG MARKER (OLD TYP)
WATERCOURSE
GRASS
BIT
EP
DYS
SYS
SYS & BYS
2-20
20-2
20
12" MTL
10" PIPE
12" RCP
GR=4.56
INV(T)=2.81
GR=4.83
(BOLTED & SILT SACKED)
GR=4.47
(BOLTED & SILT SACKED)
GR=4.72
GR=6.11
INV(T)=2.66 (CAPPED)
INV(2)=1.11
RIM=5.61
RIM=5.76
GR=6.27
GR=6.19
(FILLED w/WATER)
GR=5.88
GR=6.22
GR=6.07
GR=5.49
INV(T)=4.14
INV(2)=NPV
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INV=5.00
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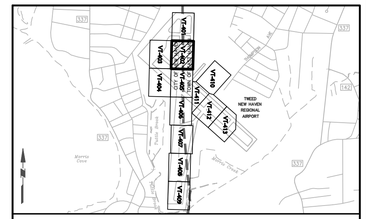
TWEED NEW HAVEN REGIONAL AIRPORT
VT-401
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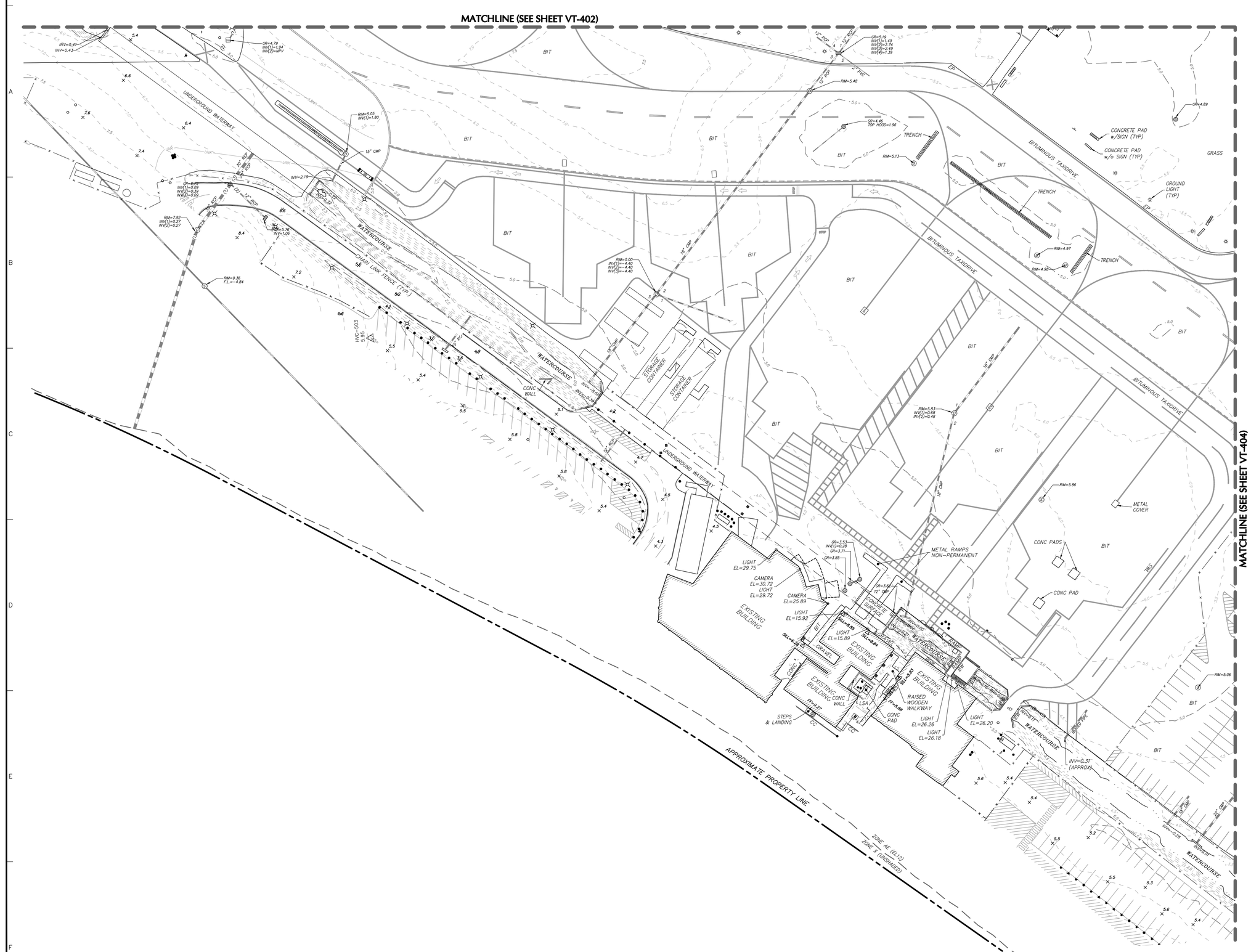

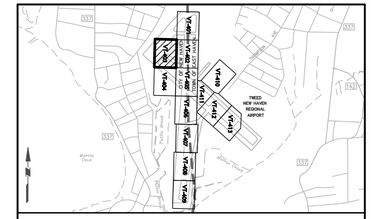

PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

STATE OF CONNECTICUT
ANDREW J. IVES
No. 70286
LICENSED LAND SURVEYOR

No.	Description	Date

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

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T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No.	Drawing No.
140237201	VT-403
Date: 02 DECEMBER 2024	
Drawn By: AJR	
Checked By: AGI	Sheet 4 of 14

PROJECT NO. 140237201

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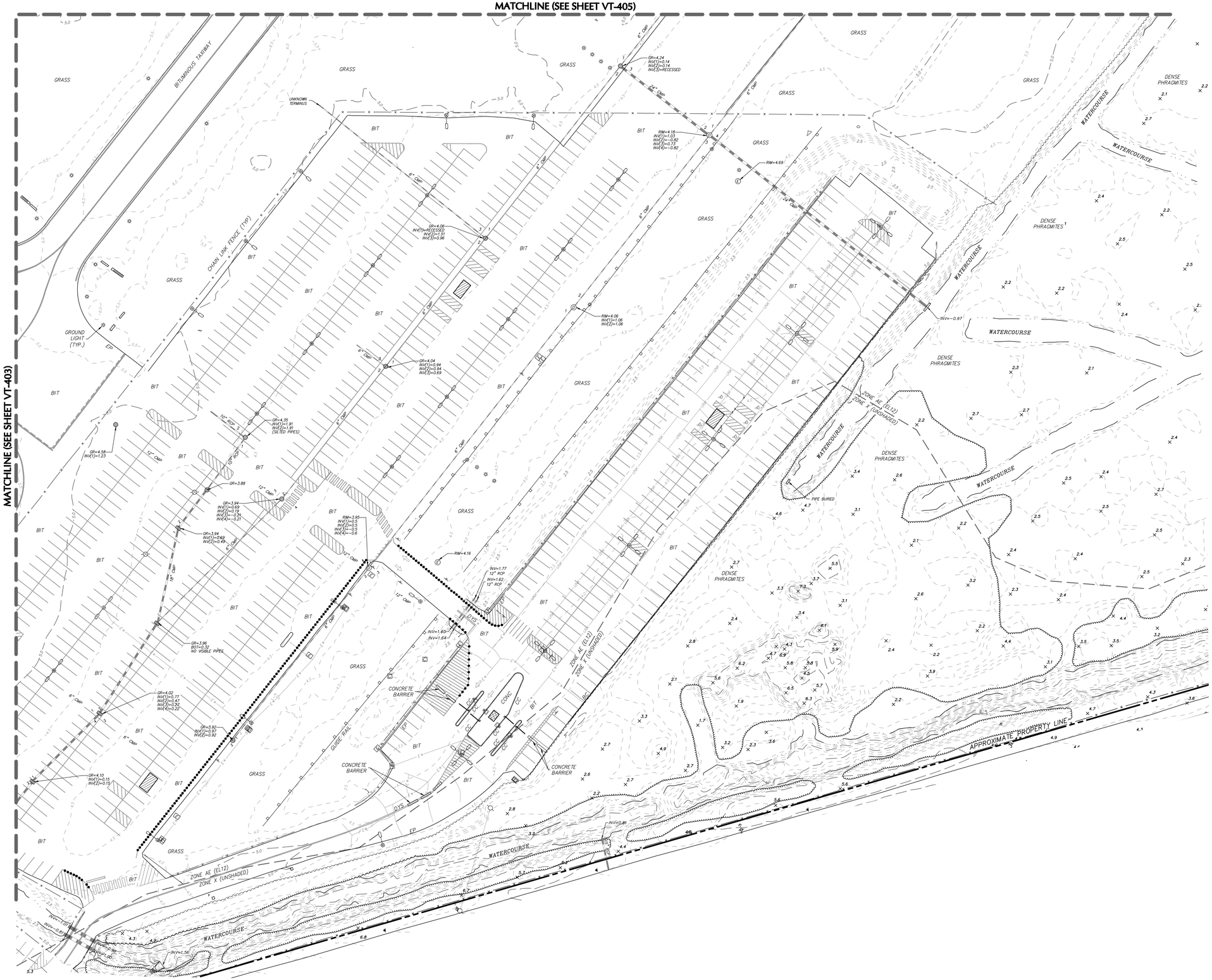
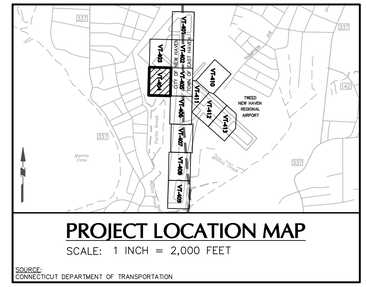
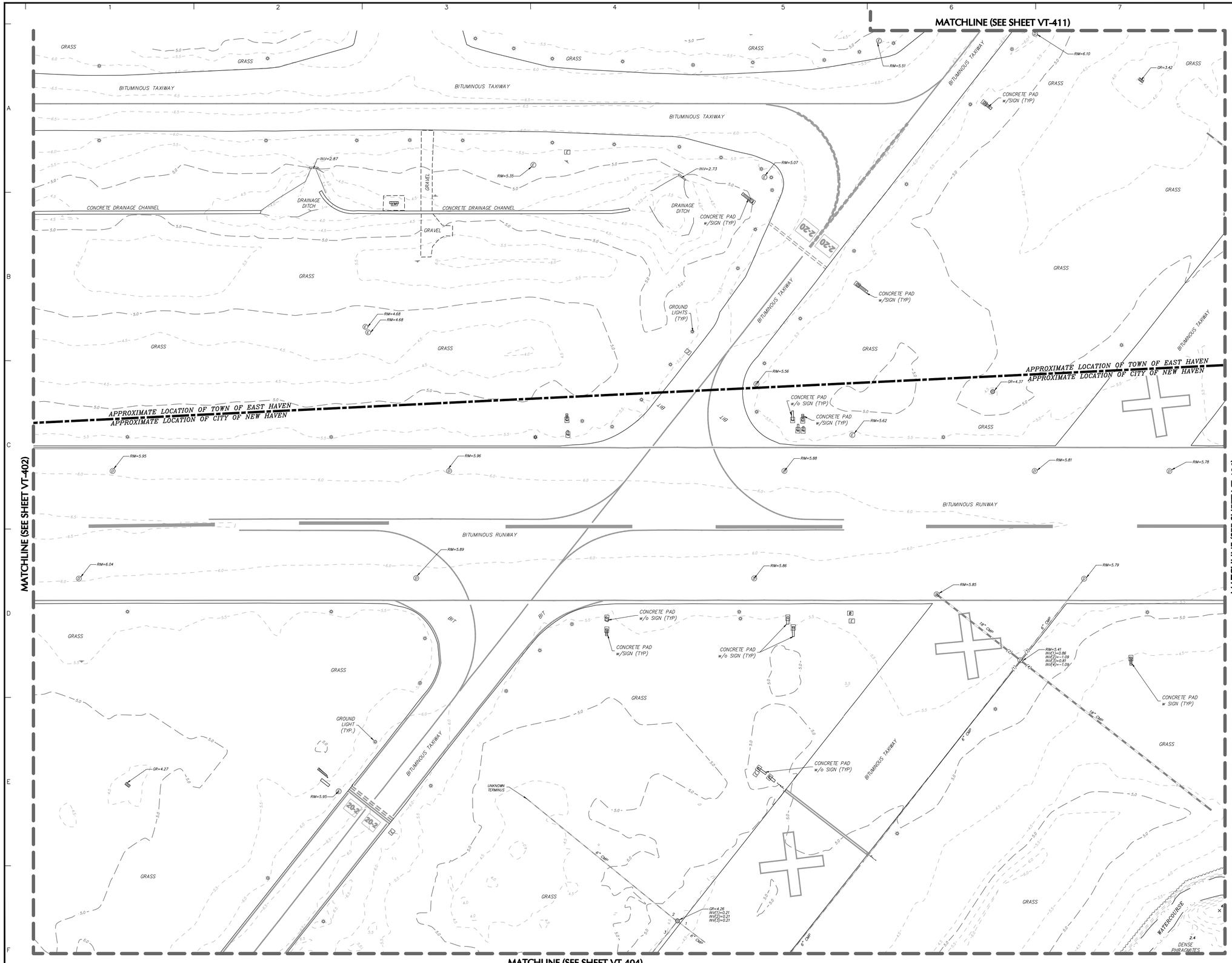
Filename: C:\bms\langan-pw-01\d0523284\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:38 User: areinhart Style Table: Langan.stb Layout: VT-403

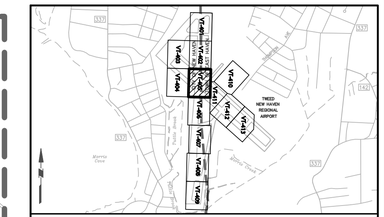
MATCHLINE (SEE SHEET VT-405)

MATCHLINE (SEE SHEET VT-403)









PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

STATE OF CONNECTICUT
ANDREW G. IVES
No. 70286
LICENSED
LAND SURVEYOR

Date	Description	No.

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No.	Drawing No.
140237201	VT-405
Date: 02 DECEMBER 2024	
Drawn By: AJR	
Checked By: AGI	Sheet 6 of 14

LANGAN

PROJECT NO. 140237201

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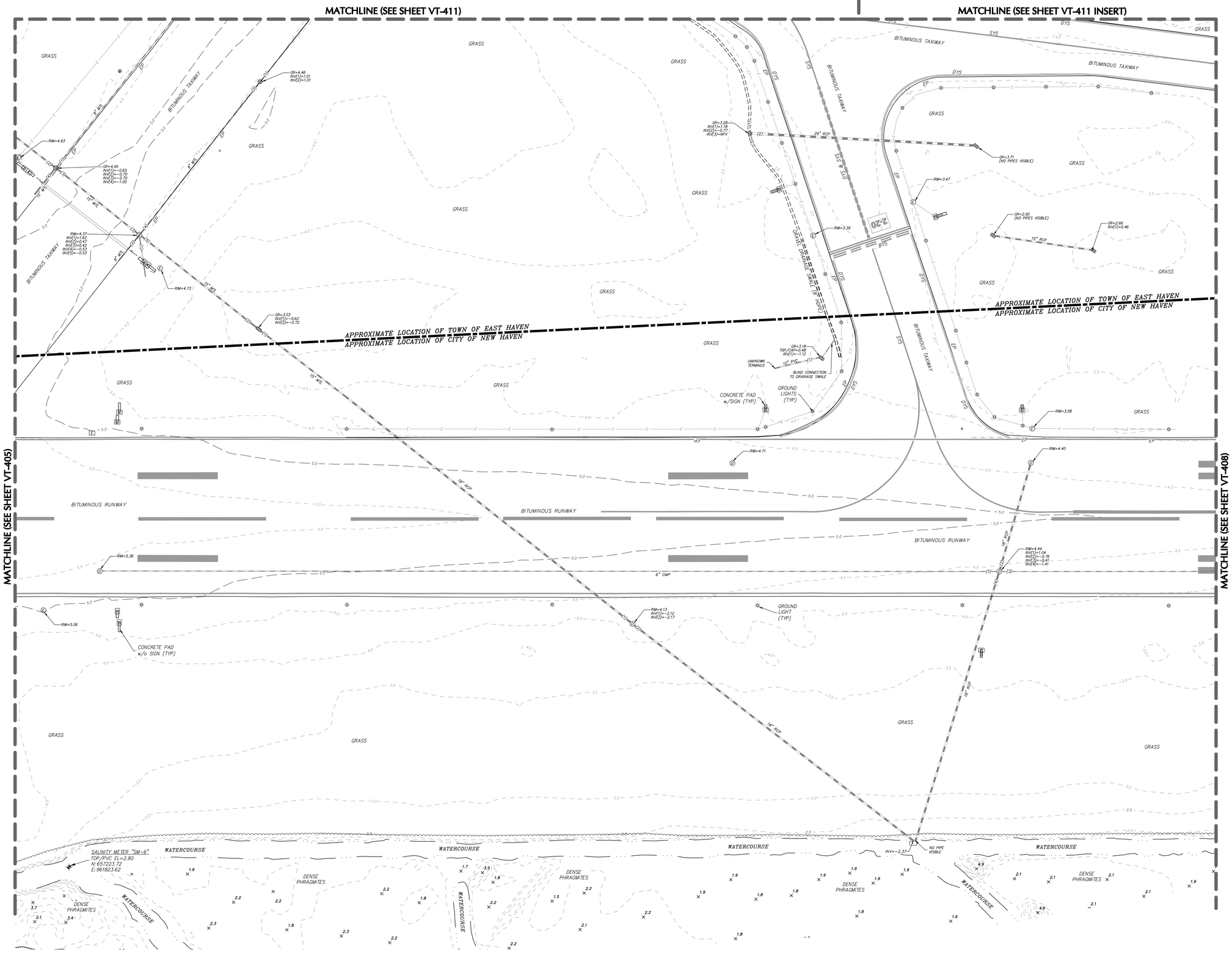
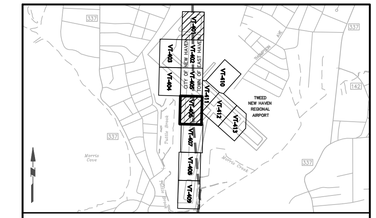
Filename: C:\bms\langan-pw-01\d0523264\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:40 User: areinhart Style Table: Langan.stb Layout: VT-405





PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

STATE OF CONNECTICUT
ANDREW G. IVES
No. 70286
LICENSED
LAND SURVEYOR

Date	Description	No.

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
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New Haven, CT 06511

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Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No.	Drawing No.
140237201	VT-406
Date: 02 DECEMBER 2024	
Drawn By: AJR	
Checked By: AGI	Sheet 7 of 14

PROJECT NO. 140237201

LANGAN

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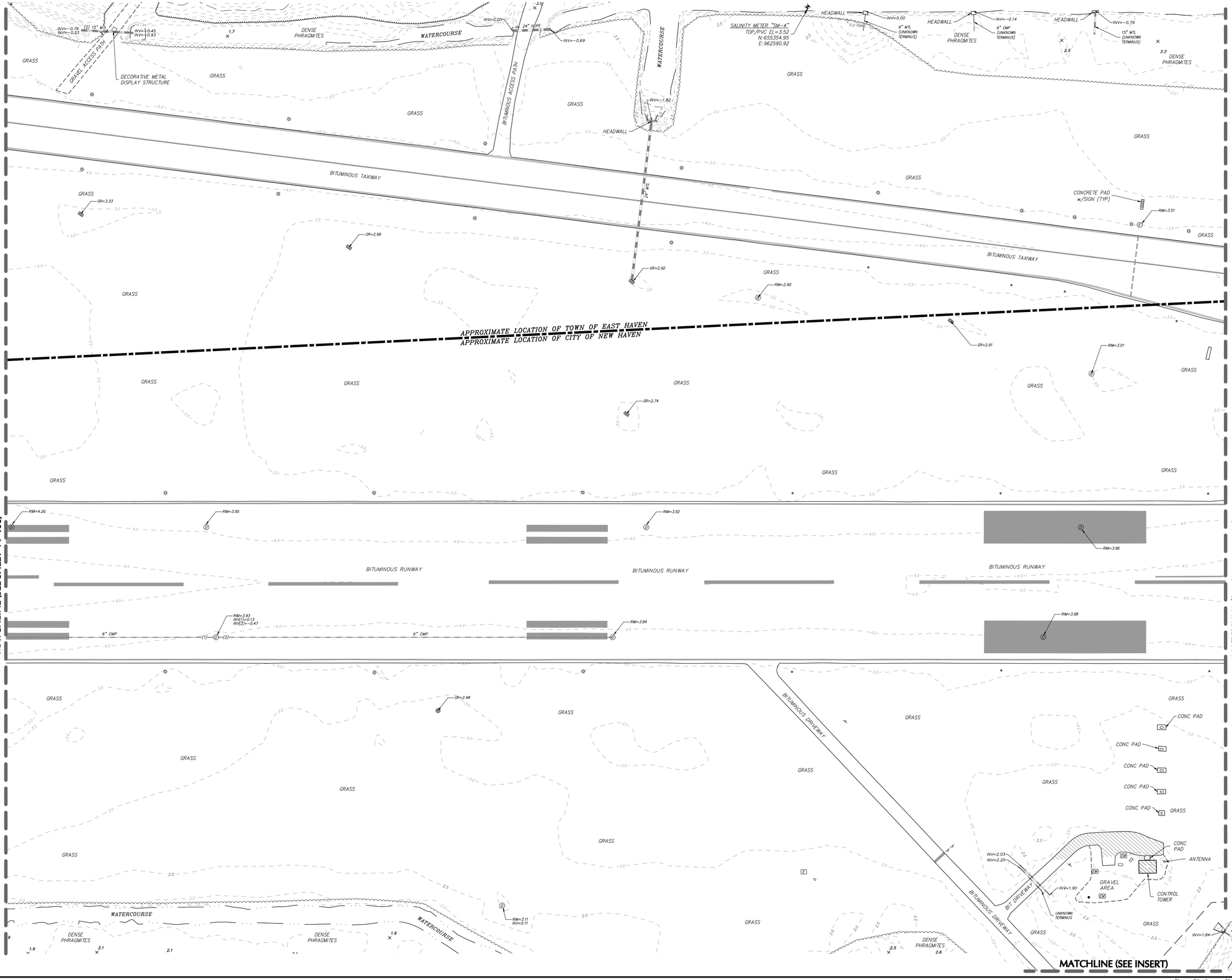
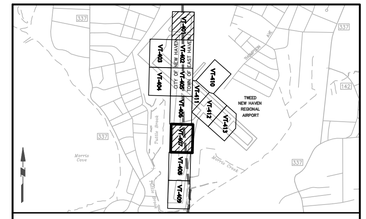
Filename: C:\bms\langan-pw-01\d0523264\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:41 User: areinhart Style Table: Langan.stb Layout: VT-406


MATCHLINE (SEE SHEET VT-406)
MATCHLINE (SEE SHEET VT-408)
MATCHLINE (SEE INSERT)
APPROXIMATE LOCATION OF TOWN OF EAST HAVEN
APPROXIMATE LOCATION OF CITY OF NEW HAVEN
BITUMINOUS TAXIWAY
BITUMINOUS RUNWAY
BITUMINOUS DRIVEWAY
BIT DRIVEWAY
GRAVEL ACCESS PATH
BITUMINOUS ACCESS PATH
DECORATIVE METAL DISPLAY STRUCTURE
WATERCOURSE
DENSE PHRAGMITES
GRASS
HEADWALL
SALINITY METER "SM-4"
TOP/PVC EL=3.52
N: 655354.95
E: 962590.92
CONCRETE PAD w/SIGN (TYP)
CONC PAD
ANTENNA
CONTROL TOWER
GRAVEL AREA
UNKNOWN TERMINUS
27" RCP (CONC PUMP STATION)
6" MTL (UNKNOWN TERMINUS)
6" CMP (UNKNOWN TERMINUS)
15" MTL (UNKNOWN TERMINUS)
24" HDPE
(2) 15" MTL
6" MTL


TWEED NEW HAVEN REGIONAL AIRPORT
TT-406
TT-407
TT-408
TT-409
TT-410
TT-411
TT-412
TT-413
TT-414
TT-415
TT-416
TT-417
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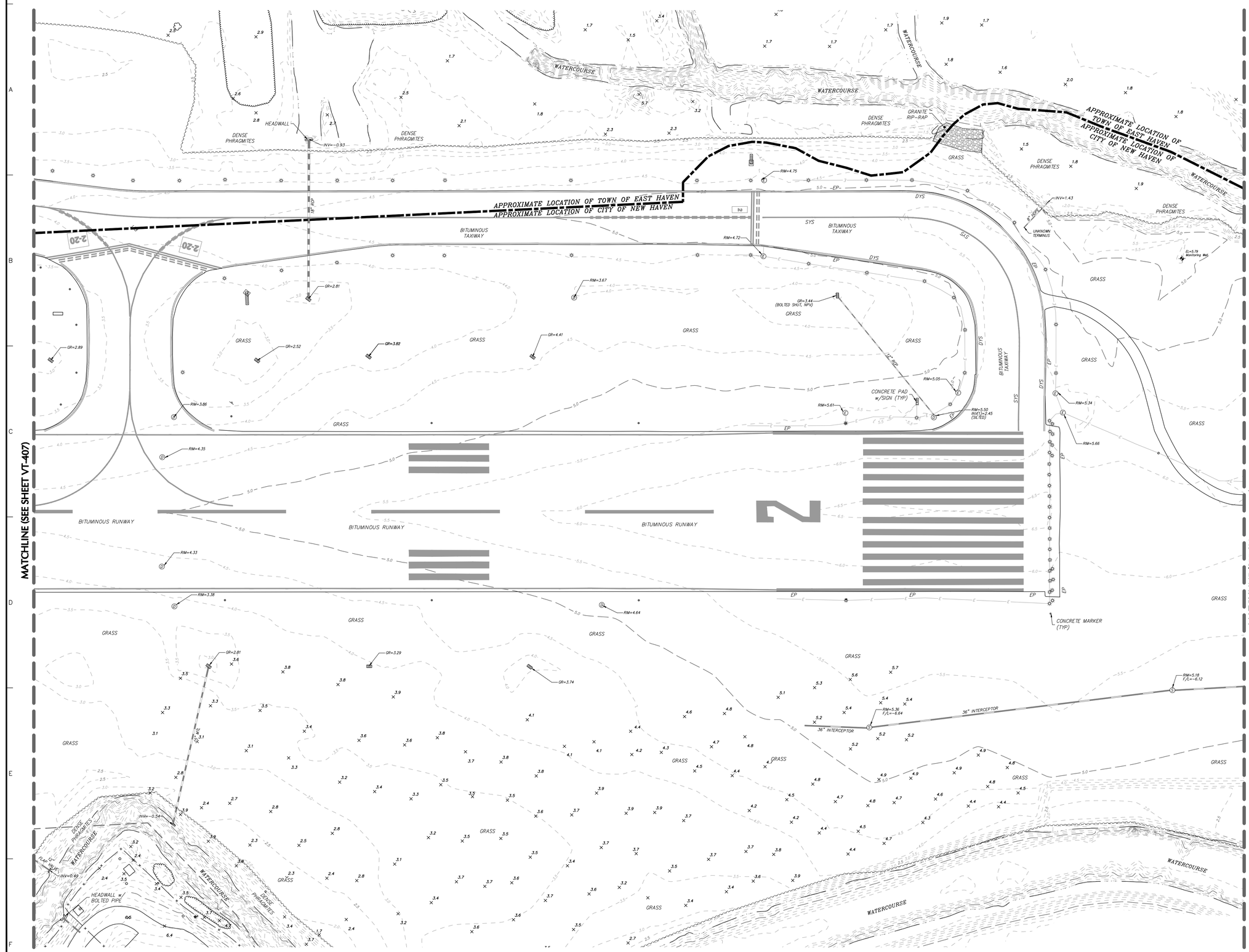
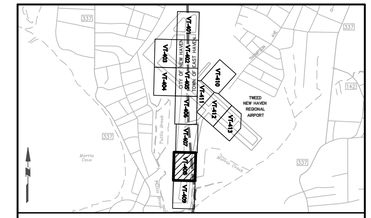
TT-445





PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

STATE OF CONNECTICUT
ANDREW G. IVES
70286
No. 70286
LICENSED
LAND SURVEYOR

Date	Description	No.

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
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Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No. 140237201	Drawing No. VT-408
Date 02 DECEMBER 2024	
Drawn By AJR	
Checked By AGI	Sheet 9 of 14

LANGAN

PROJECT NO. 140237201

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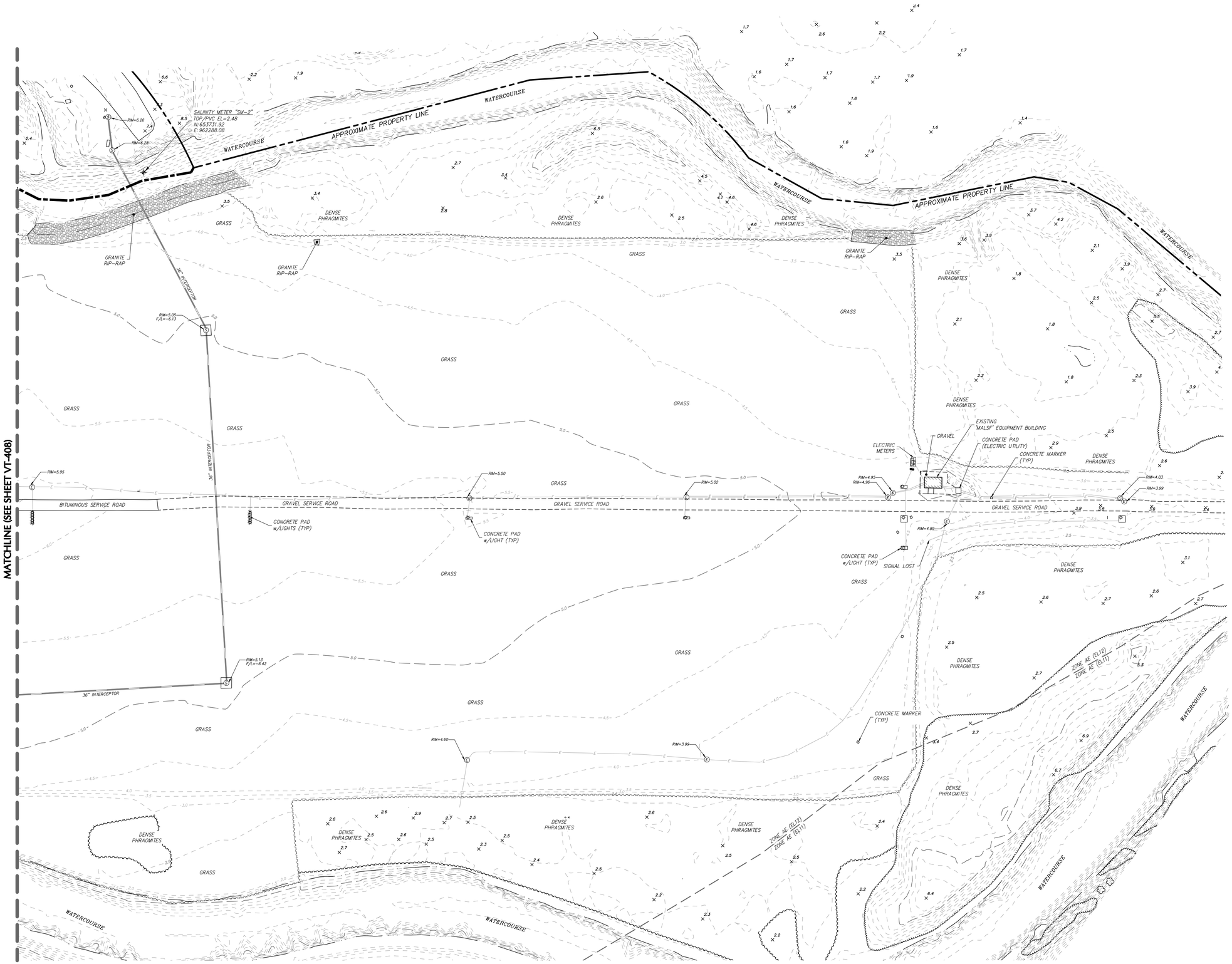
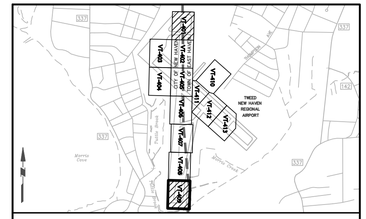
Filename: C:\bms\langan-pw-01\s0523264\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:44 User: areinhart Style Table: Langan.stb Layout: VT-408





PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

LANGAN

PROJECT NO. 140237201

Date	Description	No.

REVISIONS

SIGNATURE 12/2/2024 DATE SIGNED

ANDREW IVES
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No. 140237201	Drawing No. VT-409
Date 02 DECEMBER 2024	
Drawn By AJR	
Checked By AGI	Sheet 10 of 14

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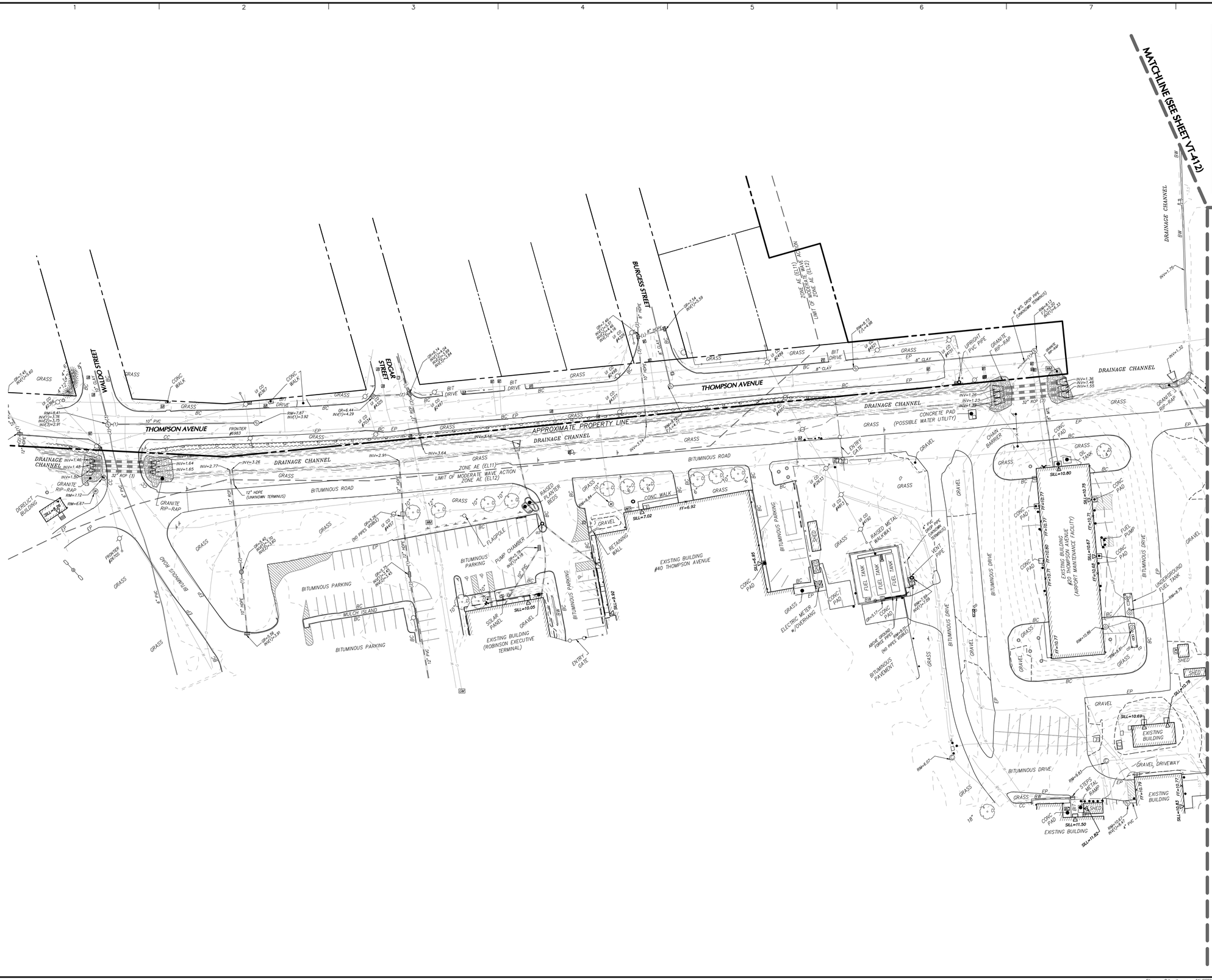
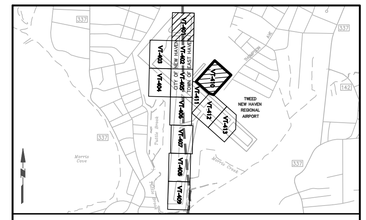
Filename: C:\bms\langan-pw-01\d0523264\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:45 User: areinhart Style Table: Langan.stb Layout: VT-409





PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

LANGAN

PROJECT NO. 140237201

No.	Description	Date

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

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Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No.	Drawing No.
140237201	VT-410
Date: 02 DECEMBER 2024	
Drawn By: AJR	
Checked By: AGI	Sheet 11 of 14

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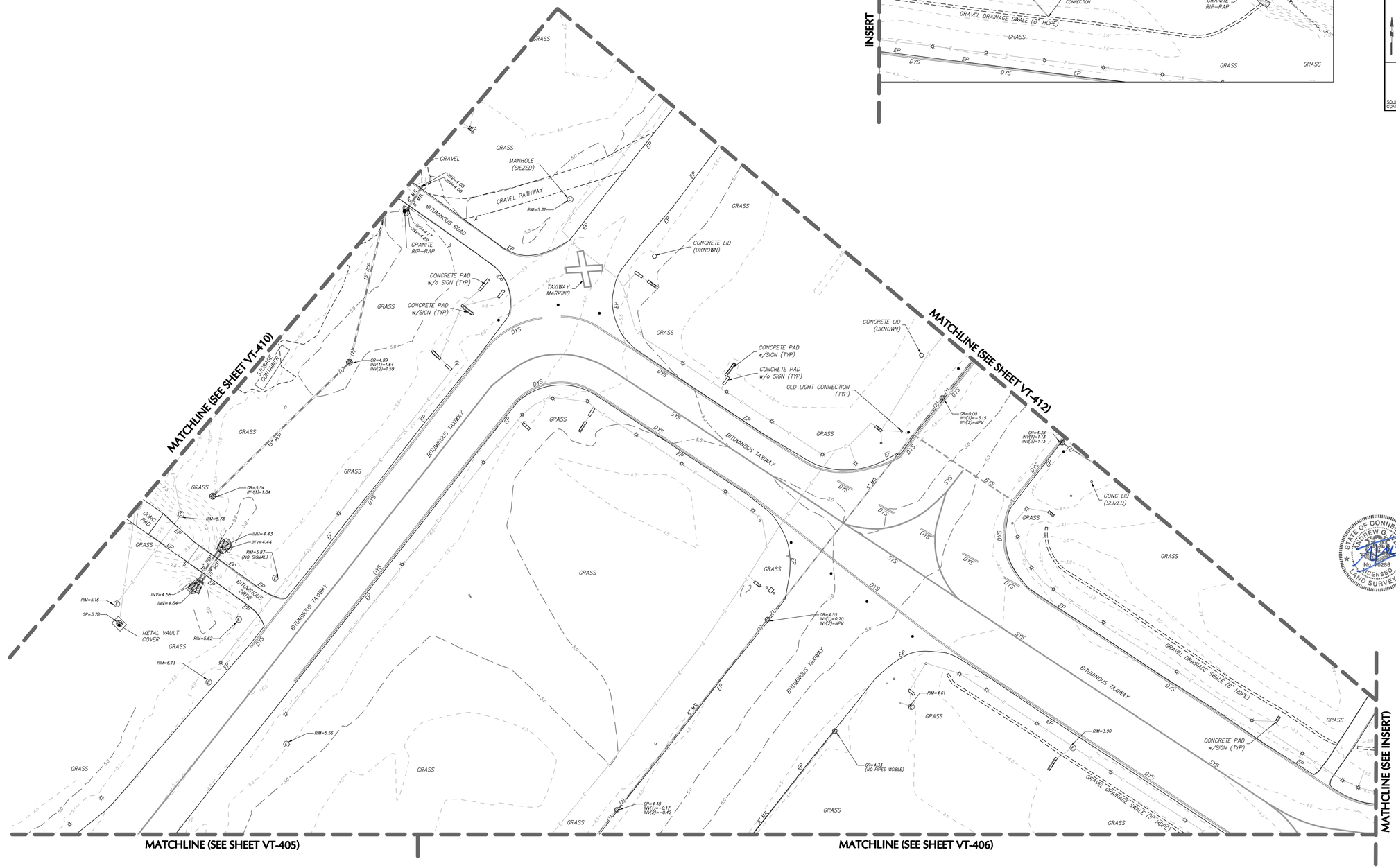
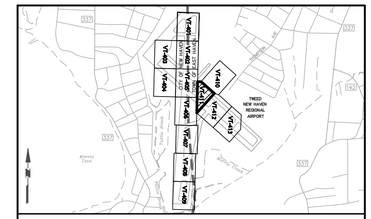
Filename: C:\bms\langan-pw-01\s0523264\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:46 User: areinhart Style Table: Langan.stb Layout: VT-410





PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40
1 INCH = 40 FEET

Date	Description	No.

REVISIONS

12/2/2024
SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

STATE OF CONNECTICUT ANDREW G. IVES No. 70286 LICENSED LAND SURVEYOR

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No.	Drawing No.
140237201	VT-411
Date: 02 DECEMBER 2024	
Drawn By: AJR	
Checked By: AGI	Sheet 12 of 14

PROJECT NO. 140237201

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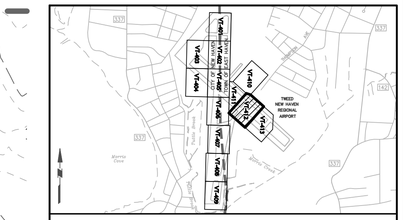
Filename: C:\bms\langan-pw-01\d0523264\140237205-0401-VT401-0101.dwg Date: 12/2/2024 Time: 12:48 User: areinhart Style Table: Langan.stb Layout: VT-411

MATCHLINE (SEE SHEET VT-413)

MATCHLINE (SEE SHEET VT-410)

MATCHLINE (SEE SHEET VT-411)



PROJECT LOCATION MAP

SCALE: 1 INCH = 2,000 FEET

SOURCE:
CONNECTICUT DEPARTMENT OF TRANSPORTATION

CT NAD 83

40 0 10 25 40

1 INCH = 40 FEET

STATE OF CONNECTICUT
ANDREW G. IVES
No. 70286
LICENSED
LAND SURVEYOR

No.	Description	Date

REVISIONS

12/2/2024

SIGNATURE ANDREW IVES DATE SIGNED
PROFESSIONAL LAND SURVEYOR
CT Lic. No. 70286

LANGAN

Langan CT, Inc.
555 Long Wharf Drive, 9th Floor
New Haven, CT 06511

T: 203.562.5771 F: 203.789.6142 www.langan.com

Project

TWEED AIRPORT

EAST HAVEN
NEW HAVEN
NEW HAVEN COUNTY CONNECTICUT

Drawing Title

PARTIAL BOUNDARY AND TOPOGRAPHIC SURVEY

Project No.	Drawing No.
140237201	VT-412
Date	
02 DECEMBER 2024	
Drawn By	
AJR	
Checked By	
AGI	Sheet 13 of 14

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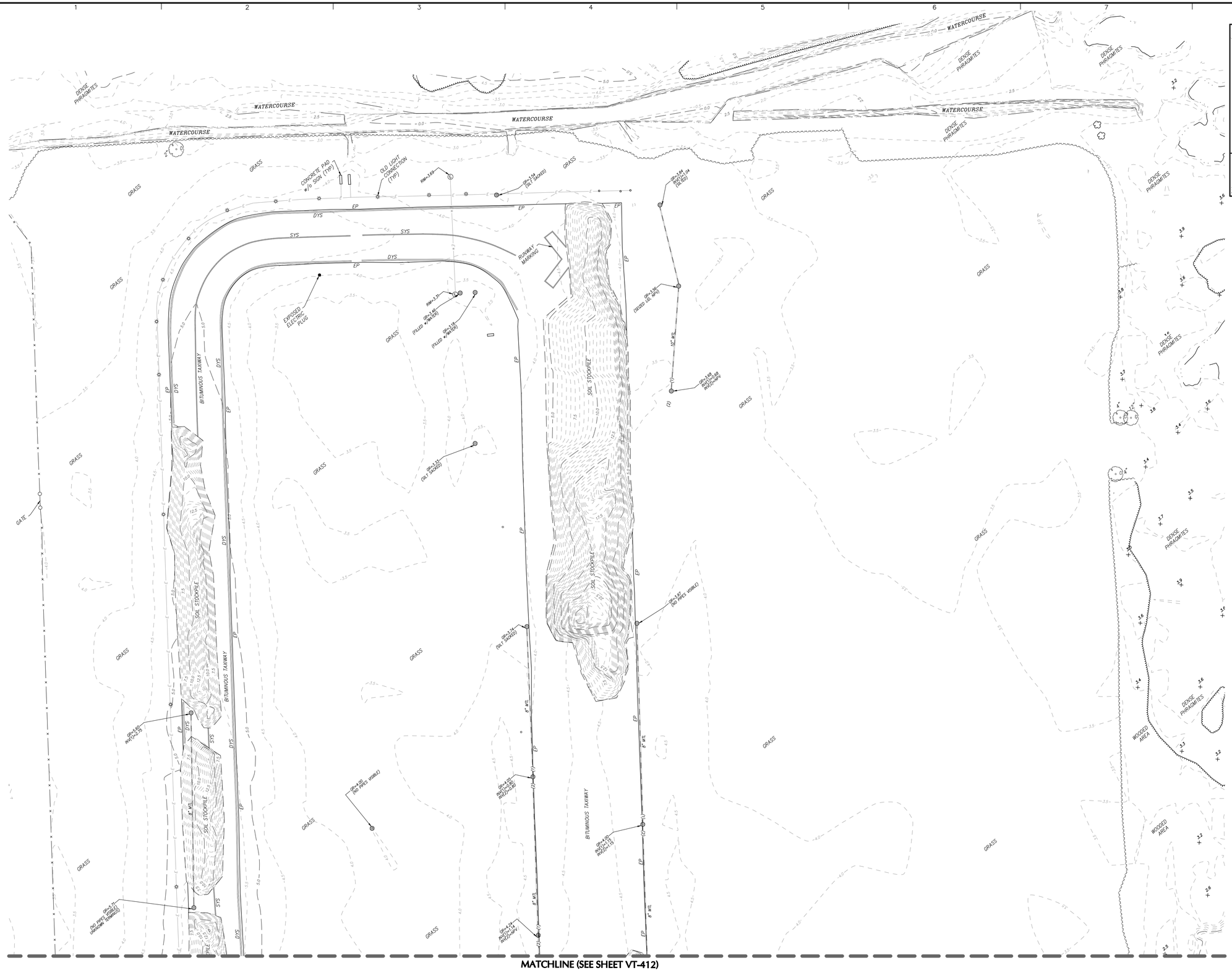
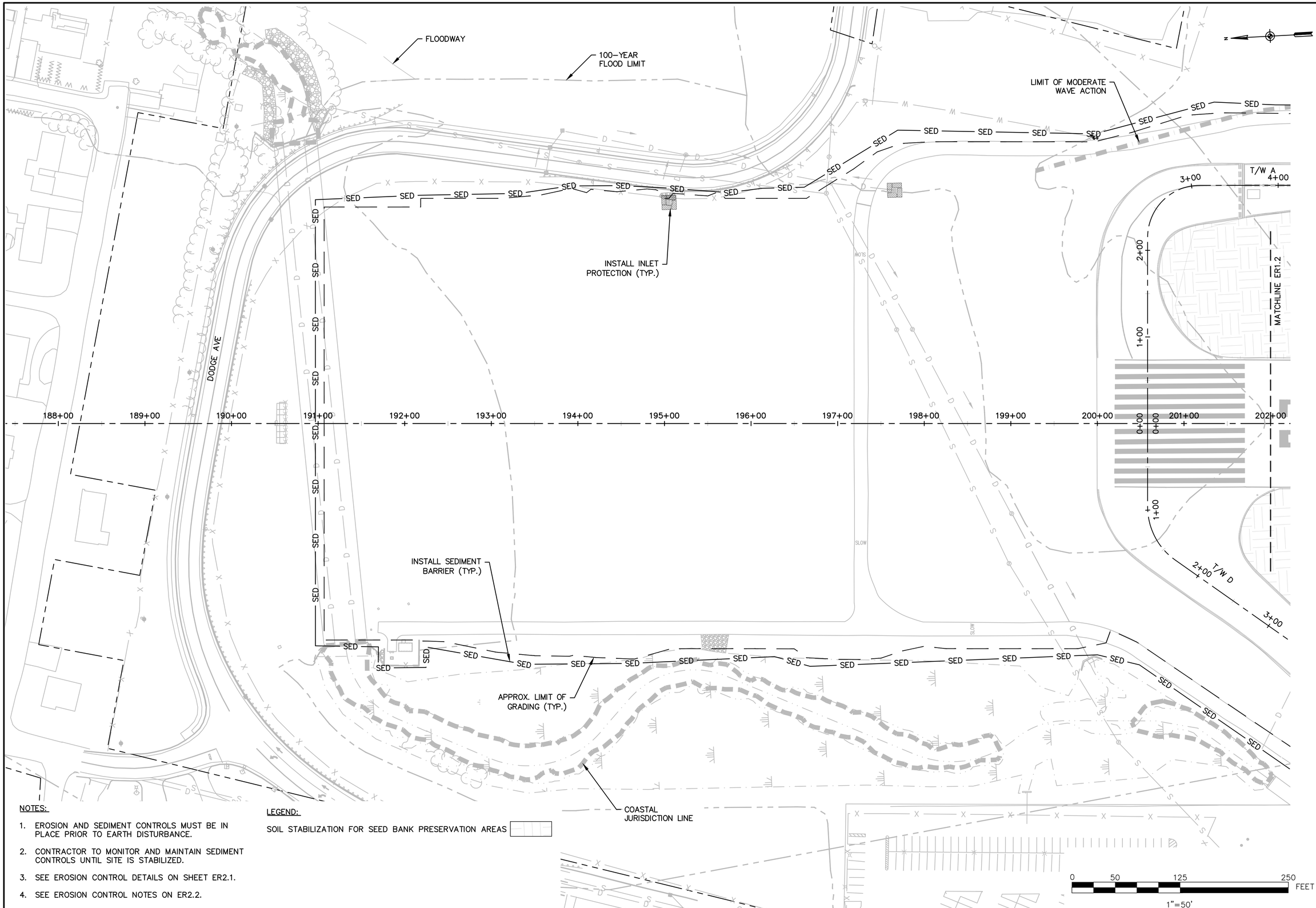
PROJECT NO. 140237201


WATERCOURSE
DENSE PHRAGMITES
GRASS
CONCRETE PAD w/o SIGN (TYP)
OLD LIGHT CONNECTION (TYP)
RIM=3.69
GR=3.58 (SLT SACKED)
EP
DYS
SYS
RUNWAY MARKING
EXPOSED ELECTRIC PLUG
RIM=3.33
GR=3.16 (FILLED w/ MATER)
GR=3.58 (SLT SACKED)
BITUMINOUS TAXIWAY
SOIL STOCKPILE
8" WTL
GR=4.68 INV(S)=2.79
GR=4.71 (NO PIPES VISIBLE) UNKNOWN DIAMETER
GR=4.68 INV(E)=2.68
GR=4.68 INV(W)=2.68
GR=4.58 (SLT SACKED)
GR=4.68 INV(E)=2.68
GR=4.68 INV(W)=2.68
GR=4.58 (NO PIPES VISIBLE)
GR=4.71 (NO PIPES VISIBLE)
GR=4.68 INV(E)=2.68
GR=4.68 INV(W)=2.68



NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURGUSON
No. 16758
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

Hoyle Tanner & Associates © 2022

DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

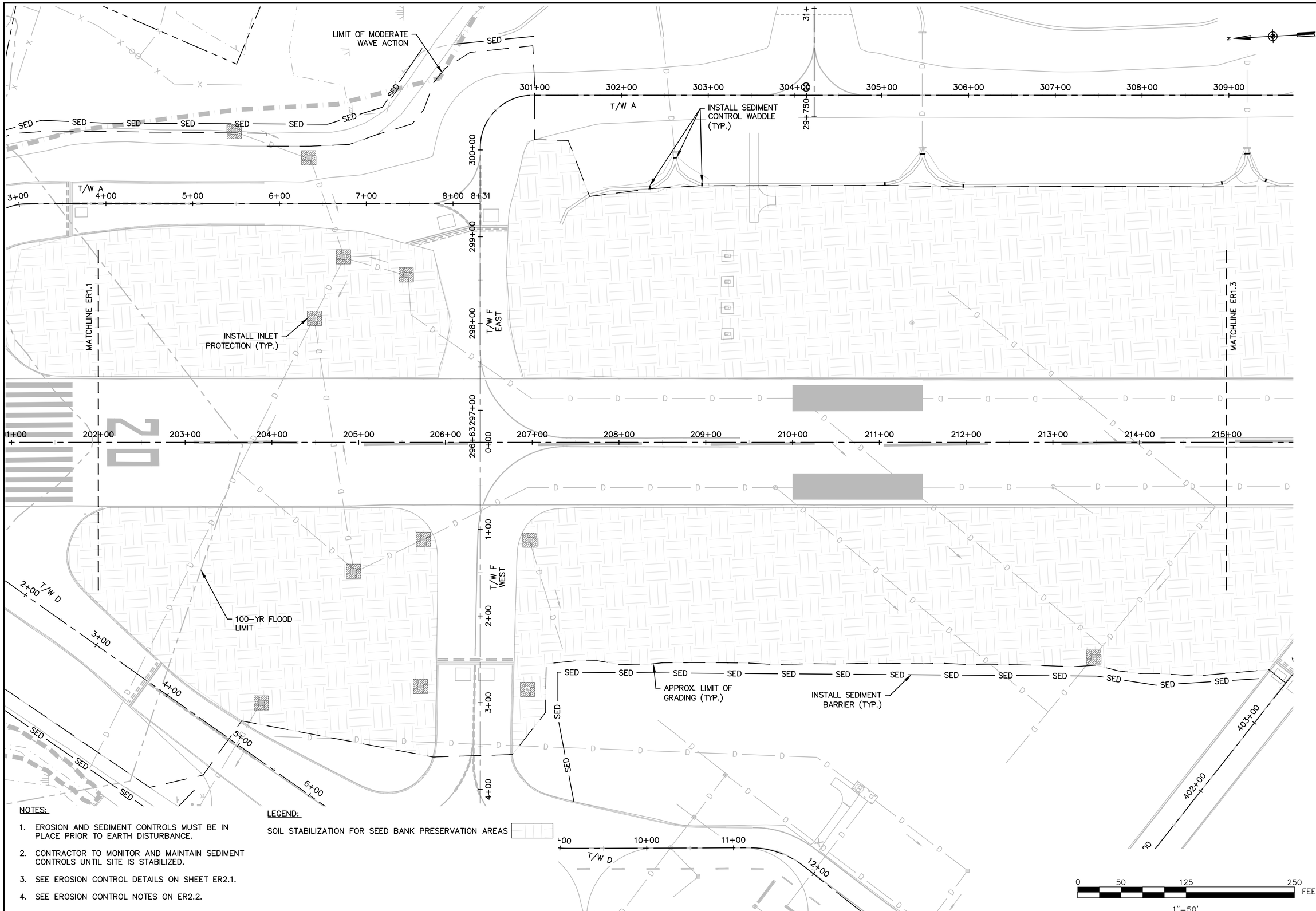
PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.

ER1.1

SHEET 41 OF 174

HTA 4/17/2025 8:48:48 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\ER1.1 - Erosion Control Plan.dwg



NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTHER
No. 25703
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

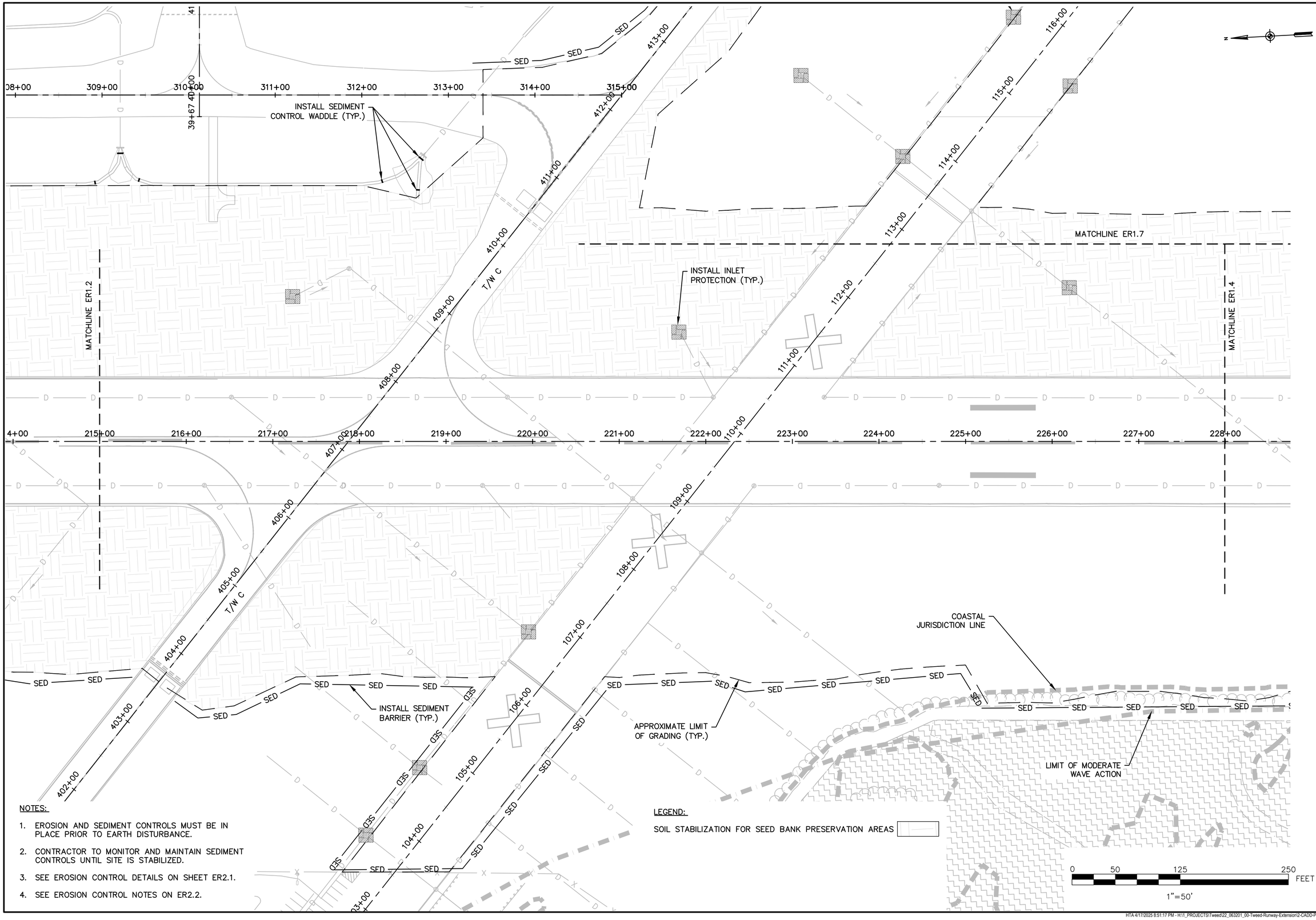
PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

ER1.2

HTA 4/17/2025 8:50:20 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\ER1.1 - Erosion Control Plan.dwg



NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURBAN
No. 23
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 3

REVISIONS

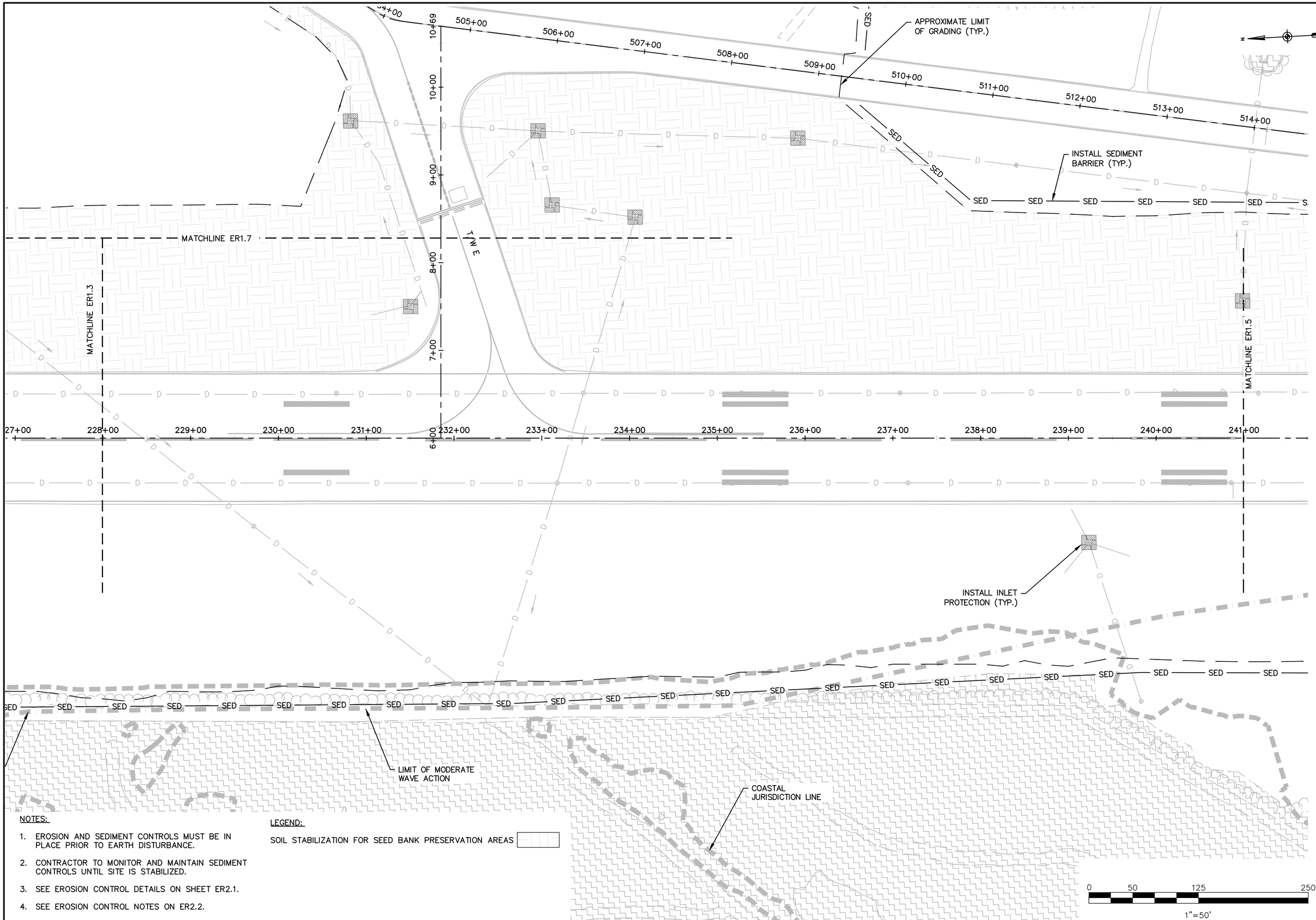
REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
ER1.3

SHEET 43 OF 174

HTA 4/17/2025 8:51:17 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\ER1.1 - Erosion Control Plan.dwg



NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FUTRELL
No. 22063
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

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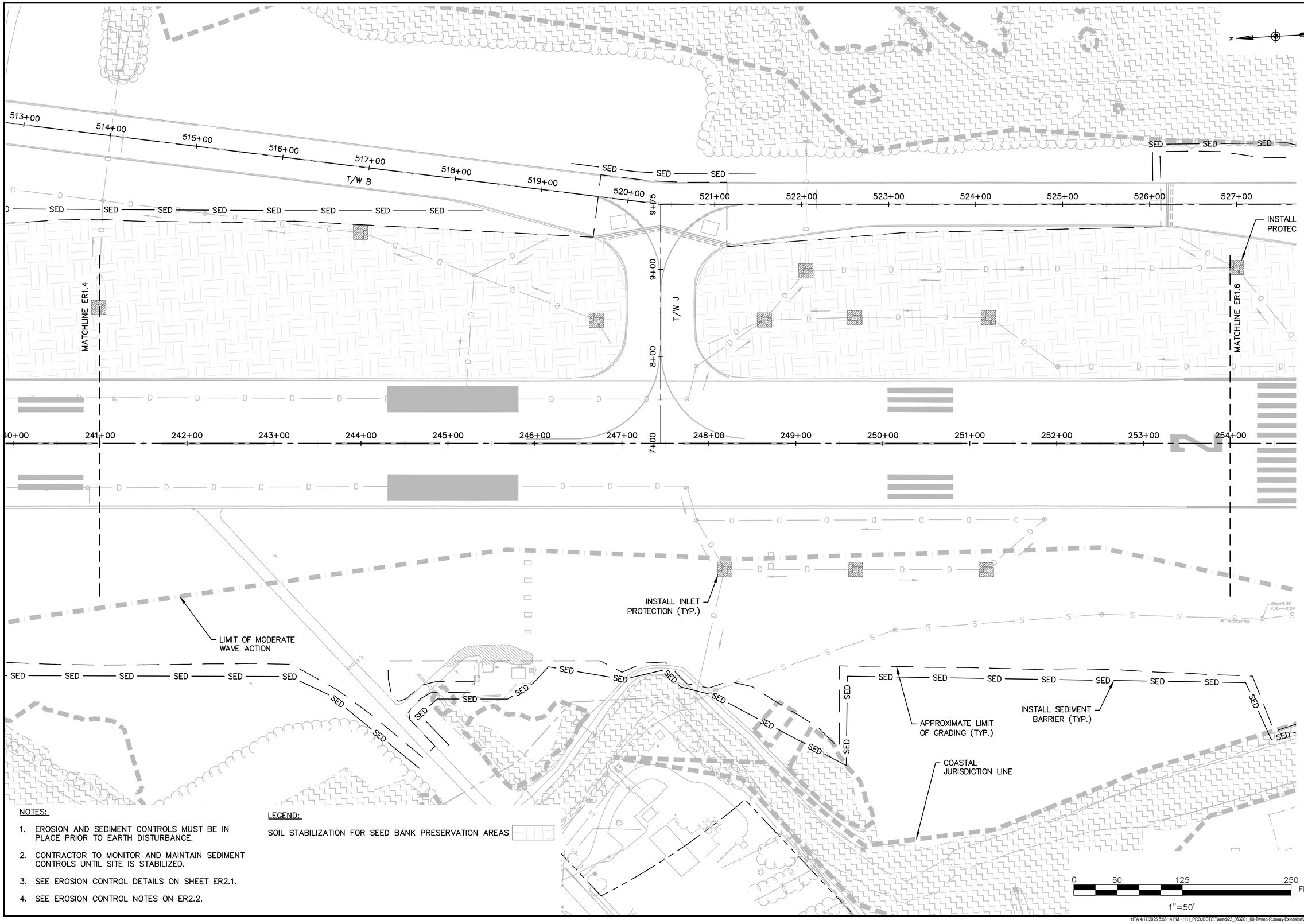

NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTH
No. 26703
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

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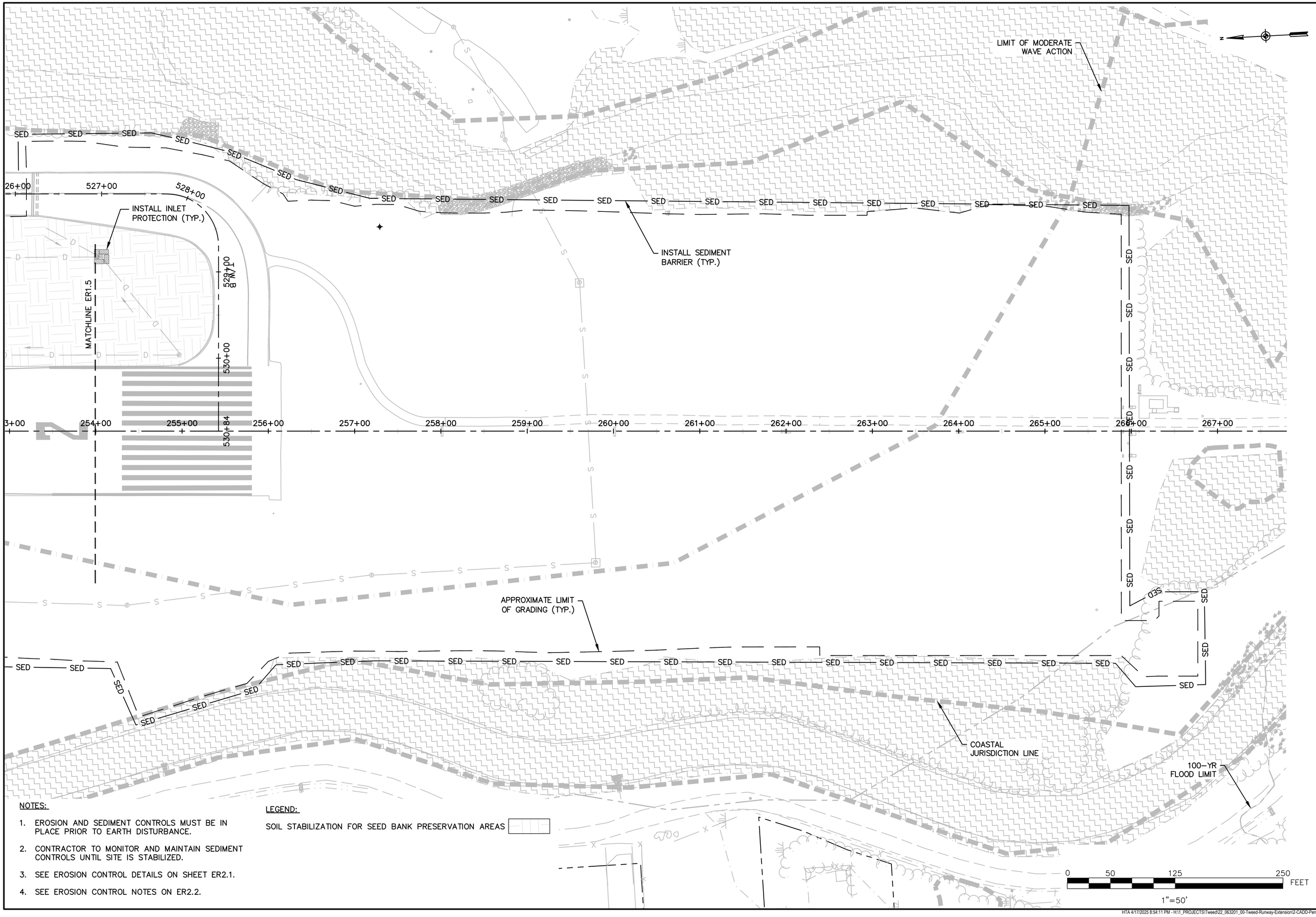

NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 6

REVISIONS

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	4/18/25	PERMIT SUBMISSION	NEG

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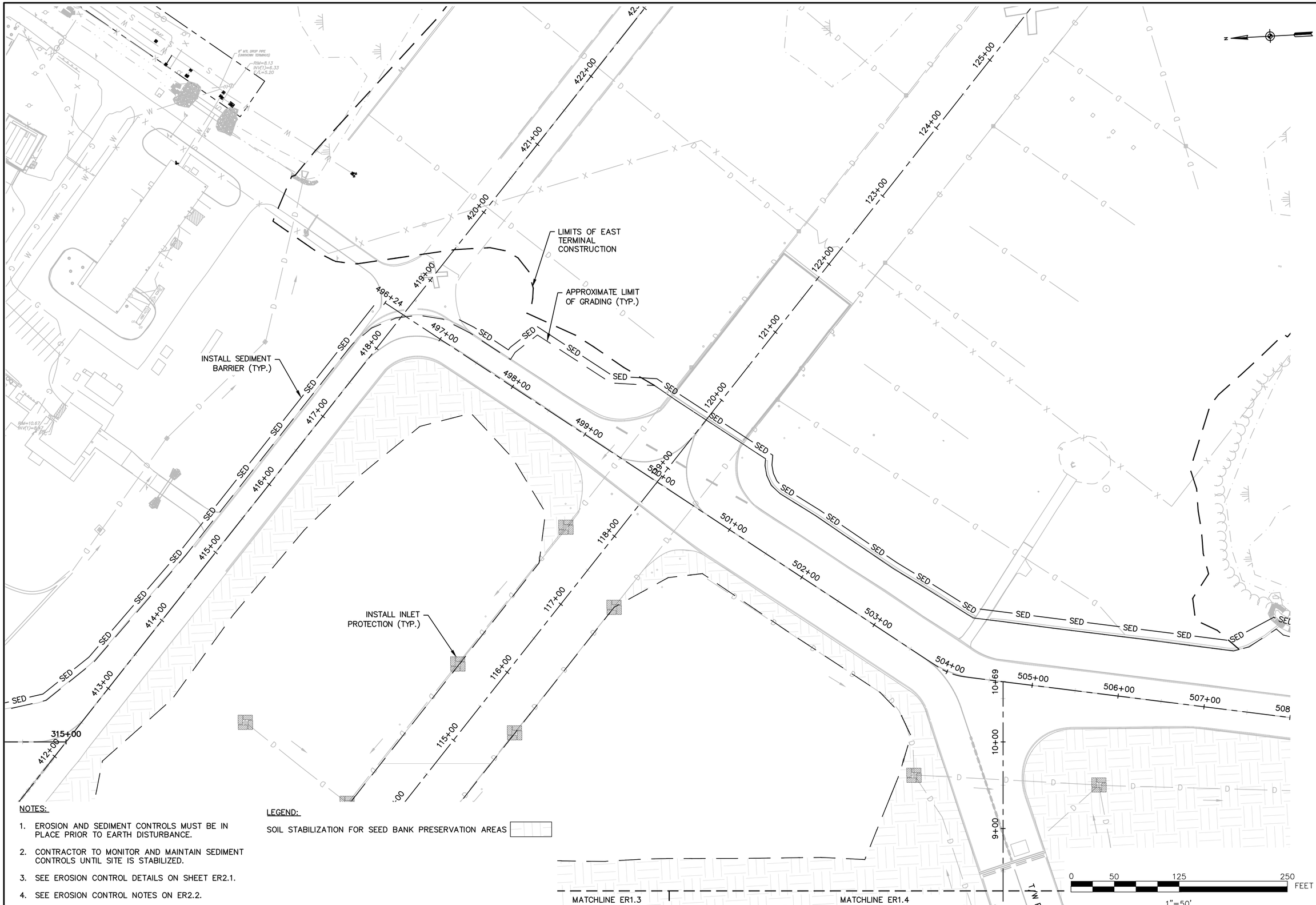

NOTES:

1. EROSION AND SEDIMENT CONTROLS MUST BE IN PLACE PRIOR TO EARTH DISTURBANCE.
2. CONTRACTOR TO MONITOR AND MAINTAIN SEDIMENT CONTROLS UNTIL SITE IS STABILIZED.
3. SEE EROSION CONTROL DETAILS ON SHEET ER2.1.
4. SEE EROSION CONTROL NOTES ON ER2.2.

LEGEND:

SOIL STABILIZATION FOR SEED BANK PRESERVATION AREAS

ENGINEER'S SEAL

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL PLAN 7

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
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PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

ER1.7

SHEET 47 OF 174

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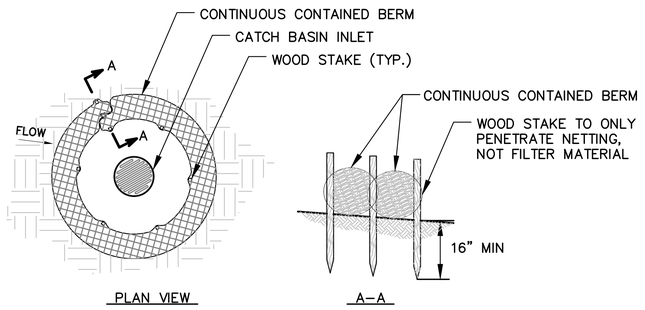
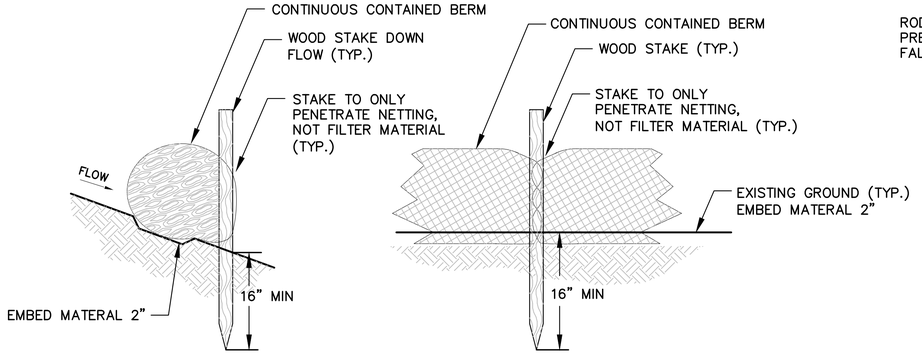


CONTINUOUS CONTAINED BERM INLET PRTECTION AT CATCH BASIN

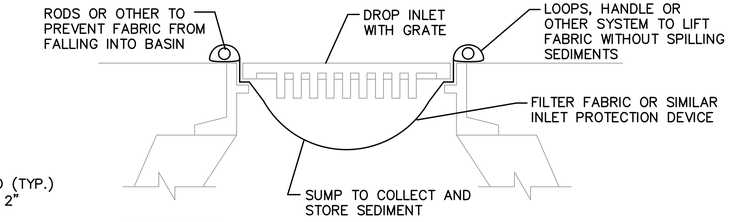
NOT TO SCALE



NOTE:
CONTINUOUS CONTAINED BERMS CONSIST OF A SYNTHETIC TUBULAR NETTING FILLED WITH EROSION CONTROL MIX OR OTHER FILTER MATERIAL AND SHALL BE INSTALLED PER MANUFACTURERS INSTRUCTION.

CONTINUOUS CONTAINED BERM SEDIMENT BARRIER DETAIL

NOT TO SCALE

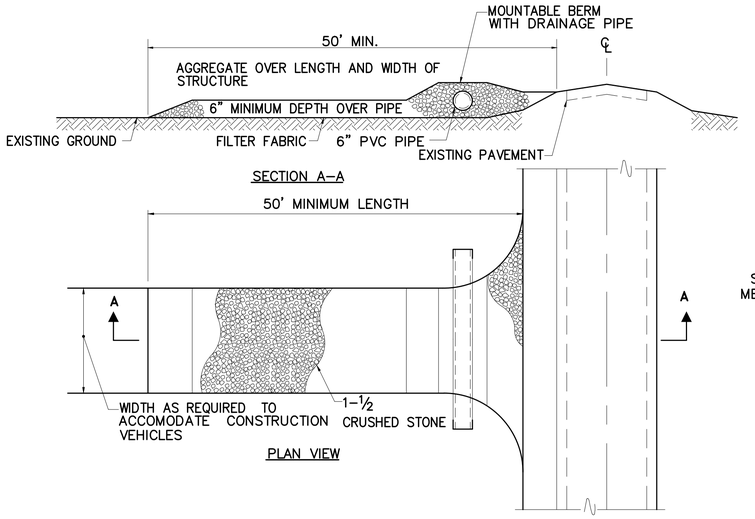


MAINTENANCE:
CONTRACTOR TO CLEAN AFTER EVERY STORM. IF THE BARRIER BECOMES CLOGGED WITH SEDIMENT SO THAT IT NO LONGER ADEQUATELY PASSES FILTERED WATER, THE SEDIMENT SHALL BE REMOVED AND THE BARRIER SHALL BE REPLACED. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

THE DEVICE SHALL BE USED FOR IN PAVEMENT CATCH BASINS, AND TRENCH DRAINS AND SHALL BE REMOVED WHEN THE DRAINAGE AREA HAS BEEN ADEQUATELY STABILIZED.

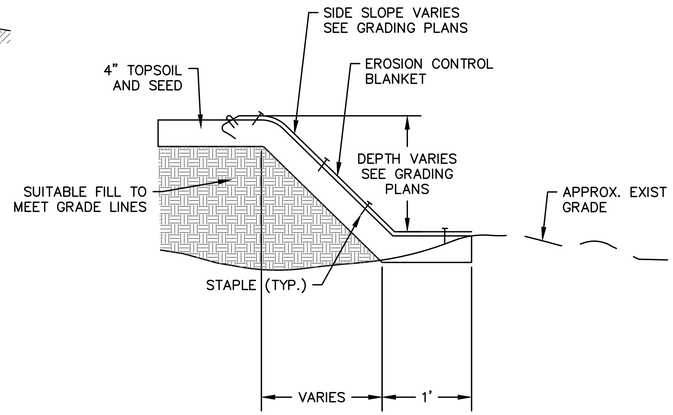
FILTER FABRIC INLET PROTECTION AT CATCH BASIN/TRENCH DRAIN

NOT TO SCALE



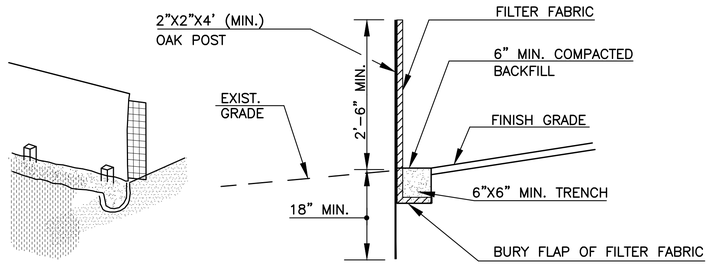
STABILIZED CONSTRUCTION ENTRANCE

NOT TO SCALE



VEGETATED SIDE SLOPE DETAIL

NOT TO SCALE



NOTE:
1. SPACING OF WOOD FENCE POST NOT TO EXCEED 6'–0".
2. SILT FENCE SHALL BE INSTALLED BEFORE ANY EARTH REMOVAL OR EXCAVATION TAKES PLACE.
3. SILT FENCE SHALL BE INSPECTED WEEKLY OR AFTER RAIN. ANY SEDIMENT ACCUMULATED HIGHER THAN 1 FOOT ABOVE EXISTING GRADE SHALL BE REMOVED, ANY DAMAGED SECTIONS SHALL BE REPAIRED OR REPLACED.

SILT FENCE SEDIMENT BARRIER DETAIL

NOT TO SCALE

NOTES:

1. PRIOR TO PLACING EROSION CONTROL BLANKET, PREPARE THE SOIL BY RAKING AREA FREE OF CLODS AND LARGE STONES.
2. SEED, MULCH AND FERTILIZER SHALL BE DISTRIBUTED AS SPECIFIED OVER THE PREPARED SOIL PRIOR TO PLACING THE EROSION CONTROL BLANKET.
3. ALL SEAMS SHALL BE OVERLAPPED A MINIMUM OF 3" AND SECURE WITH STAPLES SPACED 18"–24" ON CENTER.
4. TO SECURE BLANKET TO GROUND, STAPLE PER MANUFACTURERS RECOMMENDATIONS.
5. OVERLAP EROSION CONTROL BLANKET IN DIRECTION OF FLOW ONLY.
6. WHERE SWALE SIDE SLOPES ARE FLATTER THAN 6:1 OR WHERE GRADE BREAKS ARE SUBSTANTIALLY HIGHER THAN THE SWALE BOTTOM, EROSION CONTROL BLANKET MAY BE TUCKED INTO THE SLOPE APPROXIMATELY 1' ABOVE SWALE BOTTOM. OTHERWISE, WELL–DEFINED CHANNELS SHALL BE PROTECTED TO THE TOP OF SLOPE AS SHOWN.

EROSION CONTROL MIX BERMS SEDIMENT BARRIER

EROSION CONTROL MIX CAN BE MANUFACTURED ON OR OFF THE PROJECT SITE. IT MUST CONSIST PRIMARILY OF ORGANIC MATERIAL, SEPARATED AT THE POINT OF GENERATION, AND MAY INCLUDE: SHREDDED BARK, STUMP GRINDINGS, COMPOSTED BARK, OR ACCEPTABLE MANUFACTURED PRODUCTS. WOOD AND BARK CHIPS, GROUND CONSTRUCTION DEBRIS OR REPROCESSED WOOD PRODUCTS WILL NOT BE ACCEPTABLE AS THE ORGANIC COMPONENT OF THE MIX.

COMPOSITION
EROSION CONTROL MIX SHALL CONTAIN A WELL–GRADED MIXTURE OF PARTICLE SIZES AND MAY CONTAIN ROCKS LESS THAN 4" IN DIAMETER. EROSION CONTROL MIX MUST BE FREE OF REFUSE, PHYSICAL CONTAMINANTS, AND MATERIAL TOXIC TO PLANT GROWTH. THE MIX COMPOSITION SHALL MEET THE FOLLOWING STANDARDS (SUBMITTAL REQUIRED):

- THE ORGANIC MATTER CONTENT SHALL BE BETWEEN 80 AND 100%, DRY WEIGHT BASIS.
- PARTICLE SIZE BY WEIGHT SHALL BE 100% PASSING A 6" SCREEN AND A MINIMUM OF 70%, MAXIMUM OF 85%, PASSING A 0.75" SCREEN.
- THE ORGANIC PORTION NEEDS TO BE FIBROUS AND ELONGATED.
- LARGE PORTIONS OF SILTS, CLAYS OR FINE SANDS ARE NOT ACCEPTABLE IN THE MIX.
- SOLUBLE SALTS CONTENT SHALL BE < 4.0 MMHOS/CM.
- THE PH SHOULD FALL BETWEEN 5.0 AND 8.0.

INSTALLATION
THE BARRIER MUST BE PLACED ALONG A RELATIVELY LEVEL CONTOUR. IT MAY BE NECESSARY TO CUT TALL GRASSES OR WOODY VEGETATION TO AVOID CREATING VOIDS AND BRIDGES THAT WOULD ENABLE FINES TO WASH UNDER THE BARRIER THROUGH THE GRASS BLADES OR PLANT STEMS.

ON SLOPES LESS THAN 5% OR AT THE BOTTOM OF STEEPER SLOPES (2:1) UP TO 20 FEET LONG, THE BARRIER MUST BE A MINIMUM OF 12" HIGH, AS MEASURED ON THE UPHILL SIDE OF THE BARRIER, AND A MINIMUM OF TWO FEET WIDE. ON LONGER OR STEEPER SLOPES, THE BARRIER SHOULD BE WIDER TO ACCOMMODATE THE ADDITIONAL RUNOFF.

FROZEN GROUND, OUTCROPS OF BEDROCK AND VERY ROOTED FORESTED AREAS ARE LOCATIONS WHERE BERMS OF EROSION CONTROL MIX ARE MOST PRACTICAL AND EFFECTIVE. OTHER BMPS SHOULD BE USED AT LOW POINTS OF CONCENTRATED RUNOFF, BELOW CULVERT OUTLET APRONS, AROUND CATCH BASINS AND CLOSED STORM SYSTEMS, AND AT THE BOTTOM OF STEEP PERIMETER SLOPES THAT ARE MORE THAN 50 FEET FROM TOP TO BOTTOM (I.E., A LARGE UP GRADIENT CONTRIBUTING WATERSHED).

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DRAWN BY: JLC
DESIGNED BY: NEG
DATE: APRIL 2025

PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL NOTES AND DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/16/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3–09–0013–0XX–2025

DRAWING NO.
ER2.1

SHEET 48 OF 174

TOPSOIL AND SEEDING

1. TOPSOIL:

   SEE DEMOLITION PLANS FOR AREAS WHERE TOPSOIL MUST BE RETURNED TO ITS ORIGINAL LOCATION. THE REMAINING AREAS MAY USE SUITABLE TOPSOIL STRIPPED FROM THE SITE, FROM THE AIRPORT STOCKPILE OR FROM OFF-SITE AND SHALL MEET THE REQUIREMENTS OF SPECIFICATION SECTION T-905, TOPSOILING.

2. SEEDING:

   SEE DEMOLITION PLANS FOR AREAS WHERE TOPSOIL MUST BE RETURNED TO ITS ORIGINAL LOCATION AND THE NATIVE SEED BANK UTILIZED. THE REMAINING AREAS SHALL USE PERMANENT SEED MIXES AND RATES BETWEEN 5/15 AND 9/30. USE TEMPORARY SEED FOR PERIODS LESS THAN 12 MONTHS. IF USING TEMPORARY SEED MIXES BETWEEN 10/01 AND 5/15, RE-SEED WITH PERMANENT SEED MIX AFTER 5/15.

   THE AREAS IDENTIFIED TO RETURN TOPSOIL AND UTILIZE THE NATIVE SEED BANK SHALL NOT RECEIVE PERMANENT AND TEMPORARY MIXES

3. REGULAR SEED MIX

KIND OF SEED	LBS PER ACRE	% OF MIX
TALL FESCUE (FESCUE ARUNDINACEA)	325	100

   USE A MINIMUM OF OF 3 VARIETIES OF TALL FESCUE. EACH VARIETY SHOULD CONTAIN A MINIMUM OF 70% VIABLE ENDOPHYTES. VARIETIES SHOULD COME FROM THE FOLLOWING LIST: 2ND MILLENNIUM, BONSAI, CAYENNE, COCHISE III, CONSTITUTION, COVENANT, COYOTE II, CROSSFIRE II, DAKOTA, DYNASTY II, ESCALADE, MUSTANG 3, RENDITION, SR 8600, TAOS, TITAN LTD., TITANIUM, TOMBSTONE, OR AS APPROVED BY THE ENGINEER.

4. TEMPORARY SEED:

KIND OF SEED	LBS PER ACRE	SEEDING DEPTH	RECOMMENDED SEEDING DATES	REMARKS
WINTER RYE	112	1-1.5 IN	8/15-10/1	GOOD FOR FALL SEEDING. SELECT A HARDY SPECIES, SUCH AS AROOSTOOK RYE.
OATS	80	1-1.5 IN	4/1-7/1 8/15-9/15	EARLY FALL SEEDING WILL DIE WHEN WINTER WEATHER MOVES IN, BUT MULCH WILL PROVIDE PROTECTION.
ANNUAL RYEGRASS	40	.25 IN	4/1-7/1	GROWS QUICKLY BUT IS OF SHORT DURATION. USE WHERE APPEARANCE IS IMPORTANT. WITH MULCH, SEEDING MAY BE DONE THROUGHOUT GROWING SEASON.
SUDANGRASS	40	.5-1 IN	5/15-8/15	GOOD GROWTH DURING HOT SUMMER PERIODS.
PERENNIAL	40	.25 IN	8/15-9/15	GOOD COVER, LONGER LASTING THAN ANNUAL RYEGRASS. MULCHING WILL ALLOW SEEDING THROUGHOUT GROWING SEASON.

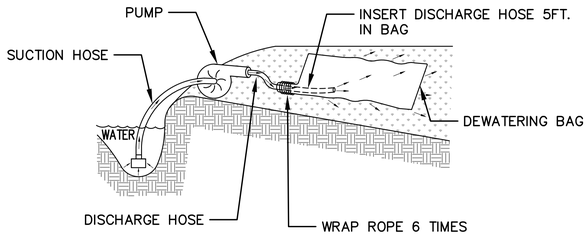
5. LIME AND FERTILIZER:

   SEE DEMOLITION PLANS FOR AREAS WHERE THE TOPSOIL MUST BE RETURNED TO ITS ORIGINAL LOCATION AND THE NATIVE SEED BANK UTILIZED, NO LIME OR FERTILIZER SHALL BE USED IN THESE AREAS. FoR THE REMAINING AREAS APPLY LIME AND FERTILIZER AT THE RATES SPECIFIED IN SECTION T-901, SEEDING.

6. MULCH:

   MULCH AND EROSION CONTROL MATTING SHALL BE AS SPECIFIED IN SECTION C-102 TEMPORARY AIR AND WATER POLLUTION, SOIL EROSION AND SILTATION CONTROL.

STRAW OR HAY (ANCHORED)	70 - 90 LBS	PROTECTED AREAS
STRAW OR HAY (ANCHORED)	185 - 275 LBS	WINDY AREAS
SHREDDED OR CHOPPED	185 - 275 LBS	MODERATE TO HIGH VELOCITY
EROSION CONTROL BLANKET	AS REQUIRED	AREAS AND SLOPES STEEPER THAN 3:1



DEWATERING BAG

NOT TO SCALE

INSTALLATION AND USE:

1. PLACE DEWATERING BAG ON THE GROUND OR ON A TRAILER OVER A RELATIVELY LEVEL, STABILIZED AREA.
2. INSERT DISCHARGE PIPE A MINIMUM OF 5FT. INSIDE DEWATERING BAG AND SECURE WITH A ROPE WRAPPED 6 TIMES AROUND THE SNOUT OVER A 6 INCH WIDTH OF THE BAG.
3. REPLACE DEWATERING BAG WHEN HALF FULL OF SEDIMENT OR WHEN THE SEDIMENT HAS REDUCED THE FLOW RATE OF THE PUMP DISCHARGE TO AN IMPRACTICAL AMOUNT.
4. REMOVE AND DISPOSE OF ACCUMULATED SEDIMENT AWAY FROM WATERWAYS OR ENVIRONMENTALLY SENSITIVE AREAS. SLIT OPEN DEWATERING BAG AND REMOVE ACCUMULATED SEDIMENT. DISPOSE OF BAG AT AN APPROPRIATE RECYCLING OR SOLID WASTE FACILITY.

EROSION CONTROL NOTES

1. ALL EARTHWORK SHALL BE CONFINED TO THE LIMITS OF WORK AS SHOWN ON CONTRACT DRAWINGS.
2. SILT FENCES OR EROSION CONTROL MIX BERMS SHALL BE INSTALLED WHERE SHOWN ON THE PLANS, ON THE DOWNHILL SIDE OF STOCKPILES OF TOPSOIL AND OTHER SOIL MATERIALS AND IN OTHER LOCATIONS AS REQUIRED, TO PREVENT SILT AND SEDIMENTATION FROM ENTERING EXISTING DRAINAGE CHANNELS.
3. ALL TURF AREAS SHALL BE PERMANENTLY STABILIZED WITHIN 15 DAYS OF FINAL GRADING OR TEMPORARILY STABILIZED WITHIN 30 DAYS OF INITIAL DISTURBANCE OF SOIL.
4. DUST CONTROL: ALL VEHICLE TRAFFIC AREAS AND EXPOSED SURFACES SHALL BE MOISTENED PERIODICALLY WITH ADEQUATE WATER TO CONTROL DUST.
5. CONSTRUCTION ROAD: STONE CONSTRUCTION ROAD SHALL BE CONSTRUCTED AFTER ALL SILT FENCING AND OTHER CONTROL MEASURES HAVE BEEN INSTALLED, AND PRIOR TO ANY EXCAVATION ACTIVITIES ON THE SITE.
6. SLOPE STABILITY: ALL SLOPES SHALL BE INSPECTED FREQUENTLY FOR SIGNS OF FAILURE, SLIPPING, AND/OR EROSION. ANY DAMAGE SHALL BE REPAIRED IMMEDIATELY.
7. CONTRACTOR EROSION CONTROL MEASURES ARE NOT LIMITED TO THOSE SHOWN ON THE PLANS. THE CONTRACTOR SHALL PERFORM ANY AND ALL ADDITIONAL MEASURES TO CONTROL EROSION.
8. SEDIMENT CONTROL AROUND CATCH BASINS SHALL BE INSTALLED WHERE INDICATED, AND PER THE DETAIL.
9. CHECK DAMS SHALL BE PLACED AS REQUIRED TO MINIMIZE SEDIMENTATION. ALL CHECK DAMS SHALL BE PERIODICALLY INSPECTED AND MAINTAINED AS DEEMED NECESSARY BY THE ENGINEER.

OVERWINTER CONSTRUCTION AND STABILIZATION

1. THE WINTER CONSTRUCTION PERIOD IS FROM NOV 1 TO APR 15.
2. USE BERMS SEEDED ACCORDING TO TOPSOILING AND SEEDING NOTE 4 FOR SEDIMENT BARRIERS.
3. APPLY TEMPORARY SEED AND MULCH AT TWICE THE NORMAL RATE ACCORDING TO TOPSOILING AND SEEDING NOTES 4 AND 5.
4. MULCH STOCKPILES OF SOIL/SUBSOIL OVER WINTER WITH HAY OR STRAW AT TWICE NORMAL RATE.
5. DO NOT PLACE PERMANENT SEED BETWEEN OCT 16 AND APR 1. PROTECT FINE GRADED AREAS WITH MULCH OR TEMPORARY SEED AND MULCH UNTIL FINAL TREATMENT.
6. CONSTRUCT AND STABILIZE STONE-LINED DITCHES AND CHANNELS BY NOV 15. CONSTRUCT AND STABILIZE GRASS-LINE DITCHES AND CHANNELS BY SEP 1. INSTALL A SOD OR STONE LINER IF DITCHES AND CHANNELS CANNOT BE STABILIZED BY THESE DATES.
7. DISTURBED SOILS WITH SLOPES LESS THAN 15% MUST BE SEEDED AND MULCHED BY SEP 15. IF NOT STABILIZED BY THIS DATE, USE TEMPORARY VEGETATION, SOD, OR MULCH.

HYDRANTS

1. CONTRACTOR MAY USE EXISTING HYDRANT FOR DUST AND MILLING.
2. HYDRANTS ARE LOCATED OUTSIDE AIRPORT SECURED AREA. CONTRACTOR MAY UTILIZE WITH WATER DISTRICT'S PERMISSION. WATER DISTRICT TO INSTALL METER AND PROPER BACKFLOW EQUIPMENT.
3. CONTRACTOR SHALL UTILIZE A WATER TRUCK TO TRANSPORT INTO PROJECT AREA.
4. CONTRACTOR TO PAY FOR FOR WATER USE INCIDENTAL TO THE PROJECT.

ENGINEER'S SEAL

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DESIGNED BY: NEG
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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL NOTES AND DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

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ER2.2

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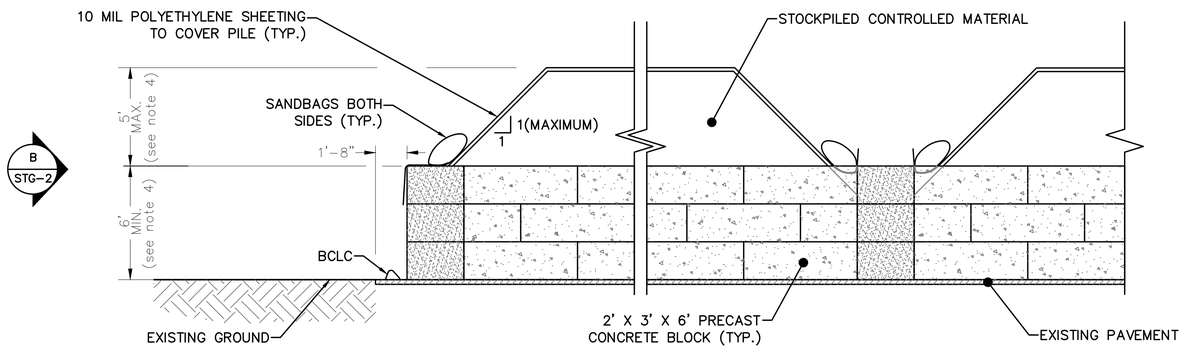

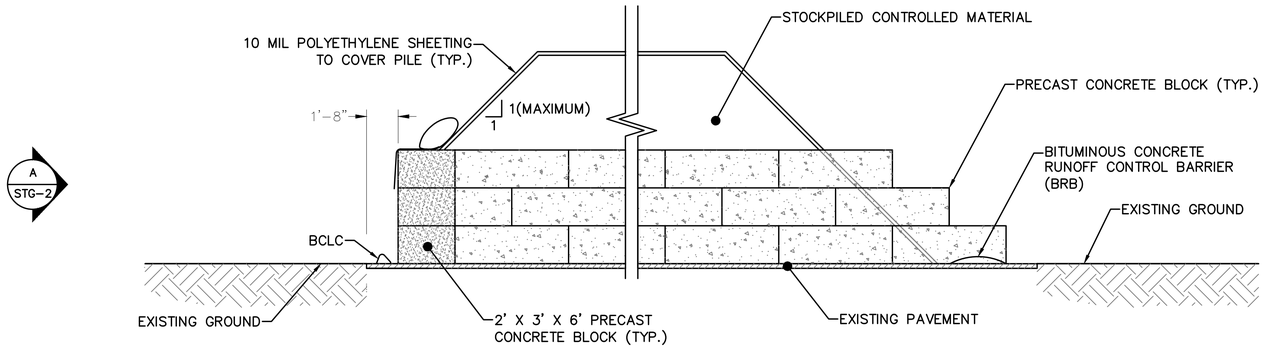

WASTE STOCKPILE AREA

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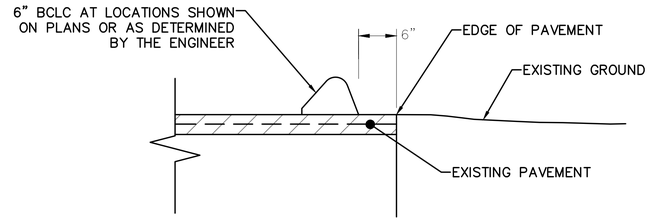
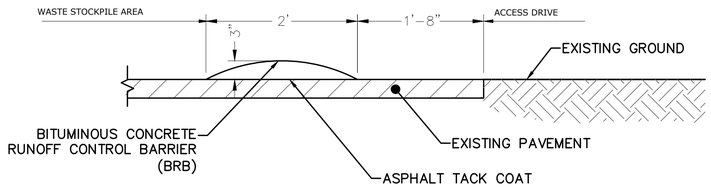


BITUMINOUS CONCRETE LIP CURB (BCLC)

SCALE: N.T.S.



NOTE:

INSTALLATION OF BRB SHALL BE ON PAVEMENT ONLY AND IS BASED ON FIELD CONDITIONS OR AS DETERMINED BY THE ENGINEER.

BITUMINOUS CONCRETE RUNOFF CONTROL BARRIER (BRB)

SCALE: N.T.S.

NOTES:

1. WASTE STOCKPILE AREA (WSA) INSTALLATION AND ALL REQUIRED MATERIALS ARE AS INDICATED ON THE CONSTRUCTION ACCESS PLANS AND MISCELLANEOUS DETAILS.
2. WHERE FEASIBLE, A MINIMUM DISTANCE OF 5' IMMEDIATELY OUTSIDE THE PERIMETER OF THE WSA CONCRETE BLOCK WALLS SHALL REMAIN CLEAR AND FREE OF ANY OBJECT TO PROVIDE ACCESS FOR MAINTENANCE.
3. HEIGHT OF THE CONCRETE BLOCKS, STOCKPILED CONTROLLED MATERIAL AND CONFIGURATION OF THE BIN(S) MAY VARY BASED ON THE SIZE AS INDICATED ON THE WSA PLAN OR AS DIRECTED BY THE ENGINEER.
4. THE WSA SURFACE SHALL BE SUFFICIENTLY IMPERVIOUS TO PREVENT OR MINIMIZE THE TRANSFER OR INFILTRATION OF CONTAMINANTS FROM THE STOCKPILES TO THE GROUND.

ENGINEER'S SEAL

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EROSION CONTROL NOTES AND DETAILS

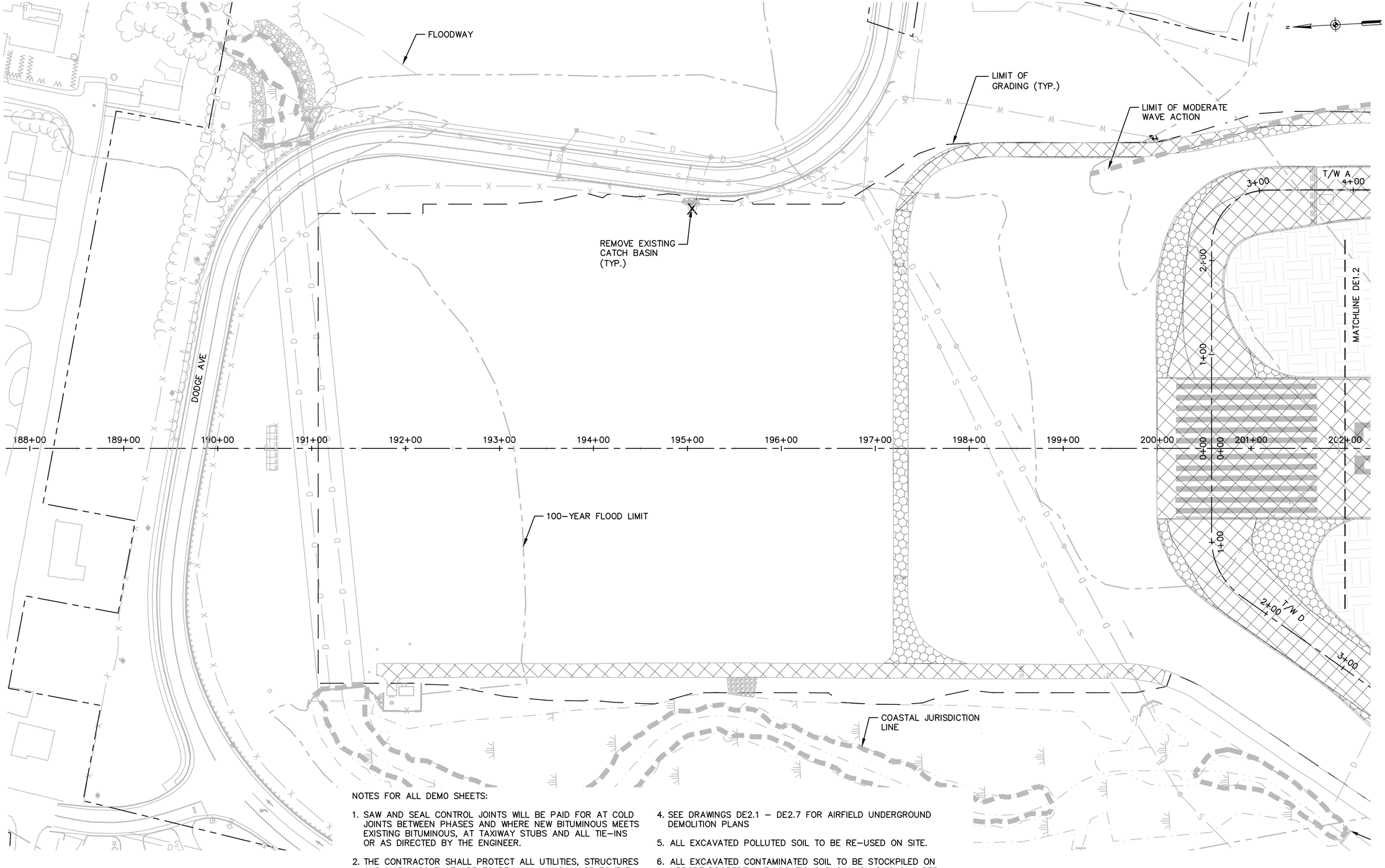
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
4	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
ER2.3

HTA 4/17/2025 9:04:02 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\ER2.3 - Erosion Control Details.dwg



NOTES FOR ALL DEMO SHEETS:

1. SAW AND SEAL CONTROL JOINTS WILL BE PAID FOR AT COLD JOINTS BETWEEN PHASES AND WHERE NEW BITUMINOUS MEETS EXISTING BITUMINOUS, AT TAXIWAY STUBS AND ALL TIE-INS OR AS DIRECTED BY THE ENGINEER.
2. THE CONTRACTOR SHALL PROTECT ALL UTILITIES, STRUCTURES AND MARKINGS THAT ARE TO REMAIN. ANY DAMAGE TO THE EXISTING UTILITIES AND STRUCTURES SHALL BE REPLACED OR REPAIRED AT NO ADDITIONAL COST TO THE OWNER IF SHOWN ON THE PLANS OR NOT.
3. ALL UNDERGROUND UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATION AND SOME MAY NOT BE SHOWN. THE CONTRACTOR SHALL FIELD VERIFY ALL AIRPORT UTILITY LOCATIONS AND COORDINATE WITH TWEED AIRPORT AND FAA TECH OPERATIONS WITH ALL OF THEIR UTILITIES, PRIOR TO CONSTRUCTION.
4. SEE DRAWINGS DE2.1 – DE2.7 FOR AIRFIELD UNDERGROUND DEMOLITION PLANS
5. ALL EXCAVATED POLLUTED SOIL TO BE RE-USED ON SITE.
6. ALL EXCAVATED CONTAMINATED SOIL TO BE STOCKPILED ON AIRPORT PROPERTY AT LOCATIONS SHOWN ON DWG G1.9 PER DETAIL DWG ER2.3.
7. ALL OTHER EXCAVATED MATERIAL TO BE DISPOSED LEGALLY OFF-SITE

REMOVE EXISTING BITUMINOUS PAVEMENT AND SUBBASE SOILS (SEE TYPICAL SECTIONS FOR DEPTH OF REMOVAL)

MILL 1" BITUMINOUS (NOMINAL)

REMOVE EXISTING BITUMINOUS PAVEMENT AND CONVERT TO TURF

TOPSOIL STRIPPED AND STOCKPILED FOR SEED BANK PRESERVATION. STRIPPED TOPSOIL SHALL BE RETURNED TO THE AREA IT WAS REMOVED FROM

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURTH No. 25733 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

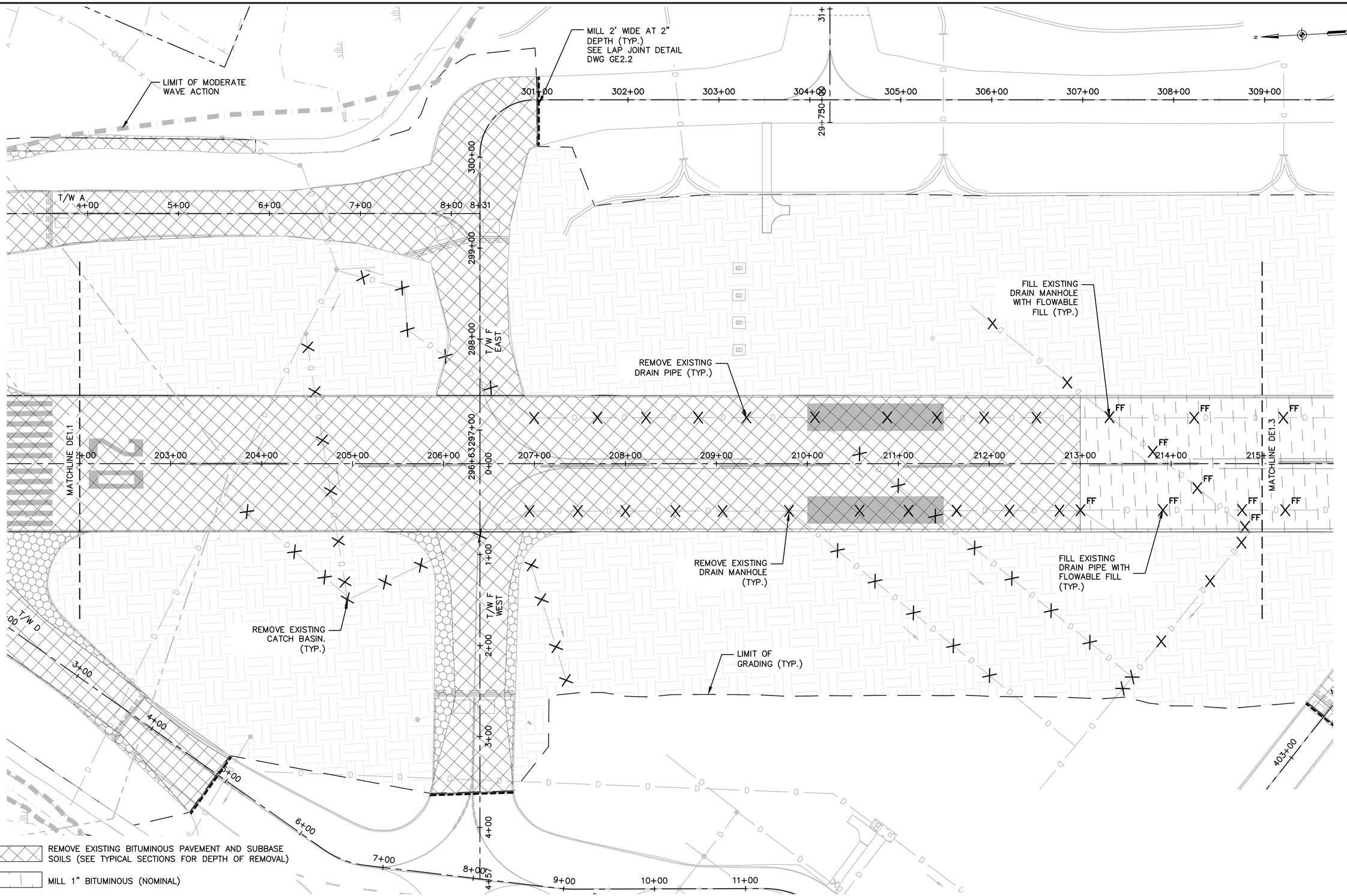
AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.1

SHEET 51 OF 174

HTA 4/17/2025 9:11:46 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DE1.1 - Demolition Plan.dwg



ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTH
No. 25203
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

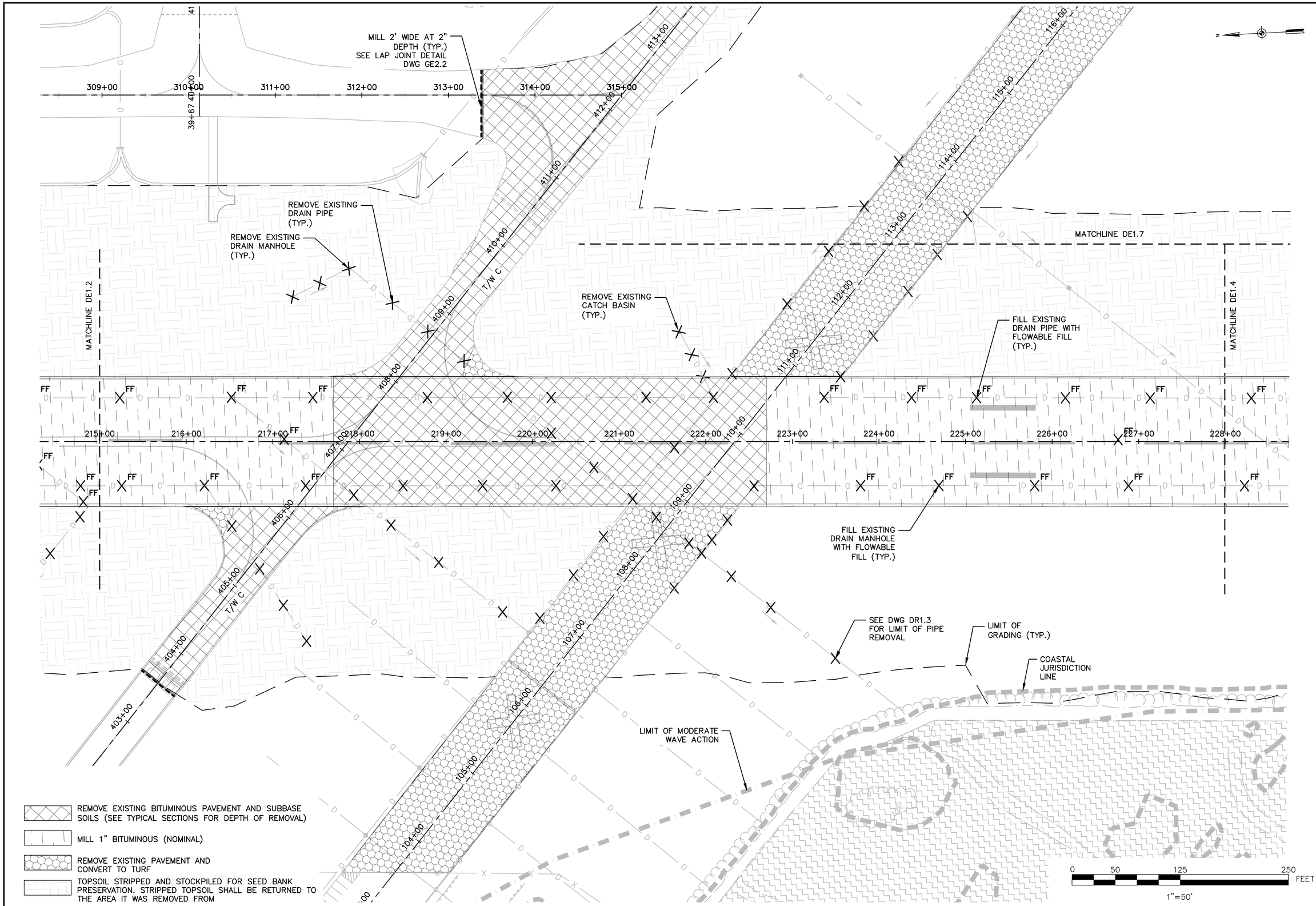
AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.2

SHEET 52 OF 174

HTA 4/17/2025 9:13:22 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DE1.1 - Demolition Plan.dwg



REMOVE EXISTING BITUMINOUS PAVEMENT AND SUBBASE SOILS (SEE TYPICAL SECTIONS FOR DEPTH OF REMOVAL)

MILL 1" BITUMINOUS (NOMINAL)

REMOVE EXISTING PAVEMENT AND CONVERT TO TURF

TOPSOIL STRIPPED AND STOCKPILED FOR SEED BANK PRESERVATION. STRIPPED TOPSOIL SHALL BE RETURNED TO THE AREA IT WAS REMOVED FROM

ENGINEER'S SEAL

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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

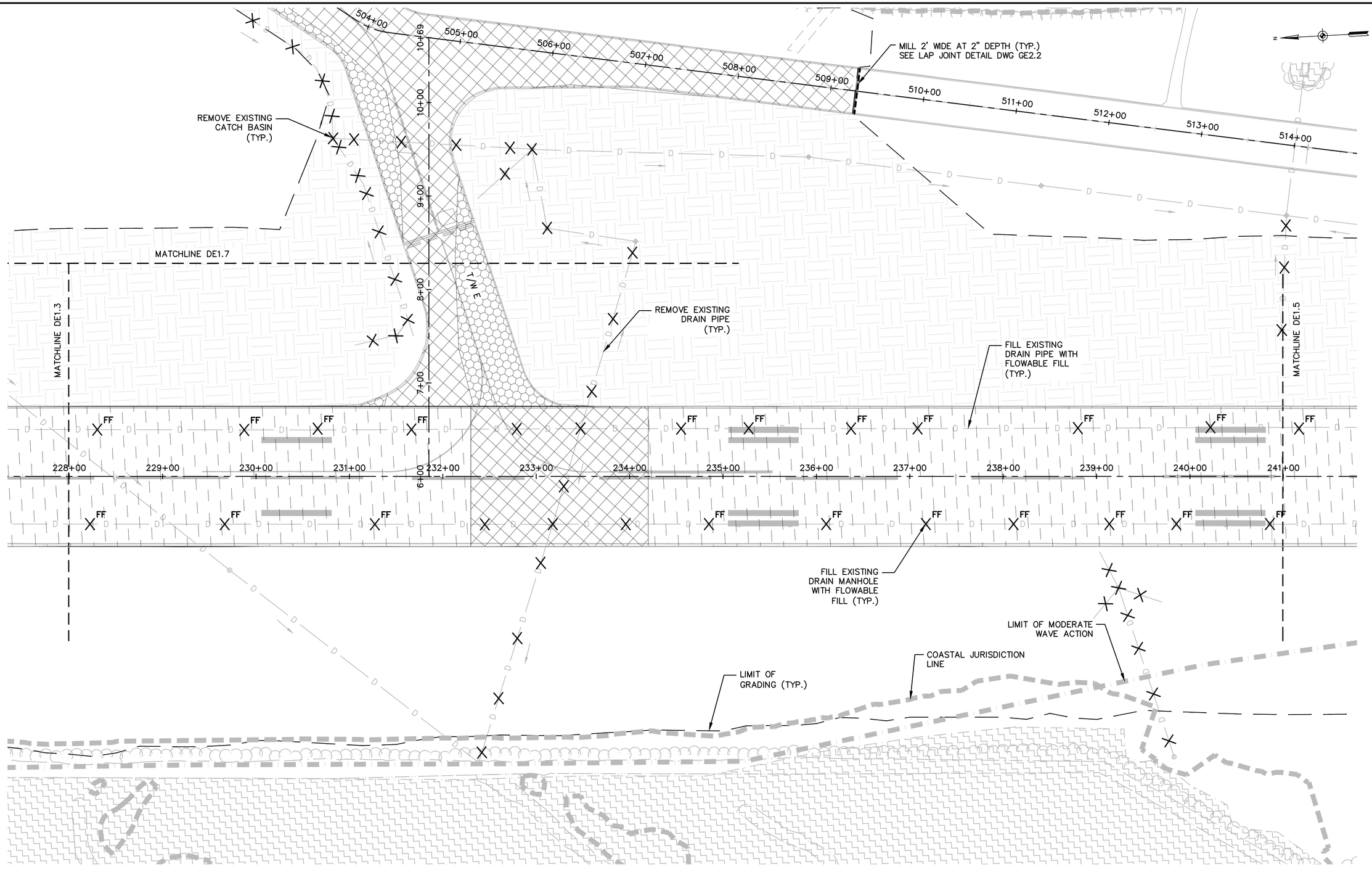
AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.3

SHEET 53 OF 174

HTA 4/17/2025 9:14:24 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DE1.1 - Demolition Plan.dwg



REMOVE EXISTING BITUMINOUS PAVEMENT AND SUBBASE SOILS (SEE TYPICAL SECTIONS FOR DEPTH OF REMOVAL)

MILL 1" BITUMINOUS (NOMINAL)

EXISTING PAVEMENT REMOVAL CONVERTED TO TURF

TOPSOIL STRIPPED AND STOCKPILED FOR SEED BANK PRESERVATION. STRIPPED TOPSOIL SHALL BE RETURNED TO THE AREA IT WAS REMOVED FROM

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FURTHER
No. 26903
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.4

SHEET 54 OF 174

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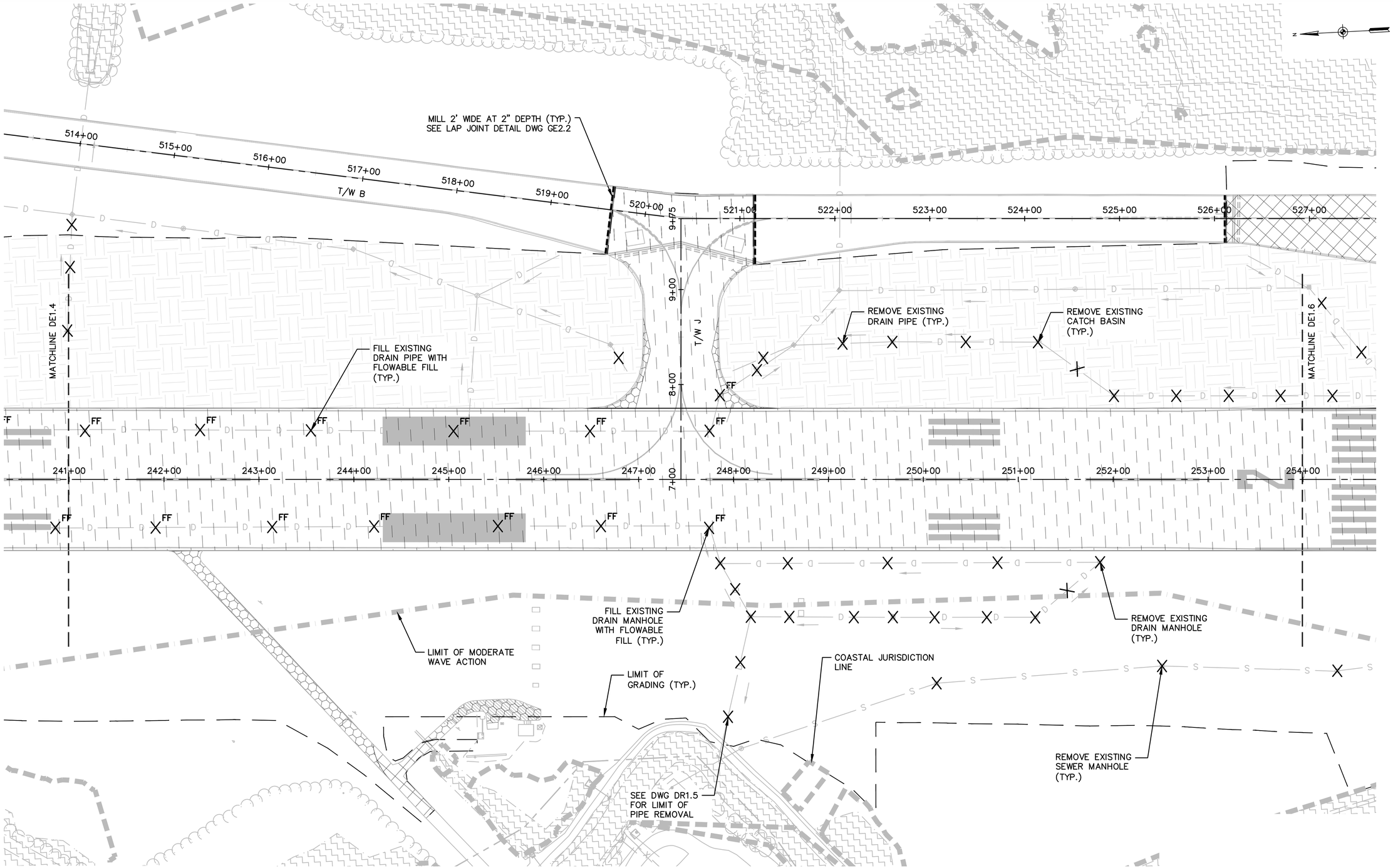

REMOVE EXISTING BITUMINOUS PAVEMENT AND SUBBASE SOILS (SEE TYPICAL SECTIONS FOR DEPTH OF REMOVAL)

MILL 1" BITUMINOUS (NOMINAL)

EXISTING PAVEMENT REMOVAL CONVERTED TO TURF

TOPSOIL STRIPPED AND STOCKPILED FOR SEED BANK PRESERVATION. STRIPPED TOPSOIL SHALL BE RETURNED TO THE AREA IT WAS REMOVED FROM

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURTH No. 26703 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.5

SHEET 55 OF 174

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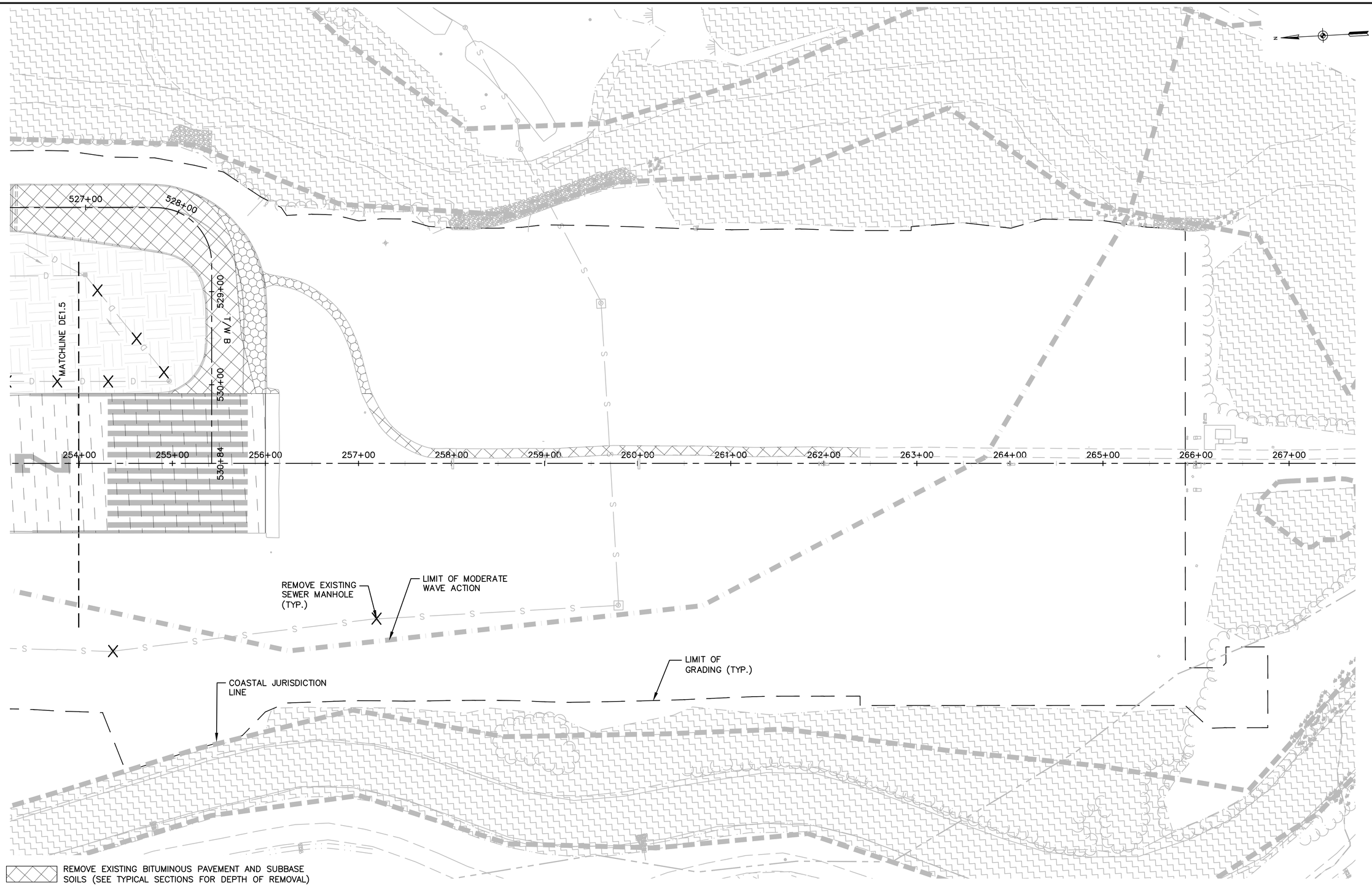

REMOVE EXISTING BITUMINOUS PAVEMENT AND SUBBASE SOILS (SEE TYPICAL SECTIONS FOR DEPTH OF REMOVAL)

MILL 1" BITUMINOUS (NOMINAL)

EXISTING PAVEMENT REMOVAL CONVERTED TO TURF

TOPSOIL STRIPPED AND STOCKPILED FOR SEED BANK PRESERVATION. STRIPPED TOPSOIL SHALL BE RETURNED TO THE AREA IT WAS REMOVED FROM

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FUTTER No. 25703 LICENSED PROFESSIONAL ENGINEER

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 6

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
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PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.6

SHEET 56 OF 174

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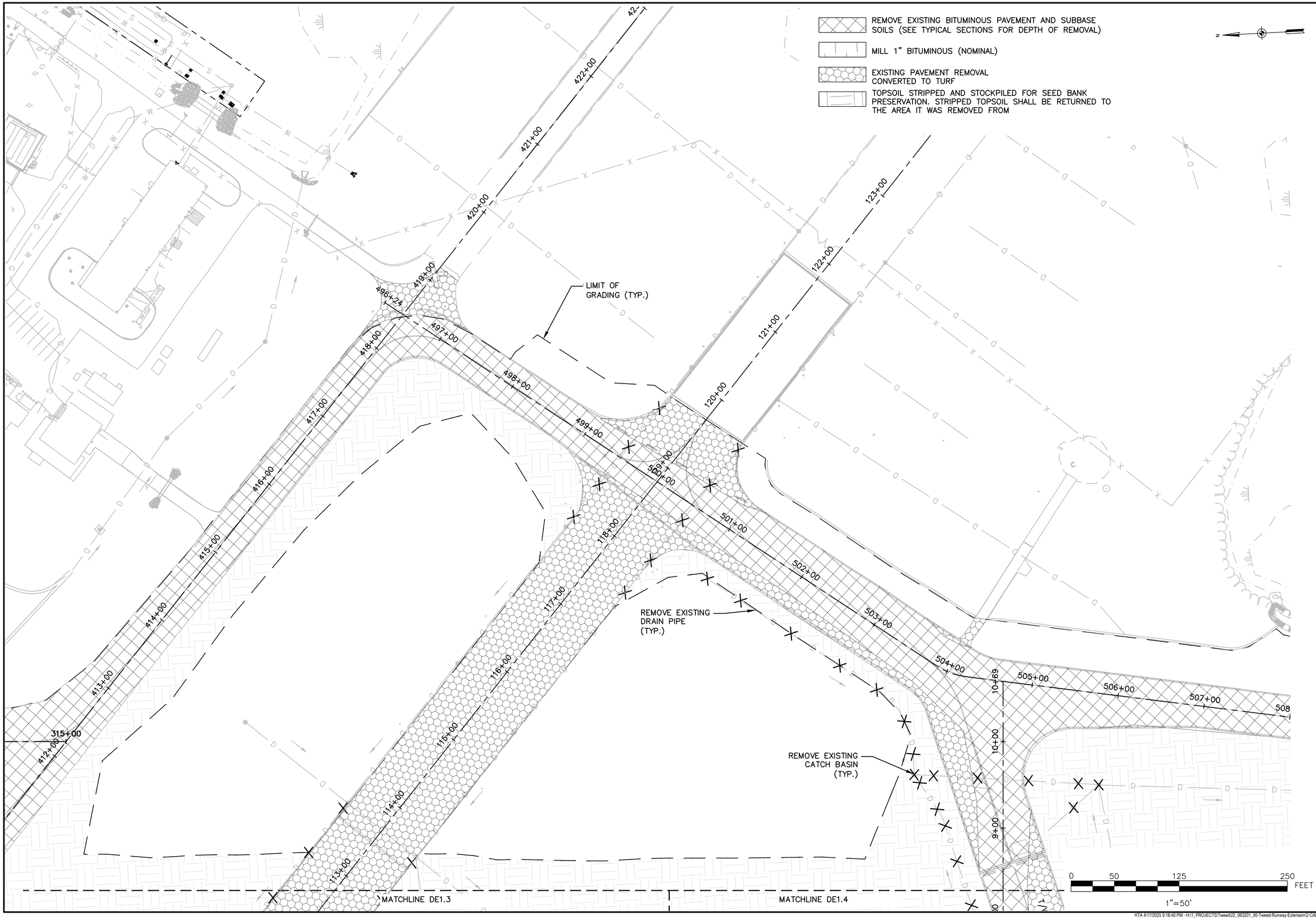

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURTH No. 23933 LICENSED PROFESSIONAL ENGINEER

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Manchester, NH 03101-1227
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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DEMOLITION PLAN 7

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DE1.7

SHEET 57 OF 174

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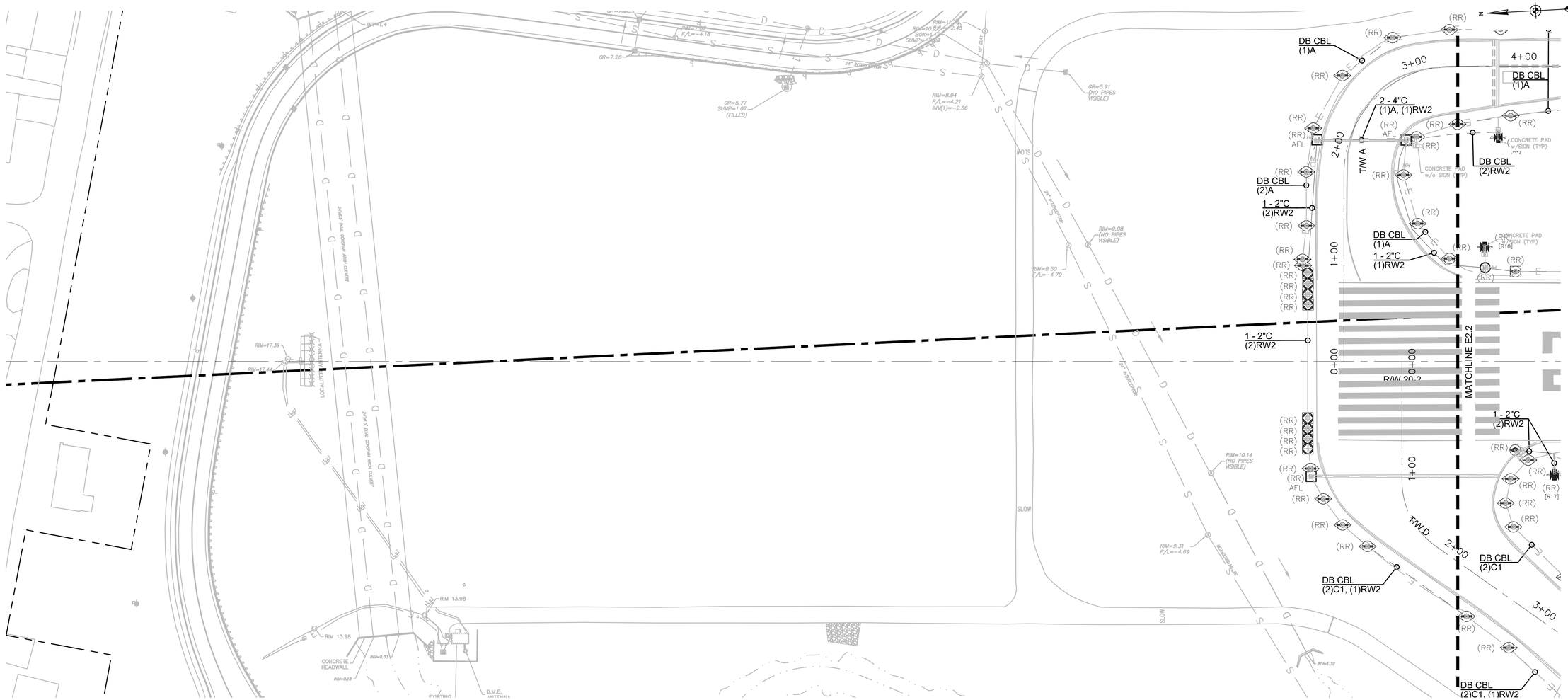

GENERAL NOTES:

A. REFER TO SHEETS E0.1 THROUGH E0.5 FOR GENERAL ELECTRICAL NOTES AND ABBREVIATIONS.

B. REFER TO SHEET E0.6 FOR ELECTRICAL LEGEND.

C. REFER TO THE XXXXX-SERIES DRAWINGS FOR UNDERGROUND UTILITIES OTHER THAN ELECTRICAL UTILITIES NOT SHOWN ON THE ELECTRICAL AREA PLANS.

D. REFER TO XXXX-SERIES DRAWINGS FOR OVERALL SAFETY / PHASING PLAN AND WORK AREA LIMITS RELATED REQUIREMENTS.

E. REFER TO XXXXX-SERIES DRAWINGS FOR AIRFIELD GUIDANCE SIGN SCHEDULES.

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

ARORA
Arora Engineers
1600 Market Street
Suite 1630
Philadelphia, PA 19103
P (215) 571-4930 | F (610) 459-7950 | aroraengineers.com

CHECKED BY NOR
DRAWN BY CJM
DESIGNED BY PAT

PROJECT DESIGNER
HOYLE TANNER

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DATE: APRIL, 2025

TWEED–NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

AIRFIELD ELECTRICAL UNDERGROUND DEMOLITION PLAN – 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
		PERMIT SET	

PROJ. No.: PROJECT #

AIP: 3–09–0006–0XX–2023

DRAWING NO.

DE2.1

SHEET 58 OF 174

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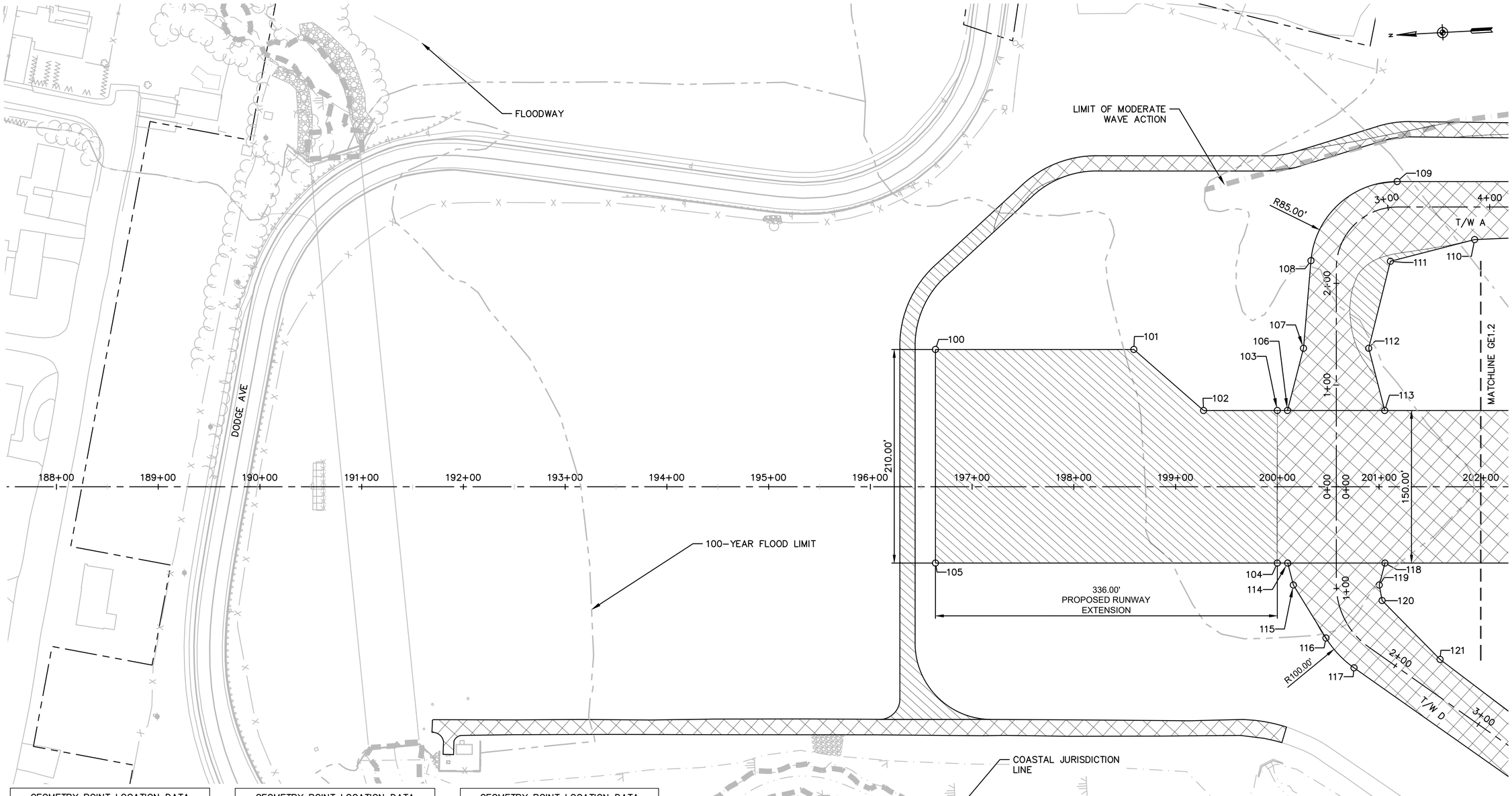

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
100	659972.32	962433.21
101	659777.58	962423.00
102	659712.27	962359.50
103	659639.92	962355.71
104	659647.77	962205.91
105	659983.31	962223.50
106	659629.93	962355.18
107	659611.00	962415.44
108	659599.16	962501.05
109	659510.52	962574.28

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
110	659437.44	962513.34
111	659521.25	962496.39
112	659547.02	962412.09
113	659534.50	962350.18
114	659637.56	962205.38
115	659633.14	962183.50
116	659603.86	962129.82
117	659577.86	962099.08
118	659542.13	962200.38
119	659548.82	962179.07

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
120	659546.86	962163.72
121	659492.95	962102.92

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

ENGINEER'S SEAL

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150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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PROJECT DESIGNER

DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 1

REVISIONS		
REV NO.	DATE	DESCRIPTION
	4/18/25	PERMIT SUBMISSION

BY: NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

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SHEET 65 OF 174

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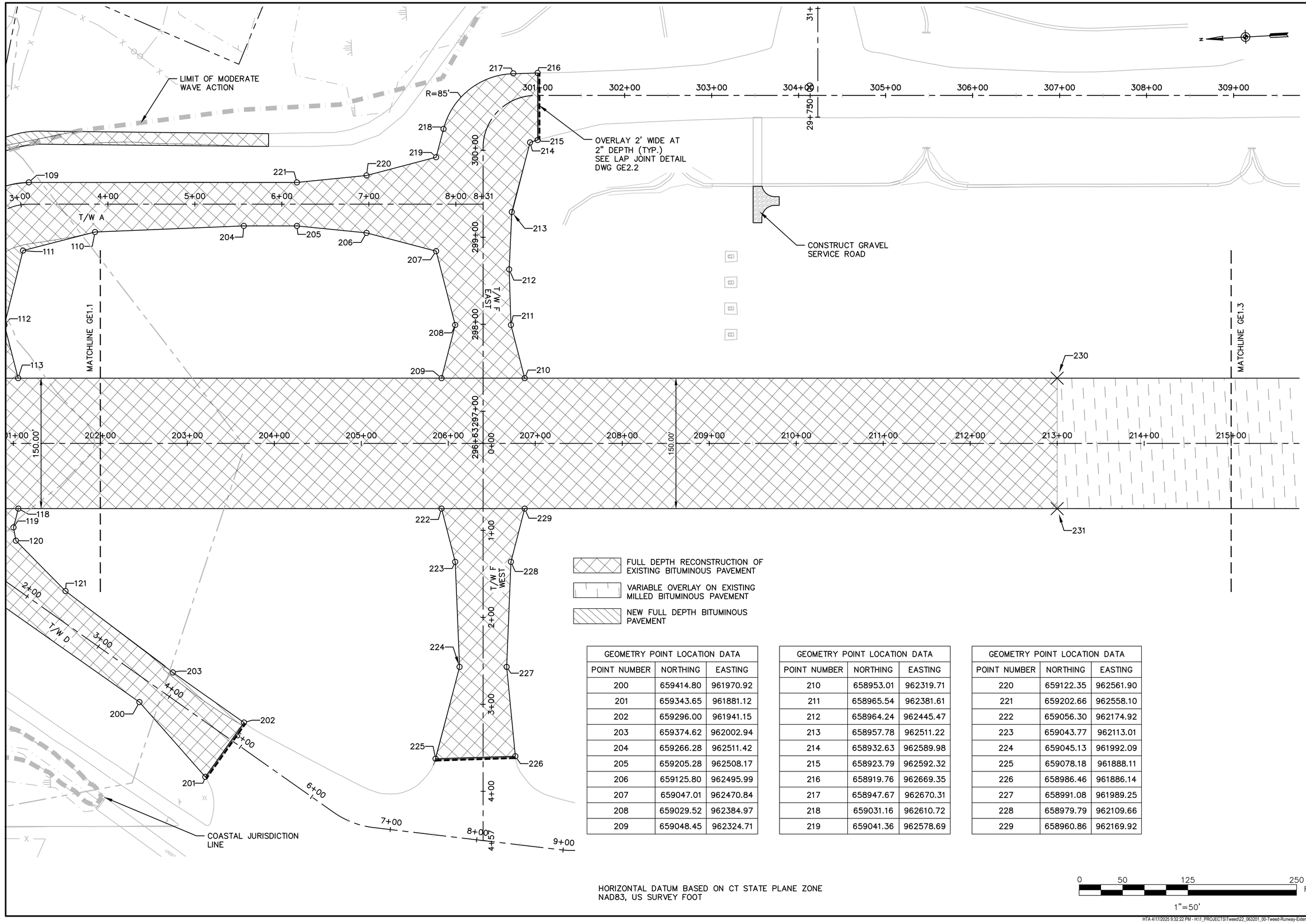

GEOMETRY POINT LOCATION DATA		
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201	659343.65	961881.12
202	659296.00	961941.15
203	659374.62	962002.94
204	659266.28	962511.42
205	659205.28	962508.17
206	659125.80	962495.99
207	659047.01	962470.84
208	659029.52	962384.97
209	659048.45	962324.71

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
210	658953.01	962319.71
211	658965.54	962381.61
212	658964.24	962445.47
213	658957.78	962511.22
214	658932.63	962589.98
215	658923.79	962592.32
216	658919.76	962669.35
217	658947.67	962670.31
218	659031.16	962610.72
219	659041.36	962578.69

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
220	659122.35	962561.90
221	659202.66	962558.10
222	659056.30	962174.92
223	659043.77	962113.01
224	659045.13	961992.09
225	659078.18	961888.11
226	658986.46	961886.14
227	658991.08	961989.25
228	658979.79	962109.66
229	658960.86	962169.92

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

GE1.2

SHEET 66 OF 174

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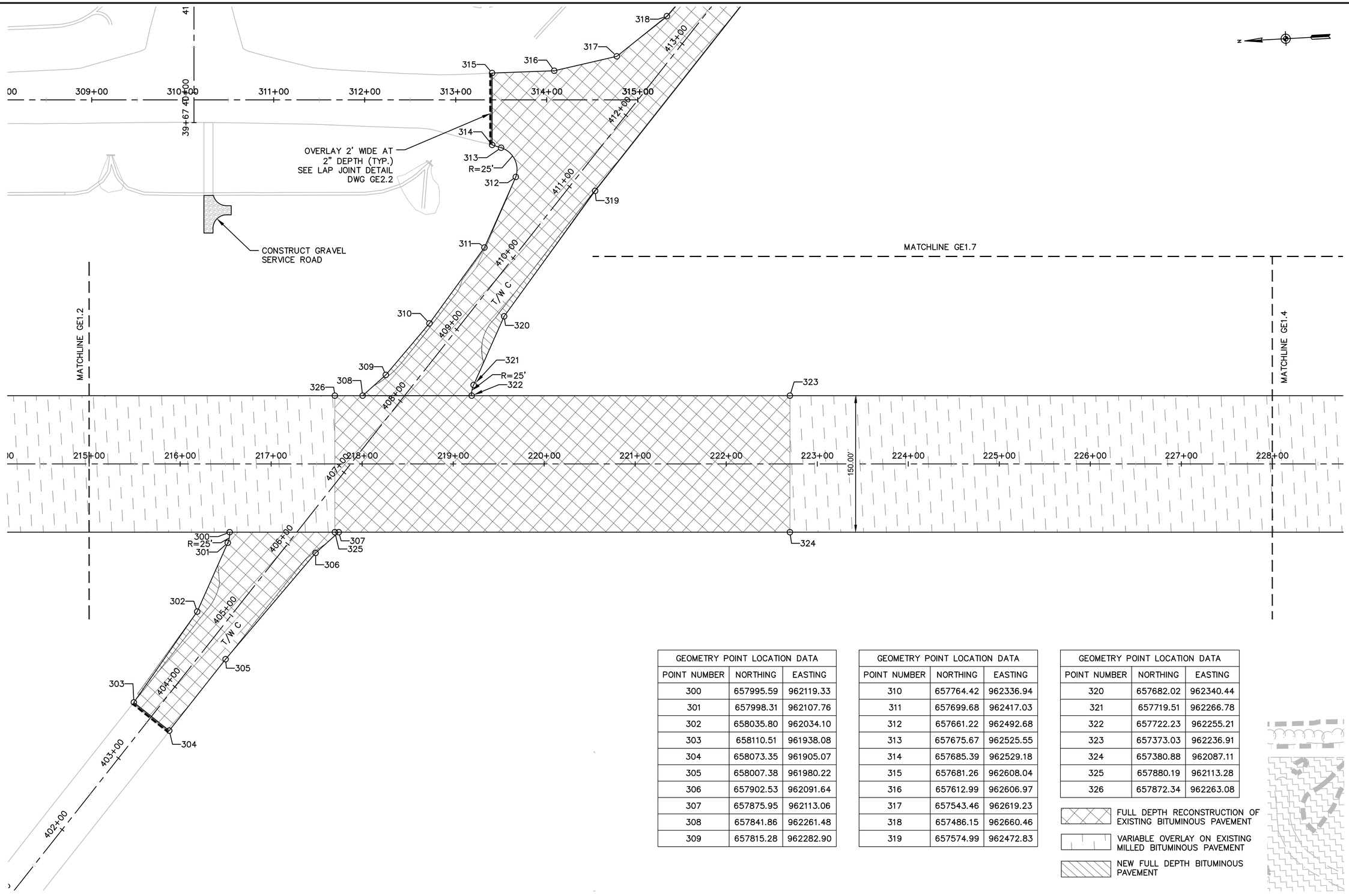

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
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301	657998.31	962107.76
302	658035.80	962034.10
303	658110.51	961938.08
304	658073.35	961905.07
305	658007.38	961980.22
306	657902.53	962091.64
307	657875.95	962113.06
308	657841.86	962261.48
309	657815.28	962282.90

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
310	657764.42	962336.94
311	657699.68	962417.03
312	657661.22	962492.68
313	657675.67	962525.55
314	657685.39	962529.18
315	657681.26	962608.04
316	657612.99	962606.97
317	657543.46	962619.23
318	657486.15	962660.46
319	657574.99	962472.83

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
320	657682.02	962340.44
321	657719.51	962266.78
322	657722.23	962255.21
323	657373.03	962236.91
324	657380.88	962087.11
325	657880.19	962113.28
326	657872.34	962263.08

FULL DEPTH RECONSTRUCTION OF EXISTING BITUMINOUS PAVEMENT

VARIABLE OVERLAY ON EXISTING MILLED BITUMINOUS PAVEMENT

NEW FULL DEPTH BITUMINOUS PAVEMENT

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

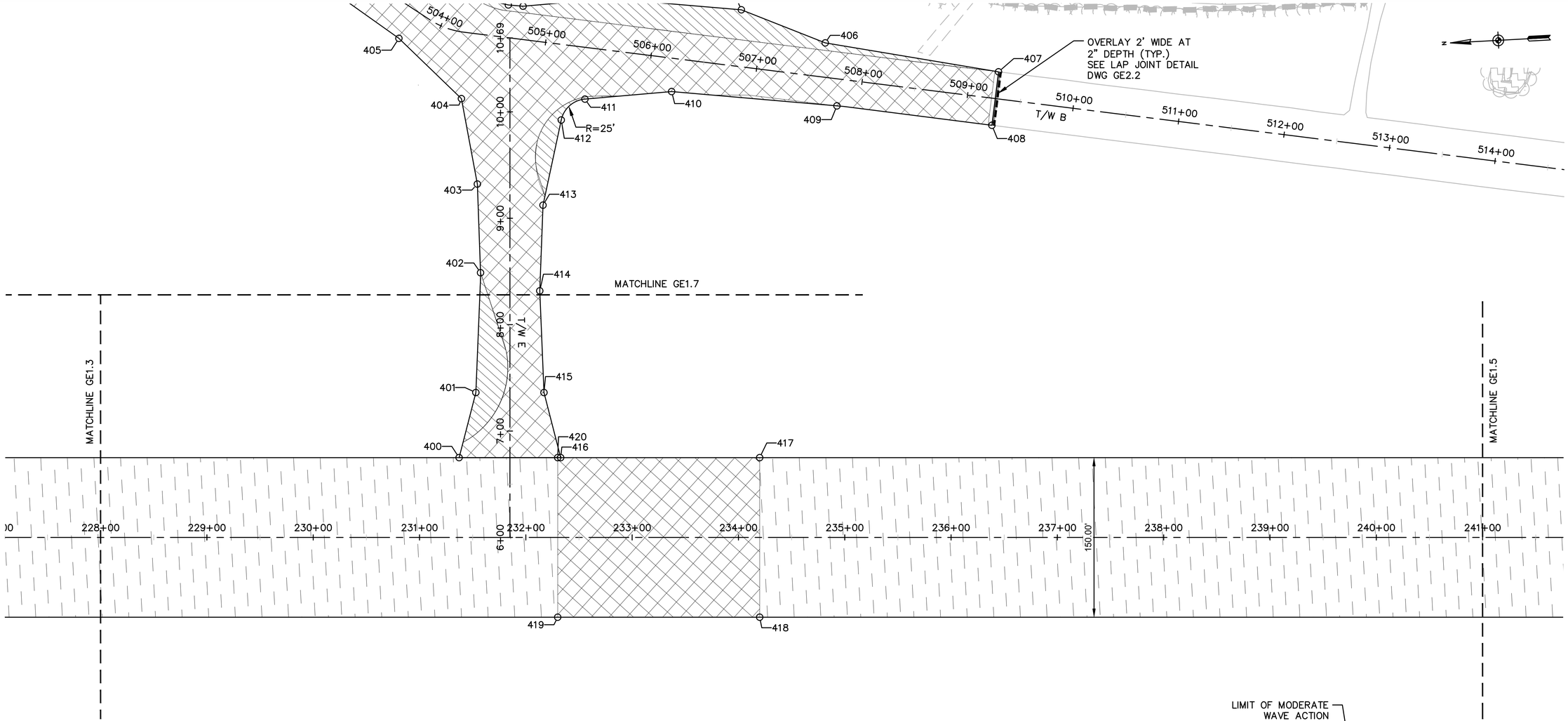
AIP: 3-09-0013-0XX-2025

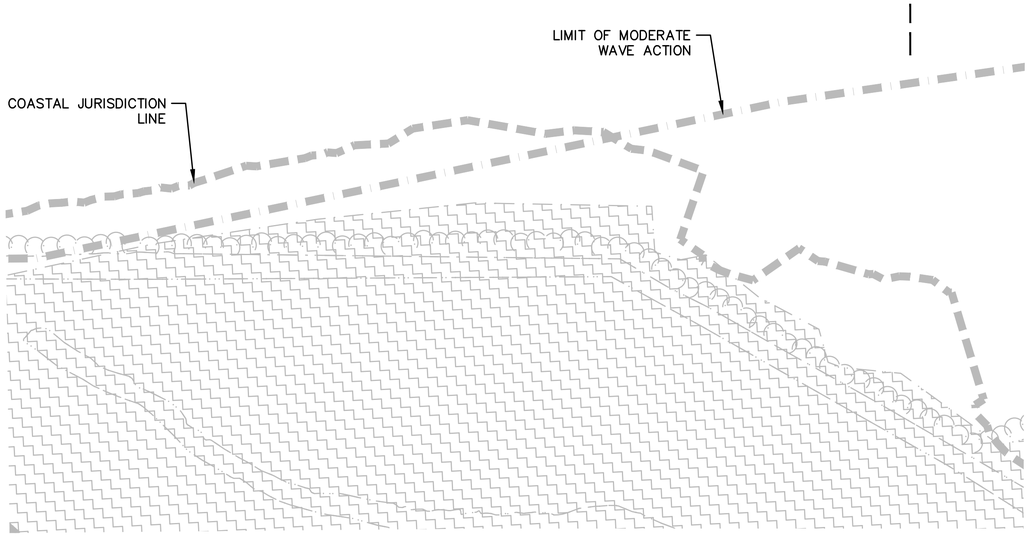
DRAWING NO.

GE1.3

SHEET 67 OF 174

HTA 4/17/2025 9:33:26 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GE1.1 - Geometry Plan.dwg





GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
400	656506.95	962191.52
401	656488.02	962251.78
402	656477.72	962364.05
403	656476.33	962447.40
404	656487.12	962528.36
405	656542.89	962588.03
406	656142.60	962562.82
407	655981.24	962527.12
408	655990.14	962477.26
409	656134.72	962503.12
410	656289.30	962524.70

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
411	656371.11	962521.88
412	656394.39	962503.40
413	656415.71	962424.36
414	656422.96	962344.10
415	656424.04	962248.42
416	656411.52	962186.52
417	656224.60	962176.73
418	656232.45	962026.93
419	656422.19	962036.87
420	656414.34	962186.67

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

FULL DEPTH RECONSTRUCTION OF EXISTING BITUMINOUS PAVEMENT

VARIABLE OVERLAY ON EXISTING MILLED BITUMINOUS PAVEMENT

NEW FULL DEPTH BITUMINOUS PAVEMENT

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

PROJECT DESIGNER

HOYLE TANNER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
4	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

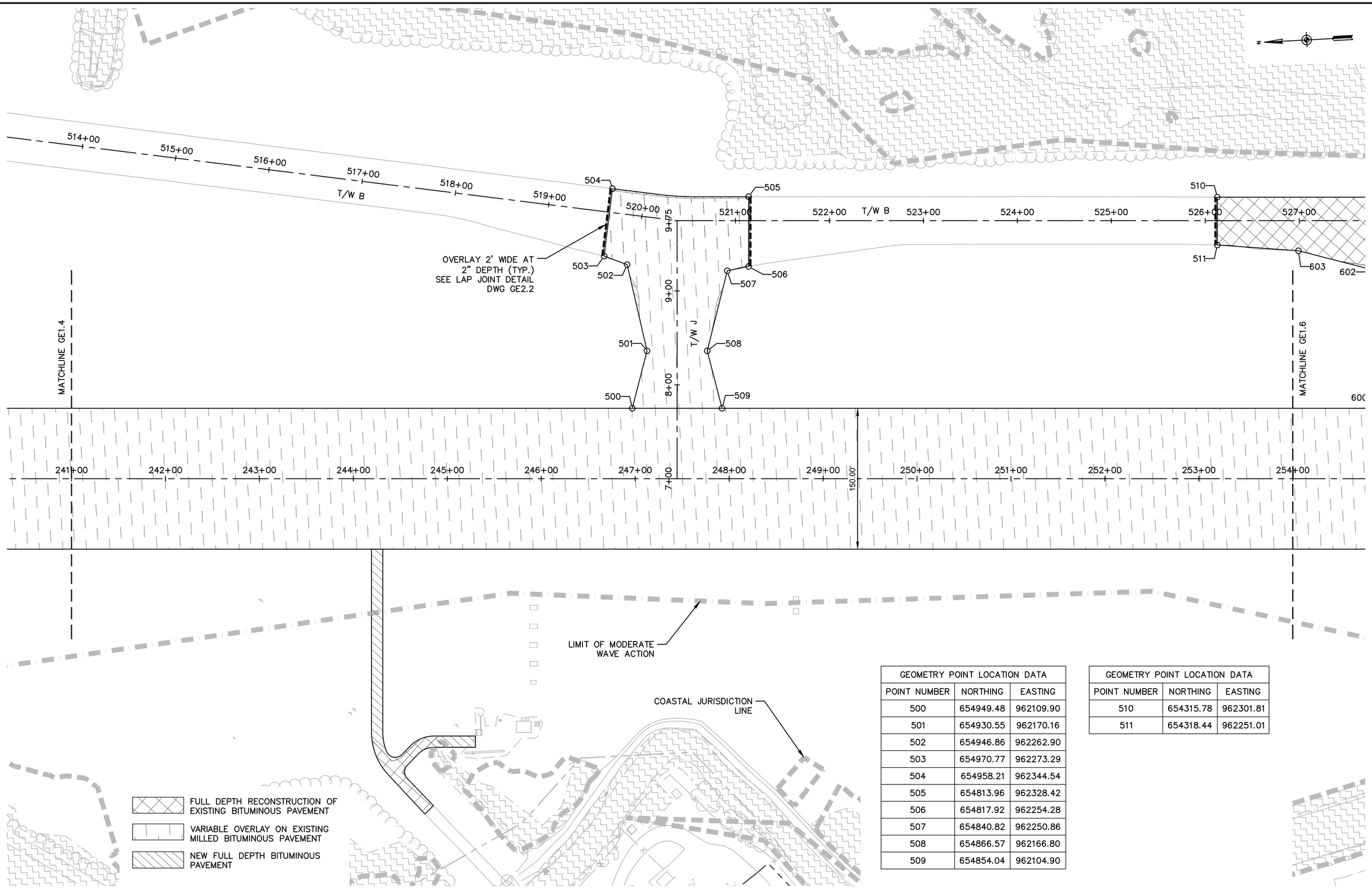
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GE1.4

SHEET ## OF 174

HTA 4/17/2025 9:34:22 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GE1.1 - Geometry Plan.dwg



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POINT NUMBER	NORTHING	EASTING
500	654949.48	962109.90
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502	654946.86	962262.90
503	654970.77	962273.29
504	654958.21	962344.54
505	654813.96	962328.42
506	654817.92	962254.28
507	654840.82	962250.86
508	654866.57	962166.80
509	654854.04	962104.90

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
510	654315.78	962301.81
511	654318.44	962251.01

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURTER No. 25703 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
0	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.:22.063201.00

AIP:3-09-0013-0XX-2025

DRAWING NO.

GE1.5

SHEET 69 OF 174

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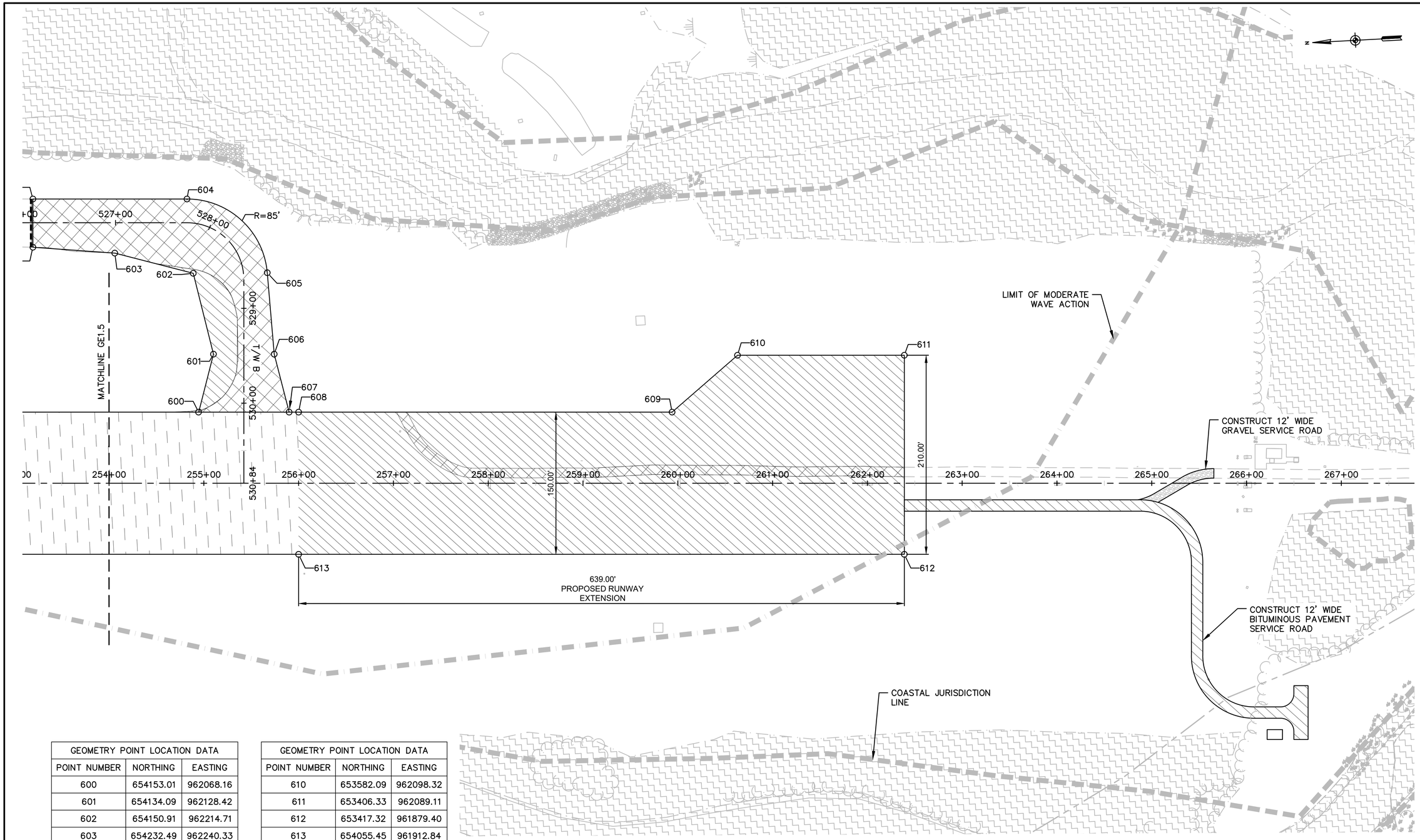

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601	654134.09	962128.42
602	654150.91	962214.71
603	654232.49	962240.33
604	654153.45	962293.30
605	654072.94	962211.22
606	654070.11	962125.06
607	654057.58	962063.16
608	654047.59	962062.64
609	653654.13	962042.02

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
610	653582.09	962098.32
611	653406.33	962089.11
612	653417.32	961879.40
613	654055.45	961912.84

FULL DEPTH RECONSTRUCTION OF EXISTING BITUMINOUS PAVEMENT

VARIABLE OVERLAY ON EXISTING MILLED BITUMINOUS PAVEMENT

NEW FULL DEPTH BITUMINOUS PAVEMENT

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURTH No. 25703 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 6

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

GE1.6

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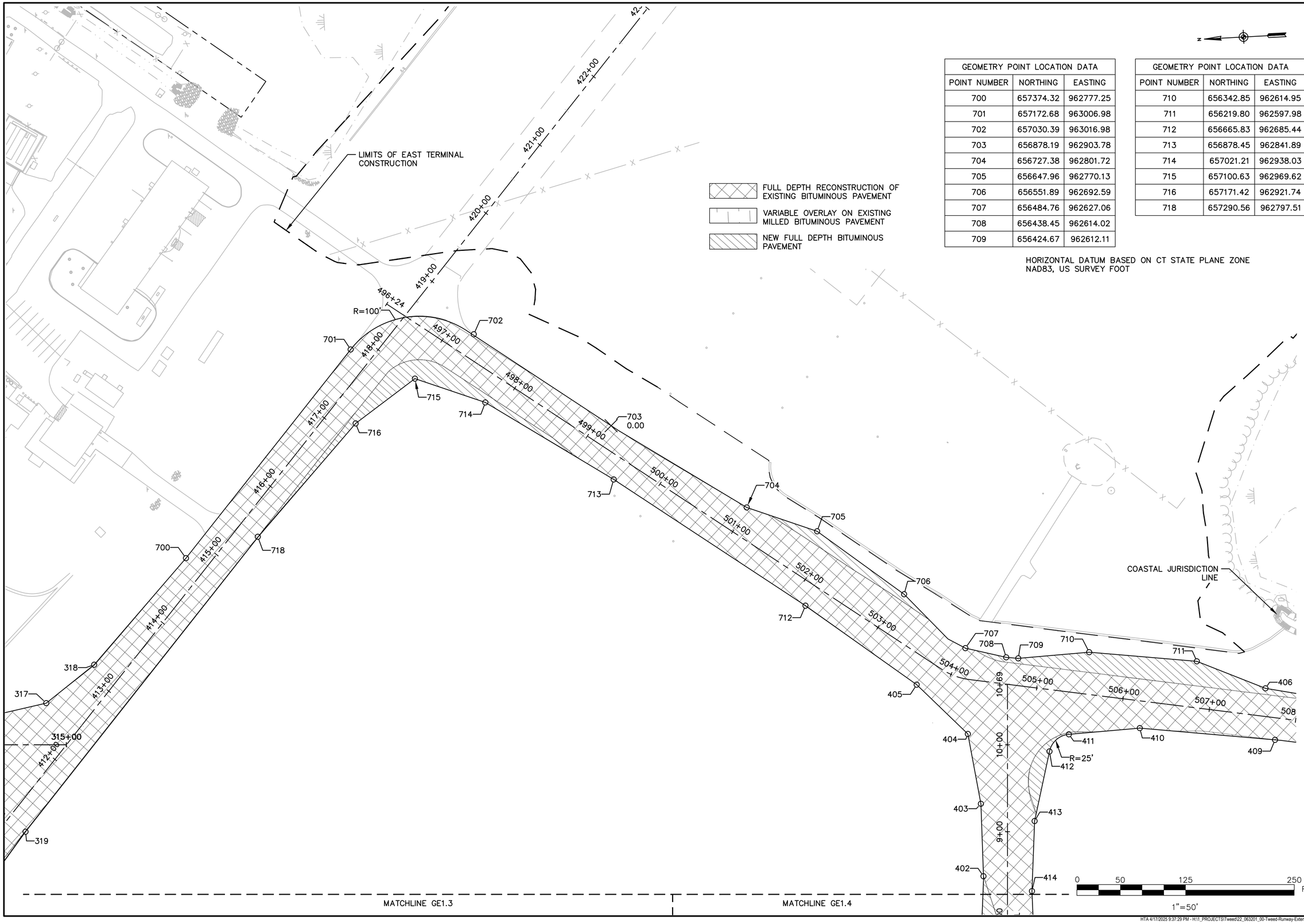

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
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701	657172.68	963006.98
702	657030.39	963016.98
703	656878.19	962903.78
704	656727.38	962801.72
705	656647.96	962770.13
706	656551.89	962692.59
707	656484.76	962627.06
708	656438.45	962614.02
709	656424.67	962612.11

GEOMETRY POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
710	656342.85	962614.95
711	656219.80	962597.98
712	656665.83	962685.44
713	656878.45	962841.89
714	657021.21	962938.03
715	657100.63	962969.62
716	657171.42	962921.74
718	657290.56	962797.51

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE NAD83, US SURVEY FOOT

ENGINEER'S SEAL

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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GEOMETRY PLAN 7

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

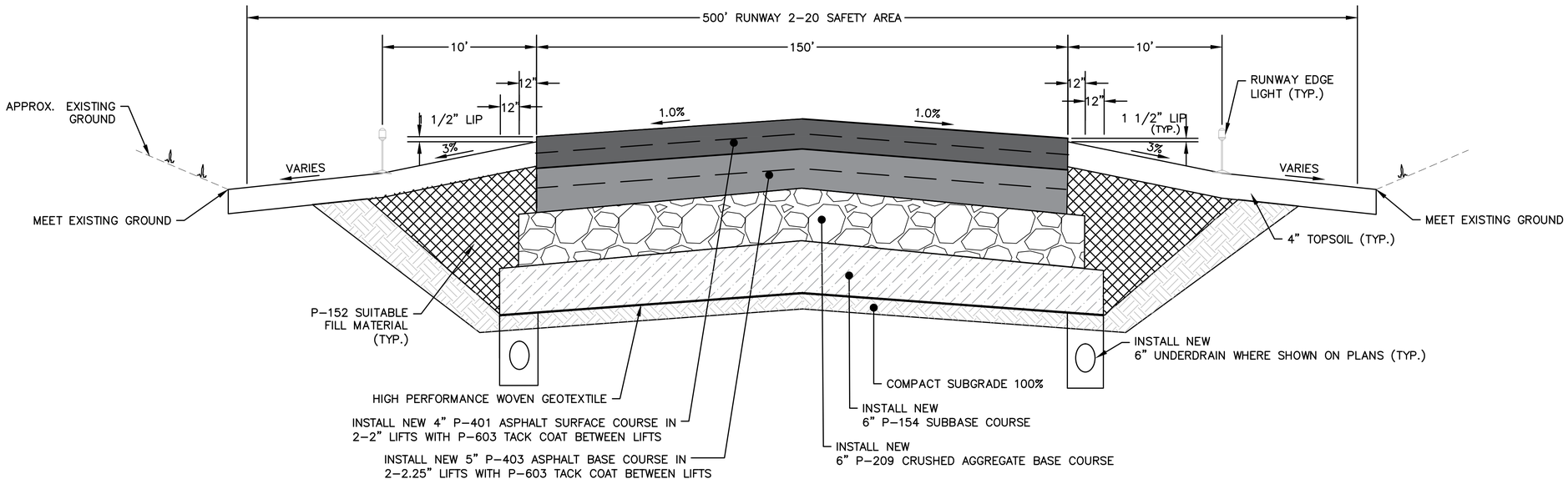
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GE1.7

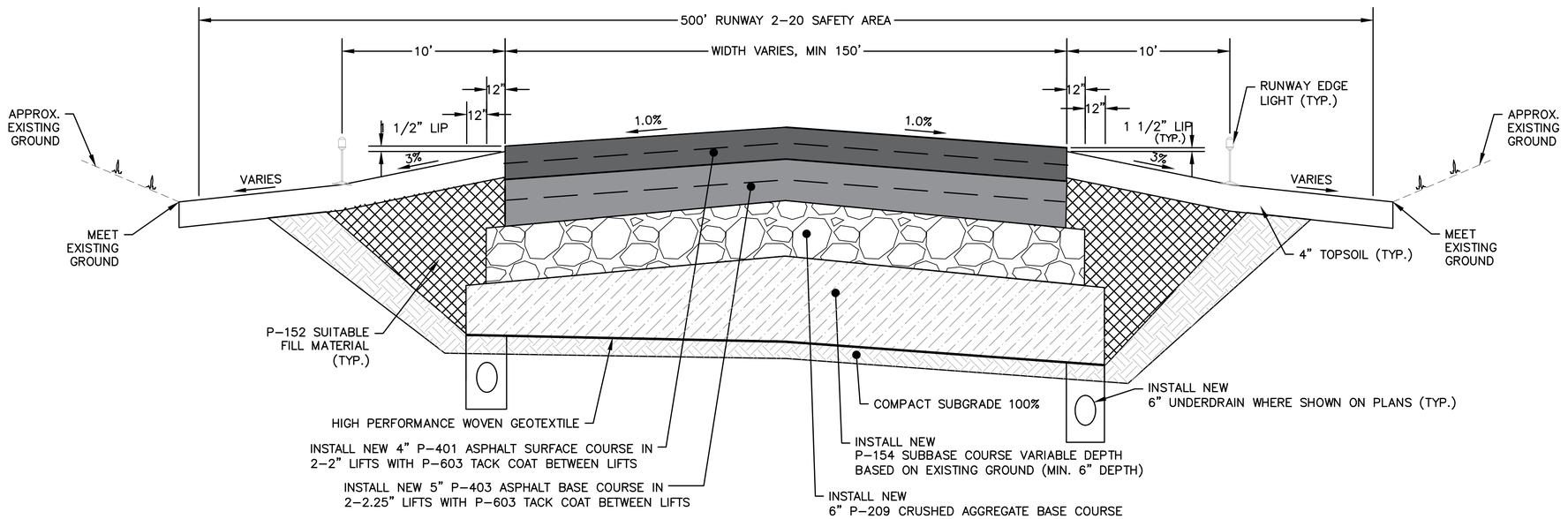
SHEET 71 OF 174

HTA 4/17/2025 9:37:29 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GE1.1 - Geometry Plan.dwg



RUNWAY 2-20 RECONSTRUCTION TYPICAL SECTION

NOT TO SCALE



RUNWAY 2-20 EXTENSION TYPICAL SECTION

NOT TO SCALE

ENGINEER'S SEAL

PROJECT DESIGNER
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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PAVEMENT TYPICAL SECTION AND DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
0	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
GE2.1

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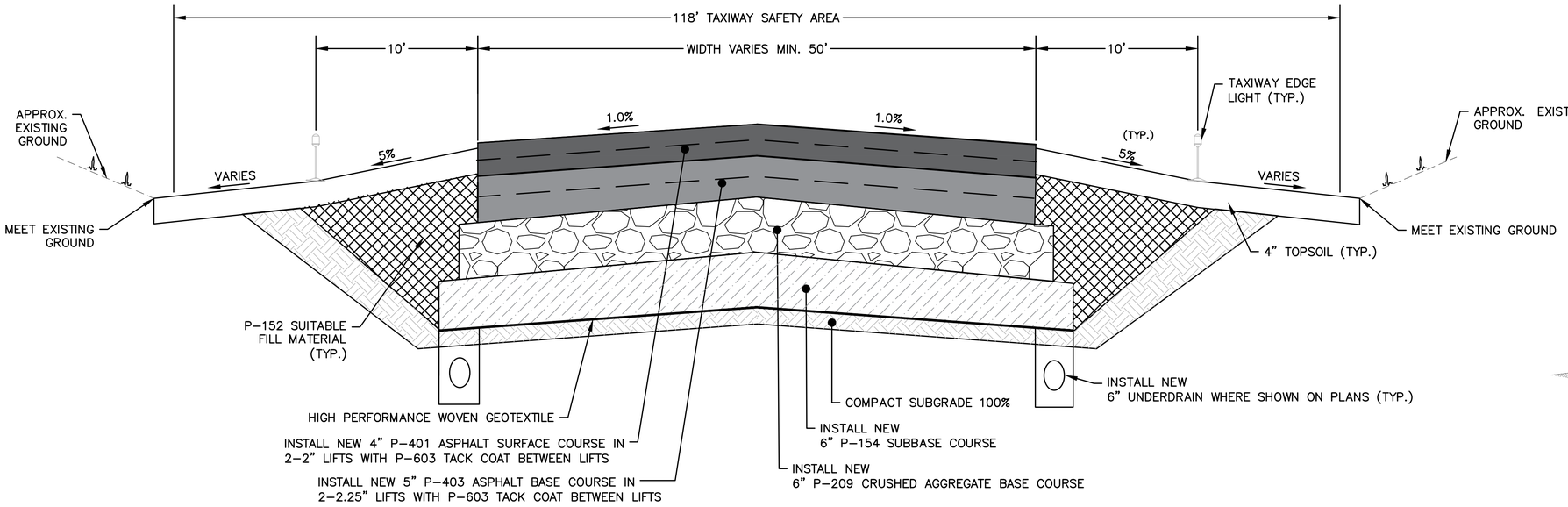

TAXIWAY RECONSTRUCTION TYPICAL SECTION

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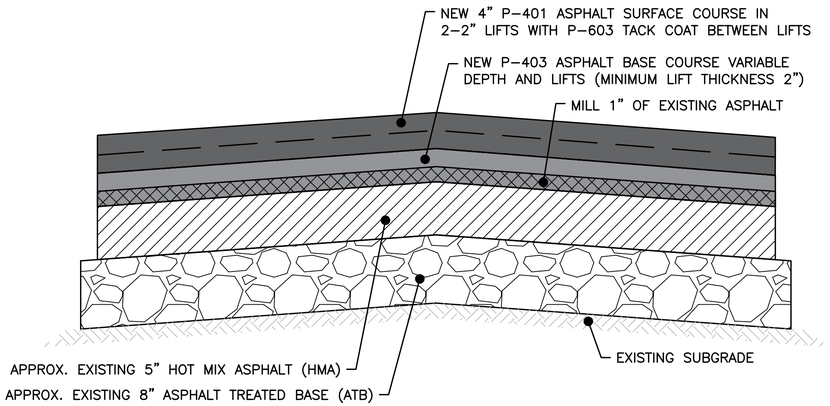
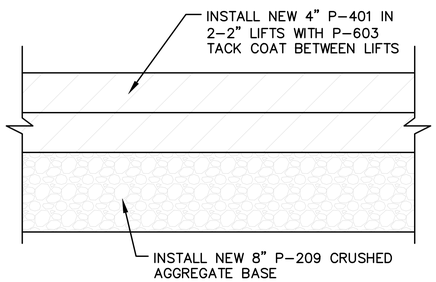


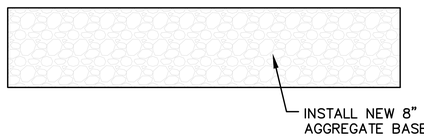
RUNWAY 2-20 MILL AND OVERLAY TYPICAL SECTION

NOT TO SCALE



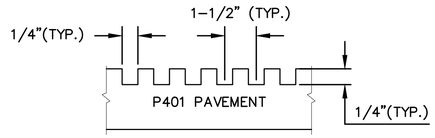
PAVED VEHICLE SERVICE ROAD

NOT TO SCALE



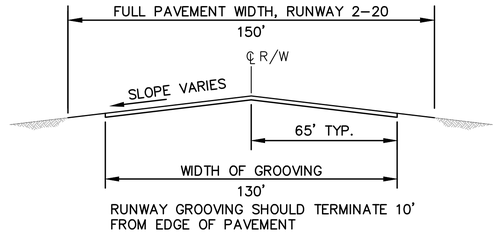
GRAVEL VEHICLE SERVICE ROAD

NOT TO SCALE



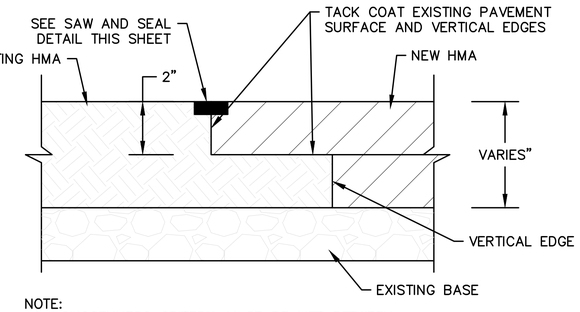
RUNWAY GROOVING CROSS SECTION

NOT TO SCALE



PAVEMENT GROOVING

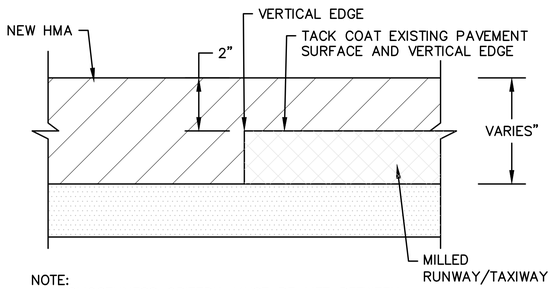
NOT TO SCALE



NOTE:
1. SMOOTHNESS CRITERIA MUST BE MET BETWEEN EXISTING PAVEMENT AND NEW PAVEMENT, (1/4" IN 12 FEET) SEE SPECIFICATION P-401.

BITUMINOUS LAP BUTT JOINT DETAIL

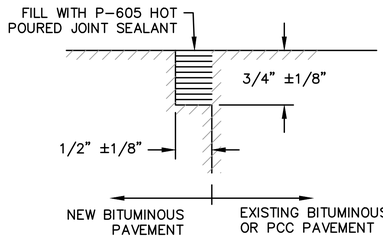
NOT TO SCALE



NOTE:
1. SMOOTHNESS CRITERIA MUST BE MET BETWEEN EXISTING PAVEMENT AND NEW PAVEMENT, (1/4" IN 12 FEET) SEE SPECIFICATION P-401.
2. MILLING SHALL BE DONE JUST BEFORE PAVING IS SCHEDULED, DURING THE SAME RUNWAY SHUTDOWN
3. THE EDGE OF MILLING MUST BE A CLEAN VERTICAL FACE PRIOR TO PAVING.
4. ALL EXPOSED VERTICAL EDGES MUST HAVE TACK COAT.

BITUMINOUS RUNWAY/TAXIWAY FULL DEPTH TO MILL AND OVERLAY

NOT TO SCALE



NOTES:

1. SAW AND SEAL SHALL BE INSTALLED AT JOINTS IN PAVEMENT BETWEEN ALL PHASES, BETWEEN DIFFERENT PAVING DAYS, AND AT PROJECT LIMITS. SEE TECHNICAL SPECIFICATION SECTION P-605 FOR PAYMENT INFORMATION.

SAW AND SEAL DETAIL FOR BITUMINOUS PAVEMENTS

NOT TO SCALE

ENGINEER'S SEAL

PROJECT DESIGNER
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DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PAVEMENT TYPICAL SECTION AND DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GE2.2

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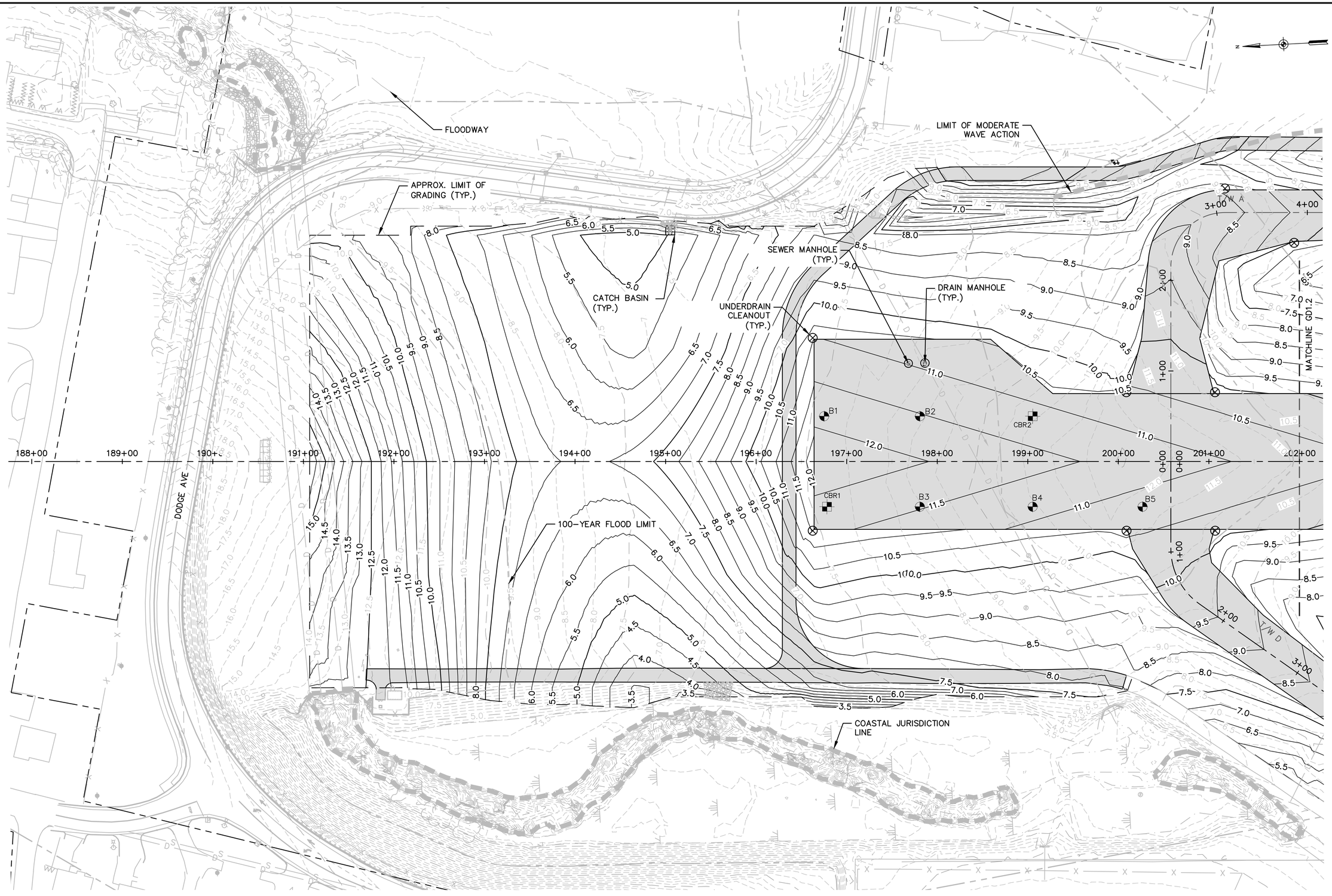

ENGINEER'S SEAL

STATE OF CONNECTICUT
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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

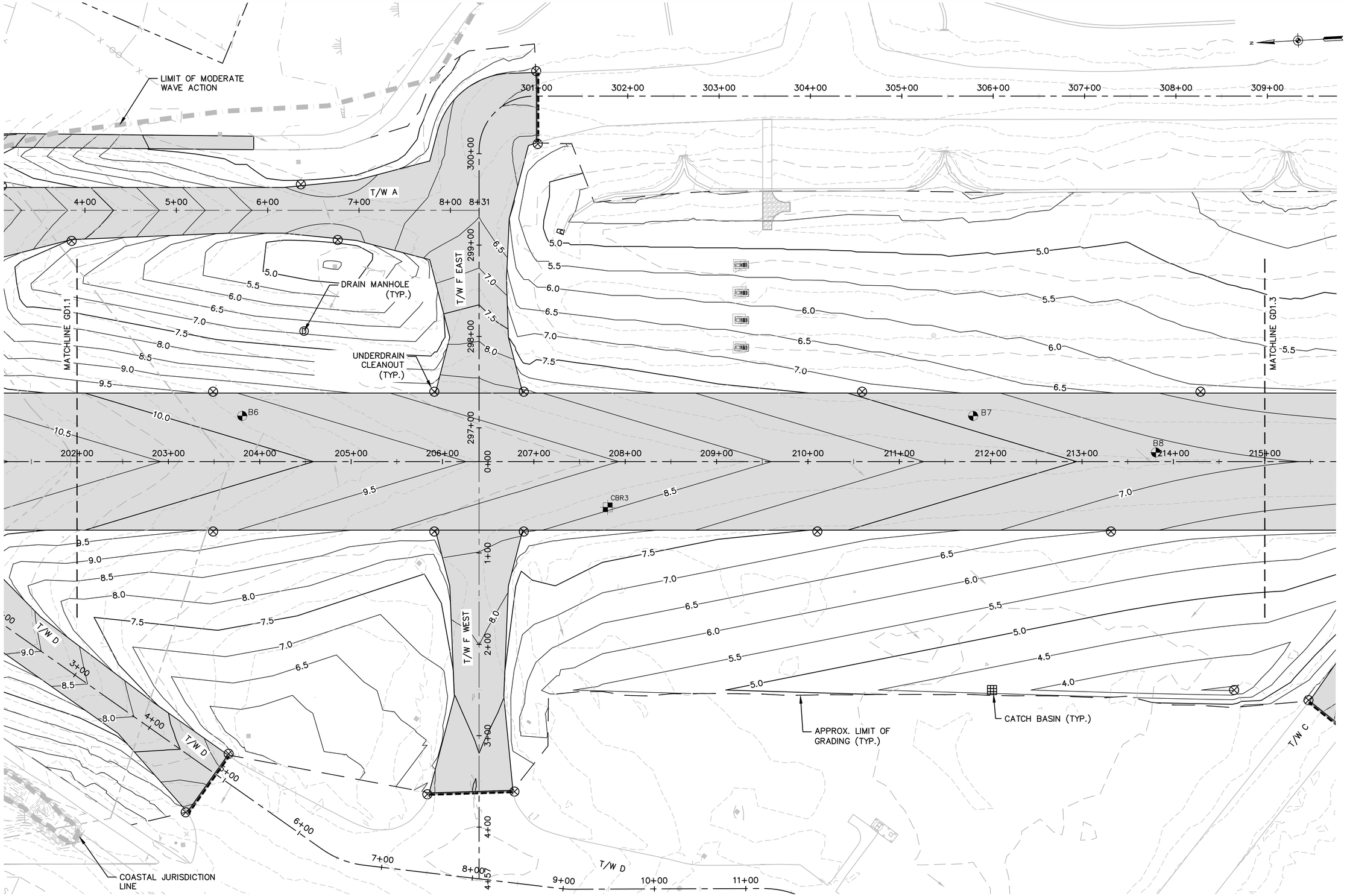
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.1

SHEET 74 OF 174

HTA 4/17/2025 9:54:07 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GD1.1 - Grading and Drainage Plan and Profile.dwg



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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.2

SHEET 75 OF 174

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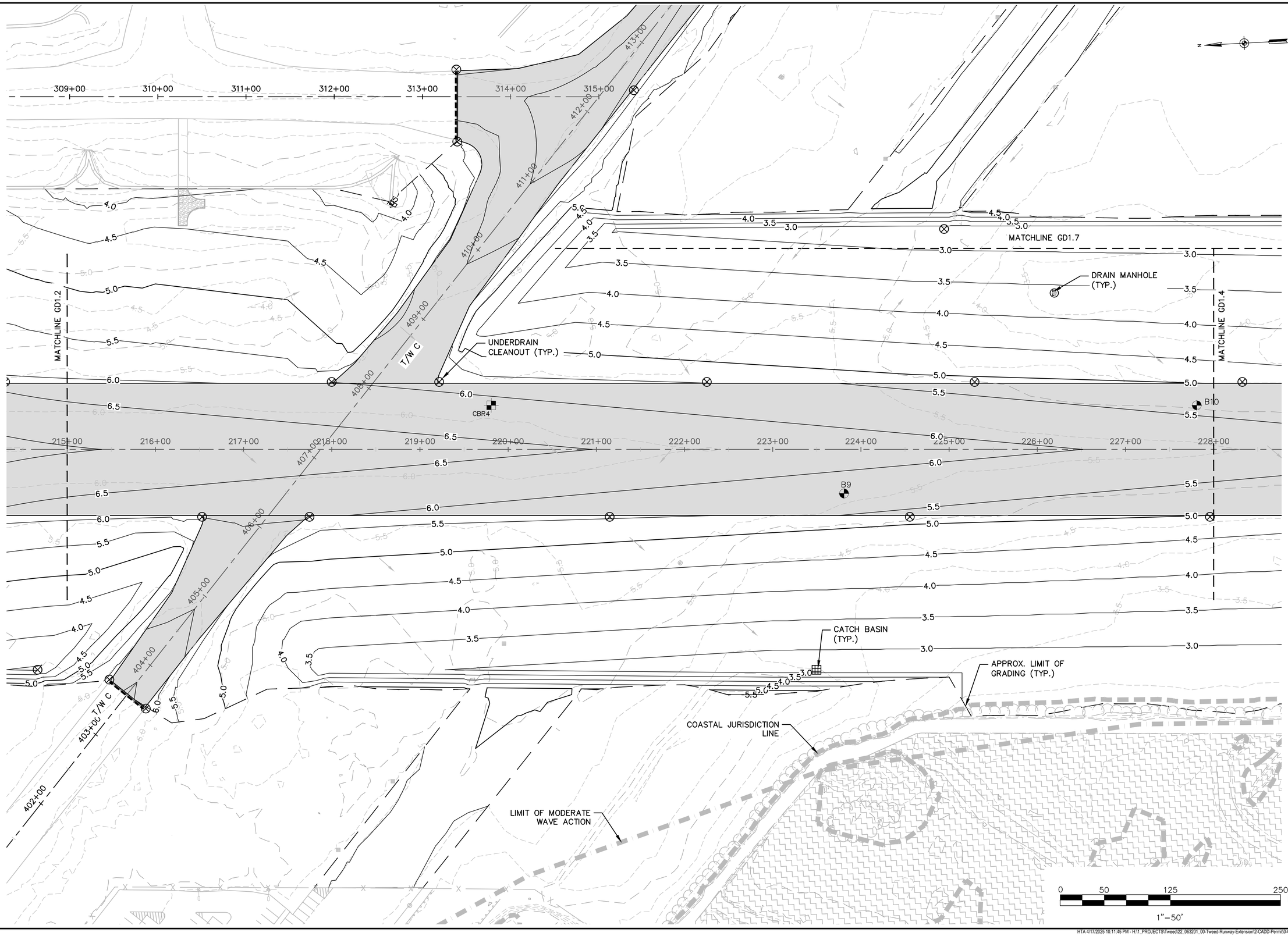

ENGINEER'S SEAL

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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.3

SHEET 76 OF 174

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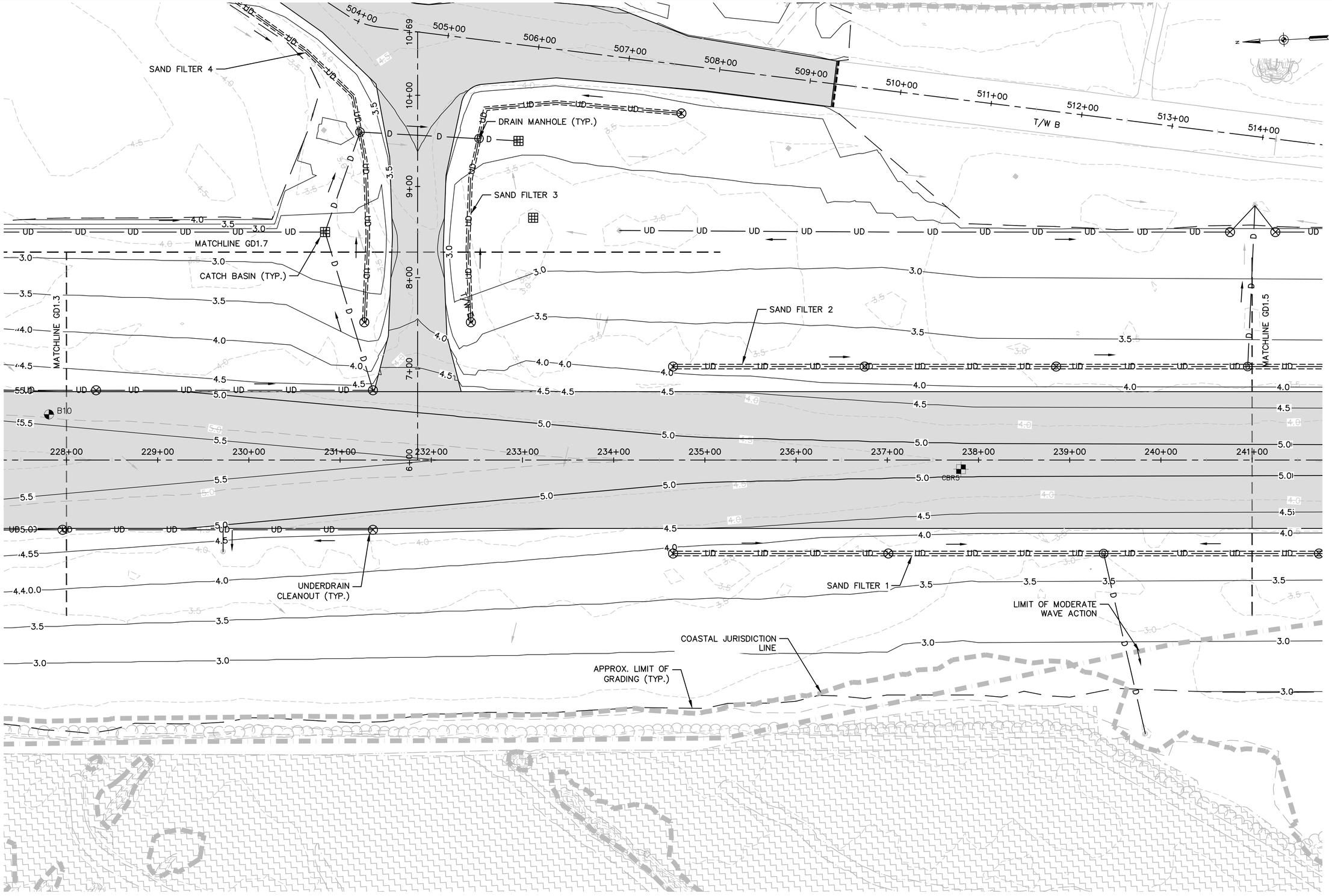

ENGINEER'S SEAL

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ROBERT M. FURTH
No. 25733
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.4

SHEET 77 OF 174

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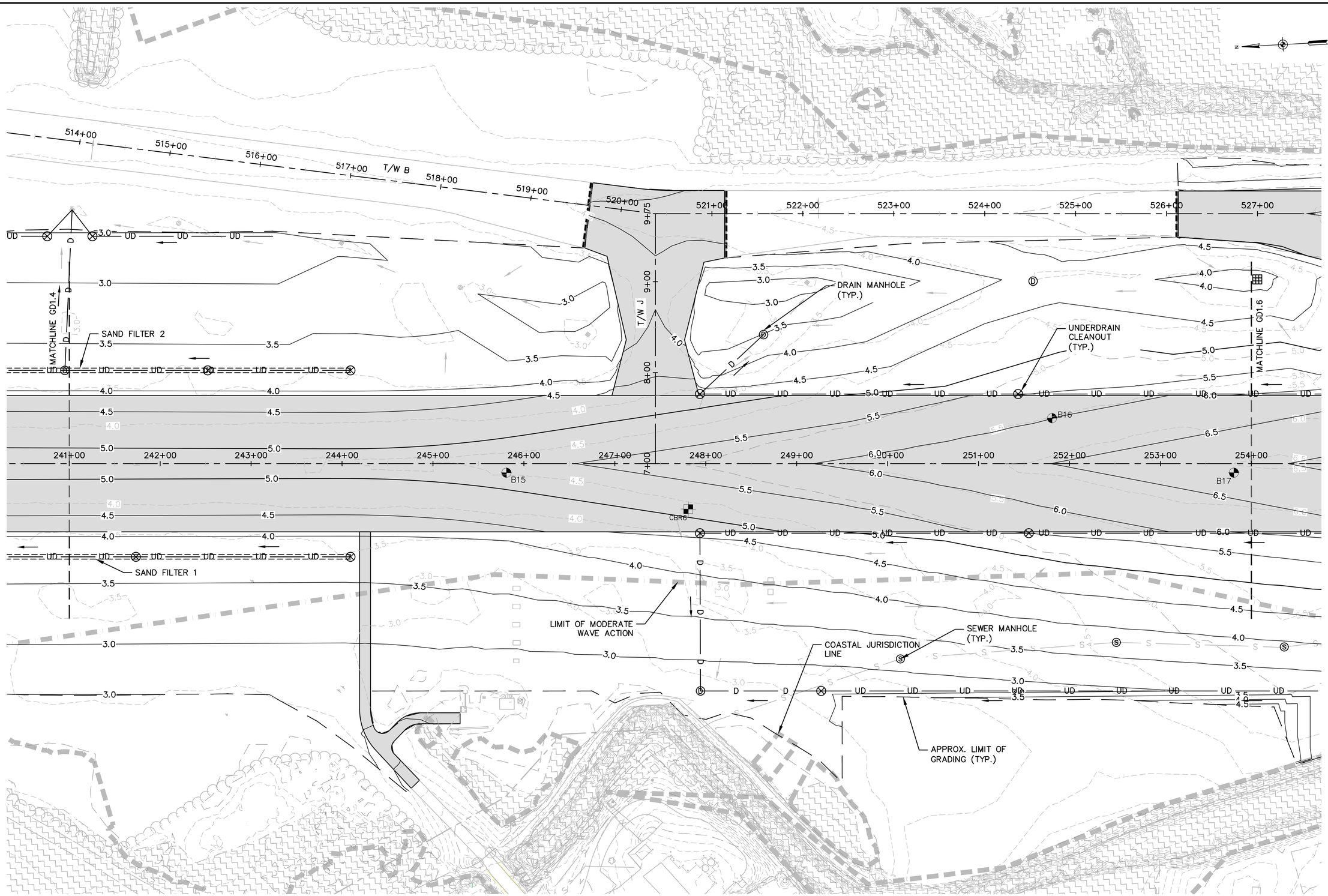

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. FUTTER
No. 26703
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

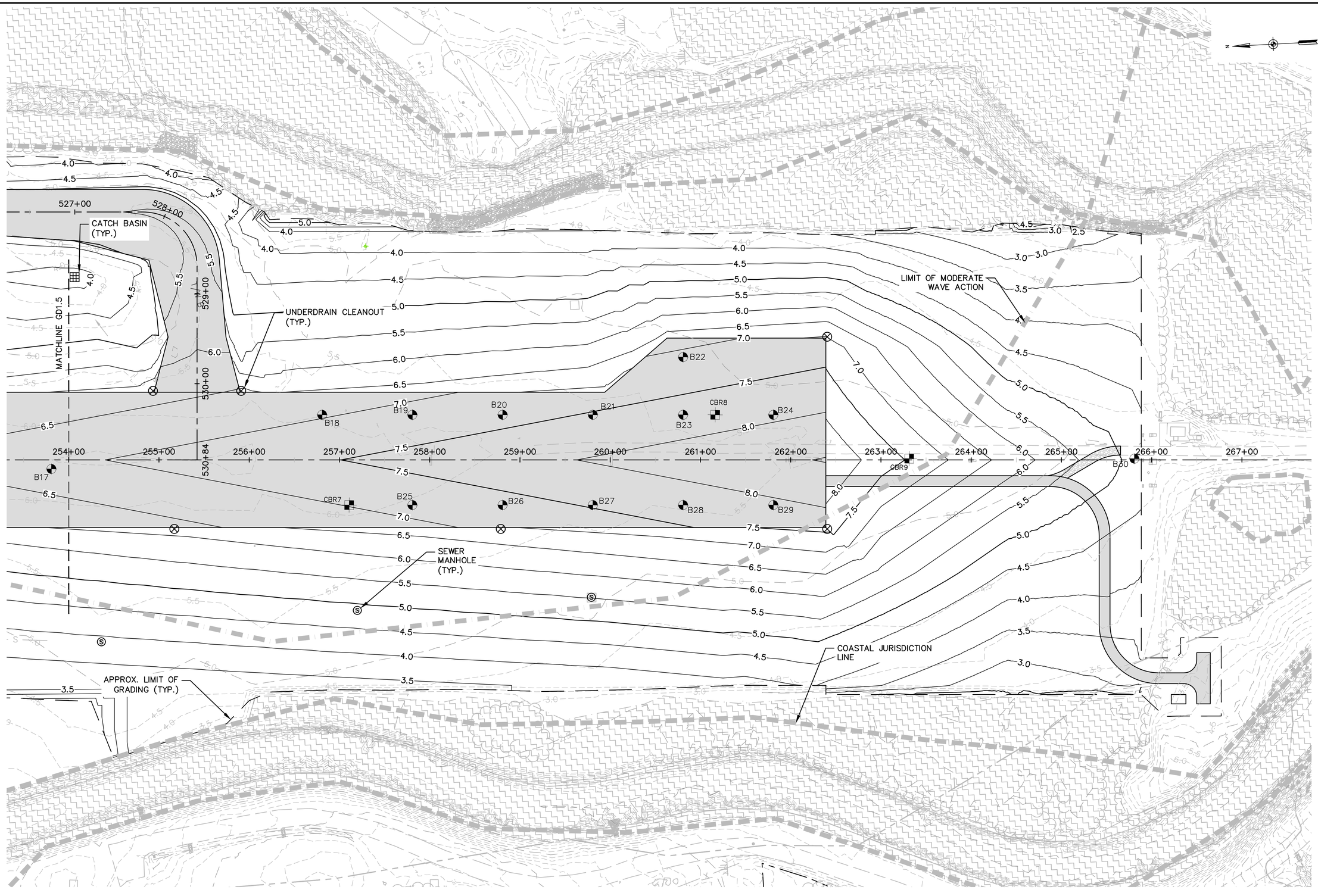
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.5

SHEET 78 OF 174

HTA 4/17/2025 10:31:11 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GD1.5 - Grading and Drainage Plan and Profile.dwg



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1"=50'

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PROJECT DESIGNER

HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 6

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

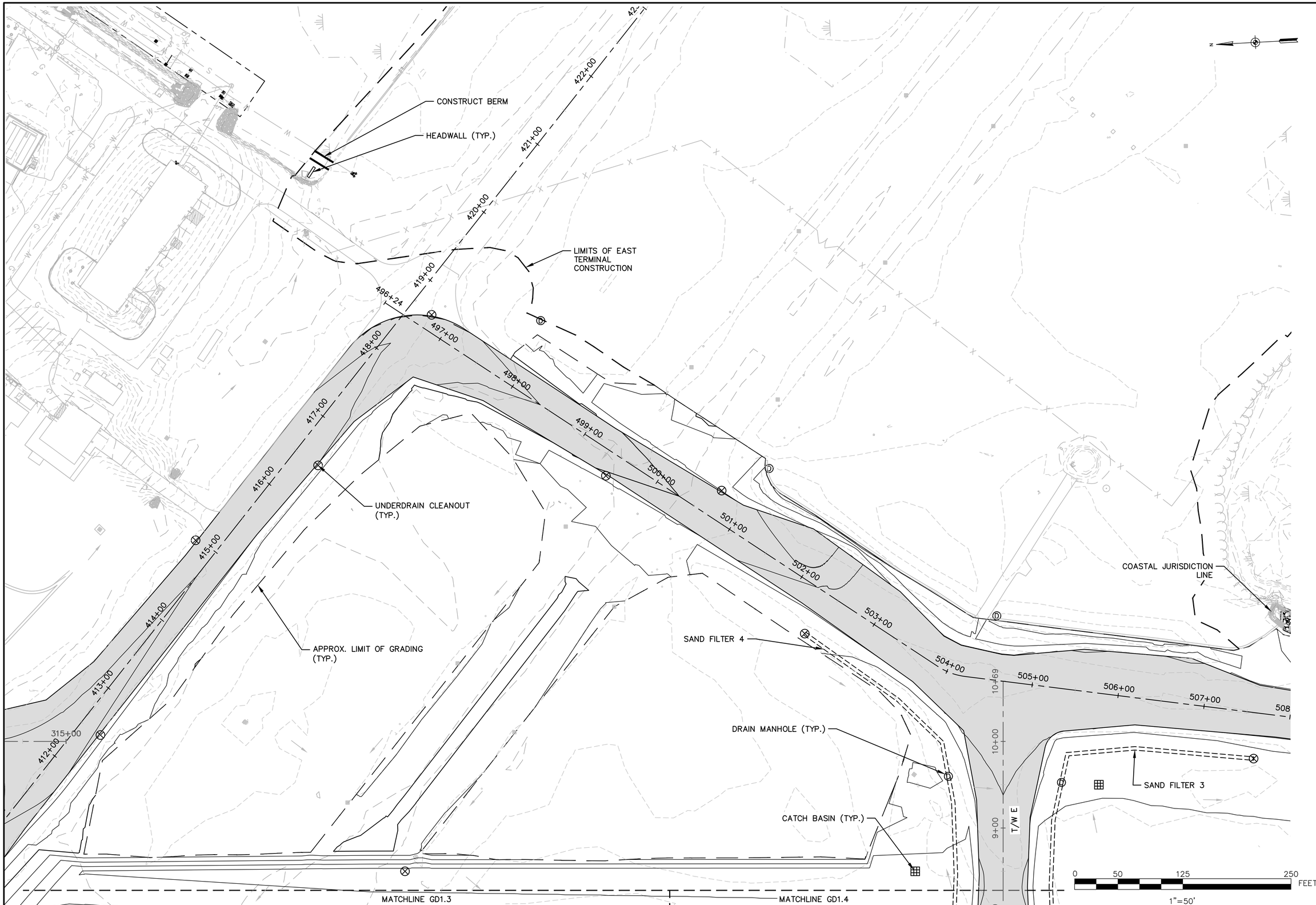
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.6

SHEET 79 OF 174

HTA 4/17/2025 10:40:32 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GD1.6 - Grading and Drainage Plan and Profile.dwg



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ROBERT M. FURBER
No. 25203
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PROFESSIONAL ENGINEER

PROJECT DESIGNER

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RUNWAY EXTENSION AND TERMINAL EXPANSION

GRADING PLAN 7

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

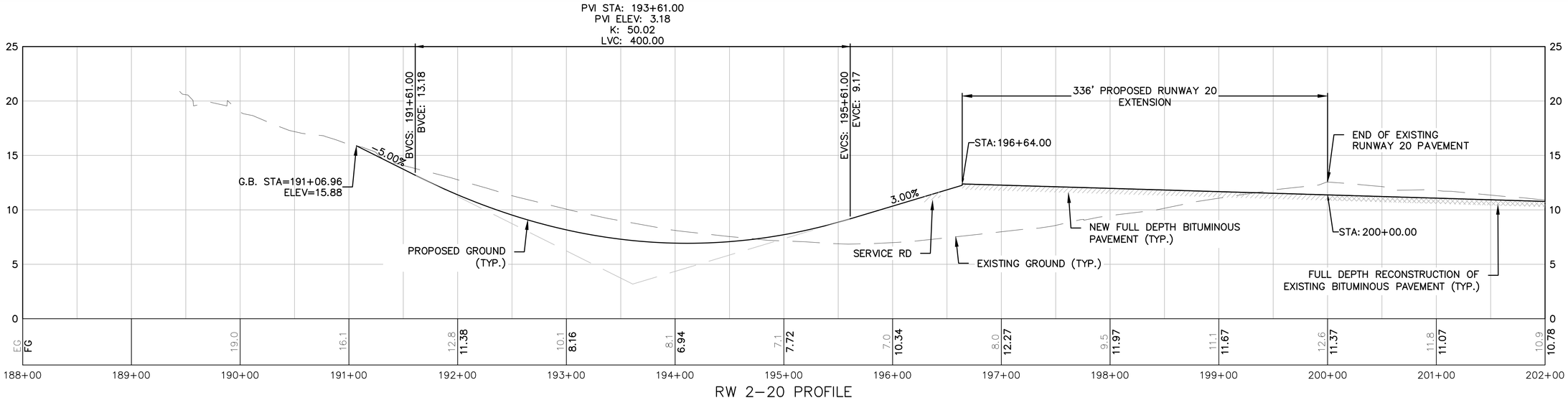
AIP: 3-09-0013-0XX-2025

DRAWING NO.

GD1.7

SHEET 80 OF 174

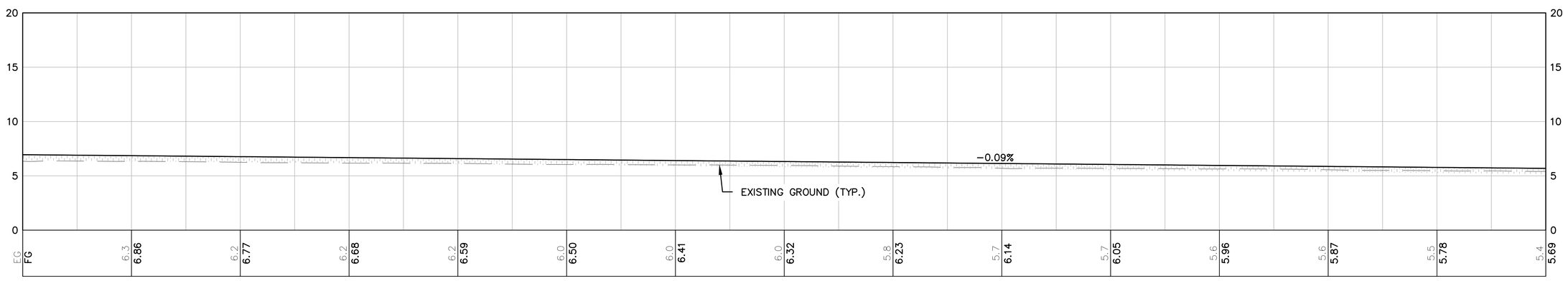
HTA 4/17/2025 10:50:47 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\GD1.7 - Grading and Drainage Plan and Profile.dwg



RW 2-20 PROFILE



RW 2-20 PROFILE



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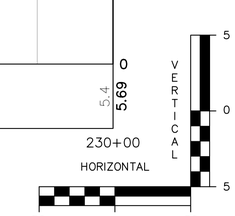

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROFILE SHEET 1

REVISIONS

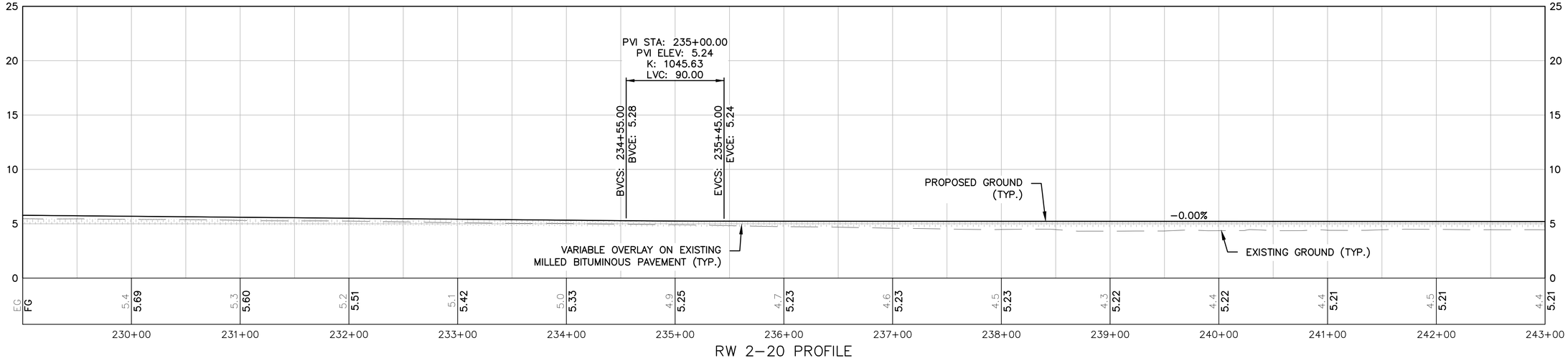
REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
PR1.1

SHEET 81 OF 174

HTA 4/17/2025 10:55:39 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\PR1.1 - PR1.5 - Profile.dwg



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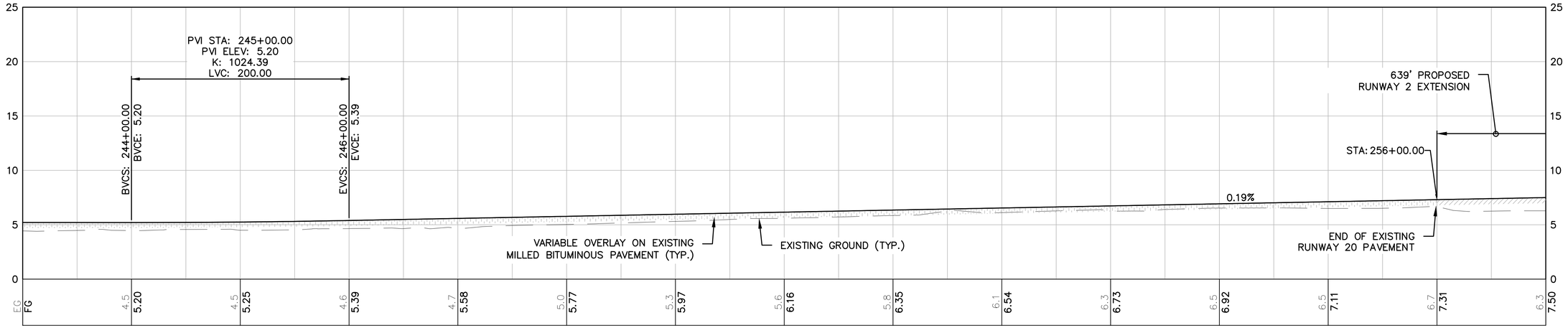

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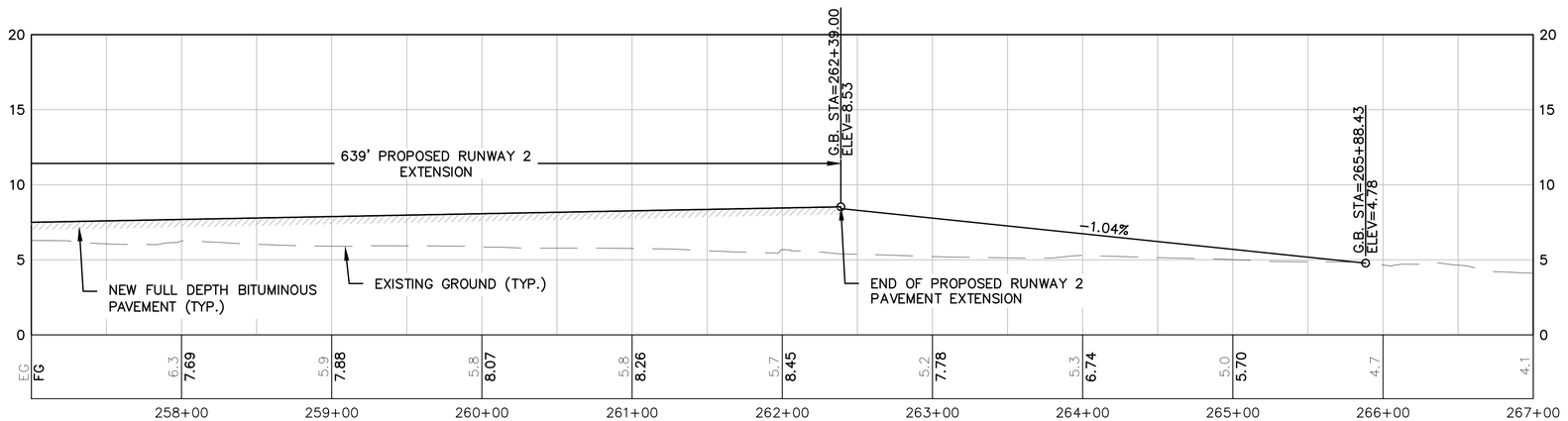

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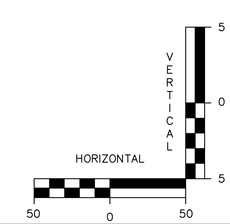

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROFILE SHEET 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

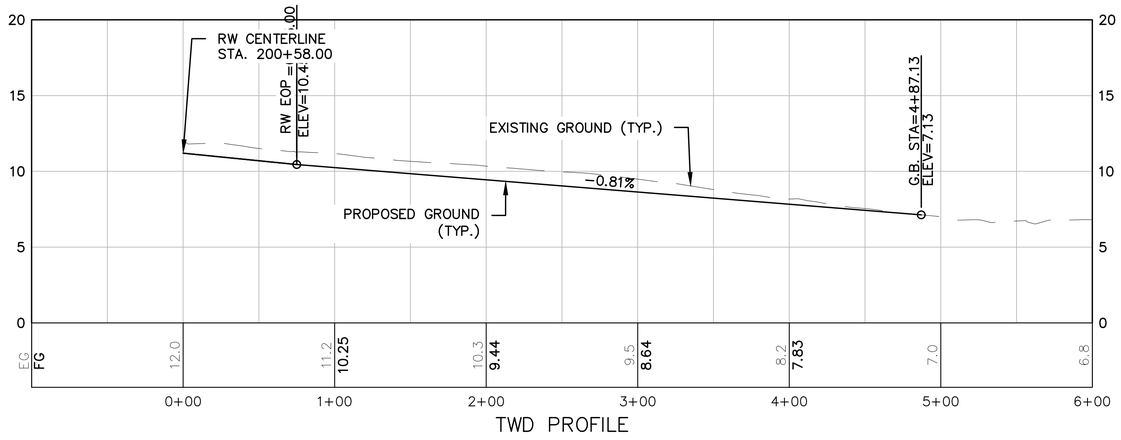
AIP: 3-09-0013-0XX-2025

DRAWING NO.

PR1.2

SHEET 82 OF 174

HTA 4/17/2025 10:56:31 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\PR1.1 - PR1.5 - Profile.dwg



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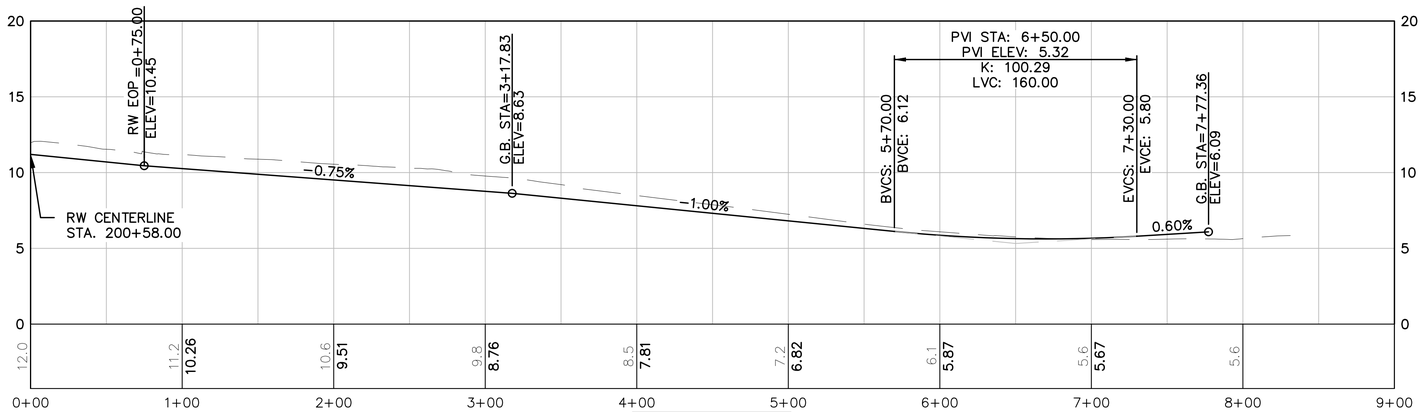

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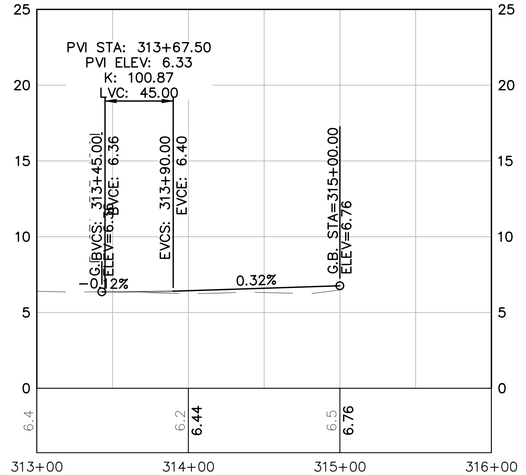

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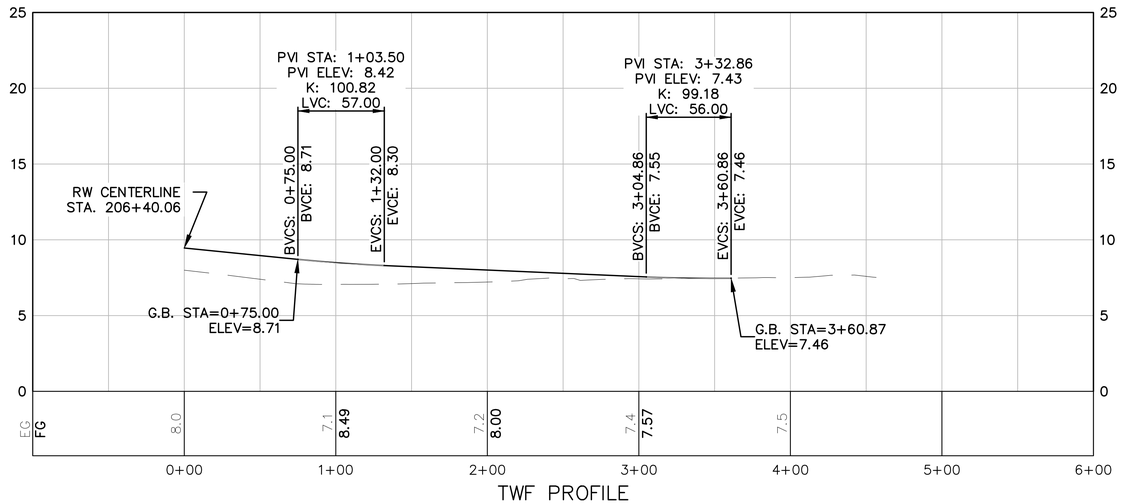

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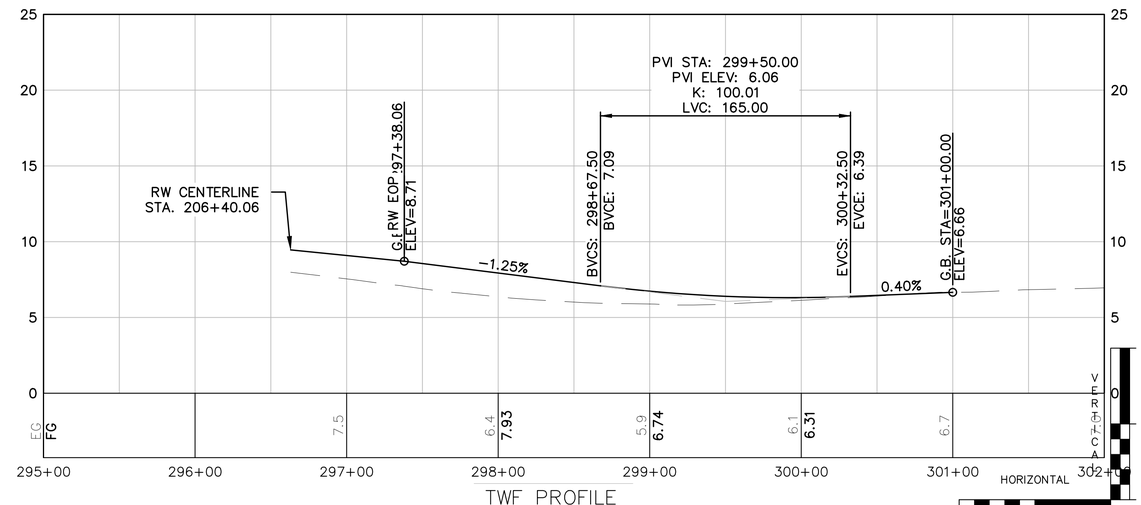

TWF PROFILE

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROFILE SHEET 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

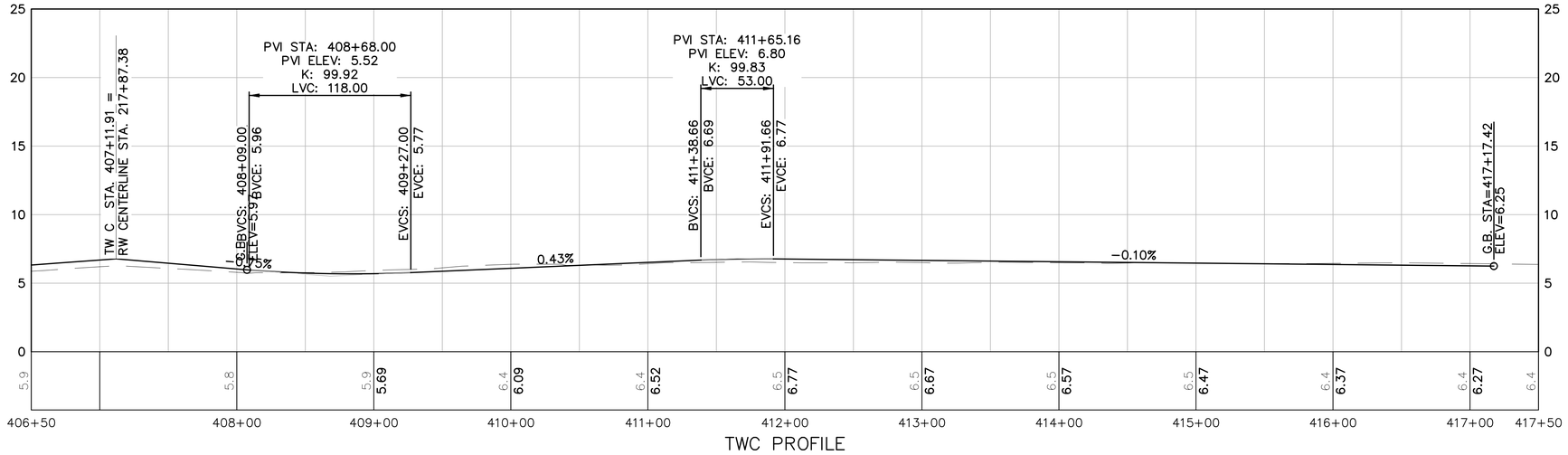
AIP: 3-09-0013-0XX-2025

DRAWING NO.

PR1.3

SHEET 83 OF 174

HTA 4/17/2025 10:56:53 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\PR1.1 - PR1.5 - Profile.dwg



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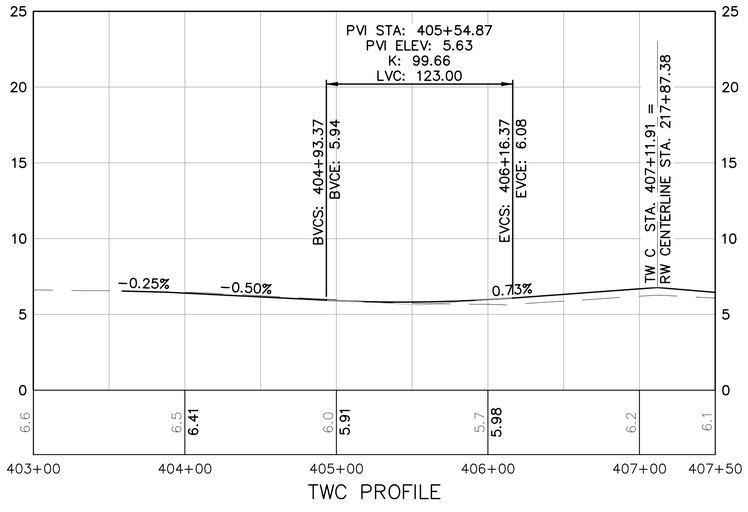

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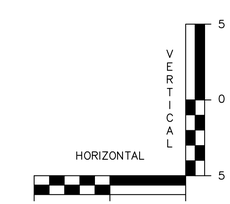

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROFILE SHEET 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.:22.063201.00

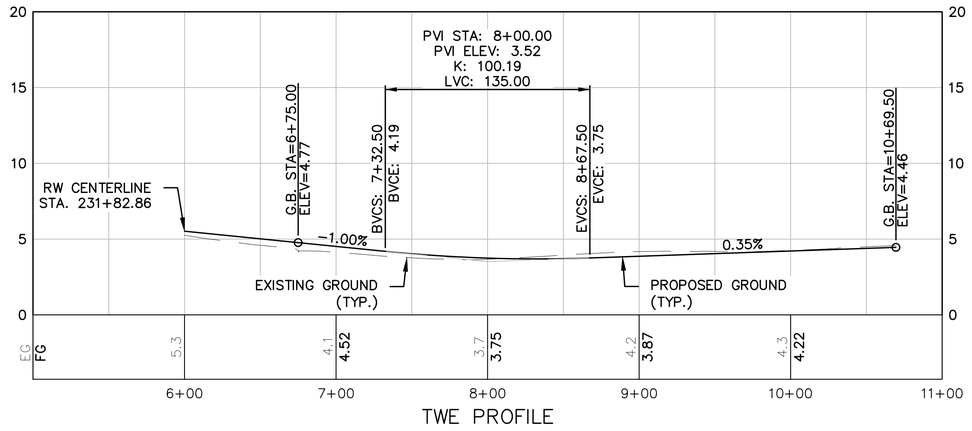
AIP:3-09-0013-0XX-2025

DRAWING NO.

PR1.4

SHEET 84 OF 174

HTA 4/17/2025 10:57:15 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\PR1.1 - PR1.5 - Profile.dwg



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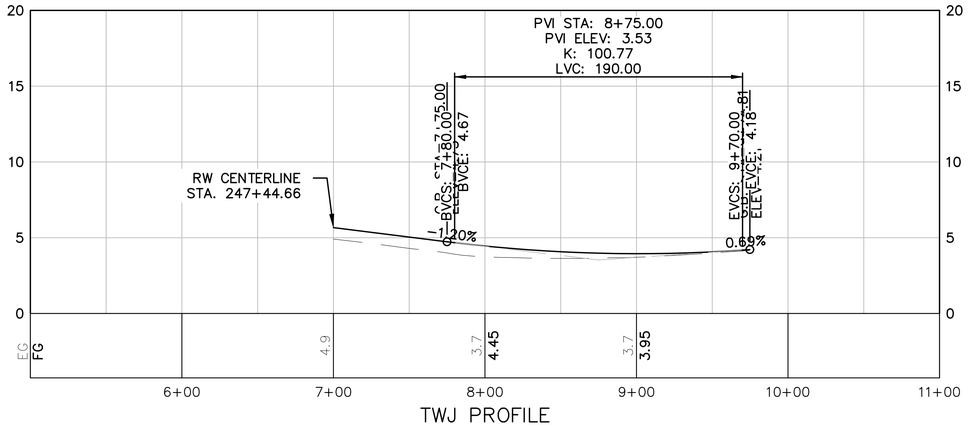

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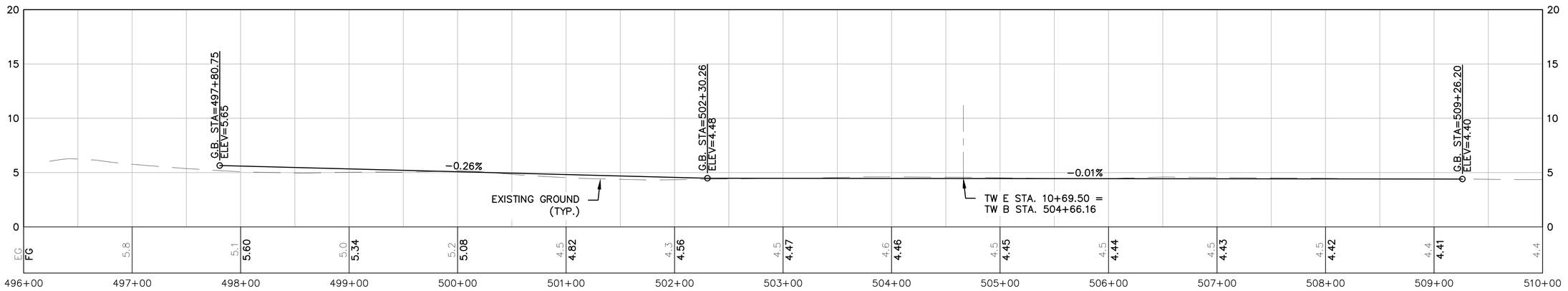

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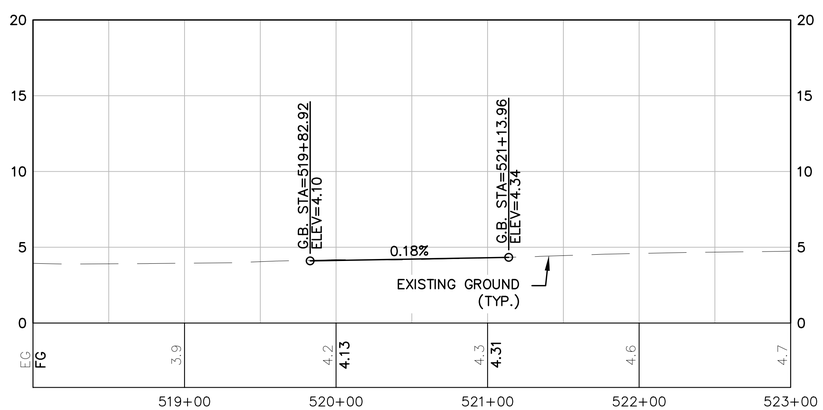

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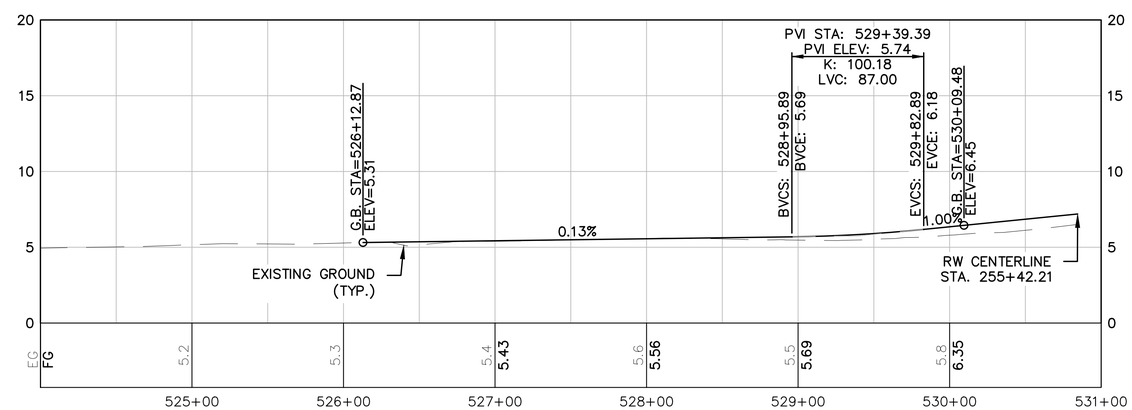

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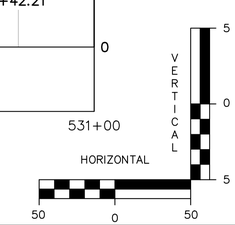

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RUNWAY EXTENSION AND TERMINAL EXPANSION

PROFILE SHEET 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
PR1.5

SHEET 85 OF 174

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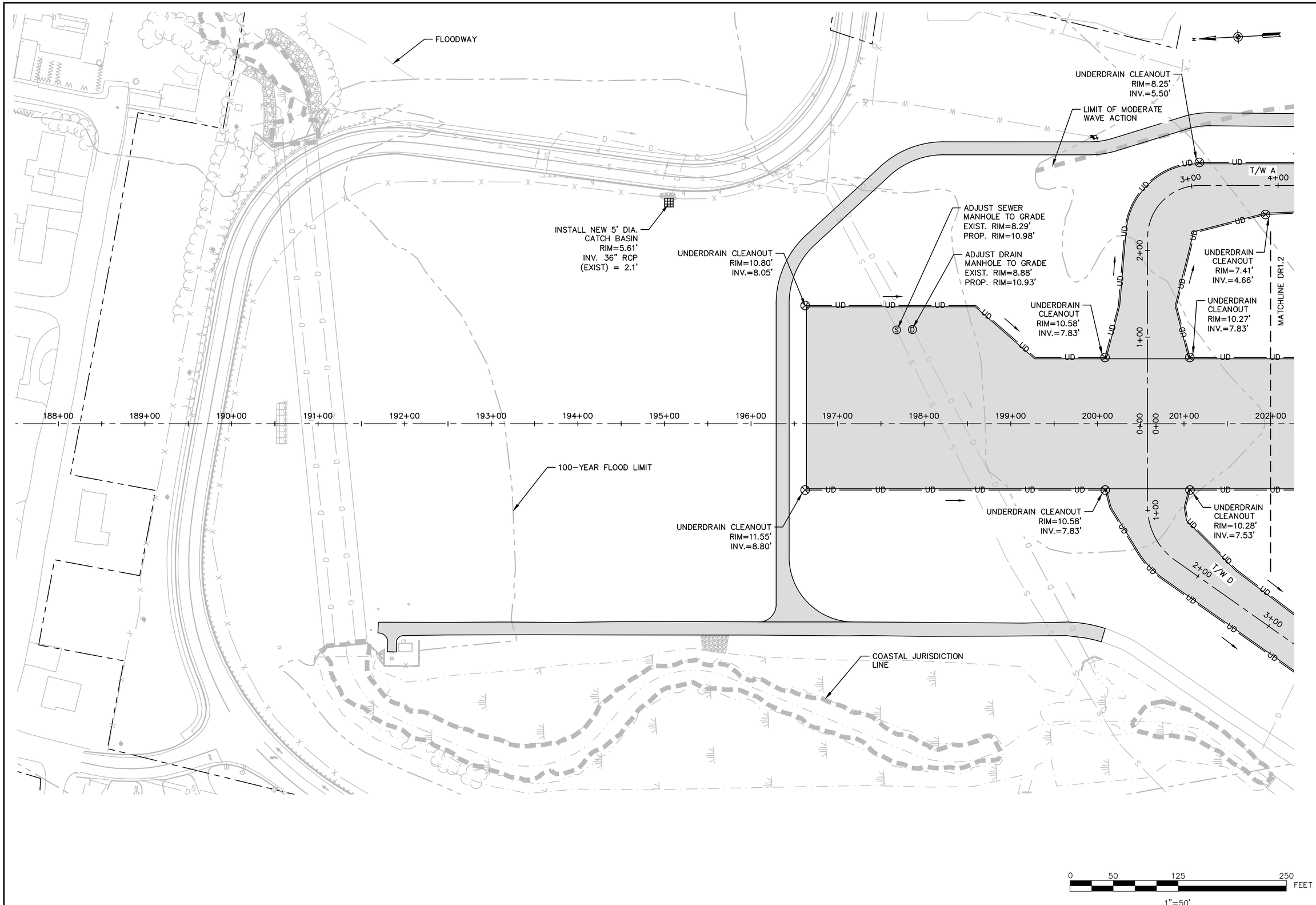

ENGINEER'S SEAL

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE PLAN 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

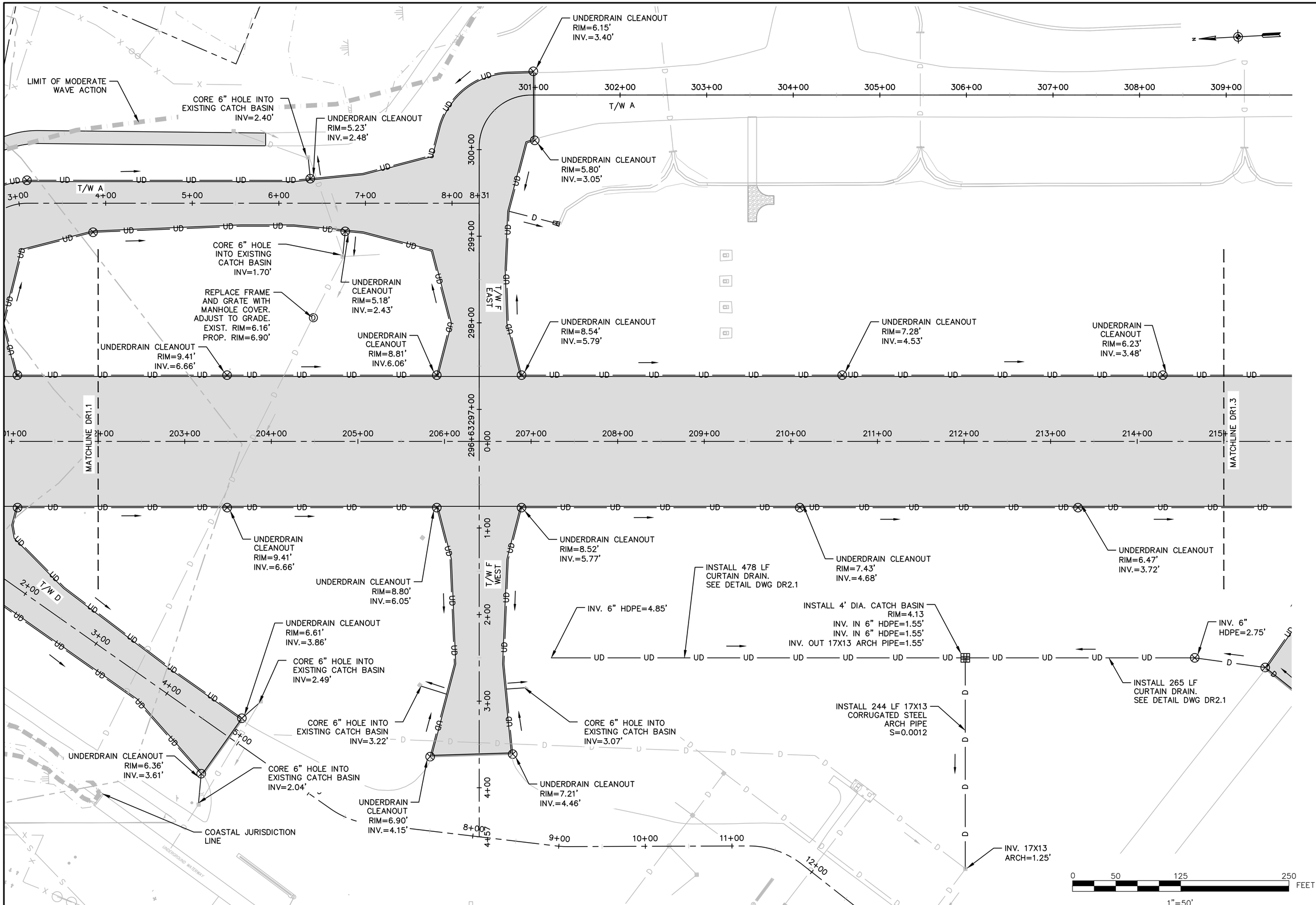
AIP: 3-09-0013-0XX-2025

DRAWING NO.

DR1.1

SHEET 86 OF 174

HTA 4/17/2025 11:02:31 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DR1.1 - Drainage Plan.dwg



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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
0	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
DR1.2

SHEET 87 OF 174

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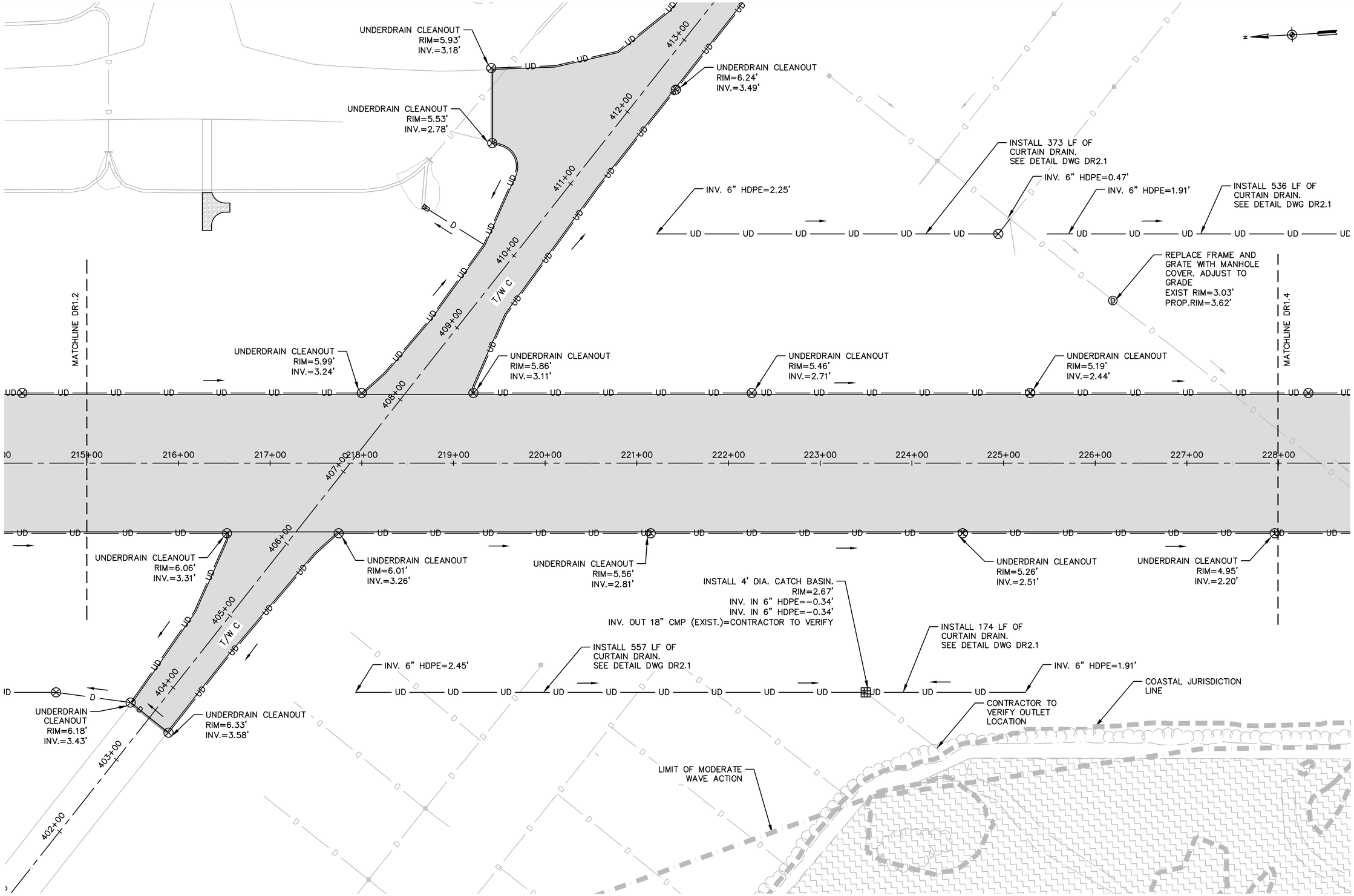

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE PLAN 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
0	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DR1.3

SHEET 88 OF 174

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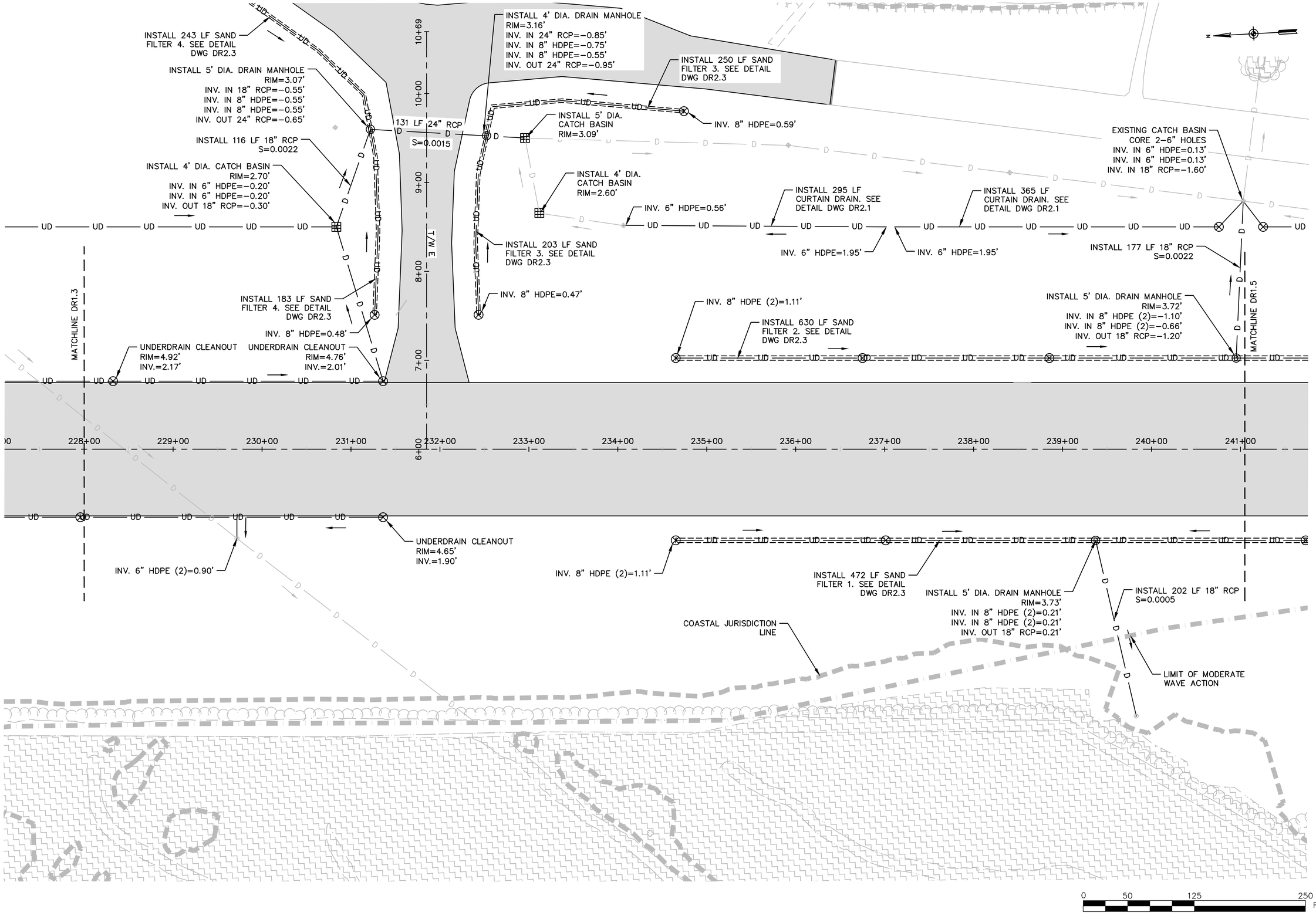

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RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.:22.063201.00

AIP:3-09-0013-0XX-2025

DRAWING NO.

DR1.4

SHEET 89 OF 174

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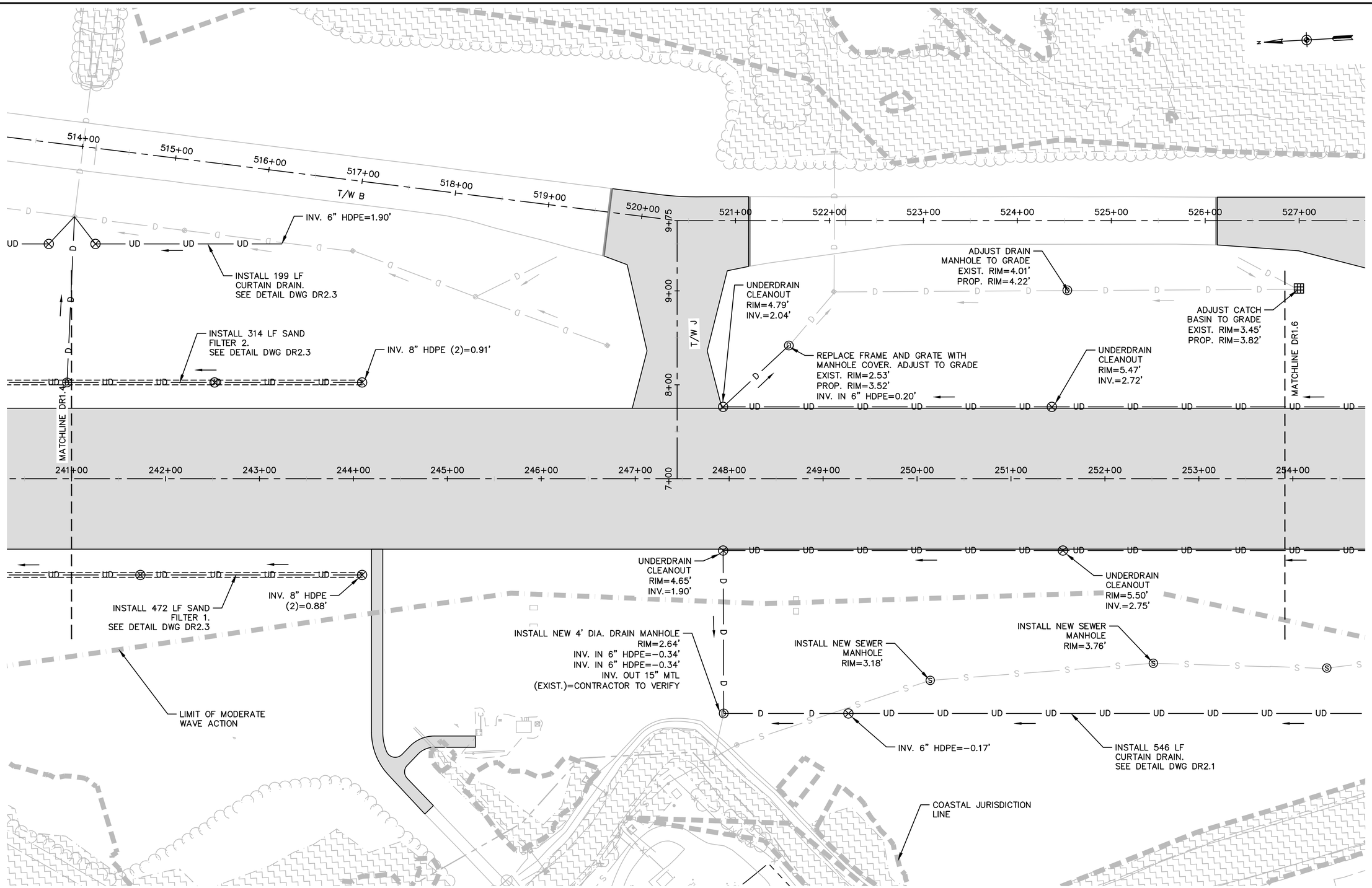

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
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PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DR1.5

SHEET 90 OF 174

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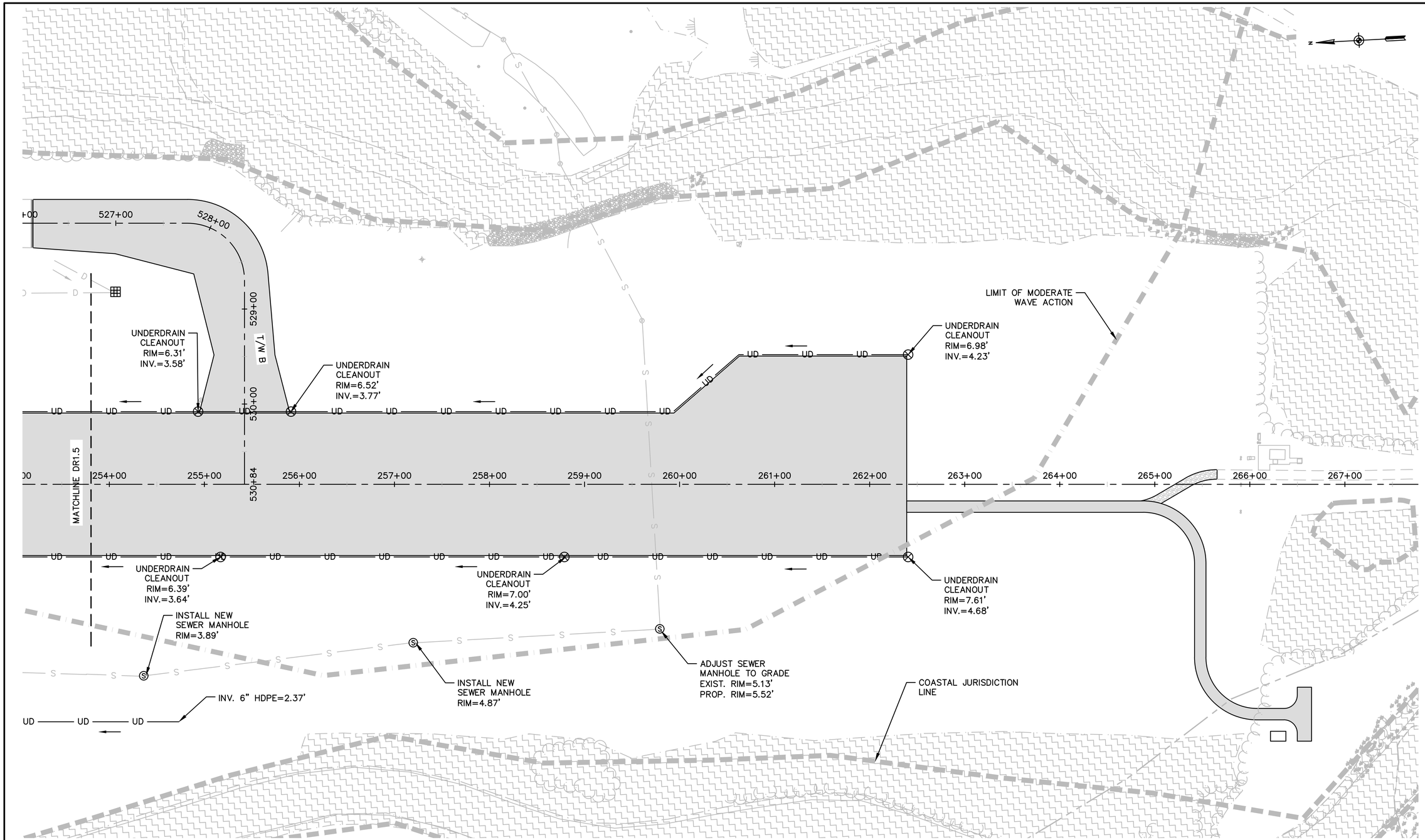

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

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DRAINAGE PLAN 6

REVISIONS

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△	4/18/25	PERMIT SUBMISSION	NEG

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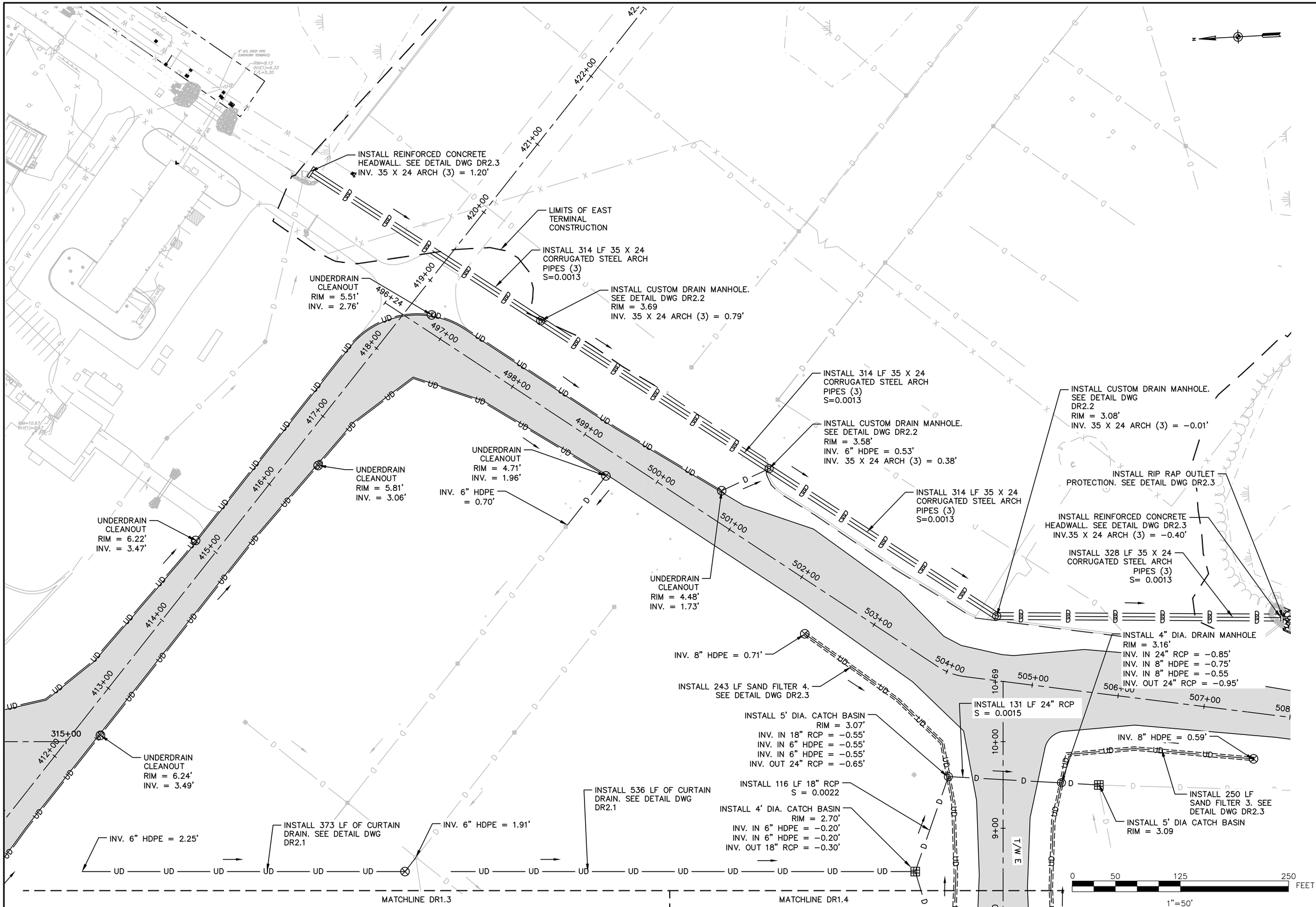
AIP: 3-09-0013-0XX-2025

DRAWING NO.

DR1.6

SHEET 91 OF 174

HTA 4/17/2025 11:26:15 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DR1.6 - Drainage Plan.dwg



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No. 25033
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PROFESSIONAL ENGINEER

PROJECT DESIGNER

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(603) 669-5555
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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE PLAN 7

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

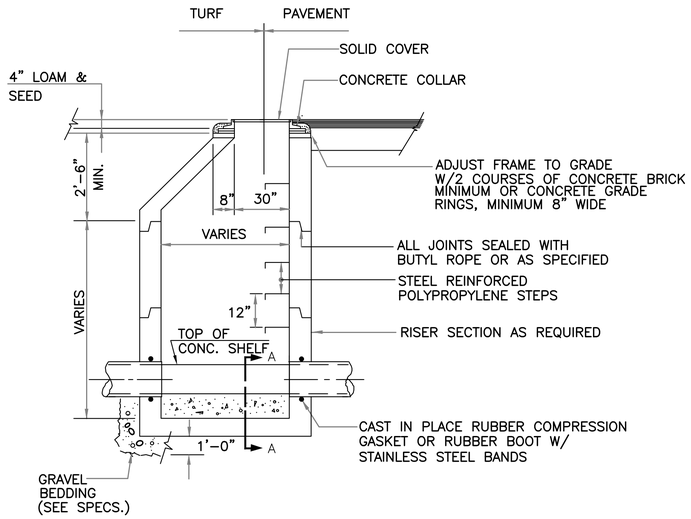
AIP: 3-09-0013-0XX-2025

DRAWING NO.

DR1.7

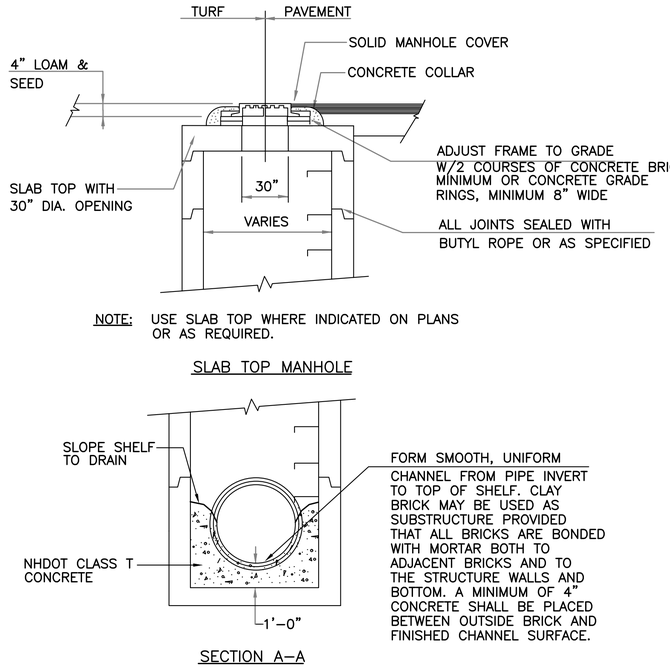
SHEET 92 OF 174

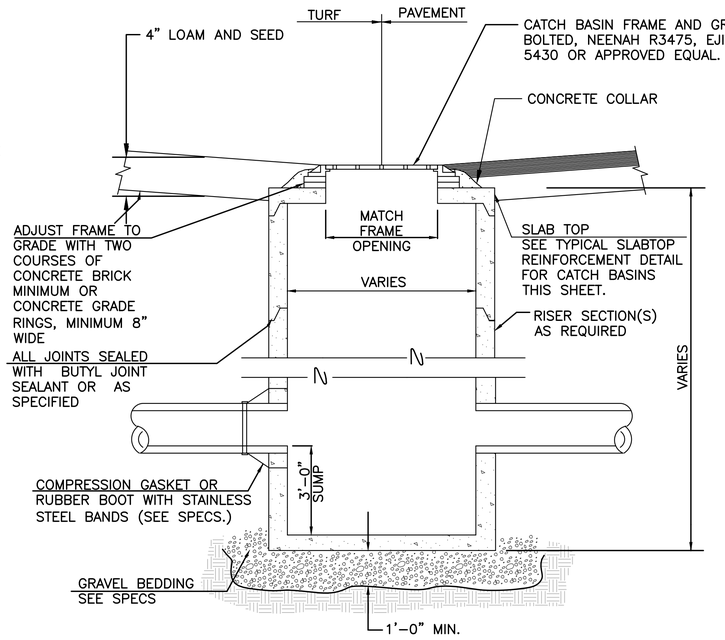
HTA 4/17/2025 11:31:38 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DR1.7 - Drainage Plan.dwg



TYPICAL MANHOLE DETAIL

NOT TO SCALE



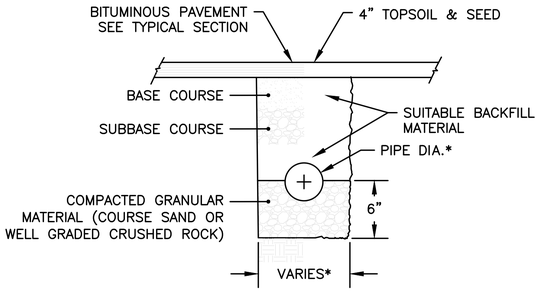


TYPICAL CATCH BASIN DETAIL

NOT TO SCALE

NOTE:

1. ALL PREFABRICATED REINFORCED CONCRETE CATCH BASINS, MANHOLES, FRAMES AND GRATES SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A 200,000 LB. DUAL WHEEL AIRCRAFT LOAD. THE CONTRACTOR IS REQUIRED TO SUPPLY SHOP DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF CONNECTICUT AND MANUFACTURERS' CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.



CONTRACTOR SHALL SHORE TRENCH SIDES WHEN REQUIRED

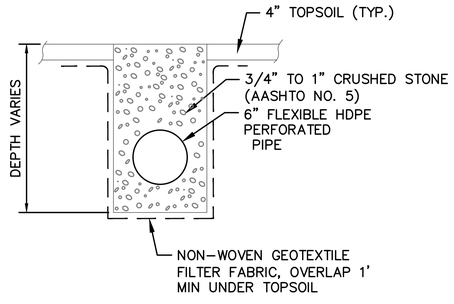
*	PIPE DIA.	TRENCH WIDTH
	UP TO 12"	36"
	12" TO 24"	I.D. PLUS 24"
	GREATER THAN 24"	2 X I.D.

WHERE DIFFERENT FROM THAT INDICATED ON THIS DETAIL, CONTRACTOR SHALL FOLLOW MANUFACTURER RECOMMENDATIONS FOR PIPE TRENCH, BEDDING, AND BACKFILL

CONTRACTOR SHALL SHORE TRENCH SIDES WHEN REQUIRED OR AS ORDERED BY THE ENGINEER

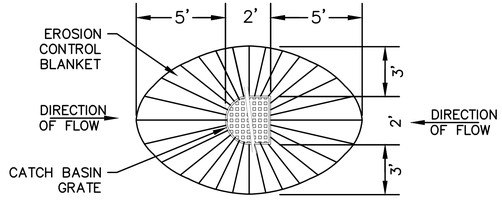
TYPICAL TRENCH DETAIL

NOT TO SCALE



CURTAIN DRAIN DETAIL

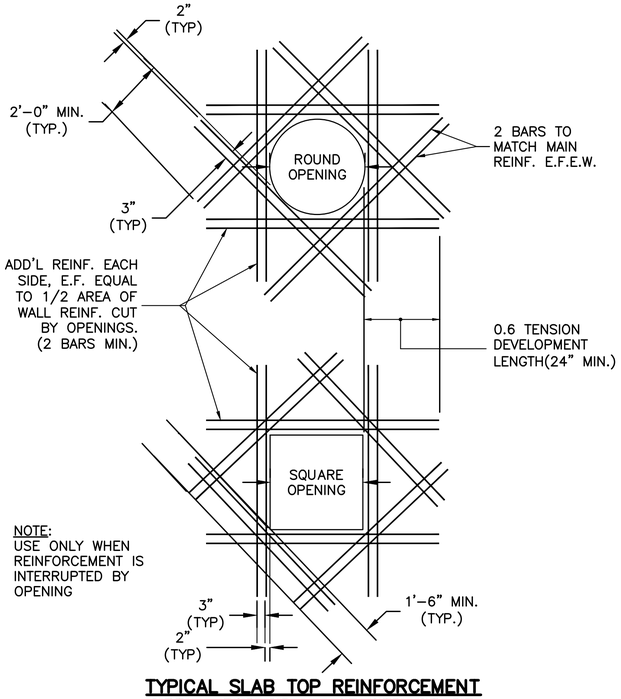
NOT TO SCALE



PLAN VIEW

CATCH BASIN GRADING DETAIL

NOT TO SCALE



TYPICAL SLAB TOP REINFORCEMENT DETAIL FOR DRAINAGE STRUCTURE

NOT TO SCALE

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FUSCO No. 19858 LICENSED PROFESSIONAL ENGINEER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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CHECKED BY: RMF
DRAWN BY: JLC
DESIGNED BY: NEG
DATE: APRIL 2025

PROJECT DESIGNER HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

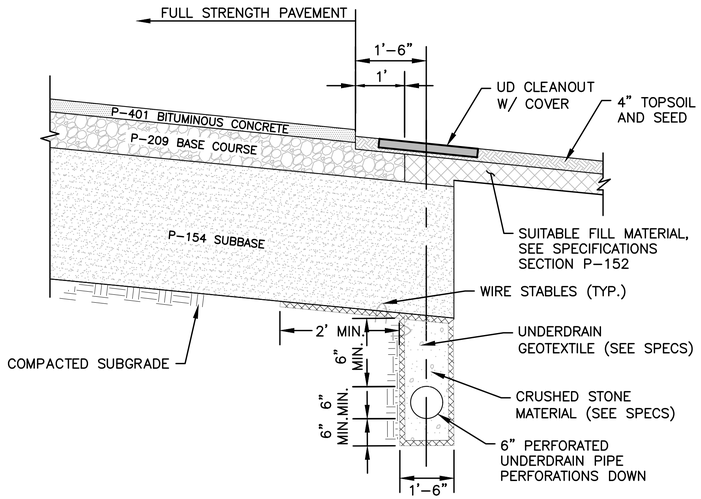
PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

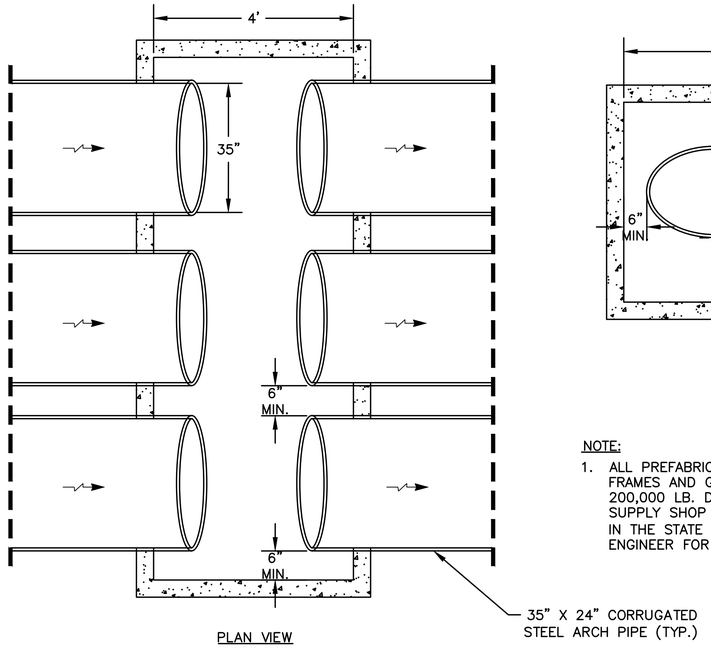
DR2.1

SHEET 93 OF 174

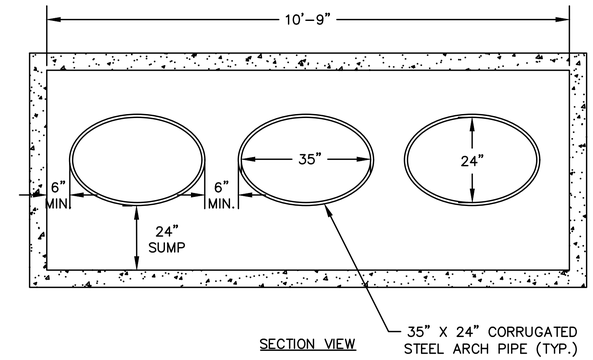


TYPICAL UNDERDRAIN DETAIL

NOT TO SCALE



PLAN VIEW



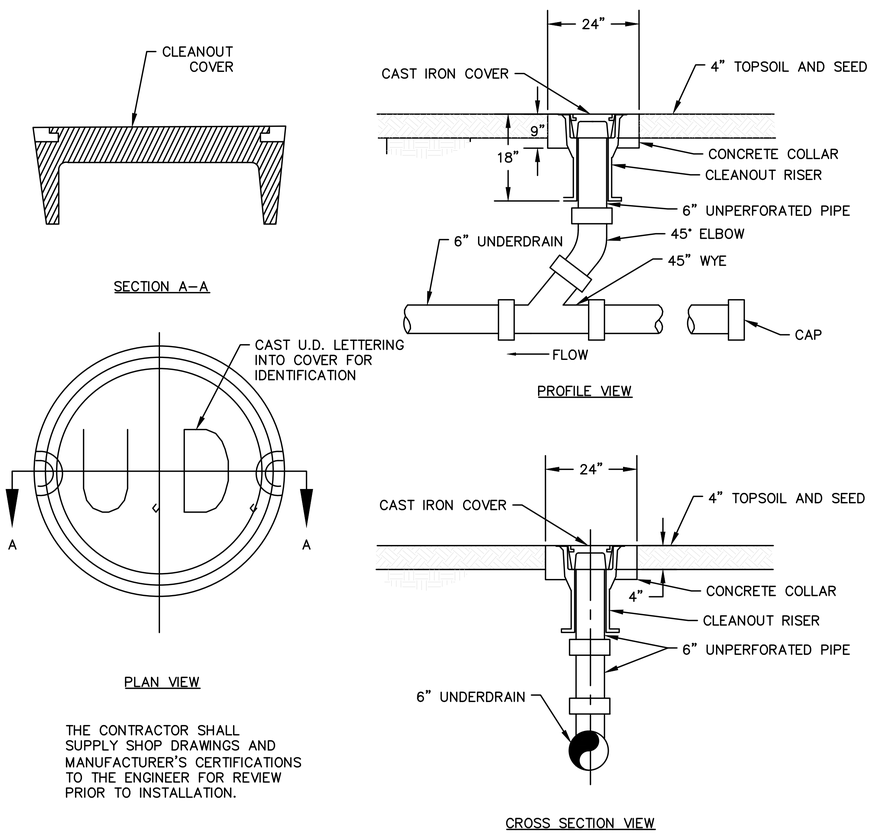
SECTION VIEW

NOTE:

1. ALL PREFABRICATED REINFORCED CONCRETE CATCH BASINS, MANHOLES, FRAMES AND GRATES SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A 200,000 LB. DUAL WHEEL AIRCRAFT LOAD. THE CONTRACTOR IS REQUIRED TO SUPPLY SHOP DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF CONNECTICUT AND MANUFACTURERS' CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

CUSTOM DRAIN MANHOLE DETAIL

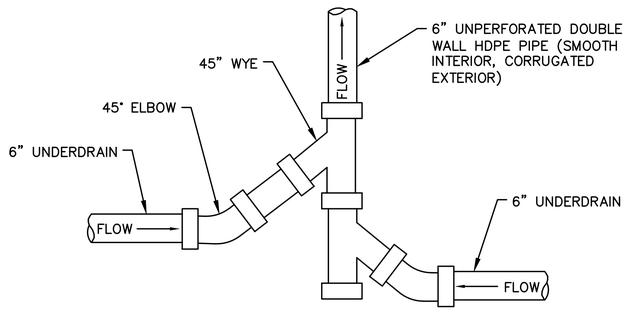
NOT TO SCALE



THE CONTRACTOR SHALL SUPPLY SHOP DRAWINGS AND MANUFACTURER'S CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

UNDERDRAIN CLEANOUT

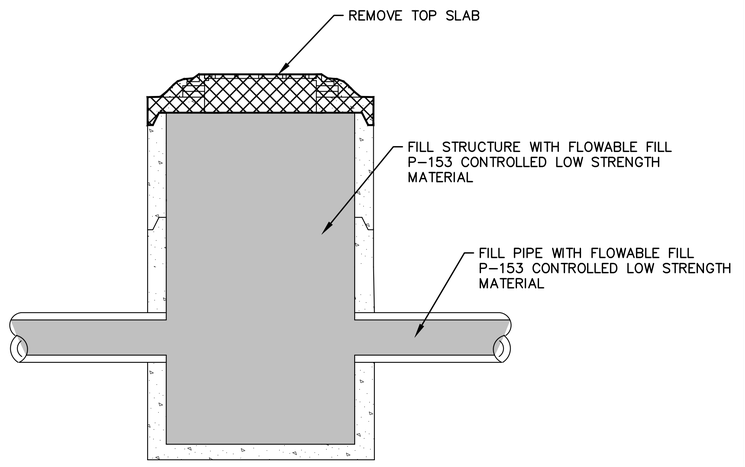
NOT TO SCALE



PLAN VIEW

UNDERDRAIN JUNCTION

NOT TO SCALE



ABANDON DRAINAGE STRUCTURE IN RUNWAY MILL AND OVERLAY AREAS

NOT TO SCALE

ENGINEER'S SEAL

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

DRAINAGE DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
0	4/18/25	PERMIT SUBMISSION	NEG

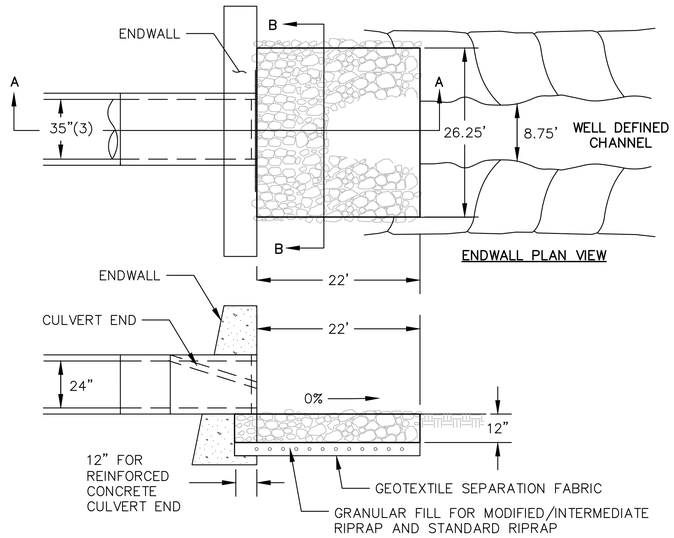
PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.

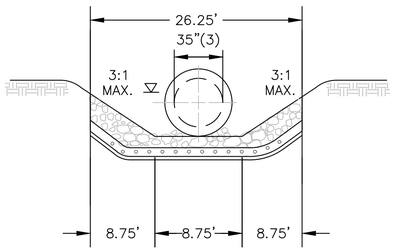
DR2.2

SHEET 94 OF 174

HTA 4/17/2025 11:37:27 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DR2.2 - Drainage Details.dwg



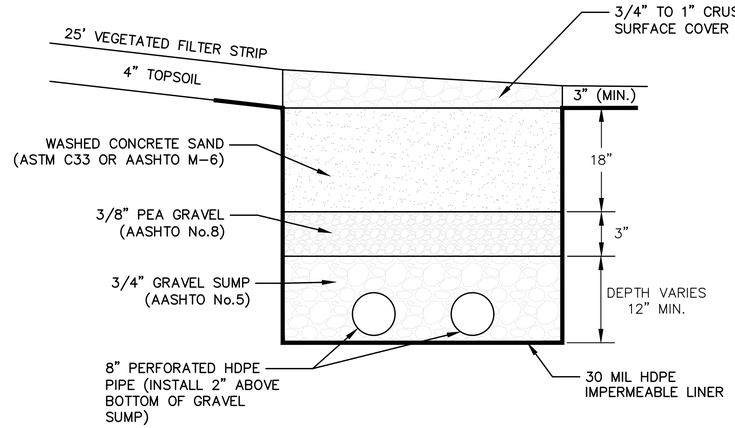
SECTION A–A
CULVERT END AND ENDWALL



SECTION B–B
CULVERT END AND ENDWALL

RIPRAP OUTLET PROTECTION

NOT TO SCALE



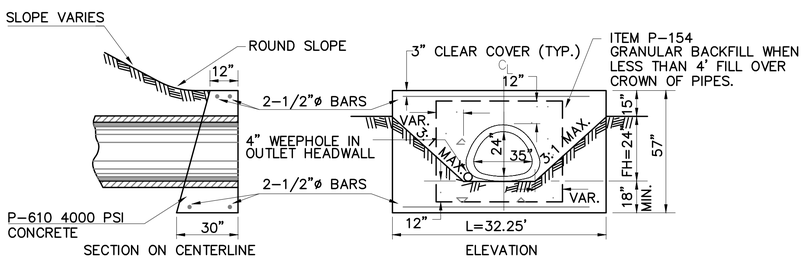
SOIL FILTER DIMENSIONS			
SOIL FILTER	LENGTH	WIDTH	PIPE
SF1	944.5'	5'	2x8"
SF2	944.5'	5'	2x8"
SF3	452'	4'	1x8"
SF4	452'	4'	1x8"

RECOMMENDED MAINTENANCE ACTIVITIES

1. INSPECT SAND FILTERS ANNUALLY.
2. REMOVE TRASH AND ORGANIC DEBRIS (LEAVES) IN THE SPRING AND FALL.
3. REMOVE SEDIMENT FROM SAND FILTER WHEN THE SEDIMENT ACCUMULATION EXCEEDS 2 INCHES OR WHEN DRAWDOWN TIME EXCEEDS 48 HOURS AFTER THE END OF A STORM EVENT, INDICATING THAT THE FILTER IS CLOGGED. REPLACE WITH FRESH WASHED CONCRETE SAND THAT CONFORMS TO THE SPECIFICATIONS IN THIS SECTION.
4. PERIODICALLY REMOVE GRASS CLIPPINGS TO PREVENT CLOGGING OF THE SURFACE OF THE SAND FILTER.

SURFACE SAND FILTER WITH UNDERDRAIN AND LINER

NOT TO SCALE



NOTE:
L = 3 X FH X Sp
LENGTH WAS CALCULATED BASED ON 3 PIPES AT 35" SPAN.

REINFORCED CONCRETE HEADWALL DETAILS

NOT TO SCALE

ENGINEER'S SEAL

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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CHECKED BY: RMF
DRAWN BY: JLC
DESIGNED BY: NEG
DATE: APRIL 2025

PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

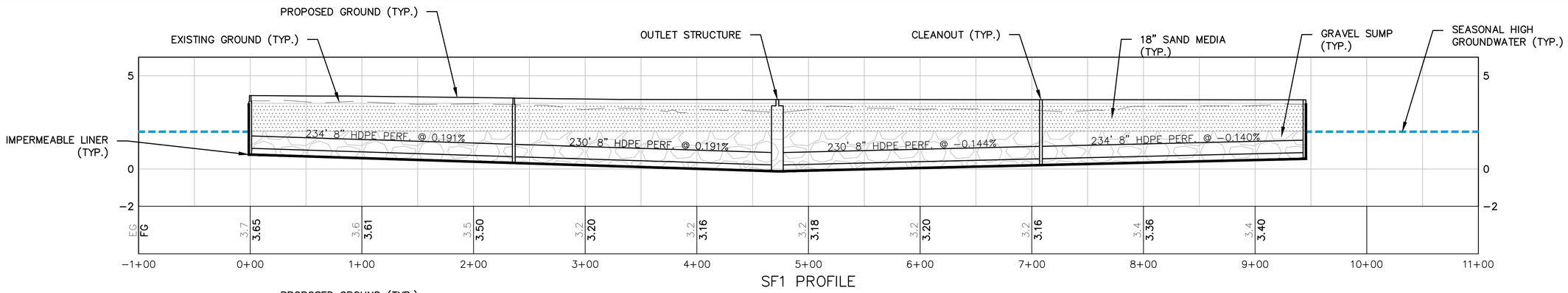
DRAINAGE DETAILS

REVISIONS			
REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

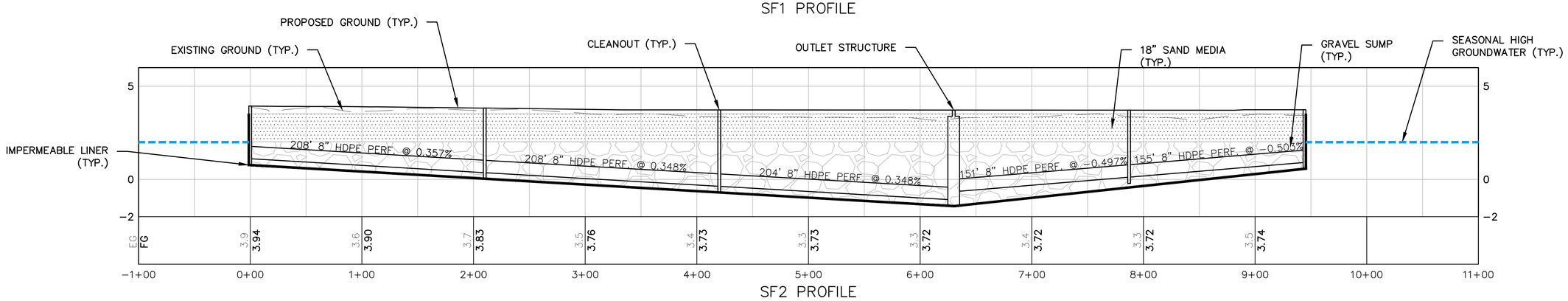
PROJ. No.: 22.063201.00
AIP: 3–09–0013–0XX–2025

DRAWING NO.
DR2.3

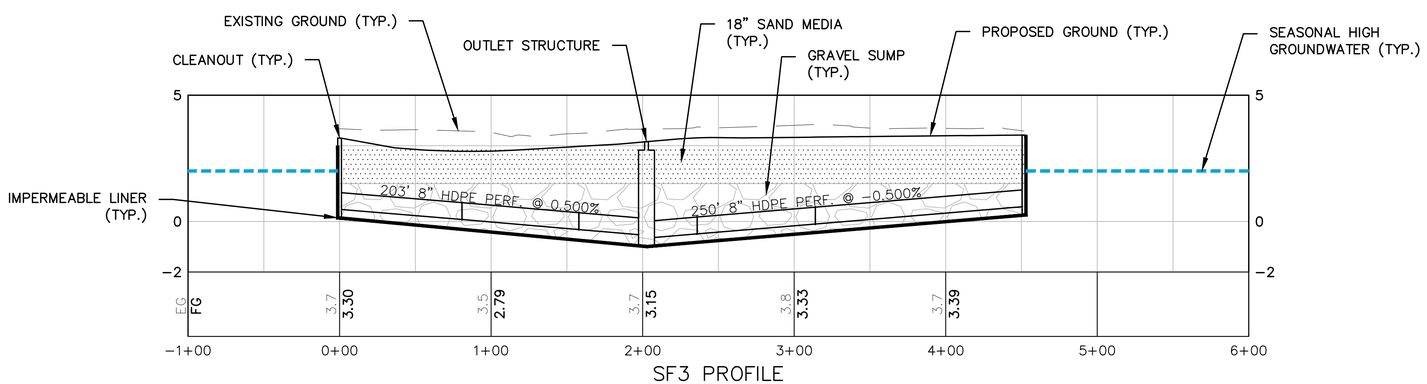
SHEET 95 OF 174



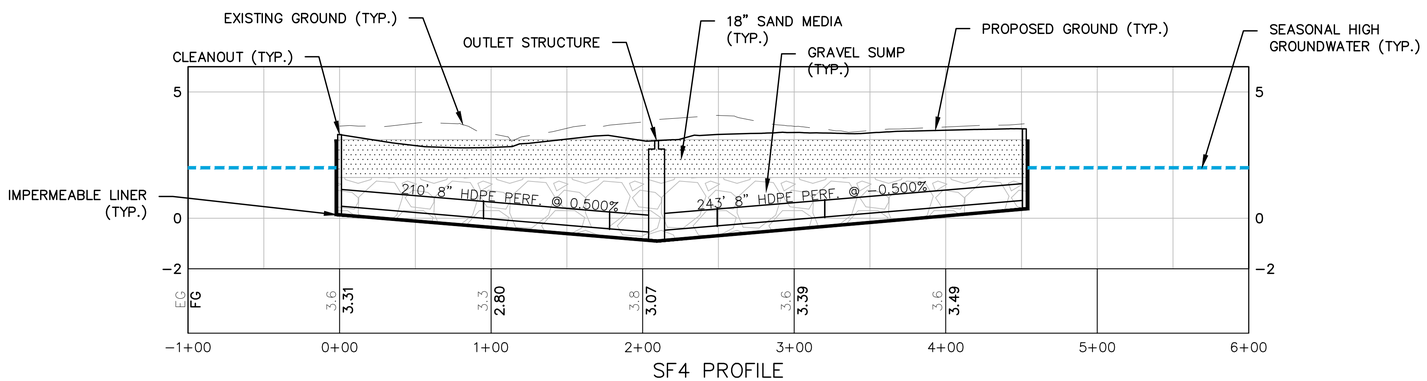
SF1 PROFILE



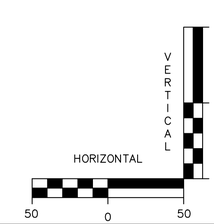
SF2 PROFILE



SF3 PROFILE



SF4 PROFILE



ENGINEER'S SEAL

150 Dow Street
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(603) 669-5555
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PROJECT DESIGNER

HOYLE TANNER

DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

SAND FILTER SECTIONS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/11/25	PERMIT SET	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

DR2.4

SHEET 96 OF 174

HTA 4/17/2025 11:44:59 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\DR2.4 - Sand Filter Sections.dwg

GENERAL NOTES:

G–1. GENERAL NOTES SHALL APPLY TO ALL DRAWINGS PREPARED BY HOYLE TANNER, INC. AND THE WORK THEY CONVEY.

G–2. ALL WORK SHALL CONFORM TO ALL FEDERAL, STATE AND LOCAL CODES, REGULATIONS AND STANDARDS, THE MORE STRINGENT SHALL GOVERN.

G–3. THE GENERAL CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS AND COORDINATION OF OTHER TRADES.

G–4. THESE DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. CARE OF ADJACENT PROPERTIES DURING CONSTRUCTION AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS REGARDING SITE SAFETY SHALL SOLELY BE THE CONTRACTORS RESPONSIBILITY.

G–5. ALL DIMENSIONS, ELEVATIONS AND CONDITIONS MUST BE VERIFIED BY THE GENERAL CONTRACTOR OR RESPONSIBLE TRADES PRIOR TO COMMENCING WITH THE WORK, FABRICATION OR ORDERING MATERIALS. DO NOT SCALE DRAWINGS, USE DIMENSIONS SHOWN.

G–6. ANY DISCREPANCIES BETWEEN THESE DRAWINGS AND AS–BUILT CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY, BEFORE PROCEEDING WITH THE WORK.

G–7. THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.

G–8. ALL APPLICABLE UTILITY DEPARTMENTS AND COMPANIES SHALL BE NOTIFIED BEFORE EXCAVATION IS STARTED. UTILITIES WITHIN 50 FEET OF AN EXCAVATION SHALL BE MARKED IN THE FIELD.

G–9. HOYLE TANNER, INC. WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS THAT ARISE DUE TO THE FAILURE OF THE CONTRACTOR:

TO FOLLOW THESE DRAWINGS AND SPECIFICATIONS AND THE DESIGN —INTENT THEY CONVEY.

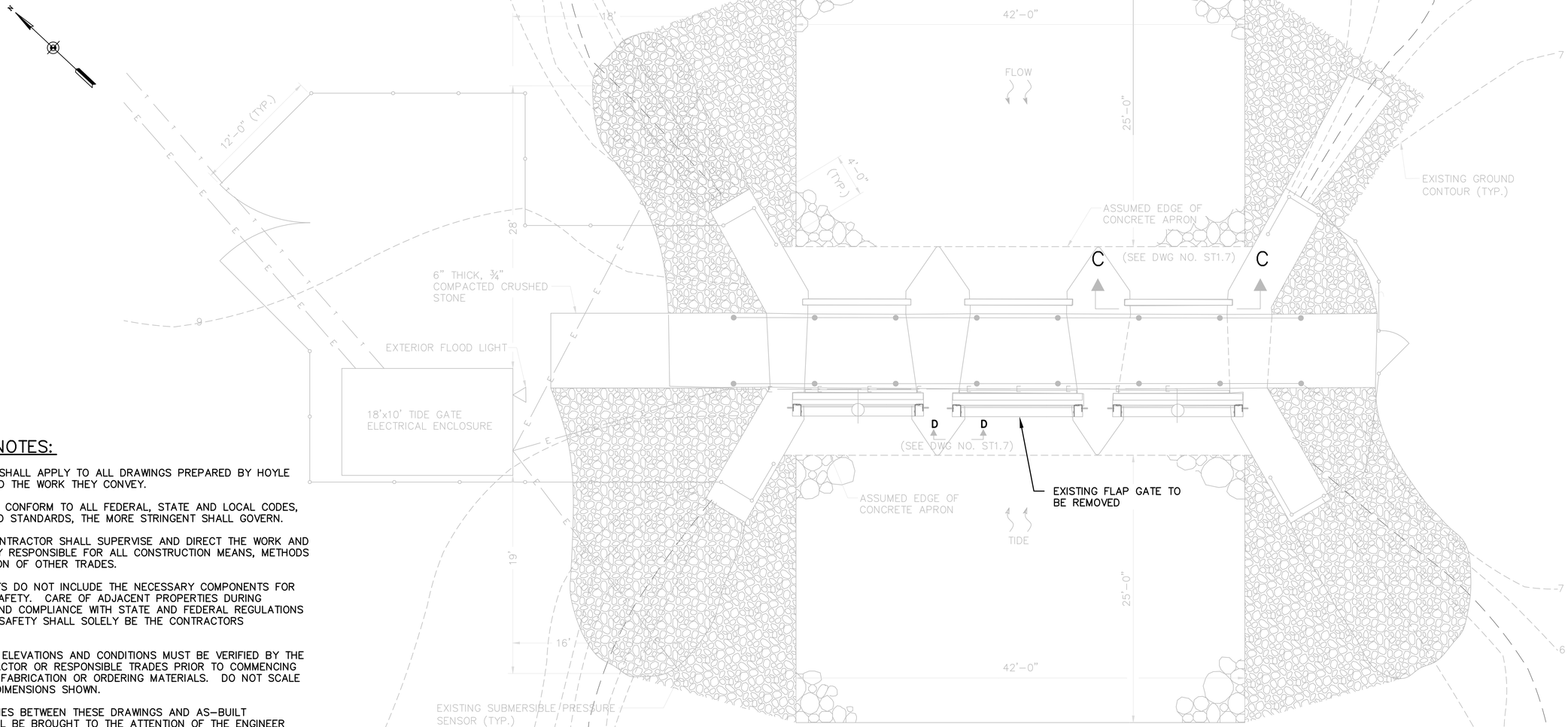
TO NOTIFY HOYLE TANNER OF ANY DISCREPANCIES, ERRORS, OMISSIONS —OR CONFLICTS AND OBTAIN THEIR GUIDANCE TO RESOLVE.

G–10. DESIGN CRITERIA

A. DESIGN STANDARD: 2021 INTERNATIONAL BUILDING CODE

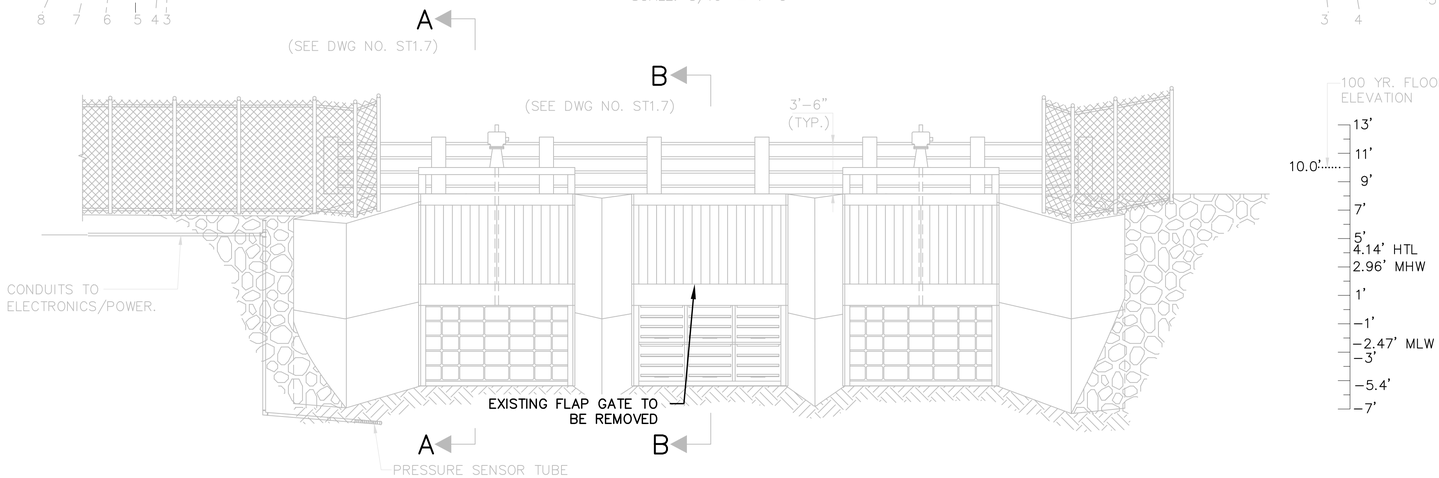
B. MOTOR DEAD LOAD: 500 LBS.

C. AASHTO ICE LOADING.



TIDE GATES–PLAN VIEW

SCALE: 3/16" = 1'–0"



TIDE GATES–OCEAN SIDE–ELEVATION VIEW

SCALE: 3/16" = 1'–0"

ENGINEER'S SEAL

PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

TIDE GATE EXISTING PLAN AND ELEVATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3–09–0013–0XX–2025

DRAWING NO.

TG1.1

SHEET 97 OF 174

GENERAL NOTES:

G–1. GENERAL NOTES SHALL APPLY TO ALL DRAWINGS PREPARED BY HOYLE TANNER, INC AND THE WORK THEY CONVEY.

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B. MOTOR DEAD LOAD: 500 LBS.

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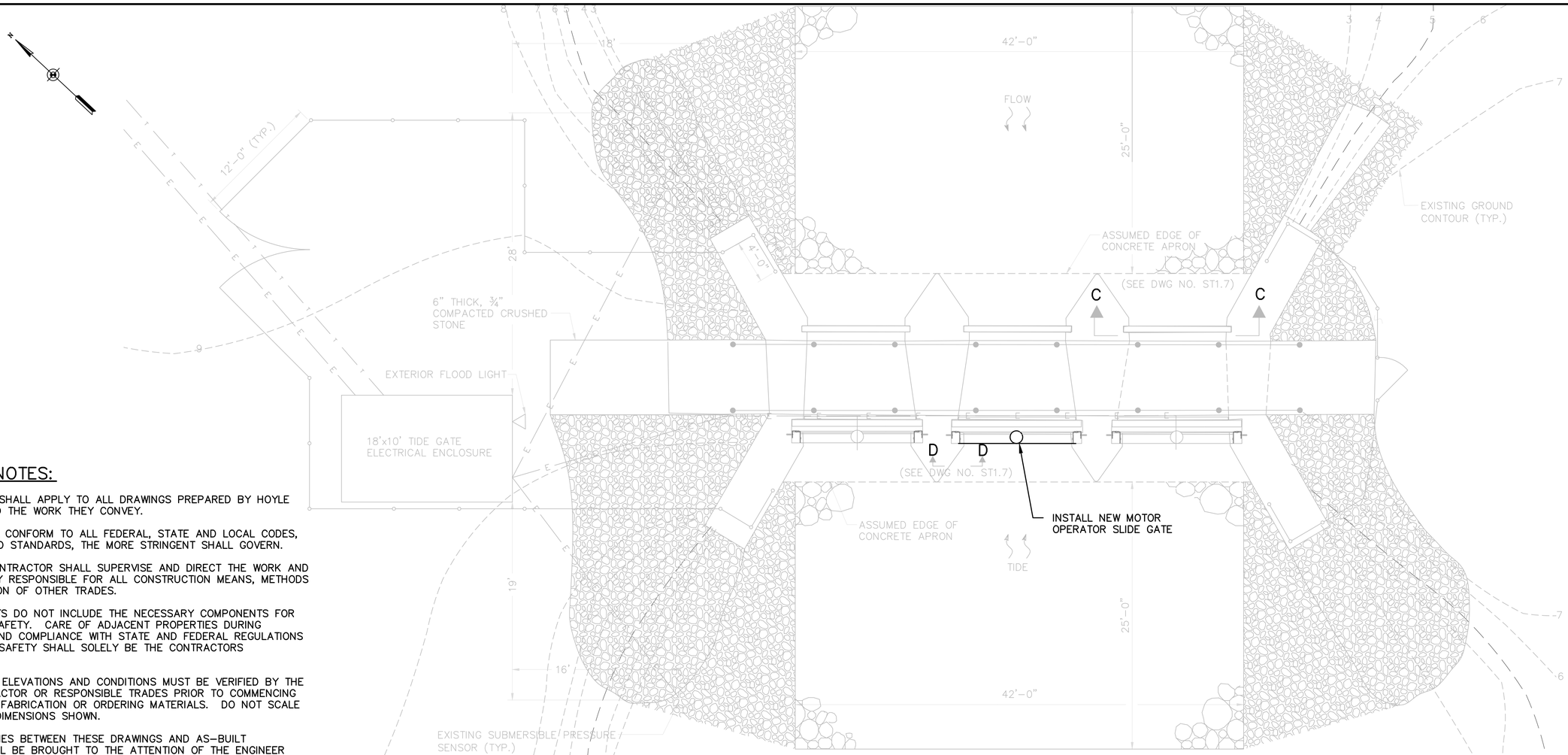
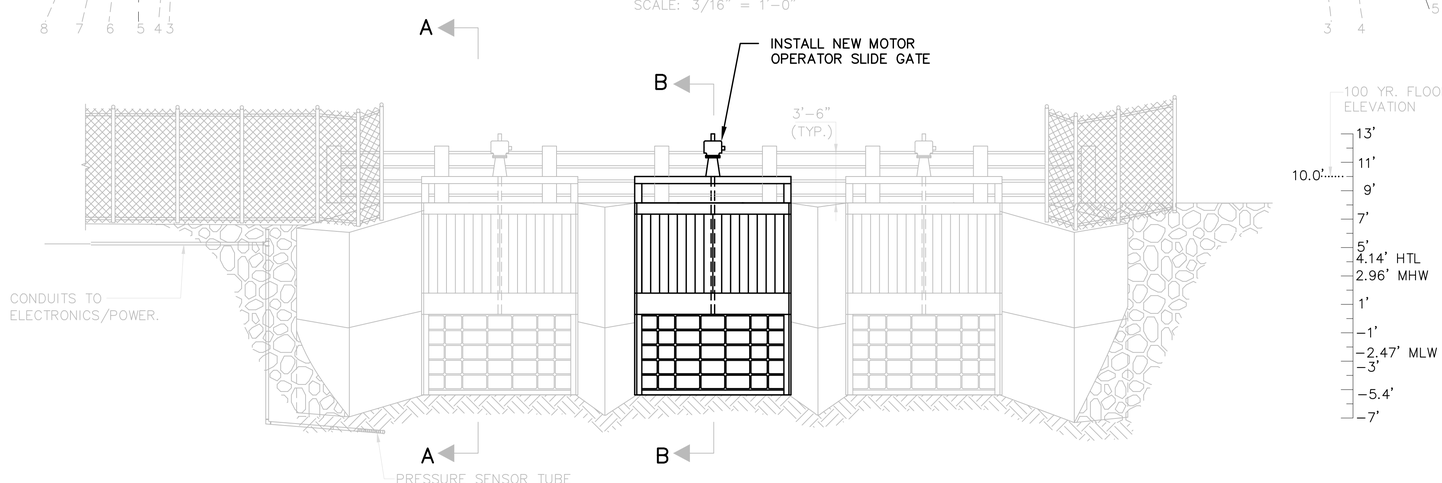


TIDE GATES–PLAN VIEW

SCALE: 3/16" = 1'–0"



TIDE GATES–OCEAN SIDE–ELEVATION VIEW

SCALE: 3/16" = 1'–0"

ENGINEER'S SEAL

STATE OF CONNECTICUT · ROBERT M. FLYNN · No. 16783 · LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

TIDE GATE PROPOSED PLAN AND ELEVATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

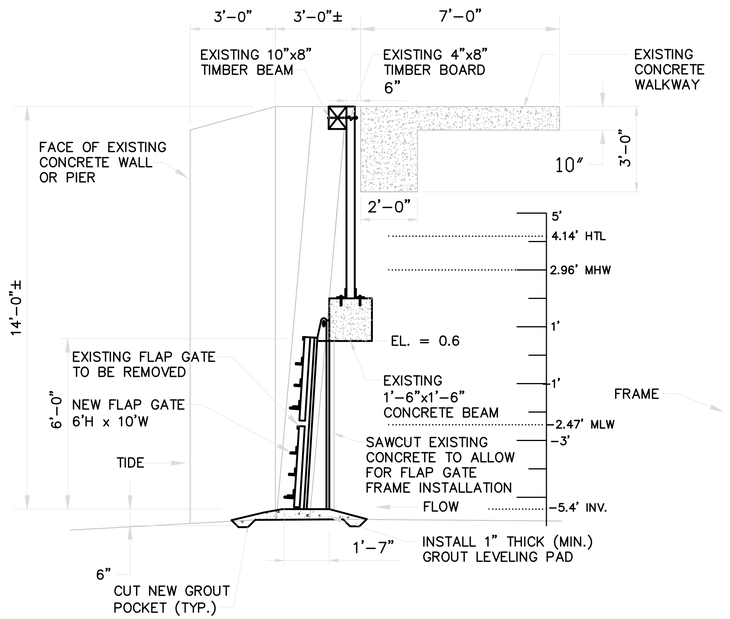
PROJ. No.:22.063201.00

AIP:3–09–0013–0XX–2025

DRAWING NO.

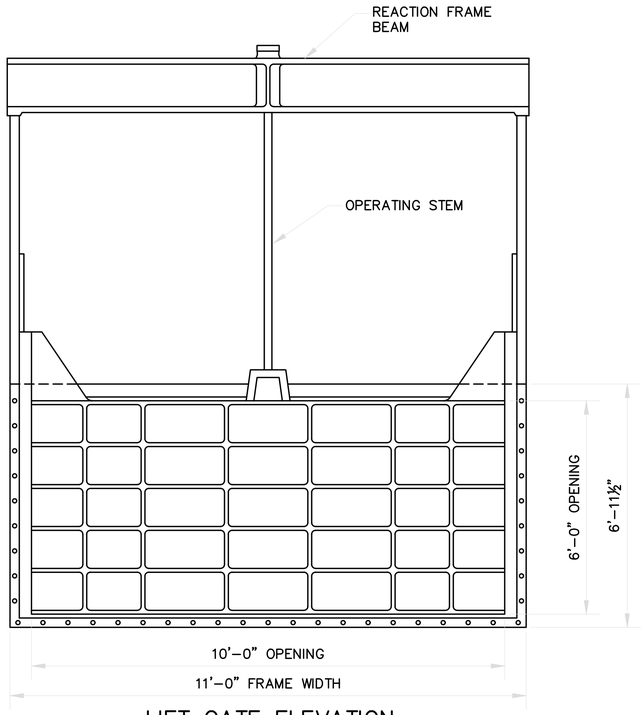
TG1.2

SHEET 98 OF 174



EXISTING FLAP GATE SECTION

SCALE: 3/8"=1'–0"

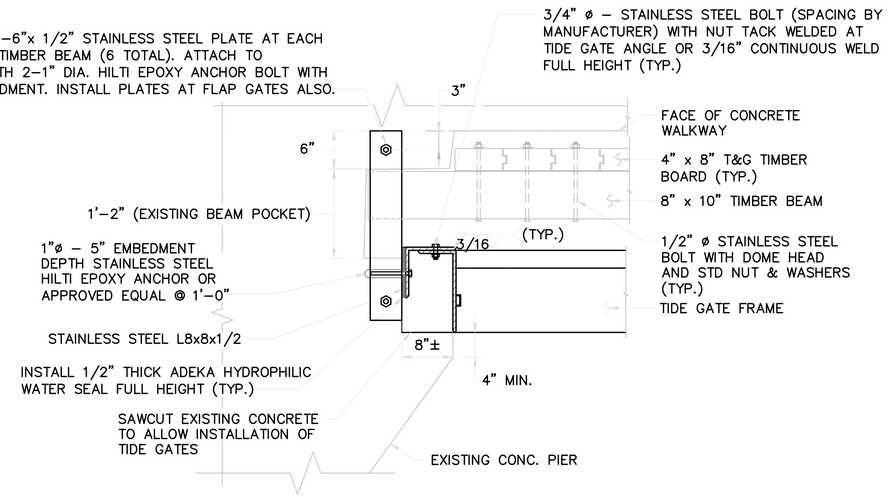


LIFT GATE ELEVATION

NOT TO SCALE

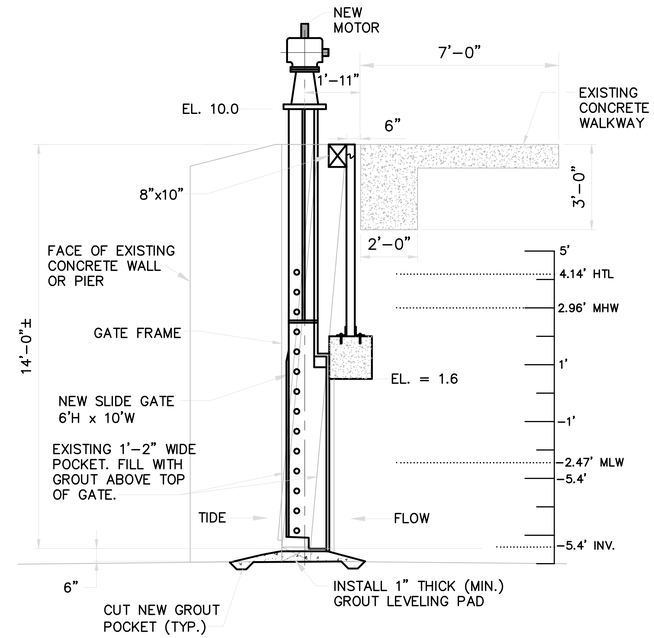
LIFT/FLAP GATE NOTES:

1. THE LIFT GATE AND FLAP GATE SHOWN ARE BASED UPON THE 'GLYDASEAL GATES' AND 'FLAP VALUE' PRODUCTS MANUFACTURED BY THE RODNEY HUNT COMPANY OF ORANGE, MA (978544–2511) AND ARE ACCEPTABLE FOR THIS PROJECT. THE CONTRACTOR MAY SUBMIT PRODUCTS FROM THIS MANUFACTURER OR ANY OTHER THAT MEETS THE SPECIFICATIONS AND DESIGN INTENT AND GEOMETRY SHOWN HERE.
2. THE LIFT GATE AND FLAP GATE MANUFACTURER SHALL BE RESPONSIBLE FOR DESIGNING THE GATE, FRAME AND ALL CONNECTIONS OF THE TIDE GATE FRAME TO CONCRETE SURFACES.



SLIDE GATE FRAME CONNECTION DETAIL (PLAN VIEW)

SCALE: 1" = 1'–0"



PROPOSED SLIDE GATE SECTION

SCALE: 3/8"=1'–0"

ENGINEER'S SEAL

STATE OF CONNECTICUT · ROBERT M. FUREY · No. 25393 · PROFESSIONAL ENGINEER

PROJECT DESIGNER
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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF | DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

TIDE GATE DETAILS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

TG1.3

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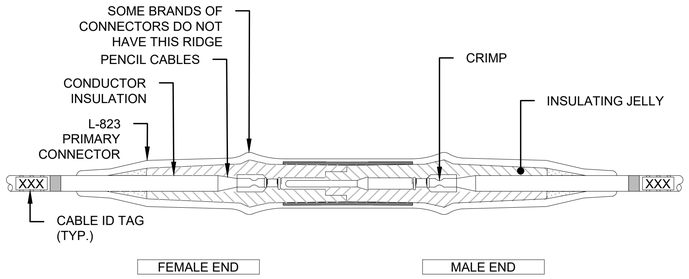
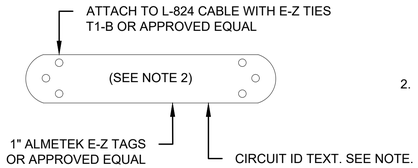


DETAIL NOTES:

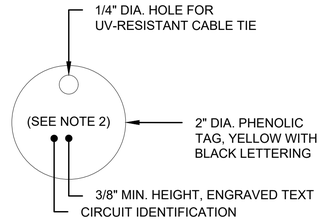
1. CLEAN THE CABLE THOROUGHLY 12" MIN. FROM THE END.
2. REMOVE INSULATION WITH A CABLE END PENCILER TOOL (ADB SAFEGATE # WS 49, CROUSE-HINDS # 10036-36 OR ENGINEER APPROVED EQUAL). DO NOT NICK THE CONDUCTOR.
3. CAREFULLY INSERT CABLE INTO CONNECTOR TO THE PROPER DEPTH. INSTALL PIN AND / OR RECEPTACLE WITH A CRIMPING TOOL WHICH MUST BE COMPLETELY CLOSED BEFORE THE TOOL MAY BE REMOVED. (SIEMENS #TMB25S, CROUSE-HINDS #33228 OR ENGINEER APPROVED EQUAL). CRIMPING DIES SHALL BE PROPER SIZED FOR FOR THE CABLE AND CONNECTOR USED.
4. BE SURE CABLE AND CONNECTOR FITTINGS ARE CLEAN. COAT THE CABLE INSULATION WITH INSULATING JELLY FROM THE CONNECTOR.
5. CLEAN CONNECTOR AND CABLE INSULATION WITH WAX OR GREASE SOLVENT TO REMOVE SURFACE SILICONE JELLY.
6. COMPLETE CONNECTION BY MATING THE PLUG AND RECEPTACLE. CAUTION: BE SURE THE CABLE DOES NOT SLIP OUT WHEN THE CONNECTION IS MADE.
7. ANY CONNECTOR WHICH IS CONTAMINATED BY DIRT OR OTHER DAMAGING MATERIAL SHALL BE REMOVED AND NOT REINSTALLED.
8. PROVIDE L-823 PRIMARY CONNECTOR KITS WITH INTEGRAL WATERTIGHT OVERLAPPING INSULATION FOR ALL 5KV AIRFIELD LIGHTING CIRCUITS MANUFACTURED BY AMERACE "SUPER KIT", INTEGRO "COMPLETE KIT", OR APPROVED EQUAL WHICH DOES NOT REQUIRE TAPE OR HEAT-SHRINK SPLICE TUBING. ALL OTHER TYPES OF CONNECTOR KITS REQUIRE SUPPLEMENTAL TAPE AND HEAT-SHRINK TUBING FOR WATERTIGHT SEAL.

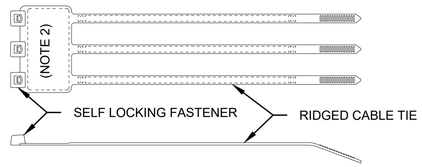
L-823 CONNECTOR INSTALLATION
NOT TO SCALE



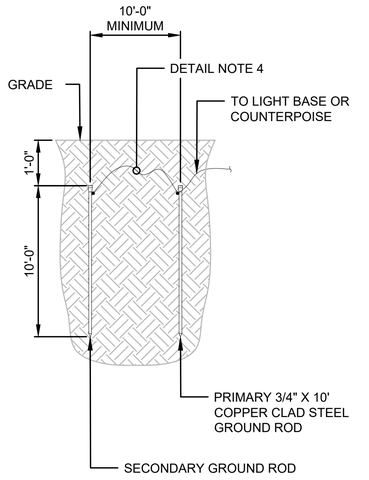
DETAIL NOTES:

1. ALL L-824 CABLES SHALL BE IDENTIFIED WITH A TAG WITH ITS RESPECTIVE CIRCUIT/LOOP NUMBER AT ALL ACCESSIBLE LOCATIONS. ATTACH THE ID TAG 12" FROM THE L-823 CONNECTORS. THE LOOPS SHALL BE IDENTIFIED ON EACH SIDE OF THE CONNECTORS.
2. NUMBERING SYSTEM FOR THE CABLE TAGS SHALL BE COORDINATED WITH ENGINEER PRIOR TO ORDERING TAGS.





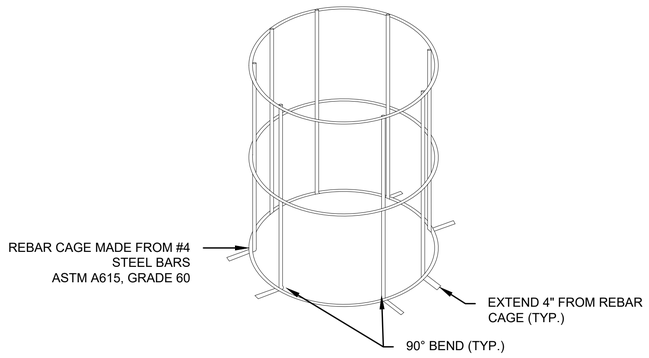
CABLE ID TAG
NOT TO SCALE



DETAIL NOTES:

1. PROVIDE GROUND RODS AT:
   - EVERY 500' OF COUNTERPOISE CABLE OR FRACTION THEREOF
   - EVERY 90' OF COUNTERPOISE (GUARD WIRE) CABLE OR FRACTION THEREOF FOR FAA TRENCHES WITH SPACING VARYING BY 10%-20% TO PREVENT RESONANCE. INSTALL GROUND ROD FOR FAA TRENCHES ON ALTERNATING SIDES OF COUNTERPOISE (GUARD WIRE) APPROX. 6' FROM TRENCH PER FAA STD-019F.
   - CHANGE IN TRENCH / DUCTBANK DIRECTION
   - TRENCH / DUCTBANK INTERSECTIONS
   - EACH END OF TRENCHES / DUCTBANKS
   - PAVEMENT EDGE OF DIRECTIONAL BORE CONDUITS
   - WITHIN 5' OF PULLCAN PLAZAS, MANHOLES, HANDHOLES, AND OTHER UNDERGROUND PULLING STRUCTURES
   - BASE MOUNTED ELEVATED LIGHT FIXTURES
   - AS NOTED ON PLANS
2. THE IMPEDANCE TO GROUND OF EACH GROUND ROD SHALL NOT EXCEED 25 OHMS. SHOULD THE IMPEDANCE EXCEED 25 OHMS THE CONTRACTOR SHALL INSTALL A SECOND GROUND ROD AT LEAST 10 FEET AWAY IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC).
3. THE IMPEDANCE TO GROUND TO THE AIRFIELD ELECTRICAL VAULT GROUNDING SYSTEM WITH THE NEUTRAL DISCONNECTED SHALL NOT EXCEED 10 OHMS.
4. INTERCONNECT GROUND RODS WITH COUNTERPOISE WITH #6 AWG STRANDED COPPER EXOTHERMIC CONNECTION. RETEST AFTER THE SECOND GROUND ROD IS INSTALLED AND NOTIFY ENGINEER IF IMPEDANCE EXCEEDS 25 OHMS.
5. GROUND ELECTRODES SHALL BE INSTALLED IN ACCORDANCE WITH NEC 250.53. TOP OF GROUND ROD SHALL BE A MIN. OF 12□ BELOW FINISHED GRADE. WHERE ROCK PREVENTS VERTICALLY DRIVEN RODS, OBLIQUELY DRIVEN (UP TO 45 DEGREES FROM VERTICAL) OR TRENCHED HORIZONTAL GROUND RODS SHALL BE INSTALLED IN ACCORDANCE WITH NEC 250.53(G).
6. WHERE INSTALLING TRENCHED HORIZONTAL GROUND RODS, INSTALL 30□ DEEP OR BELOW FROST LINE WHICHEVER IS DEEPER. PLACE GROUND ENHANCEMENT MATERIAL (GEM) IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS WITH A MIN. 1□ TOP AND BOTTOM COVER. GEM MUST BE PERMANENT AND MAINTENANCE-FREE AND MAINTAIN ITS EARTH RESISTANCE WITH TIME. GEM MUST SETUP FIRMLY AND NOT DISSOLVE OR DECOMPOSE, OR OTHERWISE POLLUTE THE SOIL OR THE LOCAL WATER TABLE. THE GEM MUST ALSO BE SUITABLE FOR INSTALLATION IN A SLURRY FORM. GEM SHALL NOT DEPEND ON THE CONTINUOUS PRESENCE OF WATER TO MAINTAIN ITS CONDUCTIVITY.
7. FOR SITUATIONS IN WHICH ENCOUNTERING ROCK DOES NOT PERMIT DRIVING A GROUND ROD THE FULL DISTANCE REQUIRED, A GROUNDING PLATE MAY BE SUBSTITUTED AS APPROVED BY THE ENGINEER.
8. GROUND RODS AND OTHER UNDERGROUND GROUNDING CONNECTIONS SHALL BE EXOTHERMICALLY WELDED. EXOTHERMIC CONNECTIONS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S GUIDELINES. CLEAN ALL METAL SURFACES PRIOR TO MAKING CONNECTIONS. SOLDER, BOLT AND WASHER TYPE CONNECTIONS ARE PROHIBITED.

GROUND ROD INSTALLATION
NOT TO SCALE



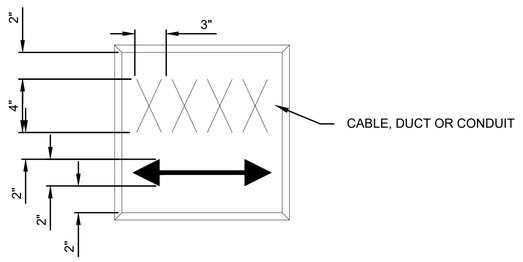
DETAIL NOTES:

1. EXOTHERMICALLY WELD GROUND TO REBAR CAGE.
2. SECURE INDIVIDUAL REBAR SECTIONS WITH STEEL WIRE TIES TO FORM REBAR CAGE.
3. HEIGHT OF CAGE SHALL BE 3" (MIN.) LESS IN HEIGHT FROM THE TOP OF LIGHT BASE.

IN-PAVEMENT FIXTURE REINFORCEMENT CAGE
NOT TO SCALE

DETAIL NOTES:

1. HAND LETTERING NOT ALLOWED ON MARKERS. LETTERING IS TO BE BOLDLY IMPRESSED. LINE WIDTH MUST BE 1/2" MIN. DEPTH OF IMPRESSION MUST BE 1/4" MIN.
2. ARROW ON MARKER TO INDICATE DIRECTION OF DUCTS OR CABLE RUNS (WHERE APPLICABLE).
3. ALL MARKERS ARE CONCRETE WITH A MIN. OF 4" IN THICKNESS.



CABLE / DUCT MARKER
NOT TO SCALE

ENGINEER'S SEAL

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P (215) 571-4920 | F (610) 459-7950 aroraeng@arora-engineers.com

CHECKED BY: RMF
DRAWN BY: CJM
DESIGNED BY: PAT
DATE: APRIL 2025

PROJECT DESIGNER
HOYLE TANNER
Hoyle Tanner & Associates © 2023

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MISCELLANEOUS DETAILS - 1

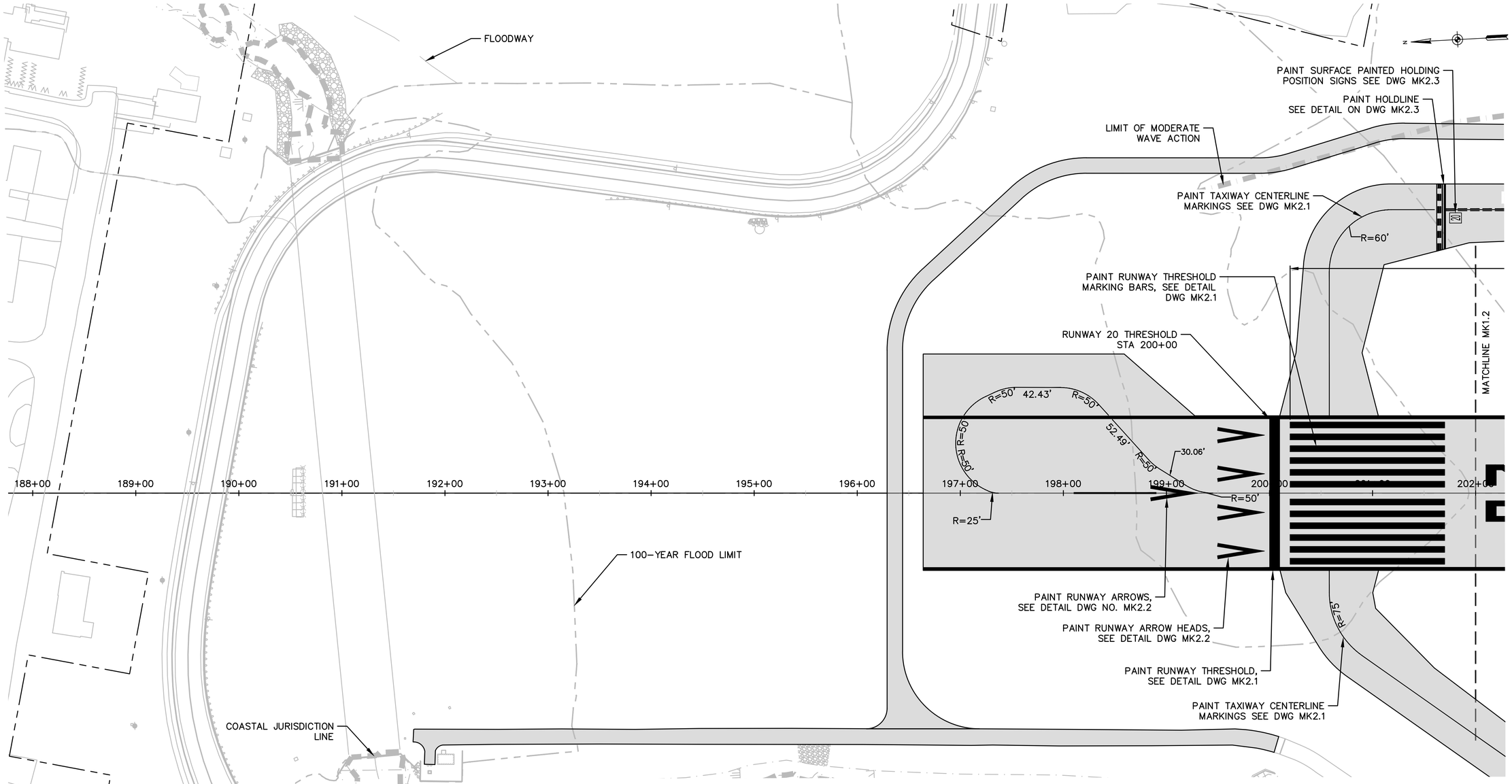
REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2023

DRAWING NO.
E7.10

SHEET 131 OF 174



NOTES:

1. SEE MK1.8 FOR POINT TABLE INFORMATION
2. TAXIWAY MARKINGS ARE YELLOW.
3. WHITE MARKINGS TAKE PRECEDENCE OVER YELLOW MARKINGS EXCEPT WHERE NOTED. WHEN A YELLOW CENTERLINE MARKING CROSSES WHITE MARKINGS THE YELLOW MARKING IS BROKEN 6" EITHER SIDE OF THE WHITE MARKING.
4. ALL MARKINGS THAT ARE BEING REMOVED SHALL BE REMOVED TO 100%.
5. ALL PAVEMENT SHALL BE CLEAN OF DEBRIS USING A VACUUM SWEEPER, AND IT SHALL BE DRY BEFORE PAINTING.
6. ANY NEWLY PAINTED MARKINGS THAT ARE DAMAGED DUE TO CONSTRUCTION ACTIVITIES SHALL BE REPAINTED AT NO ADDITIONAL CHARGE.
7. ONLY MARKINGS PAINTED ON EXISTING PAVEMENT SHALL BE OUTLINED WITH BLACK PAINT.
8. ALL LEAD-IN LINES ON THE EXISTING RUNWAYS SHALL BE PERMANENT PAINT WITH BEADS ONLY, WHICH SHALL BE OUTLINED IN (6") BLACK PAINT (PERMANENT PAINT WITHOUT BEADS). THESE MARKINGS SHALL BE PAINTED AT THE SAME TIME THE TEMPORARY MARKINGS ARE PAINTED, BEFORE OPENING EACH PHASE.
9. ALL MARKINGS OUTSIDE THE LIMIT OF WORK THAT HAVE BEEN COMPROMISED BY HAULING AND TACK COAT SHALL BE REPAINTED WITH PERMANENT PAINT WITH BEADS. THESE MARKINGS WILL BE IDENTIFIED BY THE ENGINEER/AIRPORT PRIOR TO STARTING PHASE III. THESE MARKINGS WILL NOT BE OUTLINED IN BLACK PAINT. THE CONTRACTOR WILL BE PAID FOR THESE MARKINGS WITH BEADS AT A SF UNIT COST PER CONTRACT. WHILE HAULING, THE CONTRACTOR SHALL TAKE SPECIAL CARE TO NOT HAUL OVER MARKINGS IF AT ALL POSSIBLE.

0 50 125 250 FEET

1"=50'

ENGINEER'S SEAL

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DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 1

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.:22.063201.00

AIP:3-09-0013-0XX-2025

DRAWING NO.

MK1.1

SHEET 157 OF 174

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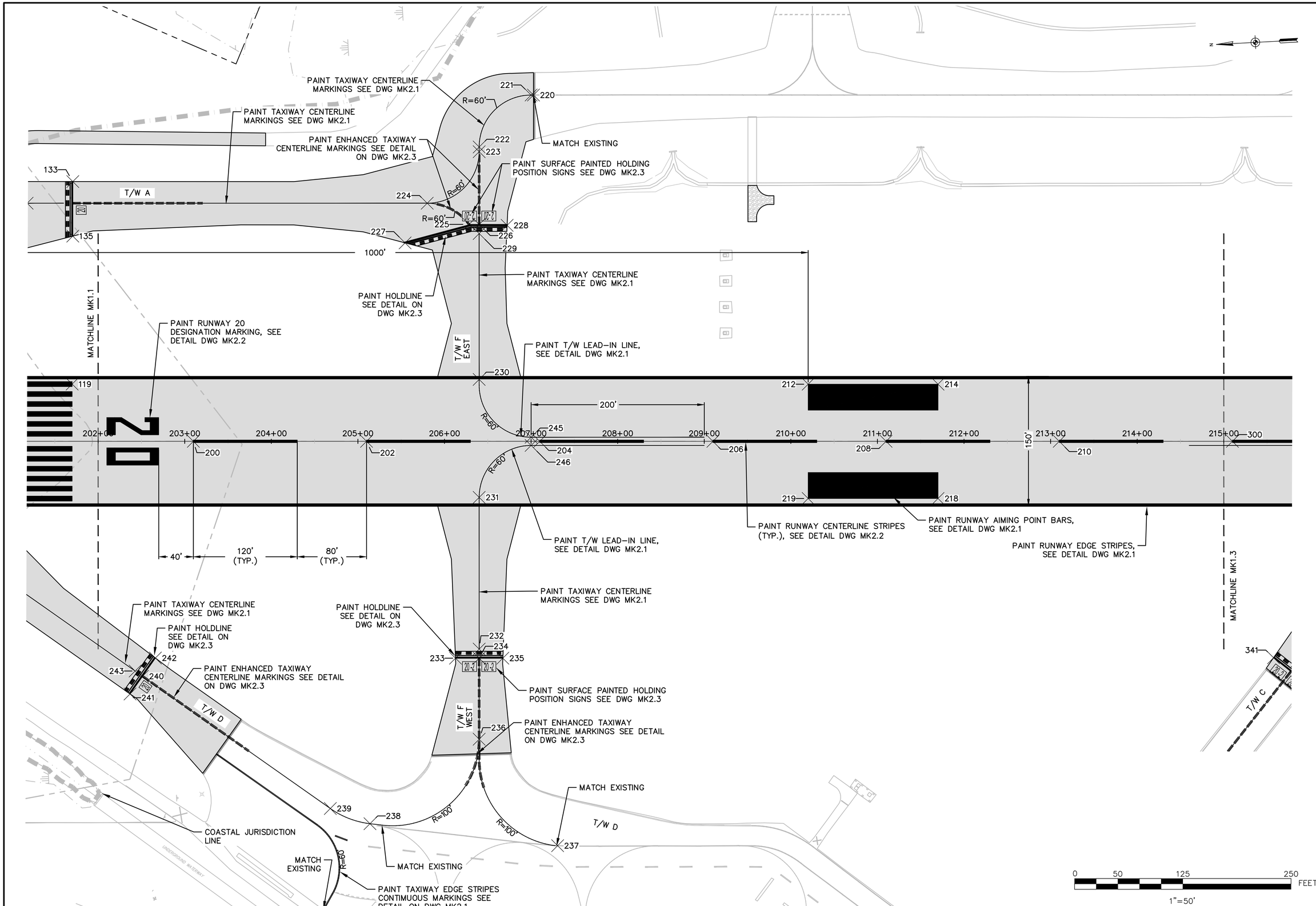

ENGINEER'S SEAL

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 2

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

MK1.2

SHEET 158 OF 174

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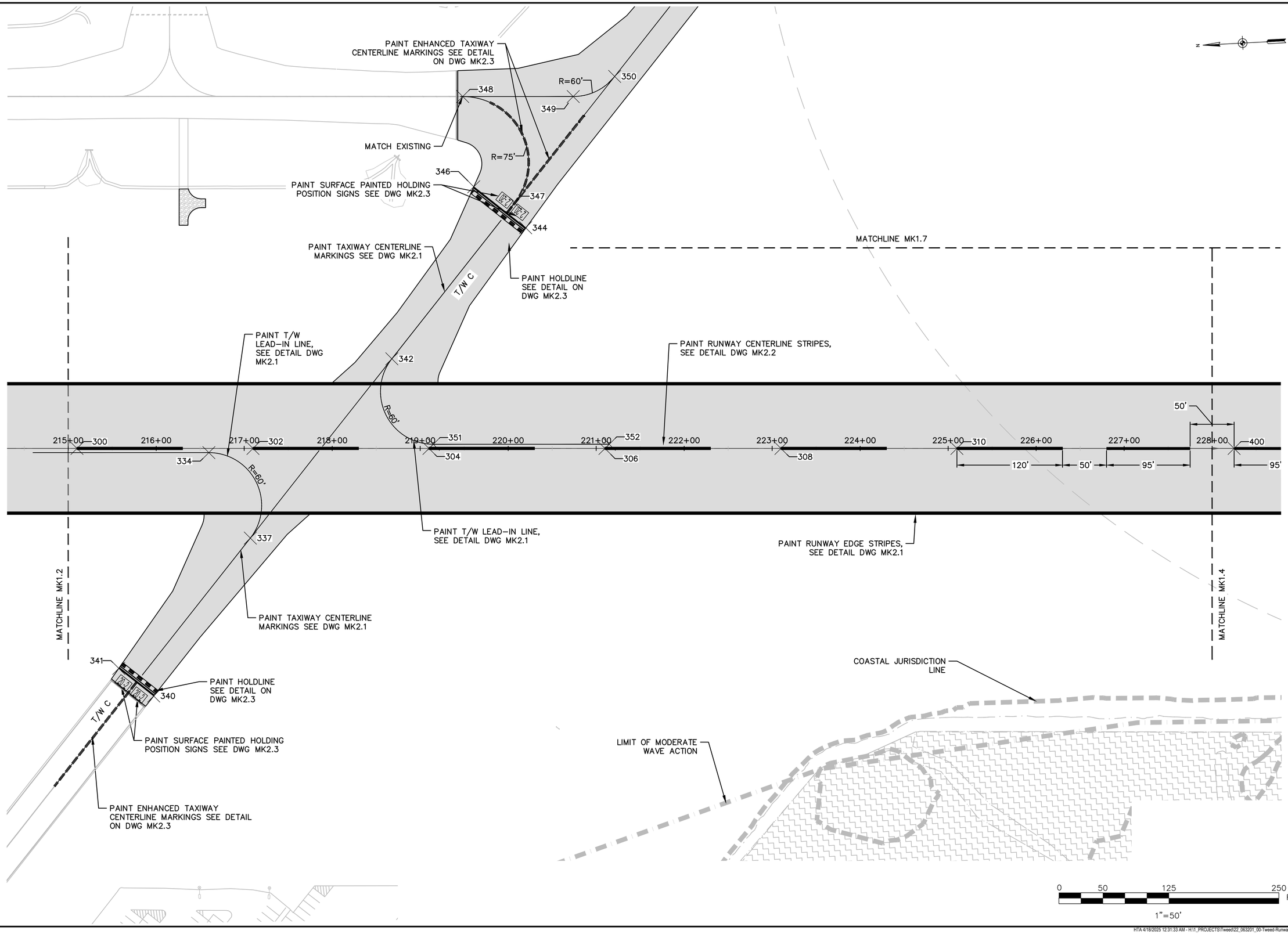

ENGINEER'S SEAL

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 3

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

MK1.3

SHEET 159 OF 174

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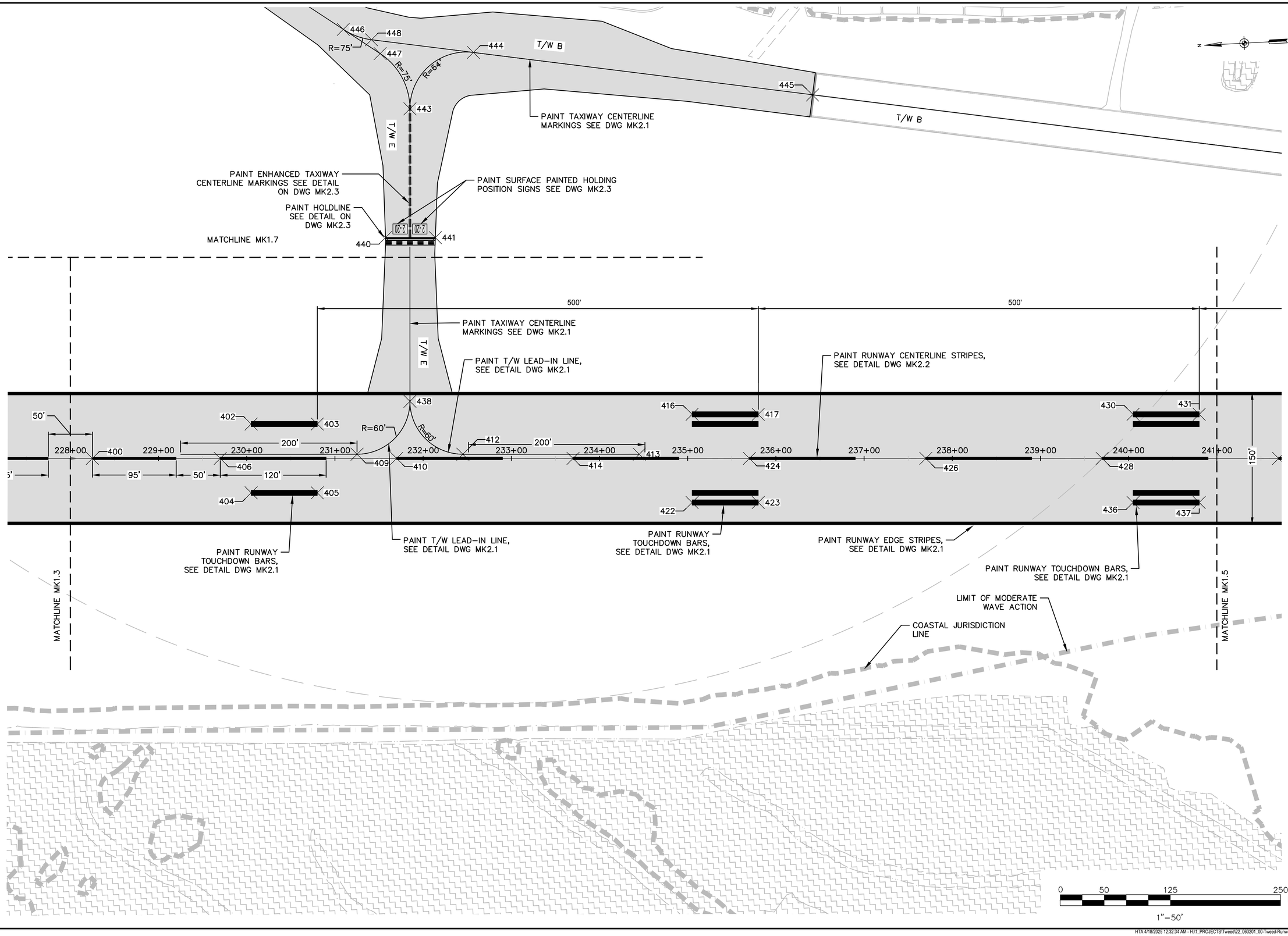

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 4

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

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AIP: 3-09-0013-0XX-2025

DRAWING NO.

MK1.4

SHEET 160 OF 174

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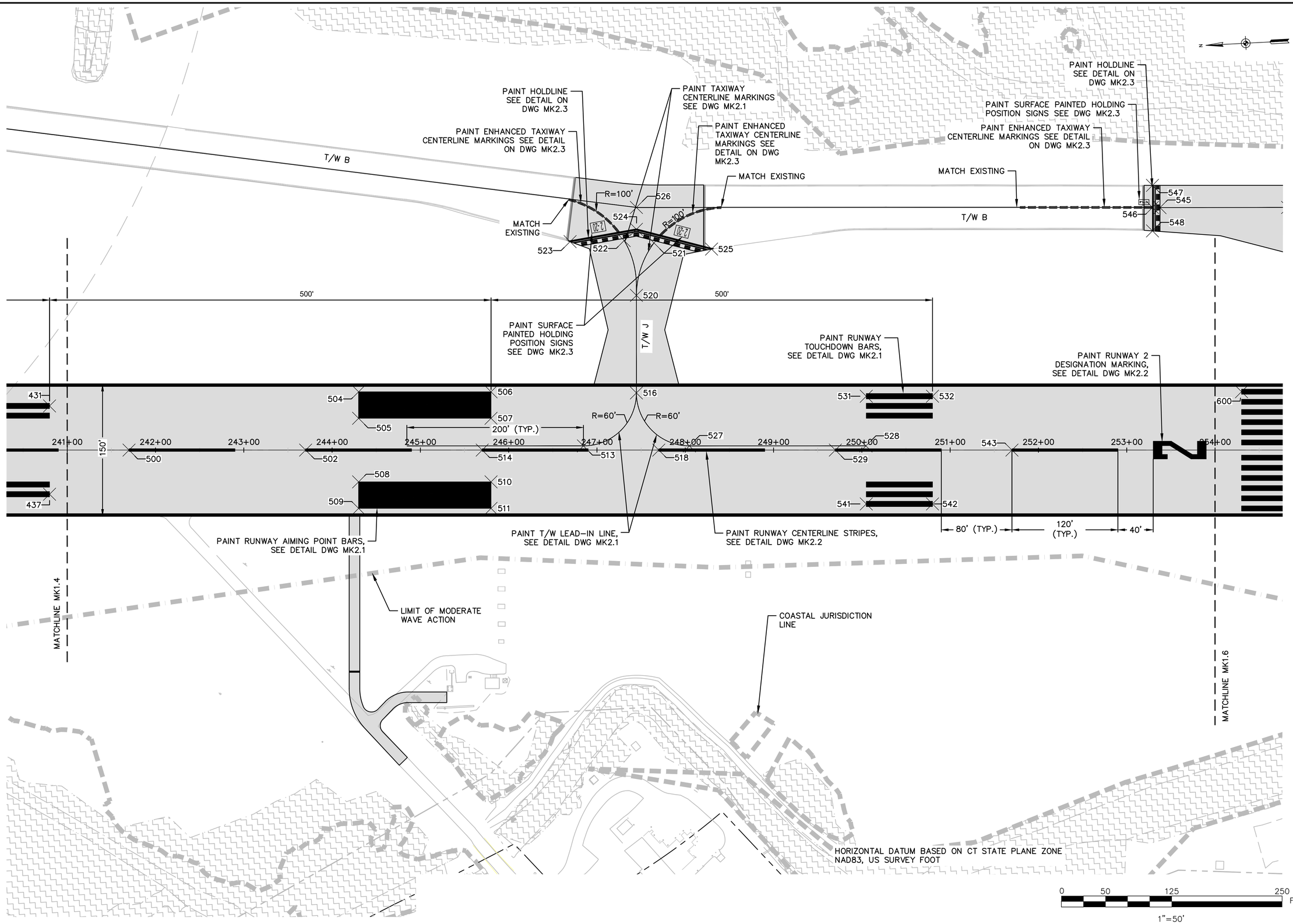

ENGINEER'S SEAL

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DRAWN BY JLC
CHECKED BY RMF
DESIGNED BY NEG

PROJECT DESIGNER
HOYLE TANNER

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 5

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
MK1.5

SHEET 161 OF 174

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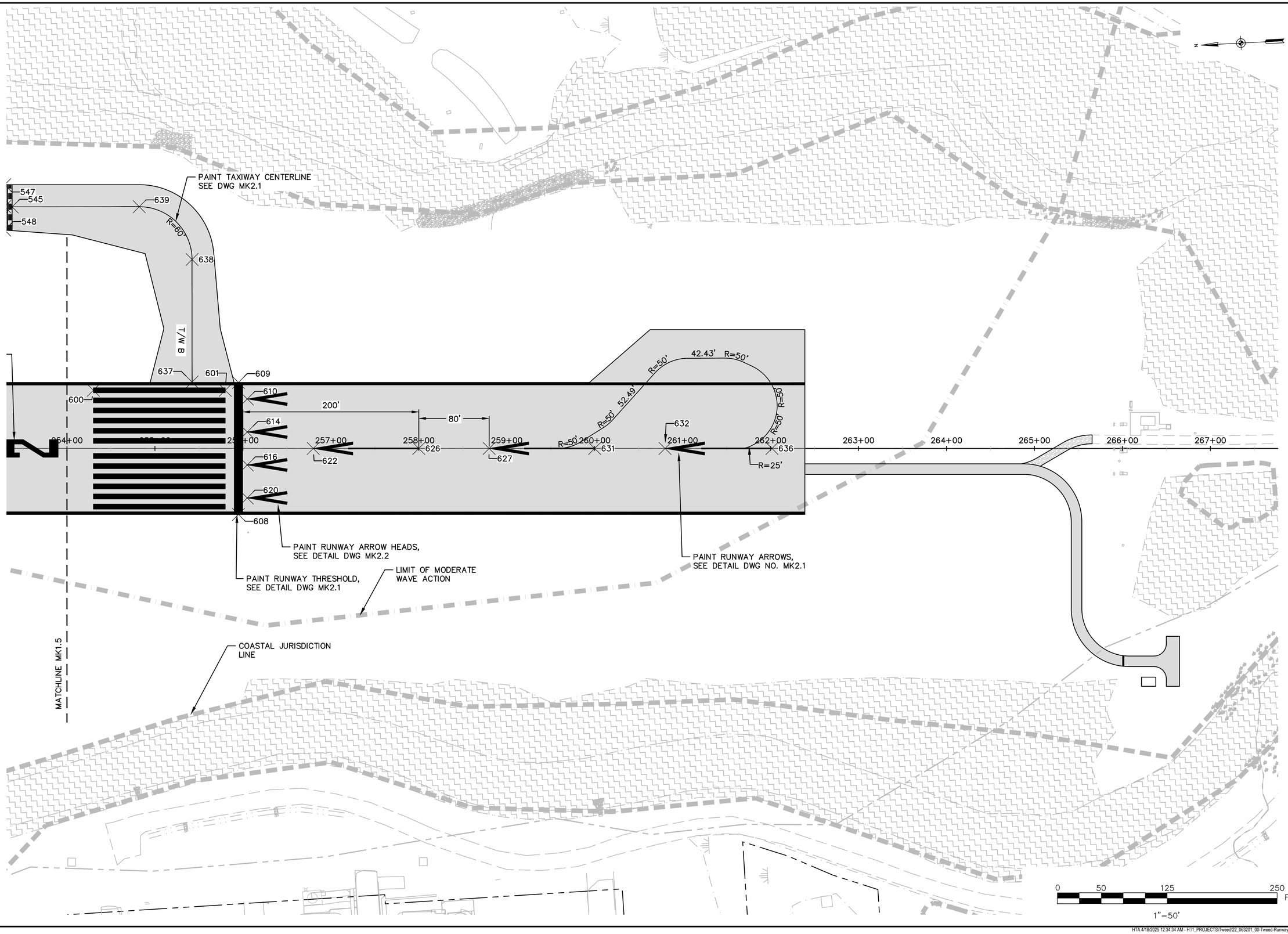

ENGINEER'S SEAL

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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 6

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

MK1.6

SHEET 162 OF 174

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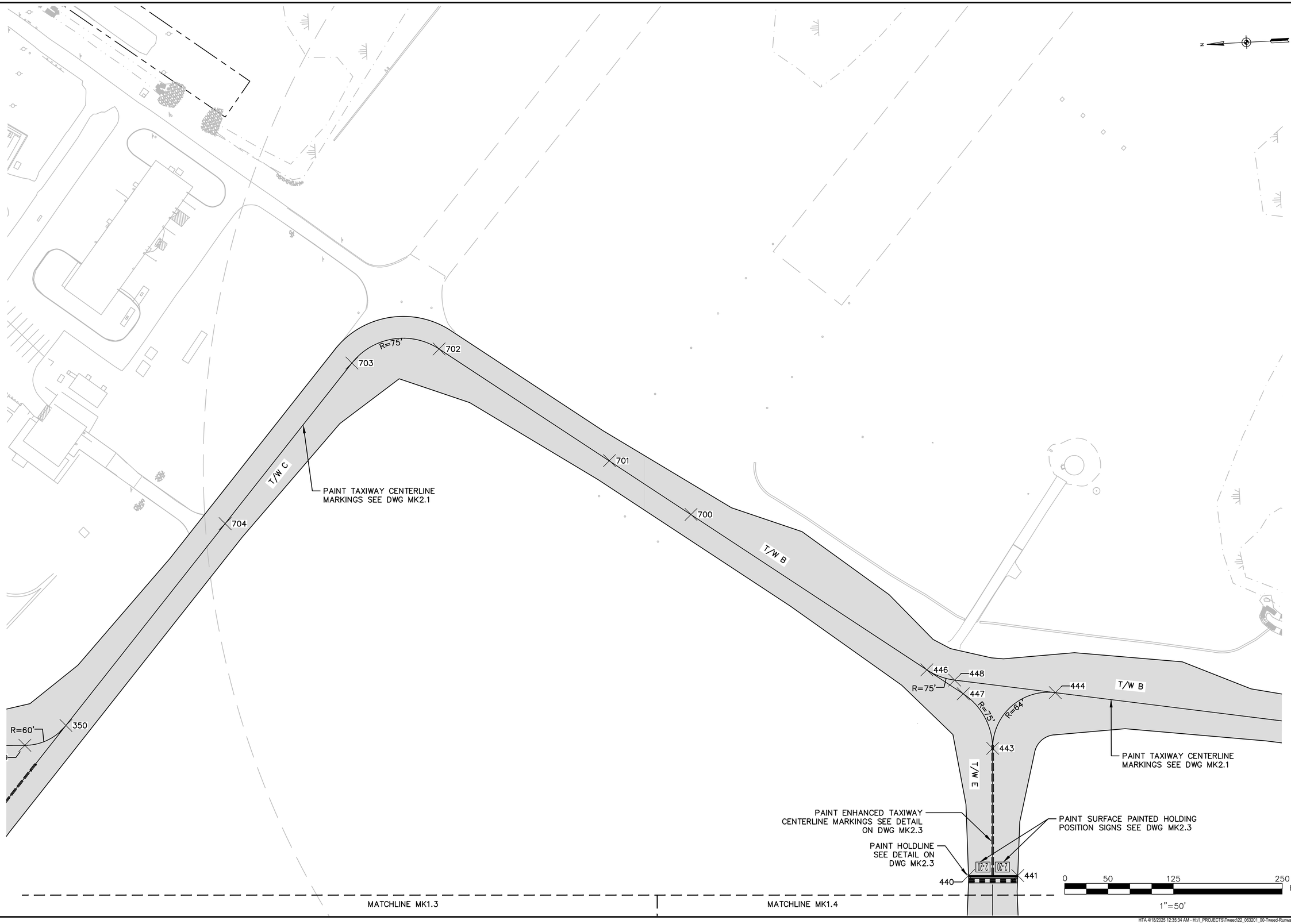

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 7

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

MK1.7

SHEET 163 OF 174

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MARKING POINT LOCATION DATA		
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101	659758.50	962292.86
102	659713.63	962284.47
103	659759.13	962280.84
104	659833.47	962290.78
105	659690.74	962345.64
106	659645.87	962337.24
107	659691.37	962333.61
108	659692.71	962308.19
109	659647.84	962299.80
110	659694.68	962270.74
111	659649.82	962262.35
112	659695.32	962258.72
113	659696.66	962233.29
114	659651.79	962224.90
115	659697.29	962221.27
116	659634.92	962355.45
117	659642.77	962205.65
118	659620.41	962345.80

MARKING POINT LOCATION DATA		
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120	659623.42	962288.38
121	659473.62	962280.53
122	659624.32	962271.15
123	659474.52	962263.30
124	659627.33	962213.73
125	659477.53	962205.88
126	659589.87	962202.38
127	659590.96	962181.62
128	659562.41	962118.73
129	659581.97	962353.17
130	659574.67	962492.53
131	659511.61	962549.31
132	659469.43	962547.10
133	659457.64	962571.51
134	659458.94	962546.55
135	659460.93	962508.59
136	659693.34	962296.16

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
200	659334.26	962264.59
201	659214.43	962258.31
202	659134.54	962254.12
203	659014.70	962247.84
204	658934.81	962243.65
205	658814.98	962237.37
206	658735.09	962233.19
207	658615.25	962226.91
208	658535.36	962222.72
209	658415.53	962216.44
210	658335.64	962212.25
211	658215.80	962205.97
212	658621.78	962293.34
213	658623.35	962263.38
214	658471.99	962285.49
215	658473.56	962255.53
216	658627.12	962191.48
217	658477.33	962183.63

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
218	658478.90	962153.67
219	658628.69	962161.52
220	658921.11	962643.48
221	658923.80	962643.62
222	658986.86	962586.85
223	658987.15	962581.40
224	659050.18	962525.13
225	659003.18	962498.17
226	658991.54	962497.47
227	659078.07	962480.69
228	658959.37	962494.78
229	658992.09	962486.98
230	659000.91	962318.71
231	659008.04	962182.65
232	659017.21	962007.64
233	659045.06	961998.59
234	659017.76	961997.16
235	658990.47	961995.73

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
236	659022.66	961903.69
244	658186.23	962199.67
245	658944.49	962248.92
246	658944.99	962239.43
247	658744.76	962238.45
248	658745.26	962228.96

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
301	658016.07	962195.51
302	657936.18	962191.32
303	657816.35	962185.04
304	657736.46	962180.85
305	657616.62	962174.57
306	657536.73	962170.39
307	657416.90	962164.11
308	657337.01	962159.92
309	657217.17	962153.64
310	657137.28	962149.45
311	657017.44	962143.17
312	656967.52	962140.47
313	656872.65	962135.50
334	657986.50	962189.20
335	657930.46	962119.42
336	657931.25	962115.46
337	657944.55	962089.70
338	658075.41	961940.61
339	658082.70	961932.30
340	658063.55	961916.22

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
341	658101.57	961949.64
342	657773.27	962284.84
343	657640.89	962435.66
344	657613.62	962425.69
345	657633.96	962443.55
346	657670.05	962475.22
347	657624.50	962454.33
348	657677.23	962578.34
349	657551.81	962571.76
350	657503.57	962592.10
351	657731.31	962185.34
352	657531.59	962174.87

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
400	656822.71	962132.97
401	656727.85	962127.90
402	656640.92	962162.49
403	656566.03	962158.57
404	656645.00	962084.60
405	656570.11	962080.68
406	656677.92	962125.38
407	656558.08	962119.10
408	656722.55	962132.47
409	656522.83	962122.01
410	656478.19	962114.91
411	656358.35	962108.63
412	656402.99	962115.73
413	656203.27	962105.26
414	656278.46	962104.44
415	656158.63	962098.16
416	656141.03	962147.31
417	656066.14	962143.39
418	656141.61	962136.33
419	656066.71	962132.40

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
420	656145.69	962058.43
421	656070.79	962054.51
422	656146.27	962047.45
423	656071.37	962043.52
424	656078.74	962093.98
425	655958.90	962087.70
426	655879.01	962083.51
427	655759.18	962077.23
428	655679.29	962073.04
429	655559.45	962066.76
430	655641.72	962121.14
431	655566.82	962117.22
432	655642.29	962110.16
433	655567.40	962106.23
434	655646.38	962032.27
435	655571.48	962028.34
436	655646.95	962021.28
437	655572.05	962017.36
438	656459.77	962178.79
439	656450.60	962353.79

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
440	656477.69	962365.73
441	656421.30	962362.77
442	656450.05	962364.28
443	656442.40	962510.15
444	656367.23	962570.25
445	655985.73	962501.94
446	656513.13	962604.12
447	656472.85	962574.49
448	656481.85	962590.70

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE
NAD83, US SURVEY FOOT

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. RUSSO
No. 19758
LICENSED
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PROJECT DESIGNER
HOYLE TANNER
150 Dow Street
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(603) 669-5555
www.hoyletanner.com

DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
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DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 8

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
MK1.8

SHEET 164 OF 174

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
500	655479.56	962062.58
501	655359.72	962056.30
502	655279.83	962052.11
503	655160.00	962045.83
504	655216.46	962114.88
505	655218.03	962084.92
506	655066.67	962107.03
507	655068.24	962077.07
508	655221.80	962013.02
509	655223.37	961983.06
510	655072.01	962005.17
511	655073.58	961975.21
512	655165.02	962050.85
513	654965.36	962040.39
514	655080.11	962041.64
516	654902.30	962097.16
517	654760.55	962024.90
518	654880.38	962031.18
520	654896.51	962207.47
521	654873.54	962265.76

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
522	654907.11	962270.22
523	654968.33	962272.22
524	654892.60	962282.16
525	654808.79	962255.40
526	654891.30	962306.93
527	654845.52	962034.11
528	654645.86	962023.64
529	654680.66	962020.71
530	654560.82	962014.43
531	654642.51	962079.80
532	654567.62	962075.87
533	654643.09	962068.81
534	654568.19	962064.89
535	654643.66	962057.83
536	654568.77	962053.90
537	654647.75	961979.93
538	654572.85	961976.01
539	654648.32	961968.95
540	654573.42	961965.02
541	654648.90	961957.96

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
542	654574.00	961954.04
543	654480.93	962010.24
544	654361.10	962003.96
545	654299.13	962275.72
546	654307.61	962276.34
547	654306.30	962301.31
548	654309.00	962249.84

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
600	654217.83	962062.67
601	654068.03	962054.82
602	654220.84	962005.25
603	654071.04	961997.40
604	654221.74	961988.02
605	654071.94	961980.17
606	654224.75	961930.60
607	654074.95	961922.75
608	654060.44	961913.10
609	654052.59	962062.90
610	654043.55	962043.65
611	653998.05	962047.28
612	653998.69	962035.26
613	654000.03	962009.83
614	654045.53	962006.20
615	654000.66	961997.81
616	654047.51	961968.75
617	654002.01	961972.38
618	654002.64	961960.36
619	654003.98	961934.94

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
620	654049.48	961931.31
621	654004.62	961922.91
622	653971.62	961983.55
623	653926.37	961987.12
624	653927.01	961975.18
625	653932.01	961981.48
626	653851.79	961977.27
627	653771.90	961973.09
628	653726.64	961976.66
629	653727.28	961964.72
630	653732.29	961971.01
631	653652.06	961966.81
632	653572.17	961962.62
633	653526.92	961966.19
634	653527.55	961954.25
635	653532.56	961960.54
636	653450.76	961956.26
637	654105.27	962066.16
638	654097.98	962205.28
639	654154.76	962268.33

MARKING POINT LOCATION DATA		
POINT NUMBER	NORTHING	EASTING
700	656774.18	962796.47
701	656864.44	962863.11
702	657053.07	963001.42
703	657153.89	962990.49
704	657308.87	962813.92

HORIZONTAL DATUM BASED ON CT STATE PLANE ZONE
NAD83, US SURVEY FOOT

ENGINEER'S SEAL

STATE OF CONNECTICUT
ROBERT M. RUSSO
No. 19628
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PROJECT DESIGNER

HOYLE TANNER
150 Dow Street
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(603) 669-5555
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DESIGNED BY NEG
DRAWN BY JLC
CHECKED BY RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

MARKING PLAN 9

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.

MK1.9

SHEET 165 OF 174

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-1
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	15	3 3 3	6		
				FILL; Silty sand with gravel, dry, coarse to fine sand, little silt, little gravel, red-brown.					
			S-2	SAND (SP); Loose, medium to fine sand, few gravel, red-brown.	5	2 2 2	4		
5			S-3		7	2 1 1	4		
			S-4		10	3 3 3	6		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-2
Total Depth (ft): 11
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 8'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANIC MATERIAL (6 inches).	20	4 4 6	10		
				SAND (SP); Loose, medium to fine sand, few gravel, red-brown.					
			S-2		16	8 7 8	15	5	GS NM HYD
5			S-3		7	8 1/12"	1		
			S-4		11	1/12" 1/18"	1		
			S-5	Few gravel.	8	1 3 4	8		
10				Bottom of exploration at 11.0'; Not refusal.		4 5			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-3
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	13	3 4 7	11		
				FILL; Silty gravel with sand, coarse to fine gravel, with coarse to fine sand, few silt, brown.					
			S-2		12	10 5 7	19	8	GS NM
5			S-3A	SAND (SP); Loose, medium to fine sand, few gravel, red-brown.	15	12 11 5	11		
			S-3B S-4		4	5 6 5	14		
10				Bottom of exploration at 9.0'; Not refusal.		5 5 9 12			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-4
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 7'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/19/24
Date Completed: 01/19/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	16	2 4 12	16		
				FILL; Silty sand with gravel, coarse to fine sand, with gravel, few silt, brown.					
			S-2		13	10 14 18	33		
5			S-3		12	15 14 16	36		
			S-4		17	18 18 19	25	43	GS NM HYD
10				SAND WITH SILT AND ORGANICS (SP-SM/OH); Trace organic fibers, dark brown. Bottom of exploration at 9.0'; Not refusal.		14 18 7 8			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-5
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1A	ASPHALT PAVEMENT (5.125 inches).	18	34	53	17	GS
			S-1B	FILL; Asphalt treated base (8 inches).		36 17			EX
			S-2	FILL; Silty sand with gravel, dry, coarse to fine sand, some silt, little gravel, red-brown.	4	15 15 16	34		
5			S-3	FILL; Gravel with silt and sand, dry, coarse to fine gravel, some sand, little silt, red-brown to gray-brown.	17	18 17 18	34		
			S-4		10	16 15 16	53		
10				SILTY SAND (SM); Medium dense to dense, medium to fine sand, little silt, trace gravel, gray. Bottom of exploration at 9.0'; Not refusal.		32 21 14			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-6
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1A	ASPHALT PAVEMENT (7.5 inches).	16	33	73	4	GS
			S-1B	FILL; Asphalt treated base (8 inches).		40 33			EX
			S-2	FILL; Gravel with silty sand, dry, coarse to fine gravel, some sand, little silt, red-brown to gray-brown.	10	32 15 17	35		
5			S-3		8	18 15 7	16		
			S-4	SAND WITH SILT (SP-SM); Loose, wet, coarse to fine sand, few silt, trace gravel, trace organic fibers, gray.	5	9 7 4	7	24	GS NM HYD
10				Bottom of exploration at 9.0'; Not refusal.		2 2 5 9			
15									
20									
25									
30									

Notes:

ENGINEER'S SEAL
STATE OF CONNECTICUT
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PROJECT DESIGNER
HOYLE TANNER

DRAWN BY: JLC
CHECKED BY: RMF
DESIGNED BY: NEG
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

BORING LOGS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
B1.1

SHEET 169 OF 174

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-7
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 3'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1A	ASPHALT PAVEMENT (5 inches).	15	34 29 15	44	4	GS
			S-1B	FILL; Asphalt treated base (8 inches).					EX
			S-2	FILL; Gravel with silty sand, dry, coarse to fine gravel, some sand, little silt, red-brown to gray-brown.	11	11 12 8	16		
5			S-3	SAND WITH SILT (SP-SM); Medium dense, wet, coarse to fine sand, few silt, trace gravel, red-brown to gray-brown.	13	8 9 9 6	13		
			S-4		20	7 8 6 7 7	13		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-8
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1A	ASPHALT PAVEMENT (6 inches).	16	88 73 23	96	3	GS
			S-1B	FILL; Asphalt treated base.					EX
			S-2	FILL; Silty sand with gravel, dry, coarse to fine gravel, some sand, little silt, red-brown to gray-brown.	16	24 9 7 6	13	12	GS HYD
5			S-3	SAND WITH SILT (SP-SM); Medium dense to loose, moist to wet, coarse to fine sand, few to little silt, red-brown to gray-brown.	18	5 9 8 8 9	16		
			S-4		20	5 4 5 6	9		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-9
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 4'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALT PAVEMENT (5 inches).	14	24 22 20	42	4	GS
				FILL; Asphalt treated base (12 inches).					EX
			S-2	SILTY SAND (SM); Medium dense, moist to wet, coarse to fine sand, little silt, red-brown.	0	23 8 10	19		
5			S-3		13	9 8 7 6	14	29	GS NM HYD
			S-4		17	8 8 9 7	14		
10				Bottom of exploration at 9.0'; Not refusal.		7 8			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-10
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 3'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALT PAVEMENT (8 inches).	14	33 28 12	40	2	GS
				FILL; Asphalt treated base (8 inches).					EX
			S-2	SILTY SAND (SM); Loose to medium dense, coarse to fine sand, few gravel, little silt, red brown.	2	10 4 4 5	9		
5			S-3	Becomes gray.	8	6 4 4 3	7	25	GS NM HYD
			S-4		1	2 1 1 2	3		
			S-5		8	2 5 7 9	12		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-15
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/19/24
Date Completed: 01/19/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1A	ASPHALT PAVEMENT (8 inches).	15		100+	4	GS
			S-1B	FILL; Asphalt treated base (10 inches).				3	EX
			S-2	FILL; Gravel with sand and silt, moist to wet, coarse to fine gravel, with coarse to fine sand, little silt, brown.	15	41 46 16 16	62		HYD
5			S-3		7	18 45 52 19	71		
			S-4		0	42 42 8 8	16		
				SAND WITH SILT (SP-SM); Medium dense, wet, medium to fine sand, few silt, red brown.		9			
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-16
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/19/24
Date Completed: 01/19/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALT PAVEMENT (5.5 inches).	19	39 20 37	57	4	GS
				FILL; Asphalt treated base (6 inches).					EX
			S-2	FILL; Silty sand with gravel, dry, coarse to fine gravel, some sand, little silt, red-brown to gray-brown.	12	28 27 35 40	75		
5			S-3	FILL; Gravel with silty sand, moist to wet, coarse to fine gravel, with coarse to fine sand, little silt, brown.	15	38 29 42	84		
			S-4		16	48 41 45 39	84		
10				Bottom of exploration at 9.0'; Not refusal.		28			
15									
20									
25									
30									

Notes:

ENGINEER'S SEAL
STATE OF CONNECTICUT
ROBERT M. RUNEY
No. 25128
LICENSED
PROFESSIONAL ENGINEER

PROJECT DESIGNER
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Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

BORING LOGS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
B1.2

SHEET 170 OF 174

HTA 4/18/2025 12:52:36 AM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\B1.2 - Boring Logs.dwg

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-20
Total Depth (ft): 6.2
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	15	2 3 5	8		
				FILL; Silty sand, red-brown.		5			
			S-2	SILTY SAND (SM); Loose, moist, coarse to fine sand, some silt, trace organic fibers, gray to dark gray.	15	5 5 5	10		
5			S-3	SILTY SAND WITH GRAVEL (SM); Very dense, wet, coarse to fine sand, little gravel, little silt, brown.	3	50/1" 50/3"	50+		
				Bottom of exploration at 6.2'; Auger refusal on possible bedrock or boulder.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-18
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	10	3 4 6	10		
				FILL; Silty sand with gravel, moist to wet, coarse to fine sand, little gravel, little silt, brown to red-brown.		5			
			S-2		17	6 7 10	20		
5				SILTY SAND WITH GRAVEL (SM); Very dense, coarse to fine sand, little to some silt, little gravel, gray-brown to red-brown.		10 12			
			S-3		3	50/3"	50+		
			S-4		0	50/1"	50+		
				Bottom of exploration at 9.0'; Not refusal.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
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Boring Log: B-19
Total Depth (ft): 7
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	15	4 5 7	12		
				FILL; Silty sand with gravel, moist, coarse to fine gravel, with coarse to fine sand, little silt, brown.		5			
			S-2		12	4 8 10	21		
5						11 15			
			S-3	SILTY SAND WITH GRAVEL (SM); Very dense, coarse to fine sand, little gravel, little silt, brown.	3	22 50/1"	50+		
				Bottom of exploration at 9.0'; Auger refusal on possible bedrock.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
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Boring Log: B-20
Total Depth (ft): 6.2
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	15	2 3 5	8		
				FILL; Silty sand, red-brown.		5			
			S-2	SILTY SAND (SM); Loose, moist, coarse to fine sand, some silt, trace organic fibers, gray to dark gray.	15	5 5 5	10		
5			S-3	SILTY SAND WITH GRAVEL (SM); Very dense, wet, coarse to fine sand, little gravel, little silt, brown.	3	50/1" 50/3"	50+		
				Bottom of exploration at 6.2'; Auger refusal on possible bedrock or boulder.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
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Boring Log: B-21
Total Depth (ft): 5.4
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	17	3 4 7	11	7	GS NM HYD
				FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.		8			
			S-2		12	8 8 8	24		
5				SILTY SAND WITH GRAVEL (SM); Very dense, coarse to fine sand, little gravel, little silt, brown.		16 20			
			S-3		2	50/2"	50+		
				Bottom of exploration at 5.4'; Auger refusal on possible bedrock.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
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Boring Log: B-22
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 4'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	13	1 4 8	12		
				FILL; Silty sand with gravel, moist, coarse to fine sand, little silt, little gravel, red-brown to brown.		8			
			S-2		2	50/5"	50+		
5			S-3	SILTY SAND WITH GRAVEL (SM); Medium dense, wet, coarse to fine sand, little gravel, littl	3	12 6 5	11		
			S-4		16	4 4 7	11		
				Bottom of exploration at 9.0'; Not refusal.		6			
10									
15									
20									
25									
30									

Notes:

ENGINEER'S SEAL
STATE OF CONNECTICUT
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www.hoyletanner.com

PROJECT DESIGNER
HOYLE TANNER

Hoyle Tanner & Associates © 2022

DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

BORING LOGS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
B1.3

SHEET 171 OF 174

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-23
Total Depth (ft): 5.9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 3'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	18	8 8 16	24		
			S-2	FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.	10	2 12 10	17		
5				SILTY SAND WITH GRAVEL (SM); Very dense, wet, coarse to fine sand, little gravel, little silt, brown.		7 8			
			S-3		4	8 50/2"	50+		
				Bottom of exploration at 5.9'; Auger refusal on possible bedrock.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-24
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 2'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	7	4 5 7	12		
			S-2	FILL; Silty sand with gravel, moist, coarse to fine sand, little silt, little gravel, red-brown to brown.	12	6 6 9	24	20	GS NM HYD
				FILL; Sandy silt, trace peaty fibers, gray.		18 24			
5			S-3	FILL; Silty sand with gravel, wet, coarse to fine sand, little gravel, little silt, gray brown.	16	37 51	90		
			S-4		6	39 42	62		
				Bottom of exploration at 9.0'; Not refusal.		17 27 35 23			
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-25
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	16	7 14 20	34		
			S-2	FILL; Silty sand with gravel, moist, coarse to fine sand, little silt, little gravel, red-brown to brown.	13	17 17 18	37		
				SILTY SAND (SM); Dense to very dense, coarse to fine sand, some silt, few gravel, red-brown.		19 19			
5			S-3		8	14 18	51		
			S-4	With gravel.	10	24 19	49		
				Bottom of exploration at 9.0'; Not refusal.		22 27 28			
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-26
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 7'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	12	4 6 8	14		
			S-2	FILL; Gravel with silty sand, coarse to fine sand, little gravel, little silt, gray brown.	12	50/1" 4 5	21		
5			S-3	SILTY SAND WITH GRAVEL (SP-SM); Medium dense to dense, wet, coarse to fine sand, little gravel, few silt, brown.	4	16 21 10	24		
			S-4		6	12 14	39	12	GS NM HYD
				Bottom of exploration at 9.0'; Not refusal.		10 12 22 29			
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-27
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	15	4 4 9	13		
			S-2	FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.	0	16 1 10	19		
5			S-3	SILTY SAND (SM); Loose, wet, medium to fine sand, little silt, red-brown.	5	9 5 4	6		
			S-4	SILTY SAND WITH GRAVEL (SM); Dense, wet, coarse to fine sand, little gravel, few silt, brown.	12	2 3 2	35	10	GS NM HYD
				Bottom of exploration at 9.0'; Not refusal.		7 28 54			
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-28
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 3'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	17	5 9 7	16		
			S-2	FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.	10	8 9 7	22		
				FILL; Sandy silt, wet, silt, with fine sand, few roots and organics, gray.		15 28			
5			S-3	SILTY SAND WITH GRAVEL (SM); Very dense, wet, coarse to fine sand, little gravel, few silt, brown.	6	14 22	49		
			S-4		8	27 39	56		
				Bottom of exploration at 9.0'; Not refusal.		31 40 16 12			
10									
15									
20									
25									
30									

Notes:

ENGINEER'S SEAL
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CHECKED BY: RMF
DRAWN BY: JLC
DESIGNED BY: NEG
DATE: APRIL 2025

PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

BORING LOGS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
B1.4

SHEET 172 OF 174

R.W. Gillespie & Associates
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• Materials Testing Services

Boring Log: B-29
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 7'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	18	4 13 10	23		
			S-2	FILL; Silty sand with gravel, moist, coarse to fine sand, little silt, little gravel, red-brown to brown. Red-brown to gray.	12	12 6 7 12	19	52	GS NM HYD
5			S-3	Brown to gray-brown.	14	14 32 19 12	31		
			S-4	Wet, silty gravel with sand.	8	12 9 10 11	23		
10				Bottom of exploration at 9.0'; Not refusal.		12			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: B-30
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 8'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	18	17 19 20	39		
			S-2	FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.	14	28 13 14 14	28		
5			S-3		18	12 15 17 19	36		
			S-4		10	22 15 19 14	33		
10				Bottom of exploration at 9.0'; Not refusal.		12			
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: CBR-1
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANIC MATERIAL (6 inches).	3	4 6 9	15		
			S-2	SAND WITH SILT (SP-SM); Loose, medium to fine sand, few silt, few gravel, red-brown.	18	10 6 7 6	13		
5			S-3	Wet.	15	5 1 2 3	5		
			S-4	Slightly siltier.	18	2 1 2 1 2	3		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

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• Materials Testing Services

Boring Log: CBR-2
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 8'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	TOPSOIL AND ORGANIC MATERIAL (6 inches).	19	2 2 4 5	6		
			S-2	SAND WITH SILT (SP-SM); Loose, medium to fine sand, few silt, few gravel, red-brown.	15	5 4 4 4	8		
5			S-3		17	4 5 2 2 2	4		
			S-4		15	2 2 4 4 5	8		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: CBR-3
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings and concrete
Observed Water Depth: 5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/15/24
Date Completed: 01/15/24
Surface Elevation:
Drilling Method: Spin Casing, SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1A	ASPHALT PAVEMENT (7 inches).	14	17 31 33	64	3	GS EX
			S-1B	FILL; Asphalt treated base (8 inches).		22 21 17			
			S-2	FILL; Gravel with silty sand, dry, coarse to fine gravel, some sand, little silt, red-brown to gray-brown.	7	9 8	26		
5			S-3	SAND WITH SILT (SP-SM); Medium dense, wet, coarse to fine sand, few silt, gray-brown.	6	3 5 6	11		
			S-4		16	6 5 5 6 7	11		
10				Bottom of exploration at 9.0'; Not refusal.					
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
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• Environmental Consulting
• Materials Testing Services

Boring Log: CBR-4
Total Depth (ft): 5
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				ASPHALT PAVEMENT (6.5 inches).					
				FILL; Asphalt treated base (8 inches).					
				FILL; Silty sand with gravel.					
5				SILTY SAND (SM)					
				Bottom of exploration at 5.0'; Not refusal.					
10									
15									
20									
25									
30									

Notes:

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DESIGNED BY: NEG
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL 2025

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

BORING LOGS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
B1.5

SHEET 173 OF 174

HTA 4/18/2025 1:00:58 AM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD-Permit\0-Contract\B1.5 - Boring Logs.dwg

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• Geotechnical Engineering
• Environmental Consulting
• Materials Testing Services

Boring Log: CBR-5
Total Depth (ft): 5
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				ASPHALT PAVEMENT (7 inches).					
				FILL; Asphalt treated base (8 inches).					
				FILL; Silty sand with gravel.					
5				SILTY SAND (SM)					
				Bottom of exploration at 5.0'; Not refusal.					
10									
15									
20									
25									
30									

Notes:

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• Geotechnical Engineering
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Boring Log: CBR-6
Total Depth (ft): 5
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				ASPHALT PAVEMENT (7 inches).					
				FILL; Asphalt treated base (8 inches).					
				FILL; Silty sand with gravel.					
5				SILTY SAND (SM)					
				Bottom of exploration at 5.0'; Not refusal.					
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
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Boring Log: CBR-7
Total Depth (ft): 9.2
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 6.5'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	18	4 7 10	17		
			S-2	FILL; Silty sand with gravel, moist, coarse to fine sand, little silt, little gravel, red-brown to brown.	5	14 14 12	19		
5			S-3	SILTY SAND WITH GRAVEL (SM); Very dense, coarse to fine sand, little to some silt, little gravel, gray-brown to red-brown.	10	7 6 10 10 18 50/0"	28		
			S-4	Bottom of exploration at 9.2'; Not refusal.	0	50/2"	50+		
10									
15									
20									
25									
30									

Notes:

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Boring Log: CBR-8
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 6'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: N/A

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	18	4 12 9	21	10	GS NM HYD
			S-2	FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.	10	8 12 23	57	21	
5			S-3		12	34 38 10 12	26		
			S-4	SILTY SAND (SM); Medium dense, wet, medium to fine sand, little silt, red brown.	12	14 18 12	15		
				Bottom of exploration at 9.0'; Not refusal.		7 8 8			
10									
15									
20									
25									
30									

Notes:

R.W. Gillespie & Associates
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• Materials Testing Services

Boring Log: CBR-9
Total Depth (ft): 9
Sheet 1 of 1

Project Name: Reconstruct Runway 2-20
RWG&A Project No. 0495-113-23
Location: New Haven, Connecticut
Client: Hoyle, Tanner & Associates, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: 7'

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50
Driller Rep.: Mike Nadeau
Date Started: 01/17/24
Date Completed: 01/17/24
Surface Elevation:
Drilling Method: SSA/ Open Hole
Casing Type: 4" Spin Casing

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Topsoil and organic material (6 inches).	18	11 17 17	34		
			S-2	FILL; Silty sand with gravel, coarse to fine sand, little gravel, little silt, gray brown.	10	22 7 12	26		
5			S-3		14	14 10 8	19		
			S-4	Brown.	12	13 18 14	22		
				Bottom of exploration at 9.0'; Not refusal.		10 12 10			
10									
15									
20									
25									
30									

Notes:

ENGINEER'S SEAL
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DESIGNED BY: NEG
DRAWN BY:
CHECKED BY: RMF
DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

BORING LOGS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
B1.6

SHEET 174 OF 174

TWEED NEW HAVEN AIRPORT

TWEED NEW HAVEN AIRPORT

RUNWAY EXTENSION AND TERMINAL EXPANSION

155 BURR STREET EAST
HAVEN, CT
06512

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(F) (713) 968-9333

DESIGNER

WSP USA
500 WINDING BROOK DR.
GLASTONBURY, CT 06033
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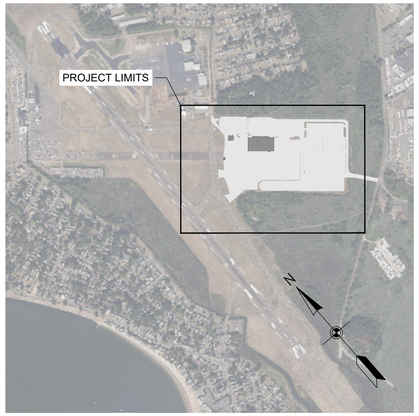
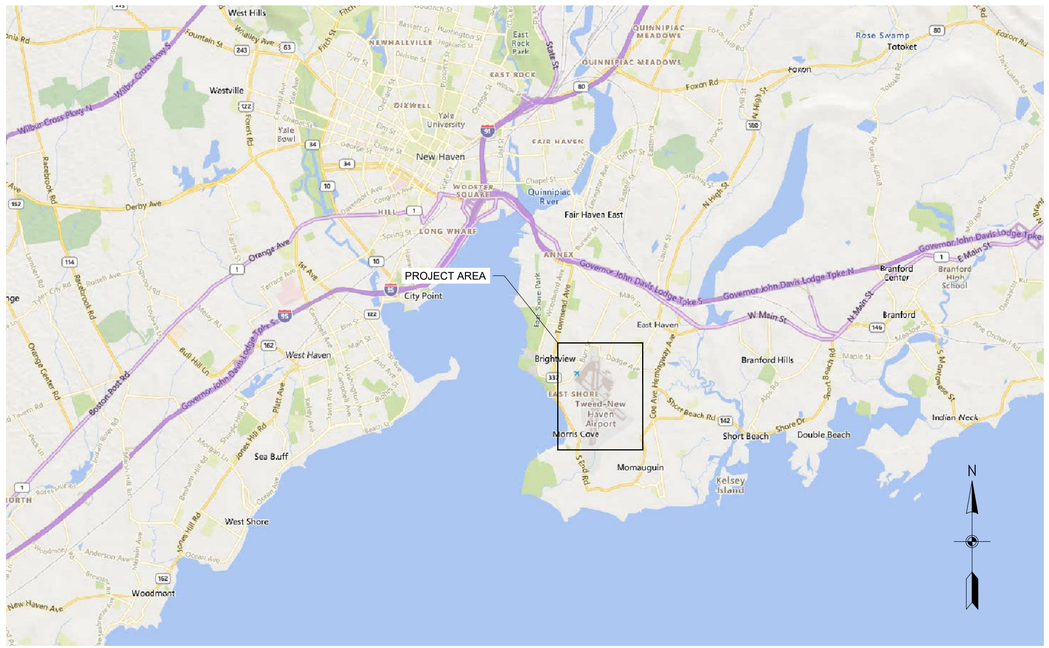
LOCATION MAP



AREA MAP



PROJECT No. US0025063.0769 (WSP) 1005259.04 (PGAL) 240248.01 (DESIMONE) 23-006724 (SYSKA)

02/20/2025

CLIENT

TWEED NEW HAVEN AIRPORT
155 BURR STREET
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WSP USA
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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
COVER SHEET

DATE	DRN BY	CHK BY	APP BY
02/20/2025	KR	GFR	CBC

SHEET NUMBER
G0.01

HVN - 2/26/2025 12:44:42 PM - C:\Users\USSD674131\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\GENERAL\PLOTSHEETS\202400769-G0.01.dwg

#	SHEET NO.	DRAWING TITLE	60%
		GENERAL	
1	G0.01	COVER SHEET	•
2	G0.02	INDEX OF DRAWINGS	•
3	G0.03	LOCATION PLAN	•
4	G0.04	GENERAL NOTES	•
5	G1.00	EXISTING CONDITIONS PLAN - OVERALL	•
6	G1.01	EXISTING CONDITIONS PLAN - SHEET 1 OF 7	•
7	G1.02	EXISTING CONDITIONS PLAN - SHEET 2 OF 7	•
8	G1.03	EXISTING CONDITIONS PLAN - SHEET 3 OF 7	•
9	G1.04	EXISTING CONDITIONS PLAN - SHEET 4 OF 7	•
10	G1.05	EXISTING CONDITIONS PLAN - SHEET 5 OF 7	•
11	G1.06	EXISTING CONDITIONS PLAN - SHEET 6 OF 7	•
12	G1.07	EXISTING CONDITIONS PLAN - SHEET 7 OF 7	•
		CONSTRUCTION STAGING	
13	CS1.00	CONSTRUCTION SAFETY AND PHASING PLAN - OVERALL	•
14	CS1.01	CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 1	•
15	CS1.02	CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 2	•
16	CS1.03A	CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 3A	•
17	CS1.03B	CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 3B	•
18	CS1.04	CONSTRUCTION SAFETY AND PHASING - DETAILS	•
		GEOTECHNICAL	
19	GT0.00	SUBSURFACE EXPLORATION PLAN	•
		CIVIL	
20	C0.01	CIVIL LEGEND AND ABBREVIATIONS	•
21	C0.02	CIVIL NOTES	•
22	C1.00	SEDIMENT AND EROSION CONTROL PLAN - OVERALL	•
23	C1.01	EROSION AND SEDIMENT CONTROL PLAN - PHASE 1A & 1B	•
24	C1.02A	EROSION AND SEDIMENT CONTROL PLAN - PHASE 2A	•
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26	C1.02C	EROSION AND SEDIMENT CONTROL PLAN - PHASE 2C	•
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CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD E. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

INDEX OF DRAWINGS

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

G0.02

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ALIGNMENT CONTROL:

TAXIWAY Y (TW Y)
BEGIN STA. 100+00.00 - N: 656624.11, E: 962685.86
P.I. STA. 102+32.63 - N: 656486.04, E: 962873.10, R75'
END STA. 111+50.00 - N: 655880.99, E: 963562.65

TAXIWAY Z (TW Z)
BEGIN STA. 200+00.00 - N: 656329.25, E: 962563.46
P.I. STA. 203+10.75 - N: 656273.75, E: 962873.08, R75'
END STA. 204+66.54 - N: 656393.70, E: 962978.33

ACCESS ROAD CL
BEGIN STA. 0+00.00 - N: 655157.63, E: 964259.44
P.I. 1 STA. 4+10.86 - N: 655480.52, E: 964005.39, R50'
P.I. 2 STA. 11+05.19 - N: 656013.26, E: 964471.79, R62'
P.I. 3 STA. 20+26.95 - N: 656643.27, E: 963726.85, R28'
P.I. 4 STA. 20+94.57 - N: 656702.29, E: 963729.68, R15'
P.I. 5 STA. 23+76.04 - N: 656887.63, E: 963517.79, R62.12'
P.I. 6 STA. 25+64.34 - N: 656723.76, E: 963376.43, R75'
P.I. 7 STA. 32+31.96 - N: 656262.51, E: 963902.61, R75'
P.I. 8 STA. 37+33.67 - N: 655860.05, E: 963552.18, R58'
END STA. 37+66.78 - N: 656903.69, E: 963590.38

GENERAL NOTES:

1. GRID COORDINATE SYSTEM: NAD83, CONNECTICUT STATE PLANE, US FOOT. VERTICAL DATUM: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD 88), US FOOT.

2. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY CONTROL POINT INFORMATION PRIOR TO CONSTRUCTION. THE CONTRACTOR MUST REPORT TO CDIA ANY DISCREPANCIES FOUND DURING SURVEY VERIFICATIONS.

AIRPORT CONTROL POINTS

NO.	DESIGNATION	DESCRIPTION	LATITUDE	LONGITUDE	ELEVATION
101	HVN D	PACS	N041° 16' 04.80"	W072° 53' 18.39"	4.40
102	HVN E	SACS	N041° 15' 41.58"	W072° 53' 00.60"	3.80
103	HVN F	SACS	N041° 15' 34.67"	W072° 53' 20.13"	2.90

CONTROL POINTS

NO.	DESIGNATION	DESCRIPTION	LATITUDE	LONGITUDE	ELEVATION
201	2	NAIL	N041° 15' 48.92"	W072° 53' 05.35"	4.62
202	3	REBAR	N041° 15' 40.25"	W072° 53' 00.07"	3.83
203	4	NAIL	N041° 15' 42.39"	W072° 52' 55.44"	4.20
204	5	NAIL	N041° 15' 46.71"	W072° 52' 55.21"	5.12
205	35	NAIL	N041° 15' 40.33"	W072° 52' 47.11"	5.08
206	36	NAIL	N041° 15' 38.51"	W072° 52' 49.48"	4.29

0 200' 400' 800'
HORIZONTAL SCALE 1"=400'

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02/20/2025	SSD	GFR	CBC

SHEET NUMBER
G0.03

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NOTE:

THESE NOTES ARE INTENDED TO HIGHLIGHT THE REQUIREMENTS SET FORTH IN THE PROJECT SPECIFICATIONS, BUT, IN ALL CASES, REQUIREMENTS OF THE PROJECT SPECIFICATIONS SHALL GOVERN.

AIRPORT OPERATIONS COORDINATOR

THE OWNER SHALL PROVIDE AN OPERATIONS COORDINATOR WHO SHALL HAVE THE AUTHORITY TO OPEN AND CLOSE FACILITIES, ISSUE AND REMOVE NOTICE TO AIRMEN (NOTAM'S), AND TO COORDINATE WITH AIRPORT USERS. COORDINATION WITH NOTAM ISSUANCE & CONSTRUCTION ACTIVITIES SHALL BE THROUGH THE ENGINEER.

THE CONTRACTORS ATTENTION IS DIRECTED TO THE CONSTRUCTION SAFETY AND PHASING PLAN REGARDING ACCESS TO THE JOB SITE. THE CONTRACTOR SHALL BE RESPONSIBLE TO ADHERE TO THE REQUIREMENTS OF THE TECHNICAL SPECIFICATIONS REGARDING AIRPORT SECURITY.

PAVEMENTS AND SAFETY AREAS. THE WORK VEHICLES ONCE INSIDE THE PERIMETER FENCING, SHALL REMAIN CLEAR OF THE ACTIVE RUNWAY, TAXIWAY AND SAFETY AREAS. WHEN NECESSARY, THE CONTRACTOR SHALL PROVIDE FLAGPERSONS AND RADIO CONTROL AS REQUIRED BY **X-XXX** OF THE TECHNICAL SPECIFICATIONS. ALL HAUL ROUTES SHALL BE MAINTAINED PER SECTION "**X-XXX** HAUL ROUTES" OF THE TECHNICAL SPECIFICATIONS.

NORMAL AIRPORT OPERATION WILL BE CONDUCTED ON THE AIRFIELD DURING CONSTRUCTION AND THE WORK SHALL BE CARRIED ON IN SUCH A MANNER AS NOT TO INTERFERE WITH THE NECESSARY OPERATION OF THE AIRPORT. THE CONTRACTOR SHALL TAKE ALL PRECAUTIONS NECESSARY TO ENSURE THE SAFETY OF OPERATING AIRCRAFT AS WELL AS HIS OWN EQUIPMENT AND PERSONNEL.

ALL AIRPORT PAVEMENTS SHALL BE KEPT CLEAR AND CLEAN AT ALL TIMES OF ROCKS, DIRT, MUD, AND OTHER DEBRIS CARRIED ONTO THE AIRPORT PAVEMENT. THE CONTRACTOR'S EQUIPMENT MUST BE REPORTED TO THE ENGINEER OR THE AIRPORT OPERATIONS COORDINATOR. THE AIRPORT OPERATIONS COORDINATOR WILL THEN CLOSE THE AFFECTED AREA TO THE SATISFACTION OF THE AIRPORT OPERATIONS COORDINATOR.

AIRPORT SECURITY

THE CONTRACTOR SHALL COMPLY WITH ALL AIRPORT SECURITY REQUIREMENTS AS DIRECTED BY THE AIRPORT OPERATIONS COORDINATOR. WORK IN THE AIRPORT OPERATIONS AREA (AOA) WILL REQUIRE CRIMINAL BACKGROUND CHECKS. PARKING OF PERSONAL CARS AT THE WORK SITES WILL NOT BE PERMITTED. THE CONTRACTOR AS A SUBSIDIARY OBLIGATION, SHALL PROVIDE ADEQUATE AND SAFE TRANSPORTATION TO/FROM THE WORK AREA. EMPLOYEES AND DRIVERS OF WORK VEHICLES WILL BE INSTRUCTED BY HIS/HER EMPLOYER FROM THE AREA WHERE THE CARS ARE PARKED, AS TO PROPER ACCESS ROADS AND WILL BE CAUTIONED THAT UNAUTHORIZED USE OF AIRCRAFT PAVEMENTS OR OTHER AREAS OUTSIDE THE DESIGNATED WORK AREA MAY LEAD TO THEIR ARREST AND SUBSEQUENT PAYMENT OF FINES. ALL ORDERS FOR MATERIAL SHALL INSTRUCT THE SUPPLIER OF THE PROCEDURES TO BE FOLLOWED.

THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER WITHIN 10 DAYS AFTER SIGNING OF THE CONTRACT A WRITTEN METHOD OF OPERATIONS DETAILING THE PRECAUTIONS HE/SHE PROPOSES FOR THE CONTROL OF VEHICLE TRAFFIC INCLUDING FLAGPERSONS, SIGNS, ESCORTS AND ANY OTHER MEASURES HE/SHE PROPOSES. AFTER APPROVAL OF HIS/HER OPERATING SCHEDULE, THE CONTRACTOR SHALL FOLLOW IT EXPLICITLY. THE OWNER MAY CLOSE THE WORK AREA AT ANY TIME THIS SCHEDULE IS VIOLATED SO AS NOT TO ENDANGER AIRPORT OR AIRCRAFT OPERATIONS. SUCH CLOSURE SHALL NOT BE CONSIDERED A VALID REASON FOR EXTENDING THE CONTRACT TIME OR FOR ANY CLAIM FOR EXTRAS BY THE CONTRACTOR. ALL SECURITY ARRANGEMENTS SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER. THE CONTRACTOR'S PERSONNEL AND VEHICLES WILL NOT HAVE ACCESS TO THE ENTIRE AIRPORT, BUT SHALL BE LIMITED TO THE WORK AREA AND THE STAGING AREA.

AIRCRAFT OPERATIONS AREA

THE CONTRACTOR SHALL KEEP HIS/HER PERSONNEL AND EQUIPMENT AT LEAST 250 FEET FROM THE CENTERLINE OF ACTIVE RUNWAYS AND AT LEAST 130 FEET FROM THE CENTERLINE OF ACTIVE TAXIWAYS AND APRONS FOR AIRCRAFT MOVEMENTS UNLESS PRIOR APPROVAL HAS BEEN OBTAINED.

OPEN TRENCHES OR EXCAVATIONS

THE CONTRACTOR WILL NOT BE PERMITTED TO LEAVE ANY TRENCHES OR OTHER EXCAVATIONS OPEN WHEN THE CONTRACTOR IS NOT ON THE SITE. IN ADDITION, NO EXCAVATIONS EXCEEDING 3 INCHES IN DEPTH SHALL BE LEFT OPEN WITHIN THE RUNWAY AND TAXIWAY SAFETY AREAS WHILE THE RUNWAYS, TAXIWAYS, AND APRONS ARE IN USE UNLESS THE EXCAVATIONS ARE COVERED WITH APPROVED PLATES. STEEL PLATES SHALL BE CAPABLE OF BEARING THE HEAVIEST AIRCRAFT/ VEHICLE USING THE AIRPORT/ROADWAY OVER THE SPAN IN WHICH THEY ARE TO BE USED. THE CONTRACTOR SHALL KEEP THE LENGTH OF OPEN TRENCHES COVERED WITH STEEL PLATES TO A MINIMUM, BUT IN NO CASE SHALL THE LENGTH EXCEED THE DISTANCE BETWEEN TWO ADJACENT MANHOLES OR CATCH BASINS.

ALL EXCAVATIONS SHALL BE BACKFILLED AND THE PAVEMENT REPAIRED AND PROPERLY CURED PRIOR TO THE AREA BEING REOPENED TO TRAFFIC.

PRIOR TO THE CLOSE OF WORK EACH NIGHT, THE CONTRACTOR SHALL ENSURE THAT THE WORK AREAS ARE GRADED AWAY FROM THE PAVEMENTS AT A MAXIMUM SLOPE OF 5% AND SHALL BE LEFT IN SUCH A CONDITION THAT IT WILL DRAIN READILY AND EFFECTIVELY AND WILL NOT POSE A HAZARD TO VEHICLES OR AIRCRAFT. NO PILES OF SOIL SHALL BE LEFT UNSPREAD, NO SHARP CHANGES IN GRADE WILL BE PERMITTED, AND THE SURFACE SHALL BE THOROUGHLY COMPACTED.

DISPOSAL OF SURPLUS AND UNSUITABLE MATERIALS

ALL DRAINAGE STRUCTURES AND PIPES, ALL BITUMINOUS CONCRETE PAVEMENT AND ALL PORTLAND CEMENT CONCRETE PAVEMENT SHALL BE LEGALLY DISPOSED OF BY THE CONTRACTOR OFF AIRPORT PROPERTY.

SURPLUS EXCAVATION MATERIALS, SHALL BE INCIDENTAL TO THE COST OF THE ITEM THAT GENERATES THE MATERIAL.

ALL EQUIPMENT, MANPOWER, TRAFFIC CONTROL, FLAGMEN, SIGNS, BARRICADES, GATES, LEGAL POLICE OFFICERS (IF REQUIRED) AND OTHER ITEMS NECESSARY FOR THE SAFE AND EFFICIENT HAULING OF EXCESS MATERIALS IS THE RESPONSIBILITY OF THE CONTRACTOR AND INCIDENTAL TO THE COST OF THE ITEM WHICH GENERATES THE MATERIAL.

ALL UNSUITABLE MATERIALS SHALL BE LEGALLY DISPOSED OF OFF AIRPORT PROPERTY BY THE CONTRACTOR. NO SEPARATE MEASUREMENT AND PAYMENT WILL BE MADE FOR THE DISPOSAL, BUT RATHER THE DISPOSAL SHALL BE INCIDENTAL TO THE ITEM THAT GENERATES THE MATERIAL TO BE DISPOSED OF.

UNDERGROUND UTILITIES AND CABLES

THE APPROXIMATE LOCATIONS OF KNOWN UTILITIES AND UNDERGROUND CABLES ARE SHOWN ON THE CONTRACT DRAWINGS. PRIOR TO COMMENCEMENT OF ANY EXCAVATION THE CONTRACTOR SHALL COORDINATE ALL WORK ON AND IN THE VICINITY OF THE UNDERGROUND UTILITIES AND CABLES WITH THE FOLLOWING AGENCIES AS APPROPRIATE.

CALL BEFORE YOU DIG		(800) 344-7233
SOUTHERN CT GAS		(203) 795-7783
FRONTIER COMMUNICATIONS (TELECOMMUNICATIONS)		(800) 921-8102
UNITED ILLUMINATION, INC. (ELECTRIC)		(203) 843-5708
SOUTH CENTRAL REGIONAL WATER AUTHORITY		(203) 401-2604
GREATER NEW HAVEN REGIONAL WATER		
POLLUTION CONTROL AUTHORITY (GNHWPCA)		(203) 466-5280
NEW HAVEN UTILITIES ENGINEER		(203) 946-8099
NEW HAVEN PUBLIC WORKS DEPT		(203) 946-7700
THE FEDERAL AVIATION ADMINISTRATION AIRWAYS		
FACILITY SECTOR FIELD OFFICE	(203) 464-8897 OR	(203) 605-7512
OPERATIONS AND MAINTENANCE		(203) 469-7773

THE CONTRACTOR SHALL REPAIR, AT HIS/HER OWN EXPENSE, ANY UNDERGROUND CABLES OR UTILITIES DAMAGED BY HIS/HER OPERATIONS INCLUDING ANY DAMAGE DONE BY DRIVING HIS/HER EQUIPMENT OVER EXISTING UNDERGROUND CABLES OR UTILITIES. THE REPAIR OF FAA CABLES SHALL BE INSPECTED AND APPROVED BY THE FAA.

RADIO CONTROL

THE CONTRACTOR SHALL HAVE TWO-WAY RADIO COMMUNICATION BETWEEN THE RADIO CONTROL VEHICLE AND HIS/HER FIELD OFFICE, SUPERINTENDENT'S VEHICLE, FLAGPERSONS, AND ESCORT VEHICLES. NO FAA OR OTHER AIRPORT FREQUENCY WILL BE USED FOR THIS PURPOSE. THESE RADIOS SHALL BE PURCHASED, INSTALLED, MAINTAINED AND OPERATED AT THE CONTRACTOR'S EXPENSE.

RADIO CONTROL WILL BE REQUIRED WHENEVER THE CONTRACTOR IS WORKING IN OR ADJACENT TO THE AIRCRAFT OPERATIONS AREAS. RADIO CONTROL AND FLAGPERSONS WILL BE REQUIRED WHENEVER THE CONTRACTOR'S VEHICLE AND EQUIPMENT ARE ON OR CROSSING ACTIVE RUNWAYS, TAXIWAYS OR APRONS.

FLAG PERSON

THE CONTRACTOR SHALL PROVIDE FLAGPERSONS AT EACH ACTIVE RUNWAY, TAXIWAY AND APRON PAVEMENT BEING CROSSED BY HIS/HER EQUIPMENT TO ASSURE THAT MOVING AIRCRAFT ARE GIVEN THE RIGHT-OF-WAY AT ALL TIMES. FLAG PERSONS AND EQUIPMENT ARE TO MEET CURRENT MUTCD STANDARDS. AIRPORT RESERVES THE RIGHT TO SHUTDOWN WORK ACTIVITIES, WITHOUT PENALTY, FOR NON-CONFORMANCE TO REGULATIONS OR FOR UNSAFE CONTROLS. FLAGPERSONS SHALL ALSO BE REQUIRED WHEN VEHICLES ON A SERVICE ROAD ARE CROSSING THE APPROACH TO AN ACTIVE RUNWAY IN ADDITION TO PREVIOUSLY SPECIFIED RADIO CARS. THE FLAGPERSONS SHALL BE CAREFULLY SELECTED AND FULLY INSTRUCTED AS TO THEIR DUTIES IN REGULATING THE CONTRACTOR'S EQUIPMENT CROSSING THE AIRCRAFT PAVEMENT. THEY SHALL ALSO BE PROVIDED WITH BROOM, SHOVEL, AND BRUSH AND INSTRUCTED TO REMOVE ANY DEBRIS THAT MIGHT BE LEFT BY THE EQUIPMENT ON THE AIRCRAFT PAVEMENT WHERE IT MIGHT BE INGESTED BY AN AIRCRAFT ENGINE. EACH FLAGPERSON SHALL BE PROVIDED WITH, AND SHALL WEAR AT ALL TIMES THEY ARE DIRECTING TRAFFIC, AN APPROVED STRIPED VEST OF A TYPE SPECIFICALLY DESIGNED FOR USE BY TRAFFIC CONTROL PERSONNEL.

BARRICADES

THE CONTRACTOR SHALL FURNISH AND PLACE BARRICADES AS REQUIRED TO CLEARLY DEFINE AND CLOSE WORK AREAS TO AIRCRAFT OPERATIONS, SEE CONSTRUCTION SAFETY AND PHASING PLANS.

THE BARRICADES SHALL BE PLACED AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE BARRICADES SHALL BE LOW PROFILE TYPE, AS LOW AS POSSIBLE TO THE GROUND, EASILY COLLAPSIBLE UPON CONTACT WITH AN AIRCRAFT, AND OF LOW MASS. THE BARRICADES SHALL BE BRIGHT ORANGE AND WHITE AND WHEN USED TO DEFINE HAZARDOUS AREAS AT NIGHT SHALL BE LIGHTED IN A MANNER APPROVED BY THE PROGRAM MANAGER AND OWNER. NO OPEN FLAME LIGHTING SHALL BE USED. ALL TEMPORARY LIGHTS AND BARRICADES SHALL BE WEIGHTED AGAINST JET BLASTS (100 MPH).

HAUL ROUTES

PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL PREPARE A PLAN SHOWING PROPOSED HAUL ROUTES FOR THE APPROVAL OF THE ENGINEER. WHEN A PUBLIC HIGHWAY MUST BE USED FOR HAUL ROUTES, IT WILL BECOME THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN THE PROPER PERMITS NEEDED FOR THIS FUNCTION AND TO OBEY RULES AND REGULATIONS PERTINENT TO THE PUBLIC HIGHWAYS.

HAUL ROUTES ON THE AIRPORT SHALL BE AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL STAKE OR OTHERWISE DELINEATE THE HAUL ROUTES. THE CONTRACTOR'S VEHICLES AND EQUIPMENT SHALL OPERATE WITHIN THE LIMITS OF THE MARKED HAUL ROUTE. CONTRACTOR'S VEHICLES WILL NOT BE ALLOWED ACCESS TO PORTIONS OF THE AIRPORT OTHER THAN THE WORK AND STAGING AREAS.

ALL PAVED HAUL ROADS OR ACCESS ROADS SHALL BE KEPT CLEAN AT ALL TIMES TO PREVENT THE ACCUMULATION OF DIRT AND MUD AND THE GENERATION OF DUST BY SWEEPING, WASHING OR OTHER METHODS AS DIRECTED BY THE OWNER. UNPAVED HAUL ROADS, IF ANY, SHALL BE MAINTAINED BY BLADING AND FILLING WHEN DIRECTED BY THE OWNER AND DUST SHALL BE CONTROLLED AT ALL TIMES.

PRIOR TO THE START OF WORK, THE CONTRACTOR SHALL TAKE AND DELIVER TO THE OWNER, PHOTOGRAPHS OF ALL PROPOSED HAUL ROUTES. VIEWS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER BEFORE THE CONTRACT WILL BE CONSIDERED COMPLETE. ALL RESTORATION AND DUST CONTROL ON HAUL ROADS SHALL BE AT THE CONTRACTOR'S EXPENSE.

AIRPORT OPERATIONS AND SAFETY REQUIREMENTS

THE CONTRACTOR SHALL STAKE AND PERMANENTLY MARK ON THE GROUND WITH A READILY RECOGNIZABLE MARKING (GRADE STAKES W/YELLOW ROPE, LIT BARRICADES) THE RESTRICTION LINES PARALLEL TO THE TAXIWAYS AND RUNWAYS ADJACENT TO THE WORK AND THE APPROACH ZONE LIMITS SO THAT PERSONNEL CAN READILY RECOGNIZE THE LIMITATIONS.

WHEN PERMISSION HAS BEEN GRANTED TO WORK INSIDE THESE LIMITS, NO EQUIPMENT SHALL BE LEFT WITHIN THE LINES WHEN NOT ACTUALLY WORKING. DURING BREAKS IN THE DAILY WORK SCHEDULE, NIGHTS, WEEKENDS, OR THE DAYS WHEN WORK IS NOT PERMITTED OR IS NOT PROGRESSING, THE EQUIPMENT SHALL BE LOCATED OUTSIDE OF THESE RESTRICTION LINES. ALL BOOMS SHALL BE LOWERED WHEN THE EQUIPMENT IS NOT IN OPERATION. NO CONSTRUCTION OPERATIONS, INCLUDING AN OPEN FLAME SUCH AS WELDING OR BURNING, SHALL BE CARRIED ON NEAR ANY AIRCRAFT.

EACH CONTRACTOR'S MOTORIZED VEHICLE OPERATING IN AN AIRCRAFT MOVEMENT AREA SHALL BE EQUIPPED WITH AN AMBER FLASHING LIGHT AND A 3-FOOT SQUARE FLAG CONSISTING OF INTERNATIONAL ORANGE AND WHITE SQUARES NOT LESS THAN ONE FOOT SQUARE DISPLAYED IN FULL VIEW ABOVE THE VEHICLE.

IN ADDITION, ALL CONTRACTOR'S VEHICLES SHALL HAVE THE COMPANY IDENTIFICATION PLAINLY VISIBLE ON BOTH SIDES OF THE VEHICLE IN ORDER TO IDENTIFY THE VEHICLE.

MAINTENANCE OF THE CONSTRUCTION SITE

THE CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE FREE OF PAPER, BOXES, CLOSED CONTAINERS AND OTHER DEBRIS WHICH COULD BE BLOWN ONTO THE RUNWAYS AND TAXIWAYS. LOOSE TRASH PLACED IN TRUCK BED IS PROHIBITED.

THE CONTRACTOR SHALL MAINTAIN, AT THE CONSTRUCTION SITE, THE EQUIPMENT FOR THE APPLICATION OF WATER TO CONTROL DUST WITHIN THE CONSTRUCTION SITE AND ON HAUL ROADS. THE EQUIPMENT SHALL BE EQUIPPED WITH A SHUT-OFF CONTROL VALVE, WHICH CAN BE OPERATED FROM THE CAB BY THE OPERATOR. THE CONTRACTOR SHALL APPLY WATER FOR DUST CONTROL AS NECESSARY TO PREVENT DUST FROM THE CONSTRUCTION SITE AND/OR HAUL ROADS FROM BEING A HAZARD TO AIRCRAFT AND FROM BEING A NUISANCE TO THE PUBLIC AND AS DIRECTED BY THE ENGINEER.

PHOTOS

THE CONTRACTOR SHALL HAVE TWO HIGH RESOLUTION DIGITAL CAMERAS ON SITE AT ALL TIMES AND SHALL SUPPLY ONE OF THE TWO TO THE ENGINEER. THESE CAMERAS SHALL BE PURCHASED, INSTALLED, MAINTAINED AND OPERATED AT THE CONTRACTOR'S EXPENSE. THE CONTRACTOR SHALL TAKE PHOTOS DURING CONSTRUCTION IN ACCORDANCE WITH SPECIFICATION SECTION **X-XXX**.

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

GENERAL NOTES

DATE	DRN BY	CHK BY	APP BY
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SHEET NUMBER

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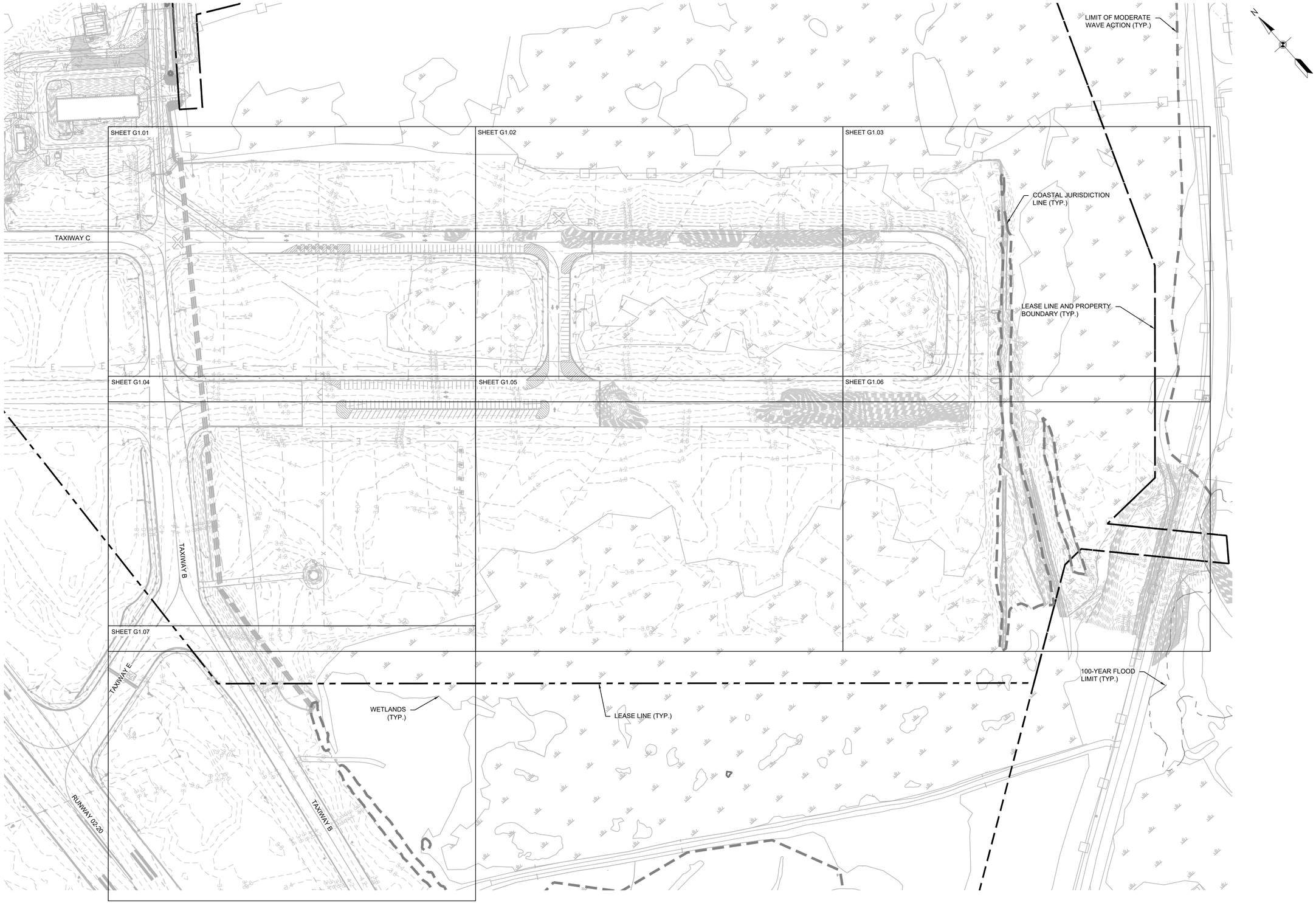

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DRAWING HISTORY

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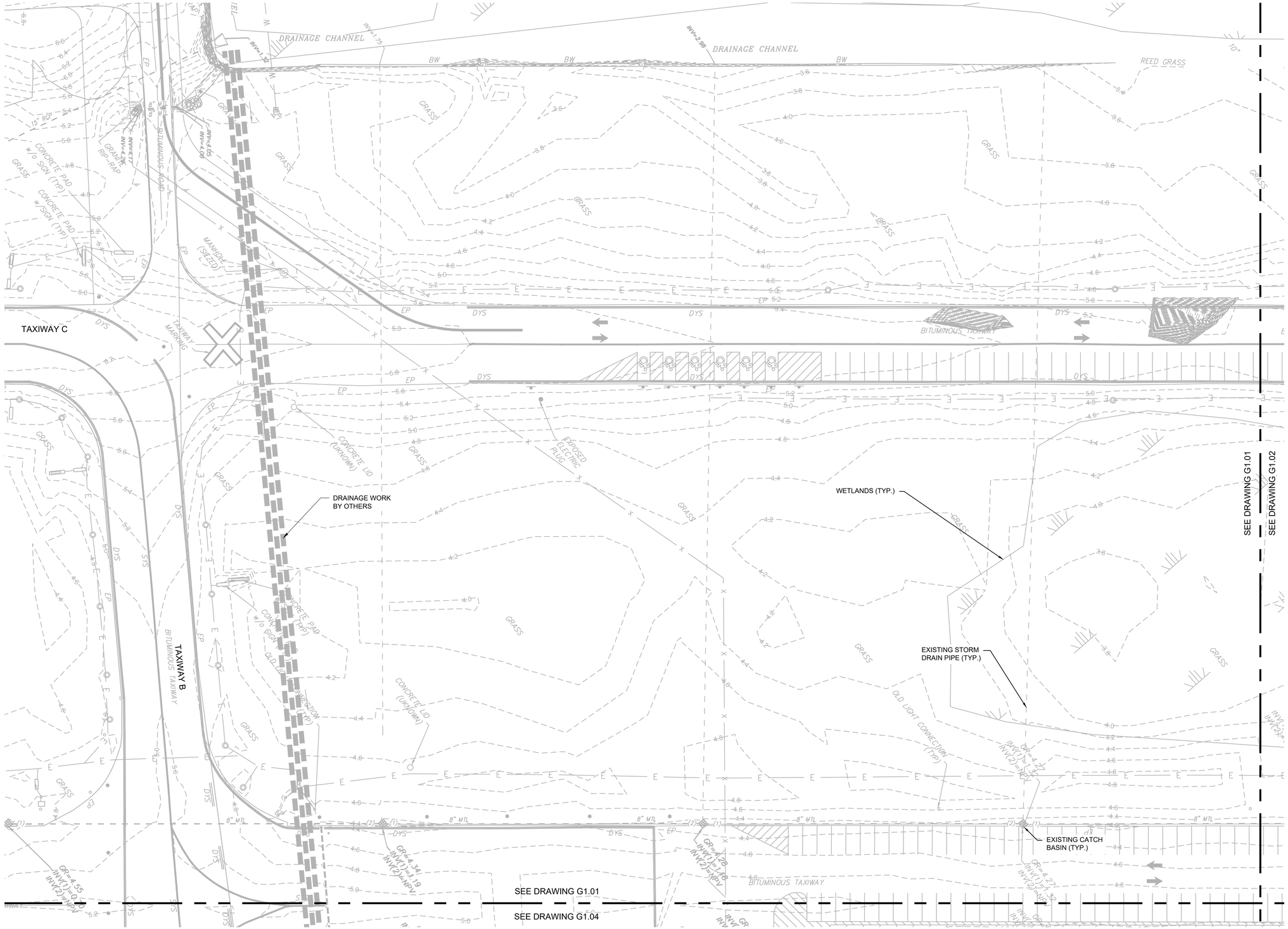
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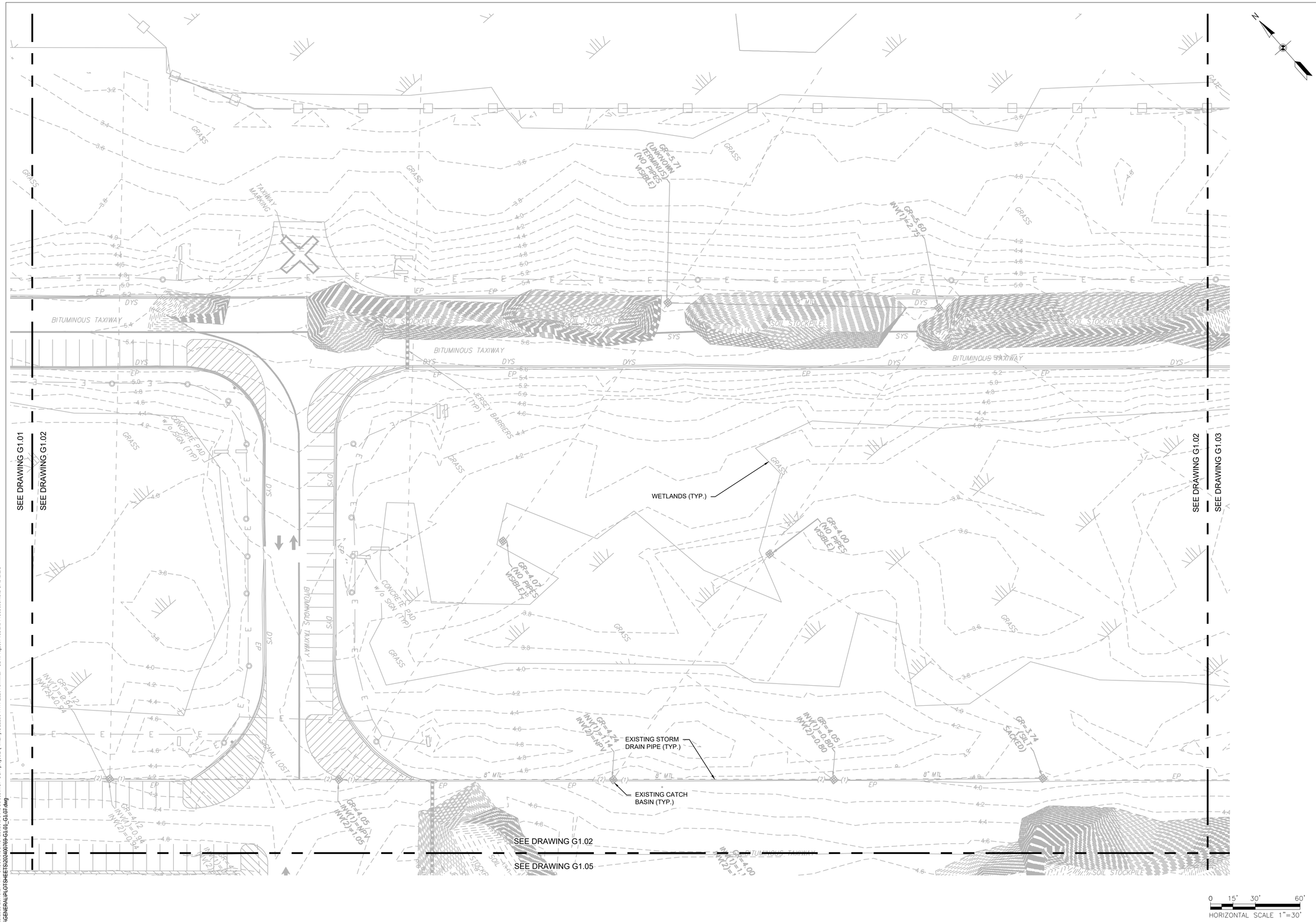

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EXISTING CONDITIONS PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
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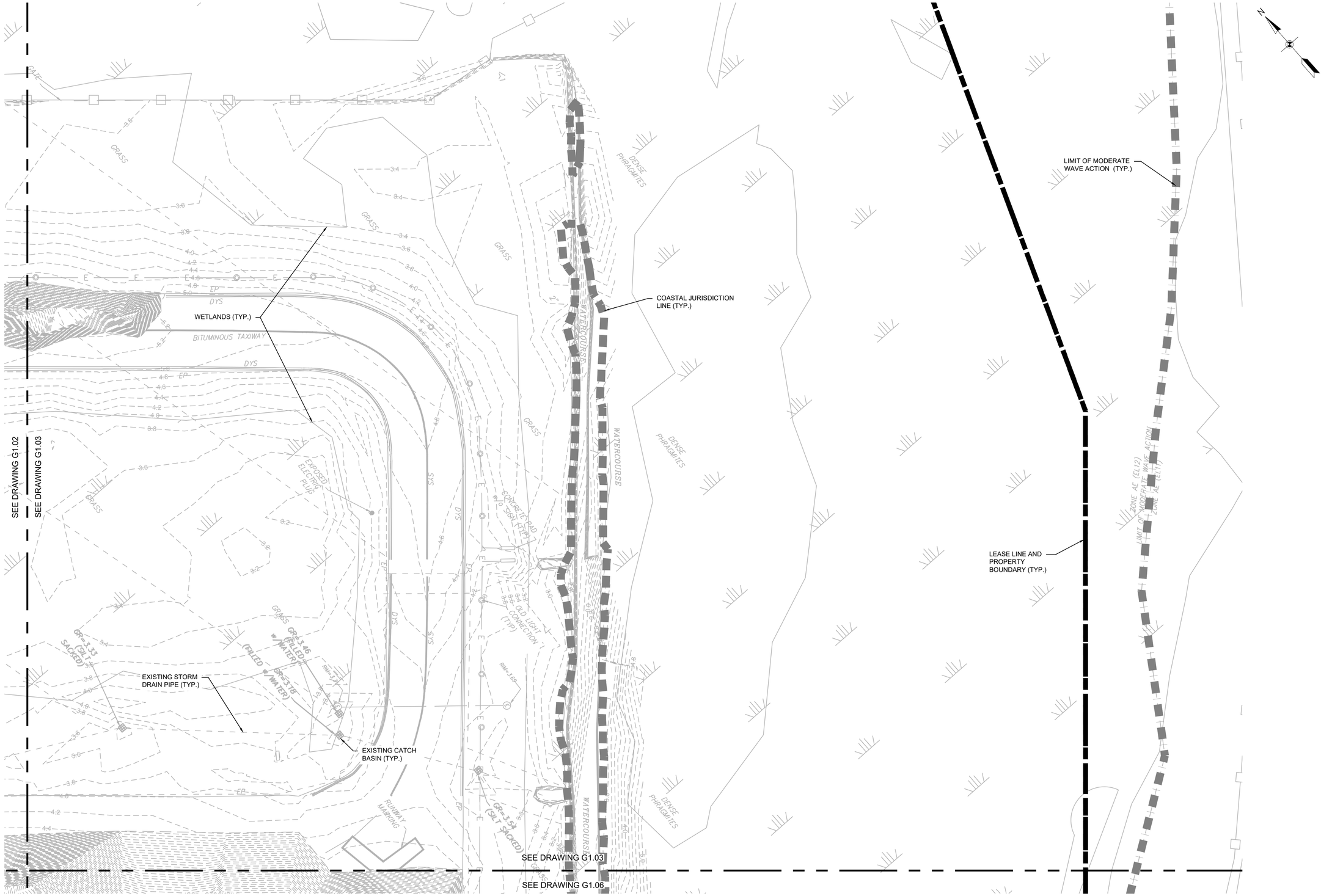

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EXISTING CONDITIONS PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
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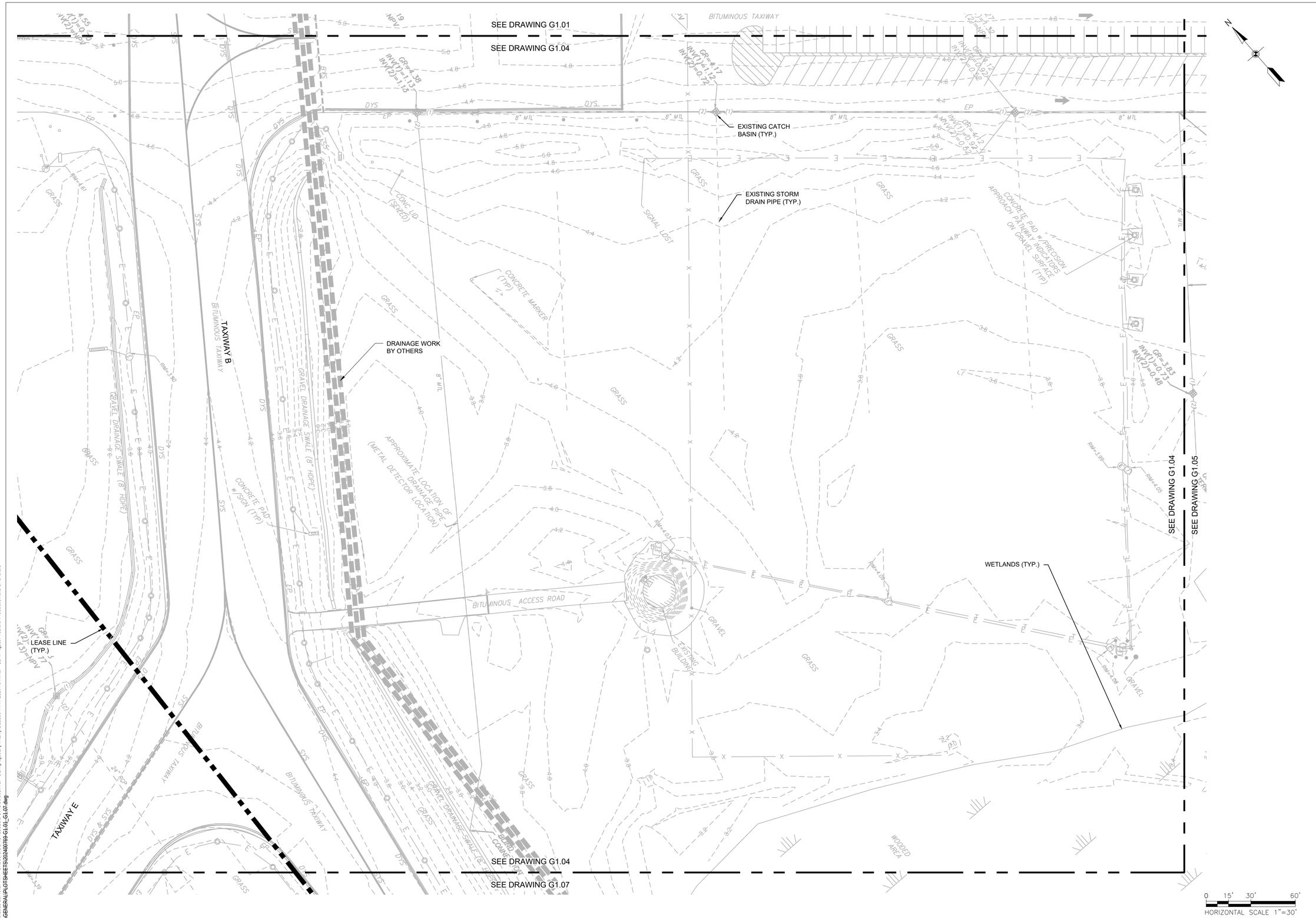

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EXISTING CONDITIONS PLAN - SHEET 4 OF 7

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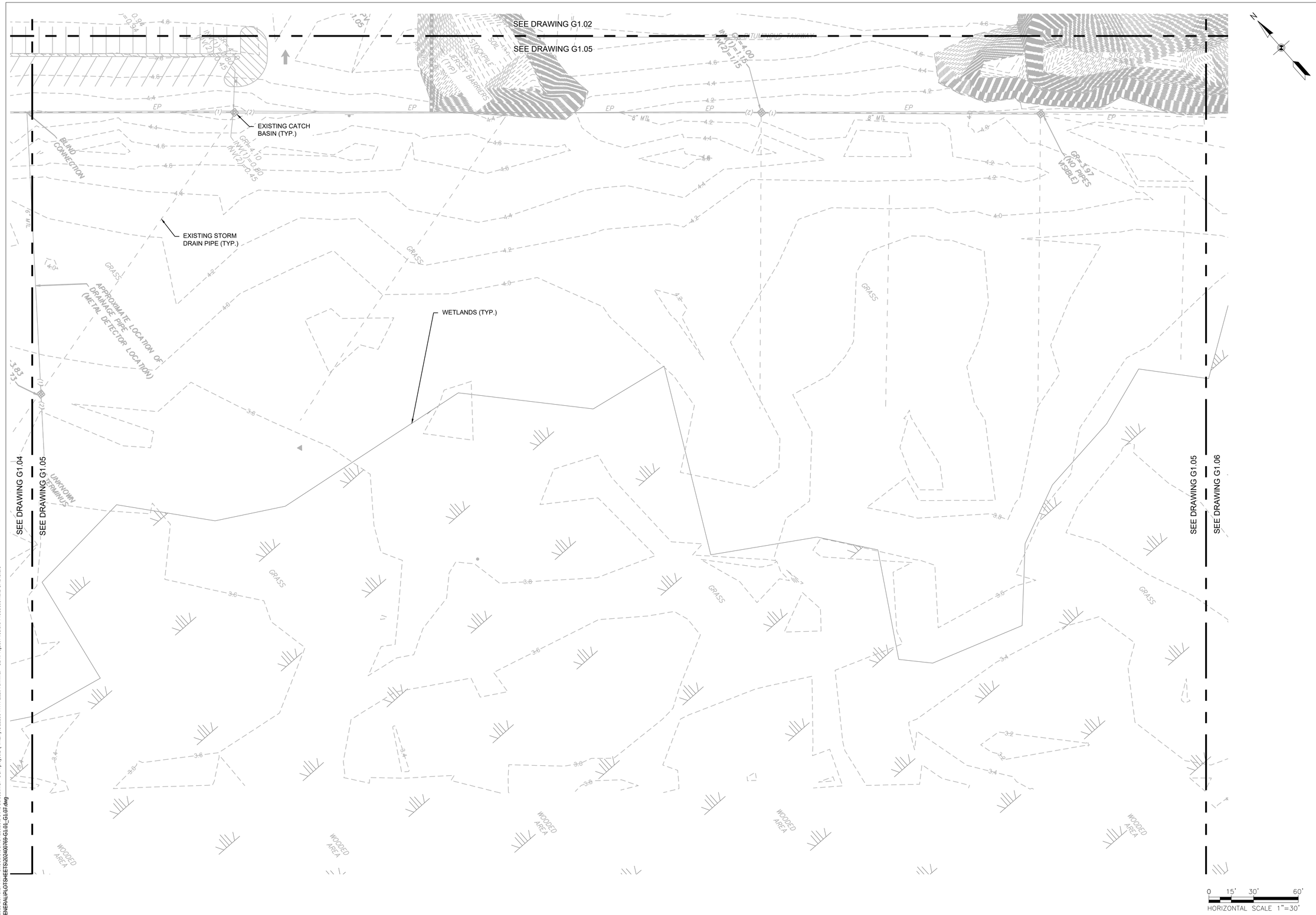

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DATE	DRN BY	CHK BY	APP BY
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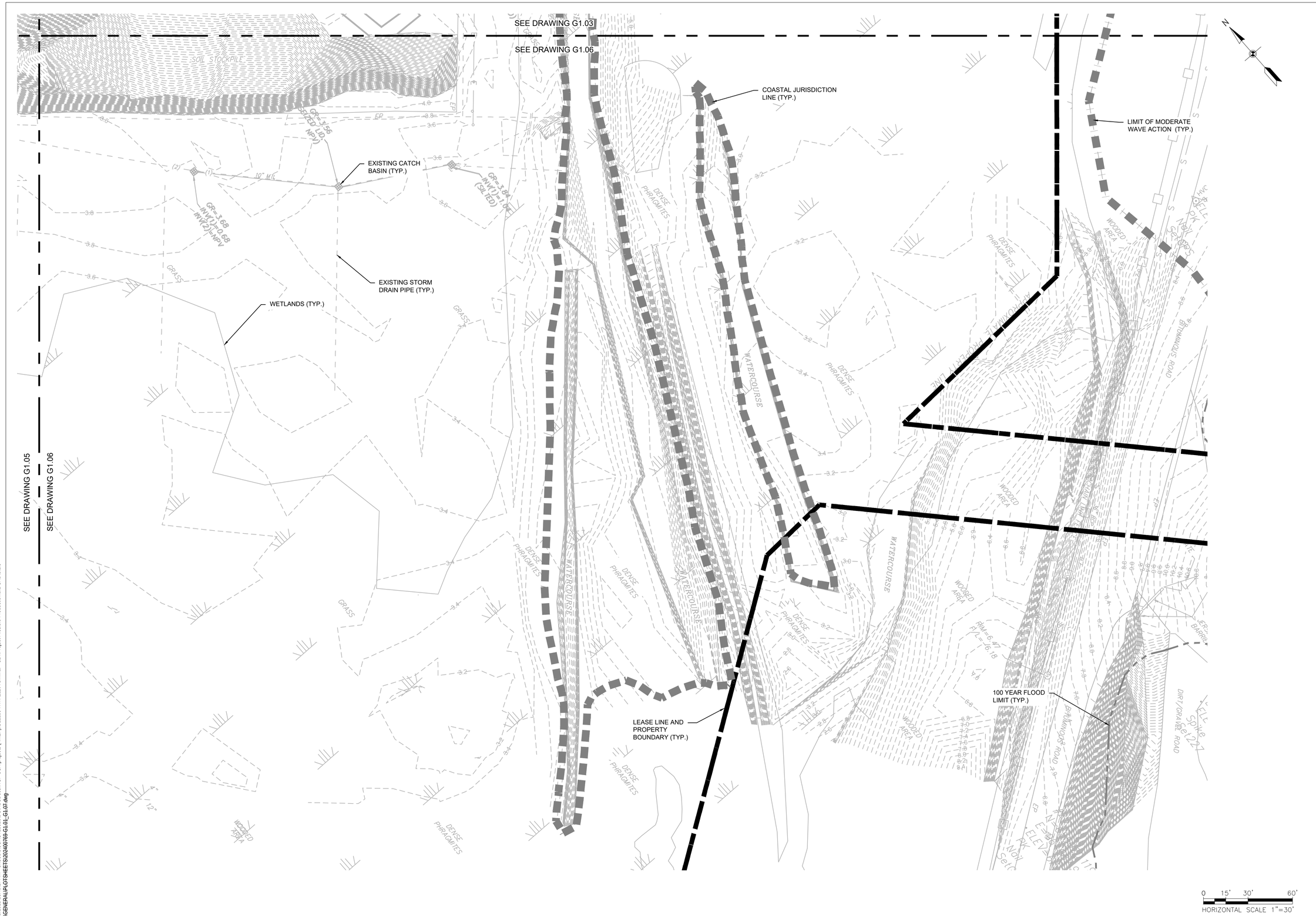

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1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

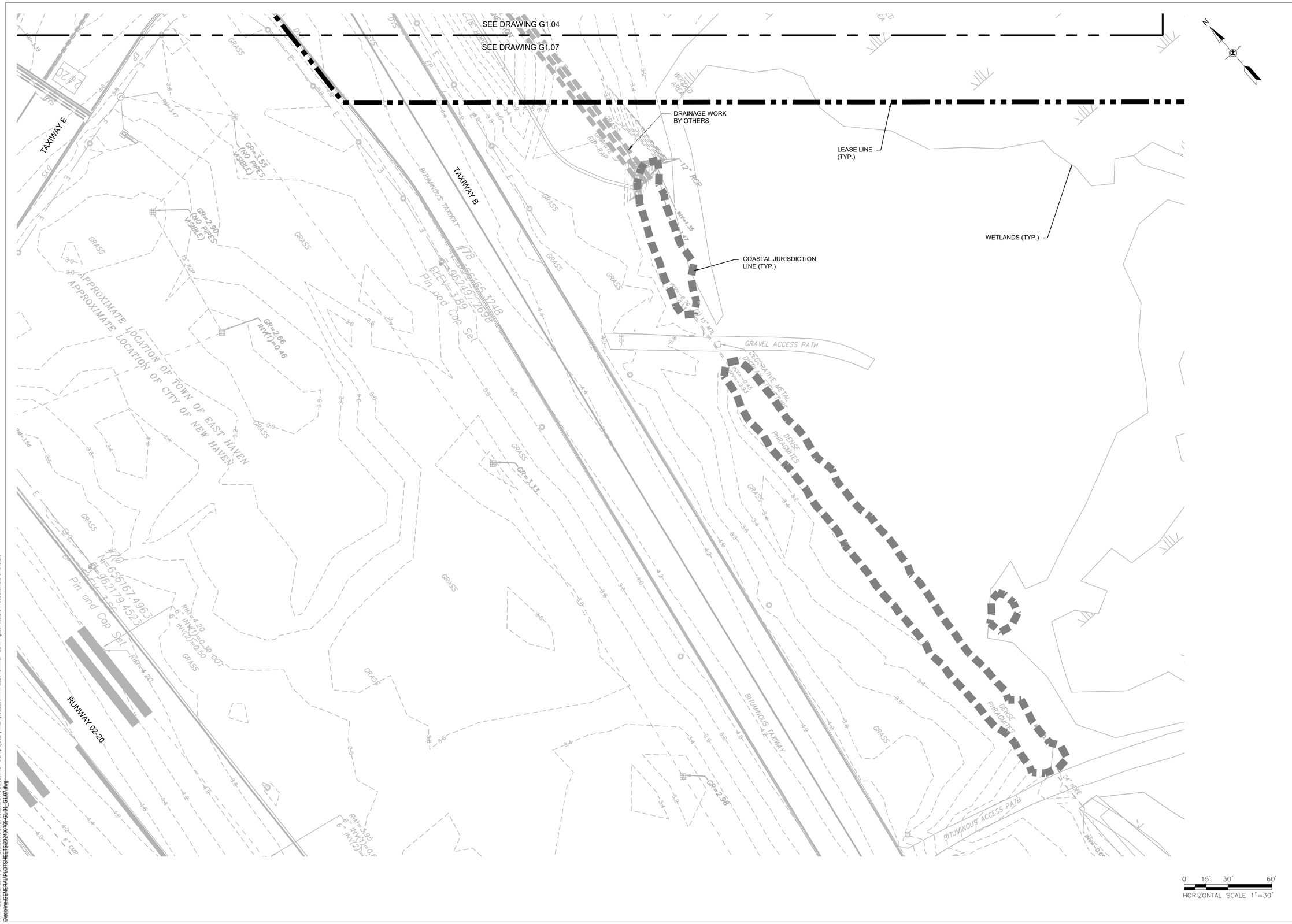
SHEET TITLE

EXISTING CONDITIONS PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	KR	GFR	CBC

SHEET NUMBER

G1.06



CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

EXISTING CONDITIONS PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	KR	GFR	CBC

SHEET NUMBER

G1.07

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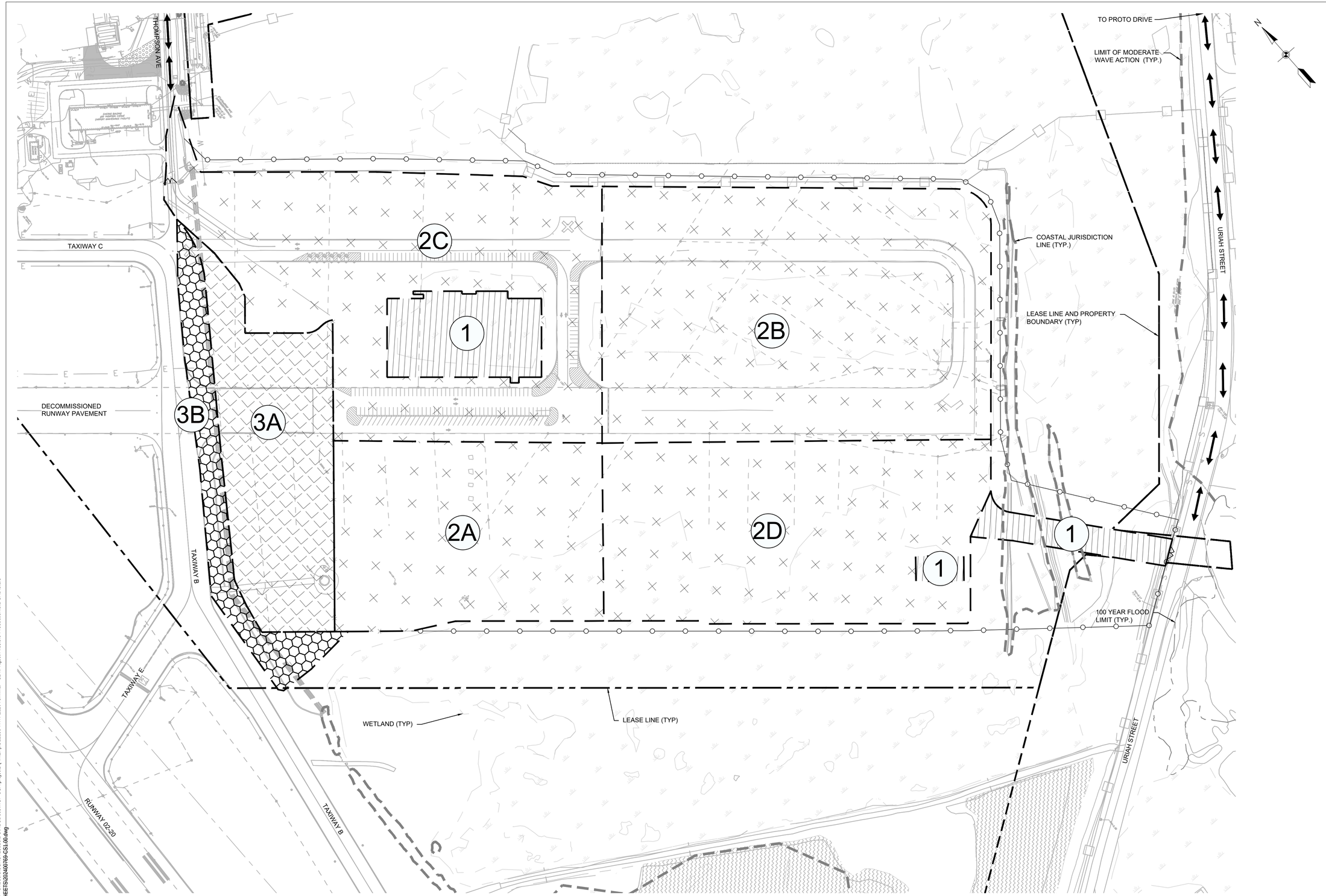

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CLIENT

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16479 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

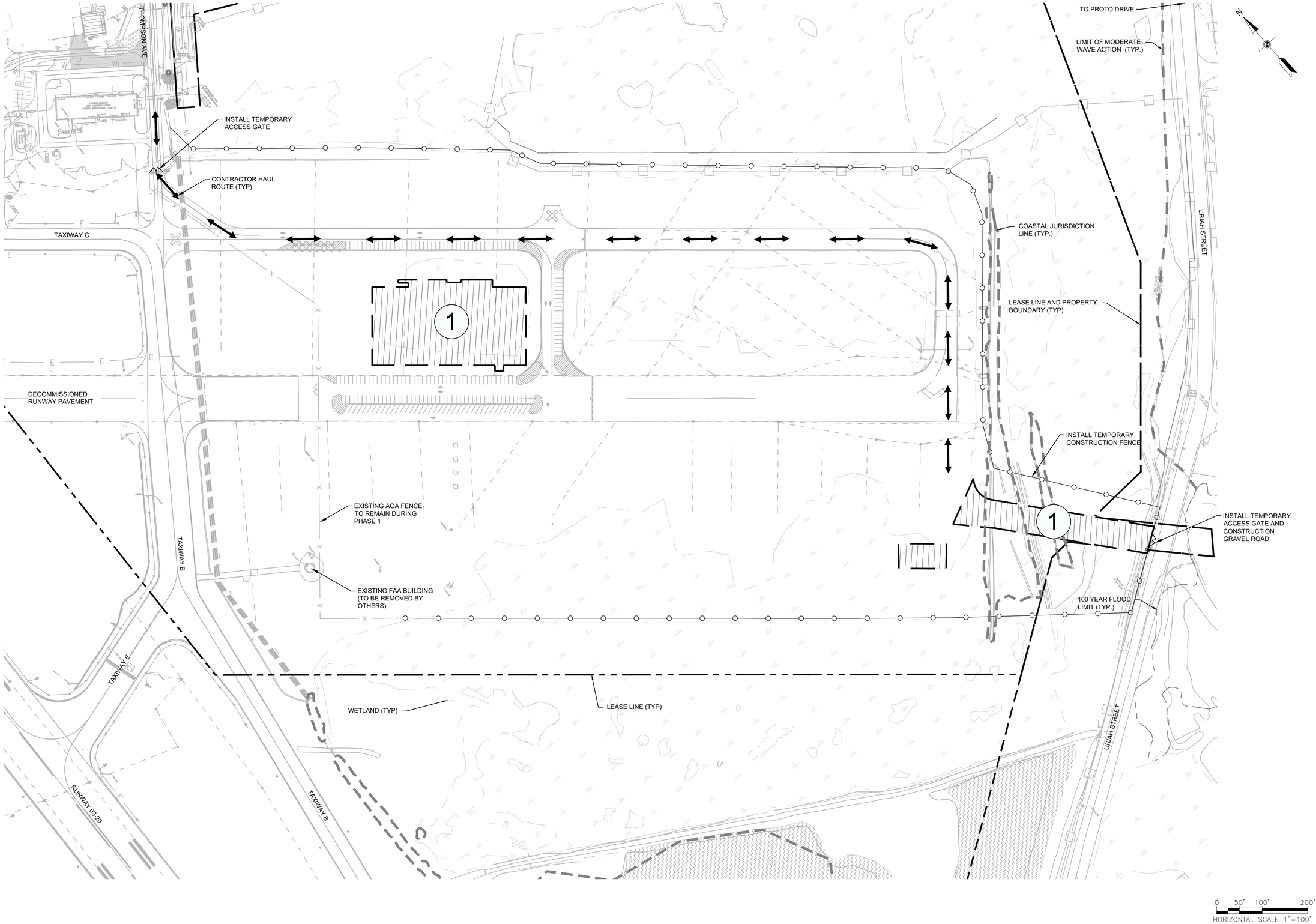
SHEET TITLE

CONSTRUCTION SAFETY AND PHASING PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

CS1.00



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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

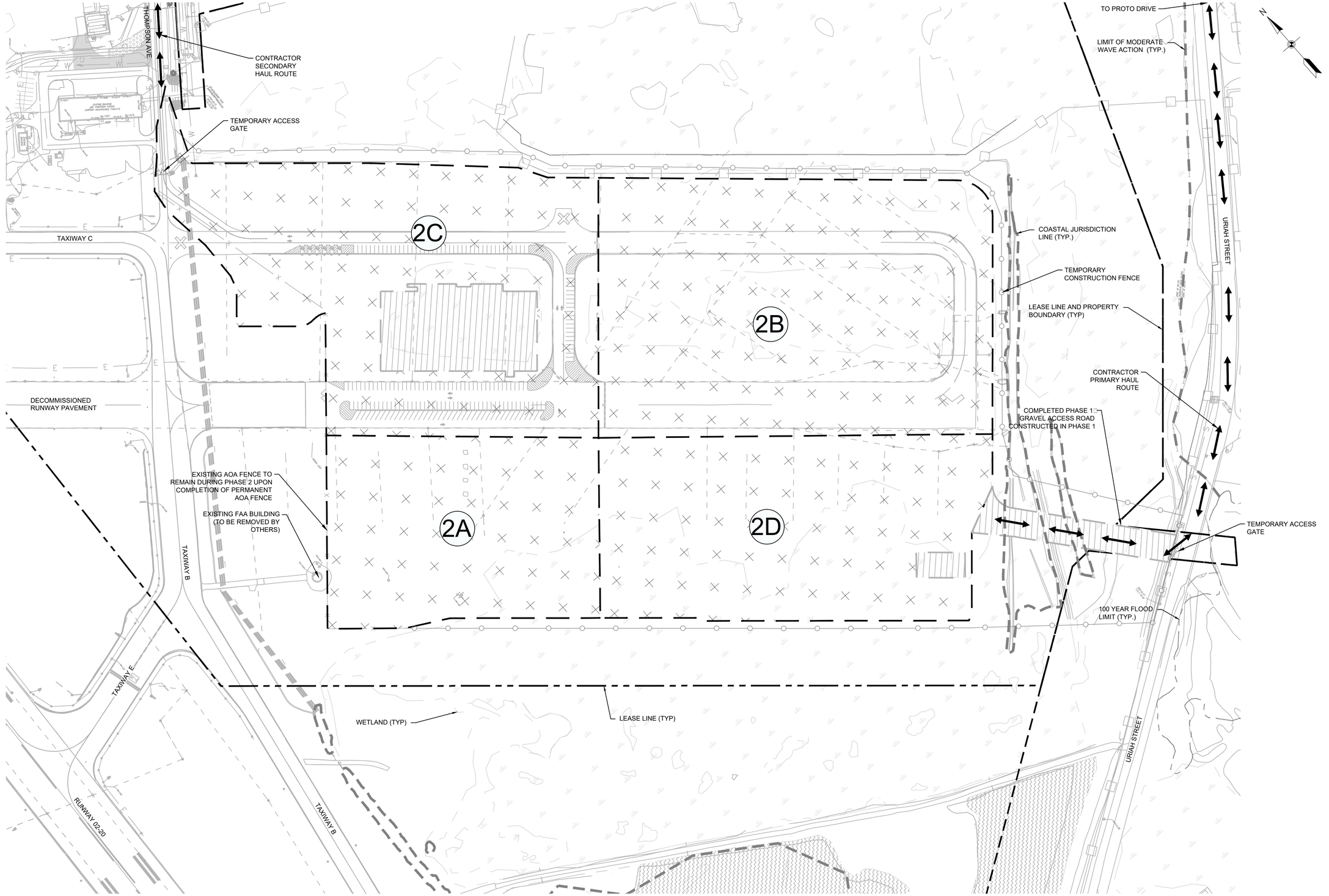
SHEET TITLE

CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 1

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

CS1.01



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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

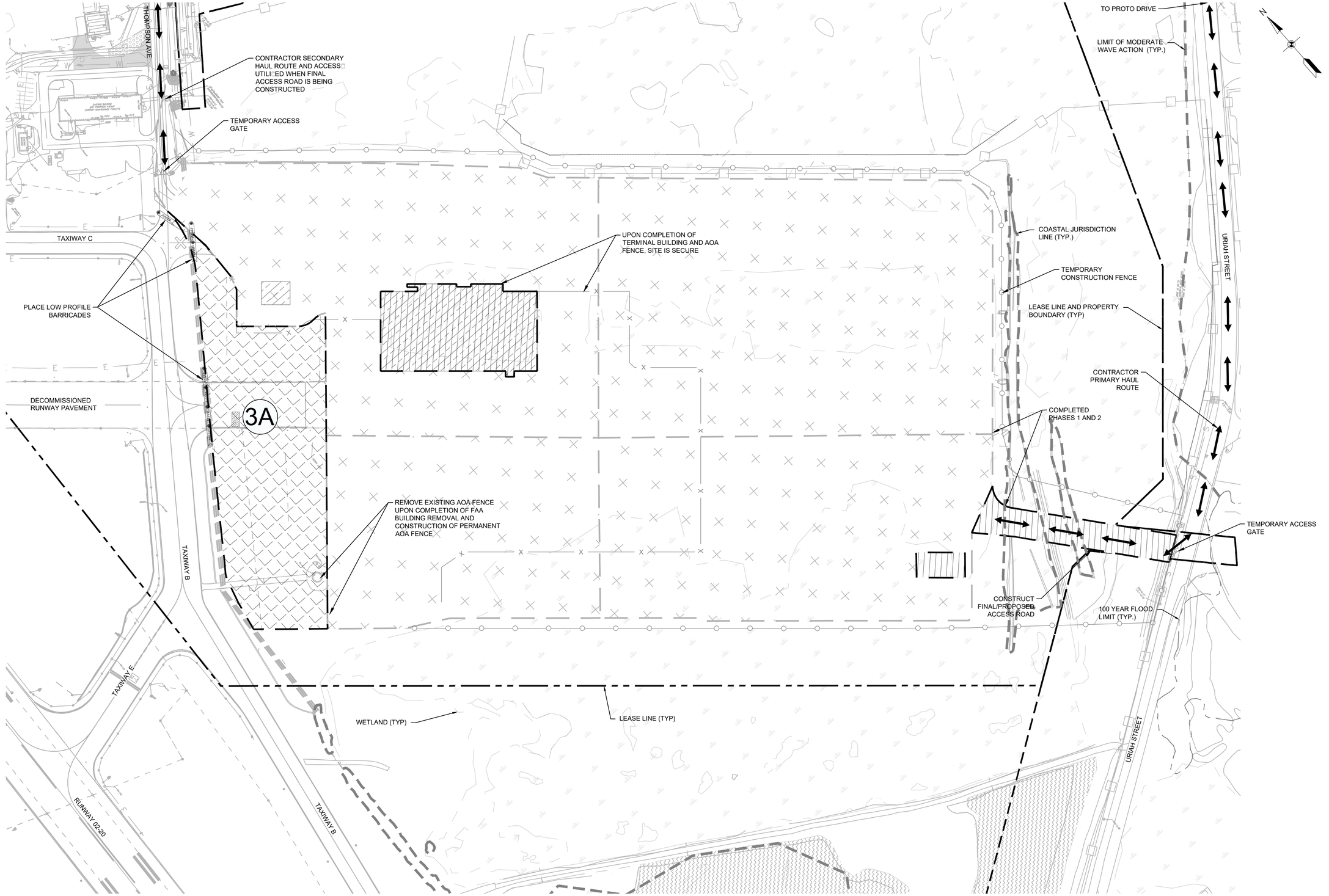
SHEET TITLE

CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

CS1.02



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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 3A

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

CS1.03A

THOMPSON AVE

CONTRACTOR SECONDARY HAUL ROUTE AND ACCESS UTILIZED WHEN FINAL ACCESS ROAD IS BEING CONSTRUCTED

TEMPORARY ACCESS GATE

TAXIWAY C

COMPLETED TERMINAL BUILDING AND AOA FENCE

DECOMMISSIONED RUNWAY PAVEMENT

3B

COMPLETED PHASE 3A

TAXIWAY B

TAXIWAY E

INSTALL TEMPORARY AOA FENCE

WETLAND (TYP)

LEASE LINE (TYP)

RUNWAY 02-20

TAXIWAY B

URIAH STREET

TO PROTO DRIVE

LIMIT OF MODERATE WAVE ACTION (TYP.)

COASTAL JURISDICTION LINE (TYP.)

TEMPORARY CONSTRUCTION FENCE

LEASE LINE AND PROPERTY BOUNDARY (TYP)

CONTRACTOR PRIMARY HAUL ROUTE

COMPLETED PHASES 1 AND 2

TEMPORARY ACCESS GATE

100 YEAR FLOOD LIMIT (TYP.)

URIAH STREET

N

0 50' 100' 200'

HORIZONTAL SCALE 1"=100'

HVN - 2/19/2025 11:08:51 AM - C:\Users\USRG72891BDC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Design\GENERAL\PLOTSHEETS\02A400769-CS1.00.dwg

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STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19478
LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

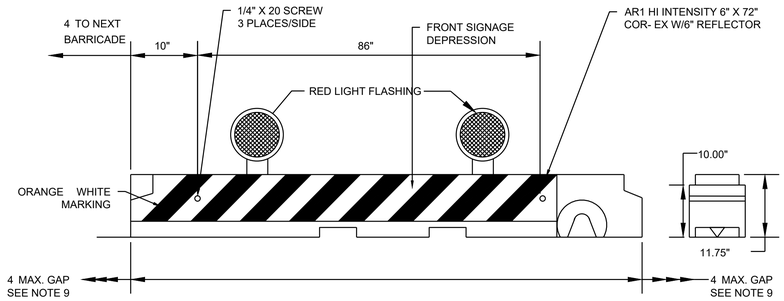
SHEET TITLE

CONSTRUCTION SAFETY AND PHASING PLAN - PHASE 3B

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

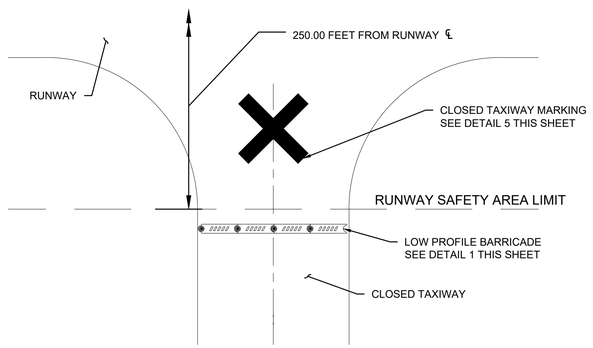
CS1.03B



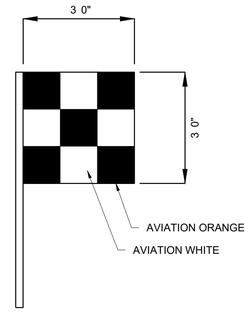
NOTES:

1. CONTRACTOR MUST USE AIRFIELD SOLUTIONS AS 3000 WITH 2 SOLAR LIGHTS.
2. CONTRACTOR MUST UTILI E ALTERNATE ORANGE AND WHITE BARRICADE BODIES.
3. IN THE PRESENCE OF FOOT TRAFFIC, AND WHERE AGREED UPON BY HVN, BARRICADES MUST BE INTERLOCKING AND HAVE NO SPACES BETWEEN THEM. GAPS BETWEEN BARRICADES MUST BE NO MORE THAN 4 FEET.
4. ALL BARRICADES MUST BE MOVED AT LEAST ONCE A WEEK AND THE CONTRACTOR MUST SWEEP ANY DEBRIS THAT HAS ACCUMULATED AND REMOVE THIS DEBRIS FROM SITE. THE BARRICADES MUST THEN BE REPLACED AT THE APPROPRIATE LOCATION.
5. THE CONTRACTOR WILL BE RESPONSIBLE FOR PLACING, MOVING, AND PROTECTING BARRICADES THROUGHOUT THE DURATION OF THE PROJECT. NIGHTLY BARRICADE PLACEMENT WILL BE CONDUCTED PRIOR TO THE START OF NIGHTTIME WORK AND UNDER ESCORT BY HVN.
6. BARRICADES MUST BE PLACED AT LOCATIONS SHOWN ON PLANS OR AS DIRECTED BY HVN.
7. CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING BARRICADES (INCLUDING LIGHTS) IN WORKING CONDITION AT ALL TIMES.
8. BARRICADES ARE TO BE SECURED FROM JET BLAST WITH SAND BAGS OR AN E UIVALENT APPROVED METHOD.
9. THE CONTRACTOR WILL ADJUST THE MAX GAP BETWEEN BARRICADES AS APPROVED AND DIRECTED BY HVN IN ORDER TO PERMIT EMERGENCY VEHICLE ACCESS, FACILITATE VEHICULAR TRAFFIC AND OTHER WORK.
10. LOW PROFILE BARRICADES MUST BE PROVIDED BY THE CONTRACTOR. THE CONTRACTOR MUST SUPPLY A SUFFICIENT NUMBER OF BARRICADES FOR THE DURATION OF THE PROJECT. IT IS THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE NUMBER OF BARRICADES FOR THE WORK AREAS AS IT RELATES TO THE CONTRACTOR S WORK PLAN. THE COST FOR FURNISHING THE BARRICADES AS WELL AS MAINTENANCE, PLACEMENT AND SECURING (SEE NOTES 1-9), WILL BE CONSIDERED INCIDENTAL TO SAFETY AND SECURITY. CONTRACTOR TO ASSUME AT LEAST XXX LF OF BARRICADES FOR BIDDING PURPOSES. BARRICADES WILL BE TURNED OVER TO THE AIRPORT AT THE CONCLUSION OF THE PROJECT,

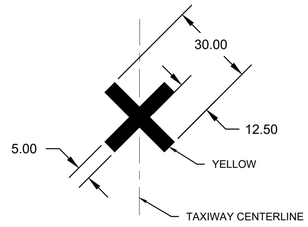
1 / CS0.01 — LOW PROFILE BARRICADE
SCALE: NTS



3 / CS0.01 — CLOSED TAXIWAY DETAIL
SCALE: NTS



2 / CS0.01 — CONSTRUCTION SAFETY FLAG
SCALE: NTS



NOTES:

1. CONTRACTOR TO PLACE TEMPORARY CLOSED TAXIWAY MARKINGS AS SHOWN ON PLANS.
2. HVN TO PROVIDE DIRECTION ON THE SAFEST LOCATION FOR THE PLACEMENT OF THIS MARKING.
3. THE CLOSED TAXIWAY MARKINGS MUST BE IN ACCORDANCE WITH FAA AC 150/5340-1 AND AC 150/5370-2 (LATEST EDITION).
4. CLOSED TAXIWAY MARKINGS MUST CONSIST OF TEMPORARY PAVEMENT MARKINGS.
5. THE COST FOR THE TEMPORARY CLOSED TAXIWAY MARKINGS WILL BE CONSIDERED INCIDENTAL TO SAFETY AND SECURITY.

4 / CS0.01 — TEMPORARY CLOSED TAXIWAY MARKINGS
SCALE: NTS

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT — RICHARD L. PETTINELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
CONSTRUCTION SAFETY AND PHASING - DETAILS

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER
CS1.04

HVN - 2/20/2025 9:33:47 AM - C:\Users\USBF73207D\OACADocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Design\GENERAL\PLOTSHEETS\260240788-CS1.04.dwg



LEGEND

B-12 ○	B-1 TO B-20	APPROXIMATE LOCATION OF EXISTING 2021 GEODESIGN BORINGS
BP-6 (OW) ○	BA-X OR BP-X	APPROXIMATE LOCATION OF NEW 2024 WSP BORINGS (PRIMARILY FOR APRON AND PARKING PAVEMENT DESIGN - SEE LEGEND NOTE 1) (OW IDENTIFIER OF BORINGS WITH GROUNDWATER OBSERVATION WELL INSTALLED)
BB-1 ○	BB-1 TO BB-2	APPROXIMATE LOCATION OF NEW 2024 WSP BORINGS (PRIMARILY FOR ACCESS ROAD DESIGN)
BX-10 ○	BX-9 TO BX-13	APPROXIMATE LOCATION OF NEW 2024 WSP BORINGS (PRIMARILY FOR TERMINAL DESIGN)
BX-14 ○	BX-14 TO BX-24	APPROXIMATE LOCATION OF NEW 2024 WSP BORINGS (PRIMARILY FOR POTENTIAL FUTURE PARKING GARAGE DESIGN - SEE NOTE 2)
DCP-P-5 ■	DCP-P-X	APPROXIMATE LOCATION OF 2024 DYNAMIC CONE PENETROMETER (DCP) EXPLORATIONS (PRIMARILY FOR PARKING PAVEMENT DESIGN)
DCP-A-4 ■	DCP-A-X	APPROXIMATE LOCATION OF 2024 DYNAMIC CONE PENETROMETER (DCP) EXPLORATIONS (PRIMARILY FOR APRON PAVEMENT DESIGN)
SCPT-1 ■	SCPT-X	APPROXIMATE LOCATION OF SEISMIC CONE PENETROMETER (SCPT) EXPLORATIONS

NOTES:

1. SOME OF THESE BORINGS TARGETED TO SUPPORT PAVEMENT DESIGN HAVE BEEN MADE DEEPER TO ALSO SUPPORT DESIGN OF TERMINAL STRUCTURES AND HIGH-MAST LIGHTING.
2. SOME OF THESE BORINGS MADE AT THE LOCATION OF A POSSIBLE FUTURE GARAGE ALSO SERVE TO SUPPORT DESIGN OF THE PARKING AND APRON PAVEMENTS, TERMINAL STRUCTURES AND HIGH-MAST LIGHTING.
3. THE BORING LOCATIONS ARE APPROXIMATE.
4. REFER TO HVN - DRAFT GEOTECHNICAL REPORT DATED JUNE 7, 2024 FOR THE RESULTS OF BORINGS, CPT S, DCP S AND SCPT S.

0 50' 100' 200'
HORIZONTAL SCALE 1"=100'

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REGISTRATION

STATE OF CONNECTICUT — HANGTAO DU — No. 20902 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SUBSURFACE EXPLORATION PLAN

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

GT0.00

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LEGEND

EXISTING CONDITION	DESCRIPTION	PROPOSED CONDITION
W	WATER LINE	W
	CONCRETE PAD W/ SIGN	
	CONCRETE PAD W/O SIGN	
E	ELECTRIC LINE/CONDUIT	
E	ELECTRICAL HANDHOLE	
	ELECTRICAL MANHOLE	
	TAXIWAY LIGHT	
X	FENCE	
	LEASE LINE	
	PROPERTY LINE	
	DRAINAGE PIPE INSTALLED BY OTHERS	
	EXISTING PAVEMENT REMOVAL	
x x x	DRAINAGE AND ELECTRICAL LINE REMOVAL	
	GRATE INLET/CATCH BASIN	
	STORM DRAIN PIPE	
	PARKING SIGN	
	RIP-RAP	
5.2	MINOR CONTOURS (0.2 INTERVAL)	5.2
5.0	MAJOR CONTOURS (1 INTERVAL)	5.0
	TREELINE/BUSHES	
	SANITARY SEWER MANHOLE	S
	FIRE HYDRANT	
	INLINE GATE VALVE	
	AOA FENCE	X
	BLAST DEFLECTOR FENCE	
	PARKING LOT FENCE	
	HAUL ROUTE	
	LIMIT OF DISTURBANCE	LOD
	PHASE 1	
	PHASE 2	
	PHASE 3A	
	PHASE 3B	
	BLAST FENCE FOUNDATION	
	RELIEVER SLAB	
	APRON PCC FULL STRENGTH PAVEMENT	
	TYPICAL SIDEWALK SECTION	
	APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT	
	APRON SHOULDER PAVEMENT ABUTTING ASHPALT	
	TYPICAL PARKING LOT SECTION	
	TYPICAL ACCESS ROAD SECTION	
	PROPOSED STORM PIPE	
	FLOW ARROW	
	PUMP STATION	
	SAND FILTER	
	COASTAL JURISDICTION LINE	
	LIMIT OF MODERATE WAVE ACTION	
	100-YEAR FLOOD LIMIT	
	TOFA	TOFA
	TSA	TSA

LEGEND

EXISTING CONDITION	DESCRIPTION	PROPOSED CONDITION
	HIGH MAST LIGHT POLE	
	AIRSIDE CATCH BASIN	
	LANDSIDE CATCH BASIN	
	LANDSIDE DRAINAGE MANHOLE	
	POTABLE WATER CABINET	
	GROUND POWER UNIT	
	MOBILE PRE-CONDITION AIR UNIT	
	BOLLARDS	

XX / XX DETAIL TITLE
SCALE:

XX / XX IDENTIFIES DETAIL
XX / XX IDENTIFIES SHEET CAN BE FOUND ON

XX / XX SECTION

XX / XX SECTION DETAIL TITLE
SCALE:

ABBREVIATIONS

AASHTO	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AGGR	AGGREGATE
AC	ADVISORY CIRCULAR
AOA	AIRPORT OPERATIONS AREA
APPROX.	APPROXIMATE
ASPH	ASPHALT
ASTM	AMERICAN SOCIETY FOR TESTING MATERIALS
ATC	AIR TRAFFIC CONTROL
BIT.	BITUMINOUS
BLDG.	BUILDING
BM	BENCH MARK
CABC	CRUSHED AGGREGATE BASE COURSE
CB	CATCH BASIN
CC	CENTER TO CENTER
CEN.	CENTER
CF	CUBIC FEET
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CM	CONSTRUCTION MANAGER
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE
CONC.	CONCRETE
CONSTR.	CONSTRUCTION
CSPP	CONSTRUCTION SAFETY AND PHASING PLAN
CT	CONNECTICUT
CTDOT	CONNECTICUT DEPARTMENT OF TRANSPORTATION
CY	CUBIC YARDS
DIA.	DIAMETER
DIP	DOOR INTERFACE PANEL
DWG.	DRAWING
E	EASTING
ELEC.	ELECTRIC
EL.	ELEVATION
ELEV.A.	PROFILE ELEVATION
EXIST.	EXISTING
E.W.	EACH WAY
FAA	FEDERAL AVIATION ADMINISTRATION
FH	FIRE HYDRANT
FOD	FOREIGN OBJECT DEBRIS
GPU	GROUND POWER UNIT
GR.	GRATE ELEVATION
GSE	GROUND SERVICE E UIPMENT
GYP	GYPSUM BOARD
HH	HANDHOLE
HP	HIGH POINT
HVN	TWEED NEW HAVEN AIRPORT
ICT	INFORMATION AND COMMUNICATION TECHNOLOGY
IMP	INSULATED METAL PANEL
INV.	INVERT
JB	JUNCTION BOX
LF	LINEAR FEET
LP	LOW POINT
L	LEFT
LTG.	LIGHTING
MAX.	MAXIMUM
MH	MANHOLE
MID	MIDPOINT
MIN.	MINIMUM
N	NORTHING
NOTAM	NOTICE TO AIR MISSIONS
N.I.C.	NOT IN CONTRACT
O.F.A.	OBJECT FREE AREA
PB	PUSHBACK
PBB	PASSENGER BOARDING BRIDGE
PCA	PRE-CONDITIONED AIR
PCC	PORTLAND CEMENT CONCRETE
PCMP	POST CONSTRUCTION MANAGEMENT PLAN
PI	POINT OF INTERSECTION
PROP.	PROPOSED
PT	POINT
PWC	POTABLE WATER CABINET
PVC	POLYVINYL CHLORIDE
R	RADIUS E UALS
RCP	REINFORCED CONCRETE PIPE
RE	RESIDENT ENGINEER
RIDS	RAMP INFORMATION DISPLAY SYSTEM
RM	REFLECTORI ED MARKER
RP	RUNWAY PROTECTION ONE
RSA	RUNWAY SAFETY AREA
R	RIGHT
R/W	RUNWAY
SD	SUBDRAIN
SHLDR.	SHOULDER
SPCD	SAFETY PLAN COMPLIANCE DOCUMENT
STA	STATION
STM	STORMWATER
SW	STORM DRAIN/STORM WATER
SY	S UARE YARD
T	TELECOMMUNICATION
TA	TENANT ADVISORY
TC	TOP OF CURB
TEMP.	TEMPORARY
TG	TOP OF GRATE
THRU.	THROUGH
TL	TAXIWAY LIGHT
TLOFA	TAXILANE OBJECT FREE AREA
TOFA	TAXIWAY OBJECT FREE AREA
TOS	TOP OF STEEL
TRAV	TRAVERSE
TSA	TAXIWAY SAFETY AREA
TYP.	TYPICAL
T/W	TAXIWAY
UD	UNDERDRAIN
UG	UNDERGROUND
VC	VERTICAL CURVE
VSR	VEHICLE SERVICE ROAD
W	WATER
WAP	WIRELESS ACCESS POINT
WL	WHITE LINE
YL	YELLOW LINE
(N)	NEW
(E)	EXISTING
(R)	REUSE/REINSTALL

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
CIVIL LEGEND AND ABBREVIATIONS

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER
C0.01

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GENERAL

1. COASTAL JURISDICTION LINE INFORMATION WAS OBTAINED FROM CTDEEP.
2. WORK UNDER THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH THE "STATE OF CONNECTICUT, DEPARTMENT OF TRANSPORTATION, STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, FACILITIES AND INCIDENTAL CONSTRUCTION, FORM 818, 2020" AS SUPPLEMENTED THROUGH JULY 2023" ("CTDOT FORM 818") AND SPECIAL PROVISIONS.
3. ALL DIMENSIONS AND ELEVATIONS MUST BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO THE SUBMISSION OF WORKING DRAWINGS, PROCUREMENT OF MATERIALS AND START OF CONSTRUCTION. ALL ADJUSTMENTS SHALL BE REVIEWED BY THE ENGINEER.
4. THE CONTRACTOR SHALL IDENTIFY, LOCATE, AND PROTECT ALL EXISTING BOUNDS, MONUMENTS, AND BENCHMARKS. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER BEFORE ANY DISTURBANCE OR RELOCATION.
5. THE CONTRACTOR SHALL PROVIDE ACCESS TO ALL PROPERTIES AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ADEQUATE SIGHT DISTANCE FOR ALL DRIVEWAYS AND OTHER ACCESS POINTS DURING CONSTRUCTION.
6. THE CONTRACTOR SHALL PROPOSE CONSTRUCTION ENTRANCES TO THE ENGINEER FOR APPROVAL BEFORE THE START OF ANY CLEARING OPERATION. ANTI-TRACKING PADS IN ACCORDANCE WITH SECTION 2.11 SHALL BE GRADED TO PREVENT RUNOFF FROM ENTERING THE ROADWAY. LOCATION OF ANTI-TRACKING PADS IS SUBJECT TO APPROVAL BY THE ENGINEER. SEE MISCELLANEOUS DETAILS FOR ADDITIONAL INFORMATION.
7. ALL SLOPES, TEMPORARY OR PERMANENT, SHALL RECEIVE TURF ESTABLISHMENT OR EROSION CONTROL MATTING IN ACCORDANCE WITH SECTION 9.50 AND/OR SLOPE PROTECTION IN CONFORMANCE WITH SECTION 2.10 WATER POLLUTION CONTROL (SOIL EROSION) AS STATED IN THE CONTRACT DOCUMENTS.
8. LIMIT OF WORK MAY EXCEED THE LIMIT OF GRADING FOR TOPSOIL AND TURF ESTABLISHMENT.
9. REFER TO SECTION 1.08 "PROSECUTION AND PROGRESS" FOR LIMITATION OF OPERATIONS AND SPECIAL CONDITIONS ON CONTRACTOR'S WORK.
10. ALL BASELINE OFFSETS SHALL BE APPLIED AT THE CENTER OF THE STRUCTURE FOR TYPE C-L CATCH BASINS AND MANHOLES. ALL BASELINE OFFSETS FOR TYPE C CATCH BASINS SHALL BE APPLIED AT THE CURB LINE. THE CONTRACTOR SHALL VERIFY THE LOCATION OF THE CATCH BASINS WITH RESPECT TO THE CURB OR BARRIER LINE.
11. IN ACCORDANCE WITH SECTION 1.05.03, A QUALITY MANAGEMENT PLAN WILL BE REQUIRED TO BE SUBMITTED BY THE CONTRACTOR.
12. ALL EXCAVATION AROUND THE PERIMETER OF THE SITE ABOVE ELEVATION 9 SHALL BE CONSIDERED AS UNCLASSIFIED EXCAVATION.

UTILITIES

1. THE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT OF ANY CONFLICTS BETWEEN UTILITIES AND PROPOSED TREE.
2. THE APPROXIMATE LOCATION OF UNDERGROUND UTILITIES ARE SHOWN ON THE PLANS AND ARE NOT GUARANTEED TO BE CORRECT OR COMPLETE. AT THE DIRECTION OF THE ENGINEER, THE CONTRACTOR SHALL VERIFY THE LOCATION OF UTILITIES WHICH MAY CONFLICT WITH THE WORK BY DIGGING TEST PITS BEFORE COMMENCING WORK. THIS WORK SHALL BE PAID FOR UNDER THE ITEM "TEST PIT".
3. THE CONTRACTOR SHALL MAINTAIN AND PROTECT EXISTING & PROPOSED UTILITIES THROUGHOUT THE DURATION OF THE PROJECT.
4. CONTRACTOR SHALL CONTACT "CALL BEFORE YOU DIG" AT 800-922-4455 AT LEAST 72 HOURS PRIOR TO CONDUCTING WORK.
5. ALL REQUIRED UTILITY RELOCATIONS SHALL BE PERFORMED BY THE RESPECTIVE UTILITY COMPANIES. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES PRIOR TO ANY WORK AND COORDINATE HIS WORK AND PROJECT SCHEDULE WITH THE UTILITY COMPANY WORK. UTILITY COORDINATION MEETINGS SHALL BE SCHEDULED BY THE ENGINEER AS NEEDED. ALL COORDINATION, INCLUDING MEETINGS, SHALL BE PERFORMED IN ACCORDANCE WITH FORM 818, SECTION 1.05.06. THE COST OF ALL COOPERATION WITH UTILITIES, INCLUDING COORDINATION AND MEETINGS, IS INCLUDED IN THE OVERALL COST OF THE PROJECT AND NO ADDITIONAL PAYMENTS WILL BE MADE TO THE CONTRACTOR.

GENERAL PHASING OF SWALES AND EROSION CONTROL MEASURES

1. EXTREME CAUTION MUST BE TAKEN TO LIMIT THE EXTENT OF DISTURBED AREAS. WORK SHALL BE CONDUCTED BY THE CONTRACTOR IN THE FOLLOWING ORDER.

A. INSTALL ANTI-TRACKING PADS AS DIRECTED BY THE ENGINEER.

B. INSTALL SEDIMENTATION CONTROL SYSTEM AT ALL CATCH BASINS AND DRAINS, EACH STOCKPILE AND STORAGE AREA AND IN OTHER AREAS AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

C. INSTALL MID-SLOPE PROTECTION AS DIRECTED BY THE ENGINEER.

PERMITTING REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH THE EROSION CONTROL PLAN AND ANY ADDITIONAL REQUIREMENTS (INCLUDING INSPECTION AND CERTIFICATION) IMPOSED BY THE U.S. EPA NPDES PERMIT AND ANY OTHER LOCAL, STATE OR FEDERAL REGULATIONS INCLUDING STATE OF CONNECTICUT DEPARTMENT OF ENVIRONMENTAL PROTECTION GENERAL PERMIT DEP-PED-GP-015, "GENERAL PERMIT FOR THE DISCHARGE OF STORMWATER AND DEWATERING WASTEWATER ASSOCIATED WITH CONSTRUCTION ACTIVITIES".
2. IF ADDITIONAL EROSION CONTROL MEASURES ARE REQUIRED DURING OR AFTER CONSTRUCTION, AS DETERMINED BY THE ENGINEER, OR OTHER AUTHORITIES, THE CONTRACTOR SHALL TAKE SUCH ADDITIONAL MEASURES AS THEY MAY DIRECT. THIS WORK SHALL BE PAID FOR UNDER THE APPLICABLE ITEMS.

FLOOD CONTINGENCY

1. THE CONTRACTOR IS HEREBY NOTIFIED THAT THE PROJECT AREA IS WITHIN THE 100 YR AND 500 YR FLOOD ZONE AND IS SUBJECT TO URBAN FLOODING.
2. THE CONTRACTOR IS BOUND BY THE CONDITIONS SET FORTH IN THE CONNECTICUT DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR ROADS, BRIDGES, FACILITIES AND INCIDENTAL CONSTRUCTION", FORM 818, 2020, WITH THE JANUARY 2023 SUPPLEMENTAL SPECIFICATIONS. SPECIFICALLY, SECTION 1.10 - ENVIRONMENTAL COMPLIANCE, ADDRESSES THE NEED FOR THE CONTRACTOR TO MAINTAIN A STABLE WORK AREA AND TO COORDINATE WITH THE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) WEATHER SERVICE FOR INFORMATION PERTAINING TO STORMS. THESE PROVISIONS ARE FULLY DESCRIBED UNDER ITEMS 9 AND 10 OF THE "REQUIRED BEST MANAGEMENT PRACTICES".

DEMOLITION

1. ALL EROSION AND SEDIMENTATION CONTROL SYSTEMS ARE TO BE IN PLACE PRIOR TO THE START OF ANY DEMOLITION WORK.
2. ABANDONMENT OF UTILITIES AS SHOWN IN THESE PLANS IS TO BE INCLUDED IN THE GENERAL COST OF THE WORK. NO SEPARATE PAYMENT WILL BE MADE.
3. ABANDONED MANHOLES AND CATCH BASINS SHALL BE REMOVED TO A DEPTH 2 FEET BELOW THE SUBGRADE. THE FLOOR OF THE STRUCTURE SHALL BE BROKEN AND ALL PIPES SHALL BE PLUGGED WITH CEMENT MASONRY. ALL ABANDONED PIPES SHALL BE PLUGGED AND FILLED WITH CONCRETE LOW STRENGTH MATERIAL, AND IN ACCORDANCE WITH THE SPECIAL PROVISION.
4. THE CONTRACTOR SHALL MEET WITH THE ENGINEER AND THE CITY OF BRIDGEPORT BEFORE REMOVING ANY TREES TO DETERMINE WHICH TREES ARE TO REMAIN AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES NOT DESIGNATED FOR REMOVAL IN ACCORDANCE WITH CITY OF BRIDGEPORT REQUIREMENTS. REMOVAL OF EXISTING TREES SHALL BE PAID FOR UNDER ITEM NO. 0201001A CLEARING AND GRUBBING.

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · REGISTERED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CIVIL NOTES

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C0.02

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INTERIM REVIEW DRAWINGS NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION
1	04/05/2024	30 DESIGN
2	04/17/2024	30 DESIGN
3	05/24/2024	30 DESIGN
4	11/22/2024	30 DESIGN
5	01/24/2025	60 DESIGN

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SEDIMENT AND EROSION CONTROL PHASING

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C1.00

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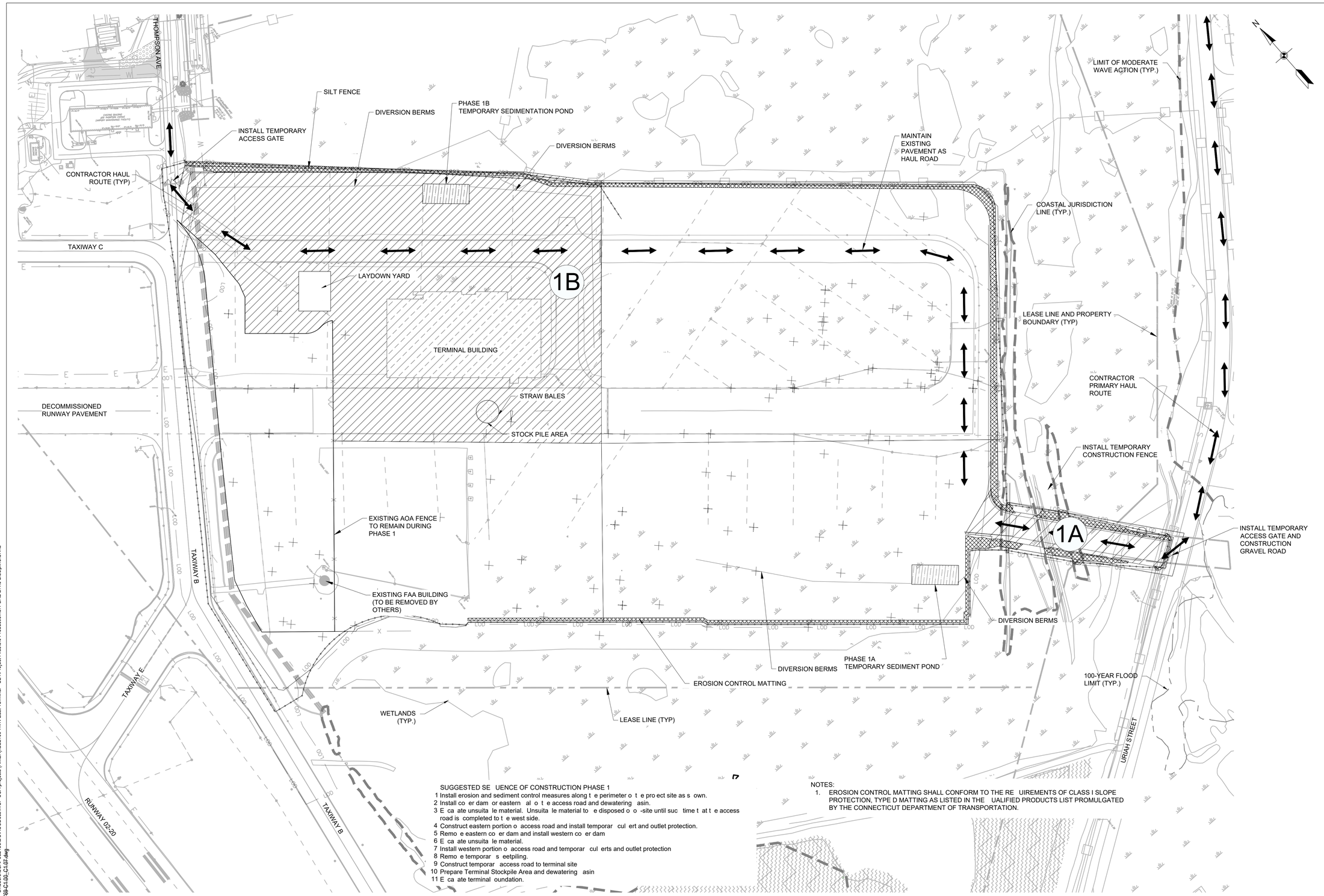

SUGGESTED SE UENCE OF CONSTRUCTION PHASE 1

1 Install erosion and sediment control measures along t e perimeter o t e pro ect site as s own.
2 Install co er dam or eastern al o t e access road and dewatering asin.
3 E ca ate unsuita le material. Unsuita le material to e disposed o o -site until suc time t at t e access road is completed to t e west side.
4 Construct eastern portion o access road and install temporar cul ert and outlet protection.
5 Remo e eastern co er dam and install western co er dam
6 E ca ate unsuita le material.
7 Install western portion o access road and temporar cul erts and outlet protection
8 Remo e temporar s eetpiling.
9 Construct temporar access road to terminal site
10 Prepare Terminal Stockpile Area and dewatering asin
11 E ca ate terminal oundation.

NOTES:

1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

CLIENT

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INTERIM REVIEW DRAWINGS NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION
1	04/05/2024	30 DESIGN
2	04/17/2024	30 DESIGN
3	05/24/2024	30 DESIGN
4	11/22/2024	30 DESIGN
5	01/24/2025	60 DESIGN

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SEDIMENT AND EROSION CONTROL - PHASE 1A 1B

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C1.01

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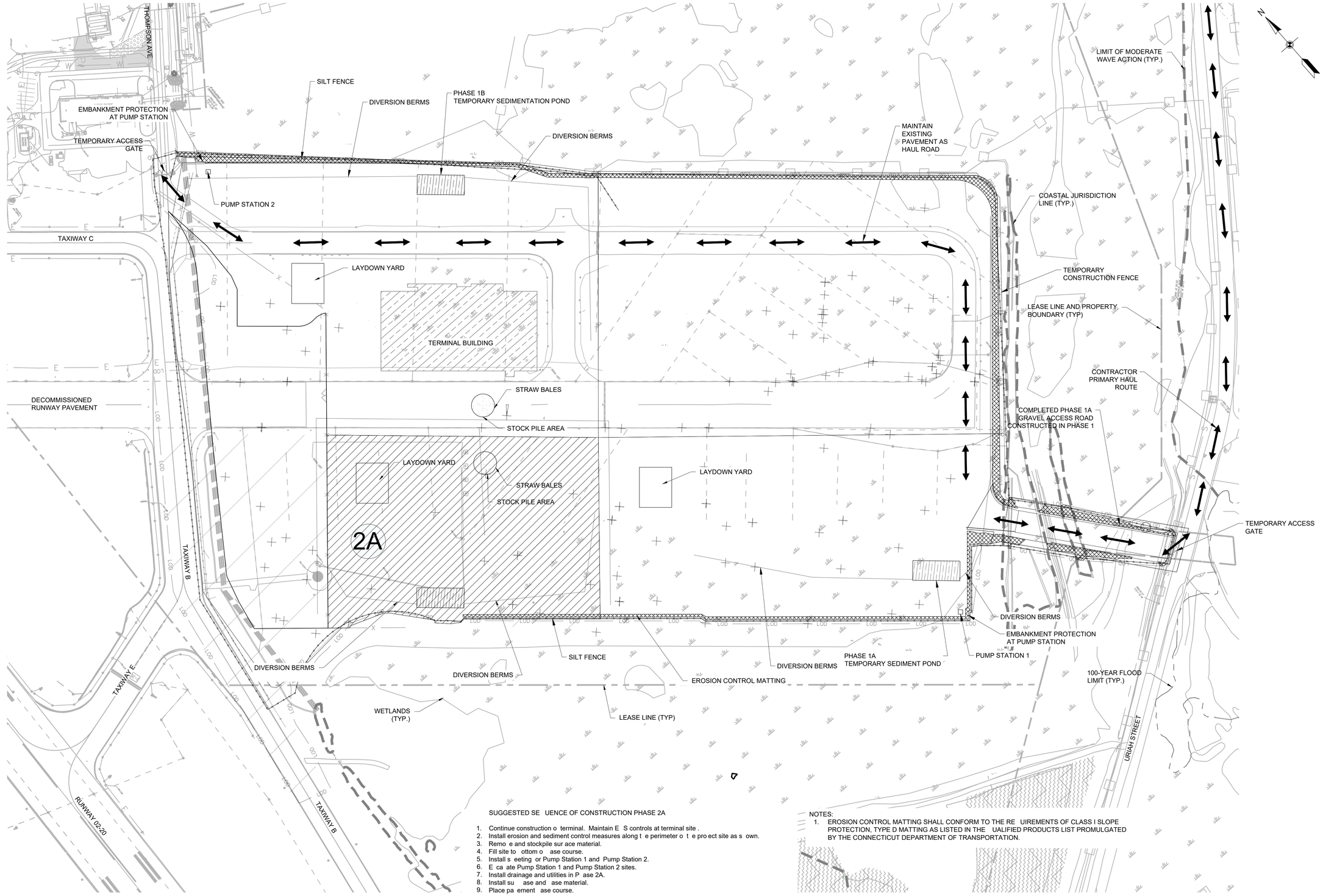

SUGGESTED SE UENCE OF CONSTRUCTION PHASE 2A

1. Continue construction o terminal. Maintain E S controls at terminal site .
2. Install erosion and sediment control measures along t e perimeter o t e pro ect site as s own.
3. Remo e and stockpile sur ace material.
4. Fill site to ottom o ase course.
5. Install s eeting or Pump Station 1 and Pump Station 2.
6. E ca ate Pump Station 1 and Pump Station 2 sites.
7. Install drainage and utilities in P ase 2A.
8. Install su ase and ase material.
9. Place pa ement ase course.

NOTES:

1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

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INTERIM REVIEW
DRAWINGS
NOT FOR
CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L PETRUCELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

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1	04/05/2024	30	DESIGN
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3	05/24/2024	30	DESIGN
4	11/22/2024	30	DESIGN
5	01/24/2025	60	DESIGN

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00250 63.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SEDIMENT AND
EROSION CONTROL
- PHASE 2A

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C1.02A

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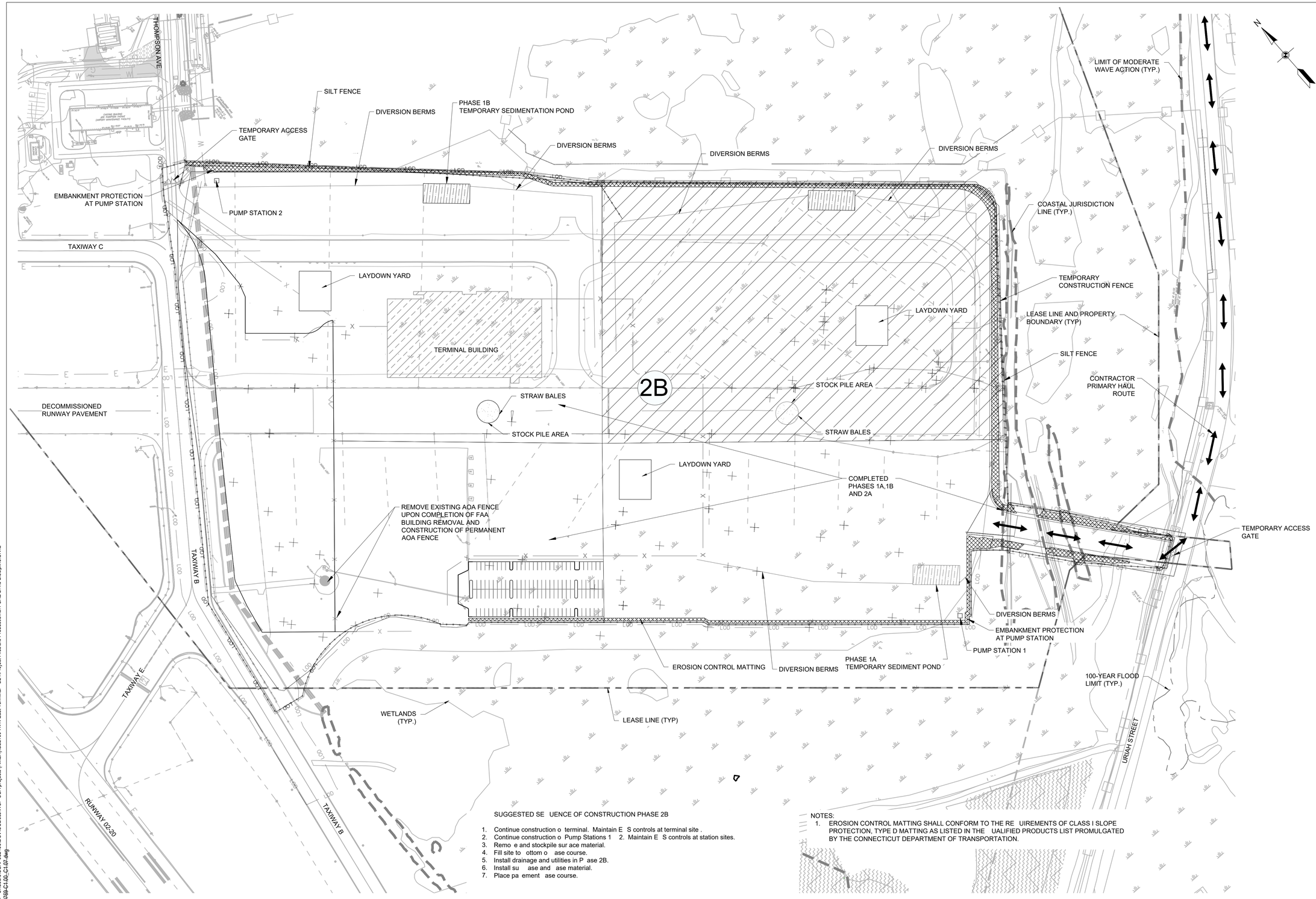

SUGGESTED SE UENCE OF CONSTRUCTION PHASE 2B

1. Continue construction o terminal. Maintain E S controls at terminal site .
2. Continue construction o Pump Stations 1 2. Maintain E S controls at station sites.
3. Remo e and stockpile sur ace material.
4. Fill site to ottom o ase course.
5. Install drainage and utilities in P ase 2B.
6. Install su ase and ase material.
7. Place pa ement ase course.

NOTES:
1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

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INTERIM REVIEW DRAWINGS NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 18478
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PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION
1	04/05/2024	30 DESIGN
2	04/17/2024	30 DESIGN
3	05/24/2024	30 DESIGN
4	11/22/2024	30 DESIGN
5	01/24/2025	60 DESIGN

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
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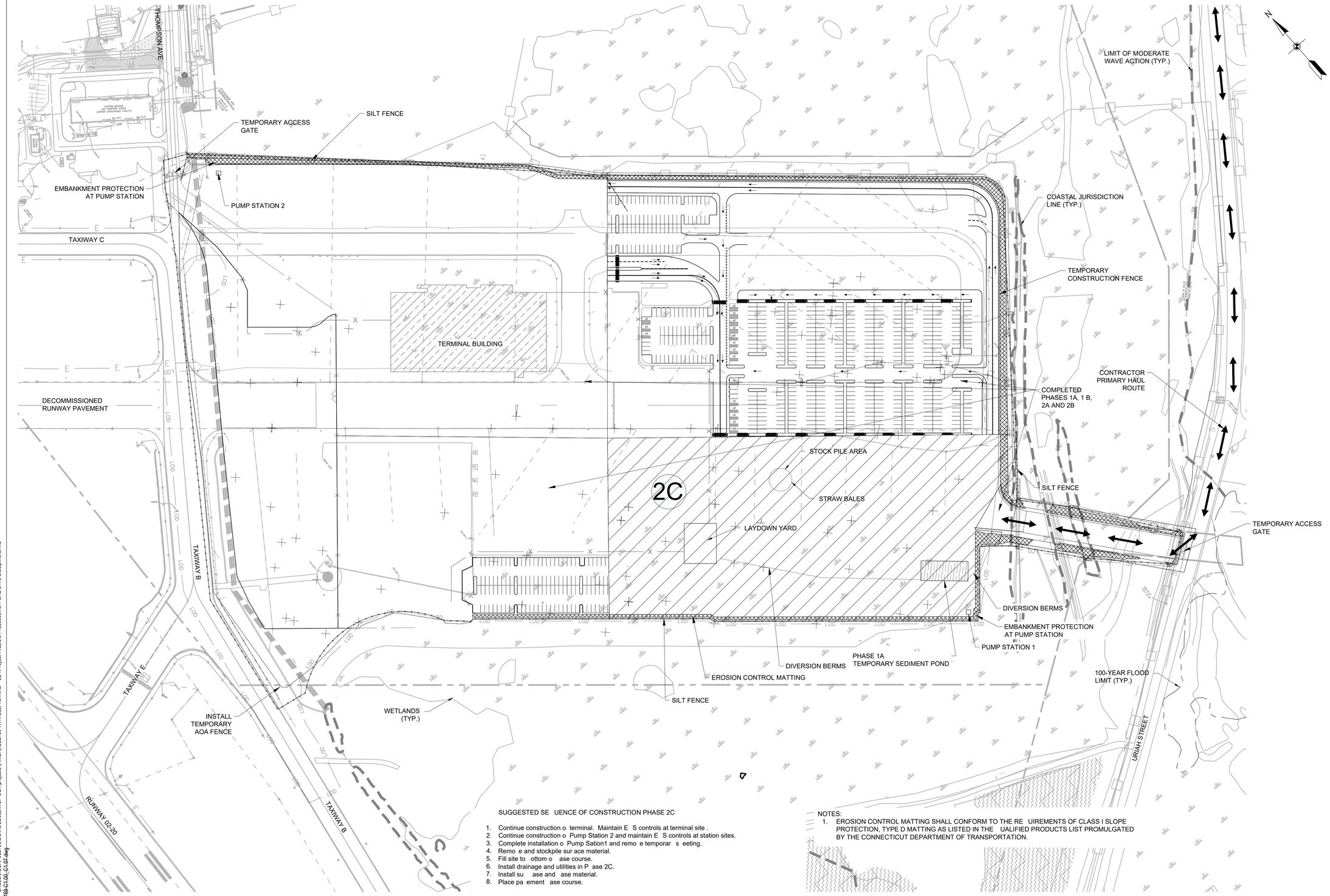
SHEET TITLE

SEDIMENT AND EROSION CONTROL - PHASE 2B

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C1.02B



SUGGESTED SE UENCE OF CONSTRUCTION PHASE 2C

1. Continue construction o terminal. Maintain E S controls at terminal site .
2. Continue construction o Pump Station 2 and maintain E S controls at station sites.
3. Complete installation o Pump Sation1 and remo e temporar s eeting.
4. Remo e and stockpile sur ace material.
5. Fill site to ottom o ase course.
6. Install drainage and utilities in P ase 2C.
7. Install su ase and ase material.
8. Place pa ement ase course.

NOTES:
1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

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INTERIM REVIEW DRAWINGS NOT FOR CONSTRUCTION

REGISTRATION

RICHARD L. PETTINELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER — STATE OF CONNECTICUT

DRAWING HISTORY

No.	DATE		DESCRIPTION
1	04/05/2024	30	DESIGN
2	04/17/2024	30	DESIGN
3	05/24/2024	30	DESIGN
4	11/22/2024	30	DESIGN
5	01/24/2025	60	DESIGN

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

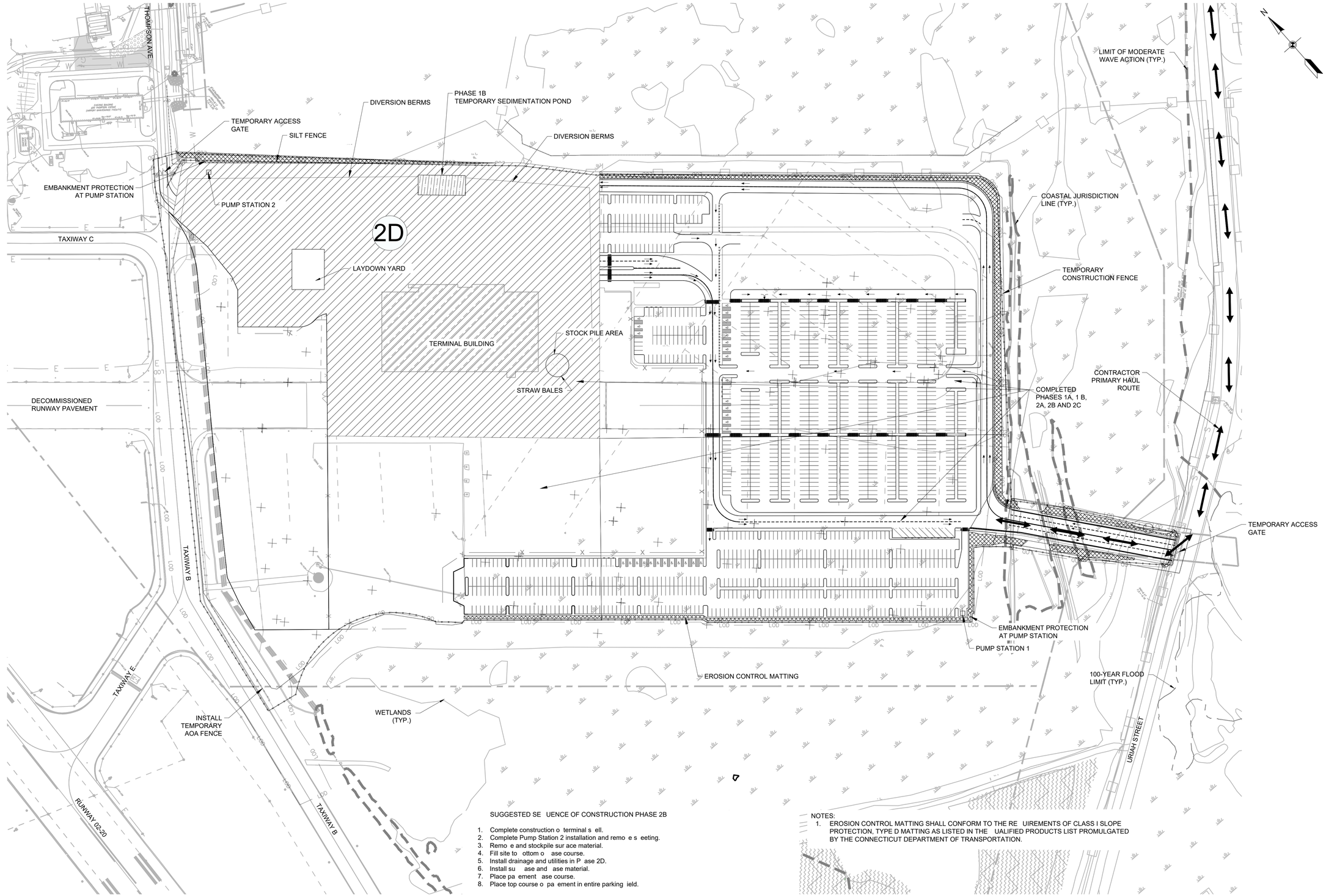
SEDIMENT AND EROSION CONTROL
- PHASE 2C

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C1.02C

HVN - 2/26/2025 4:47:12 PM - C:\Users\IAE\Desktop\USAPRBZ138\DOCACDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL SHEETS\SHEETS\02240248-01-00_C1.01P.dwg



SUGGESTED SE UENCE OF CONSTRUCTION PHASE 2B

1. Complete construction o terminal s ell.
2. Complete Pump Station 2 installation and remo e s eeting.
3. Remo e and stockpile sur ace material.
4. Fill site to ottom o ase course.
5. Install drainage and utilities in P ase 2D.
6. Install su ase and ase material.
7. Place pa ement ase course.
8. Place top course o pa ement in entire parking ield.

NOTES:
1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

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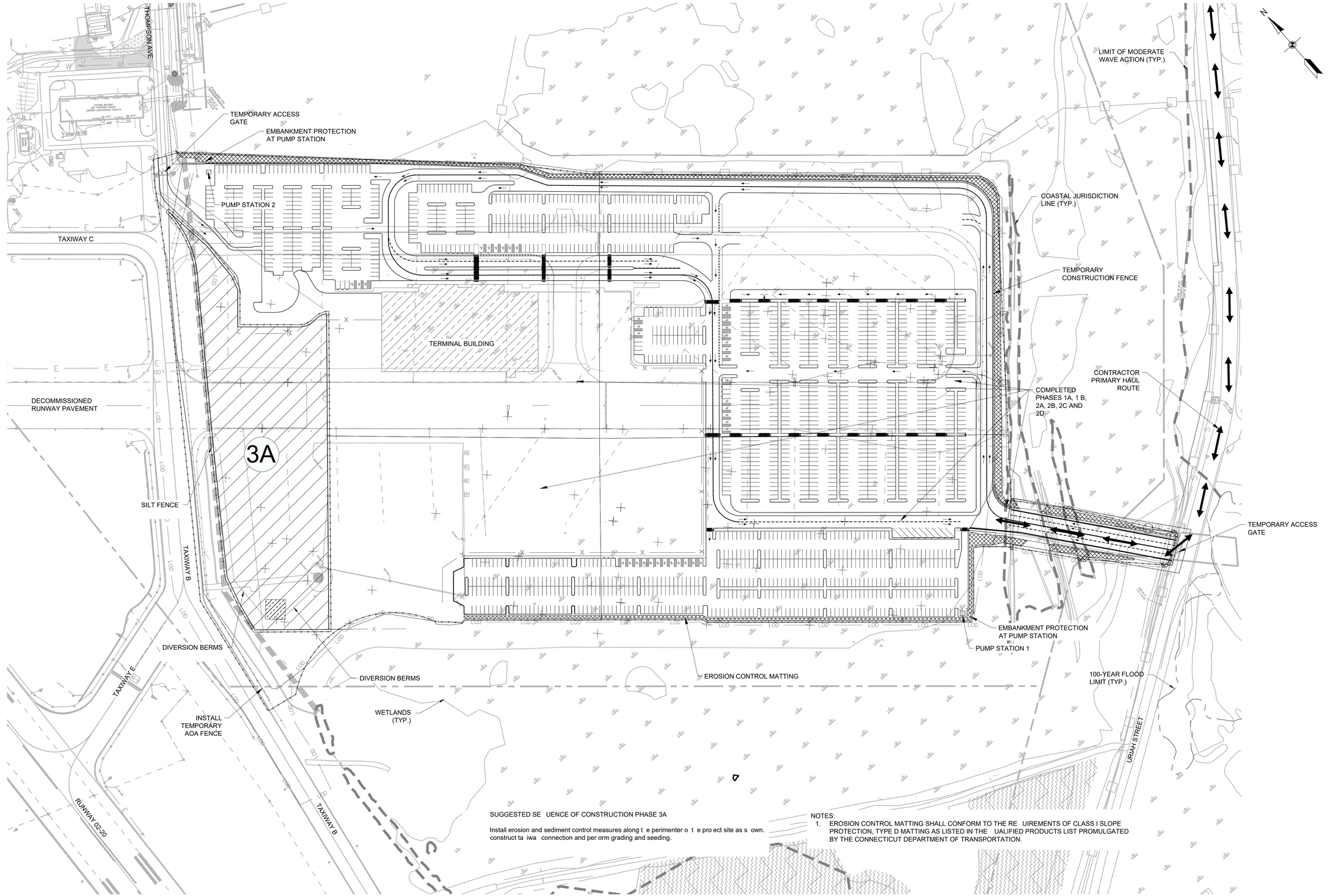
SHEET TITLE

SEDIMENT AND EROSION CONTROL - PHASE 2D

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C1.02D



SUGGESTED SE UENCE OF CONSTRUCTION PHASE 3A

Install erosion and sediment control measures along t e perimenter o t e pro ect site as s own. construct ta iwa connection and per orm grading and seeding.

NOTES:

1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

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SHEET TITLE

SEDIMENT AND EROSION CONTROL - PHASE 3A

DATE	DRN BY	CHK BY	APP BY
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SHEET NUMBER

C1.03A

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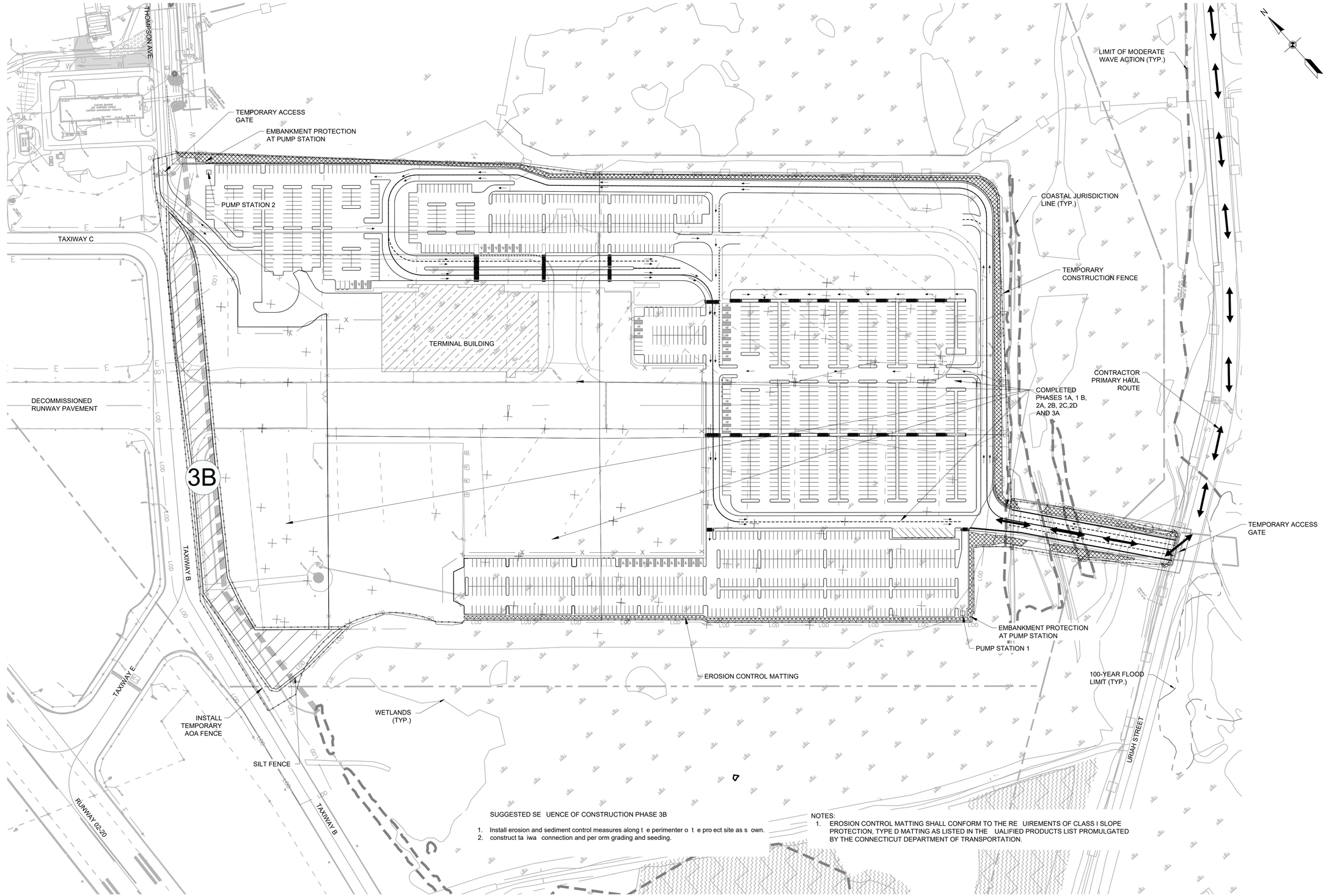

SUGGESTED SE UENCE OF CONSTRUCTION PHASE 3B

1. Install erosion and sediment control measures along t e perimenter o t e pro ect site as s own.
2. construct ta iwa connection and per orm grading and seeding.

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1. EROSION CONTROL MATTING SHALL CONFORM TO THE RE UIREMENTS OF CLASS I SLOPE PROTECTION, TYPE D MATTING AS LISTED IN THE UALIFIED PRODUCTS LIST PROMULGATED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION.

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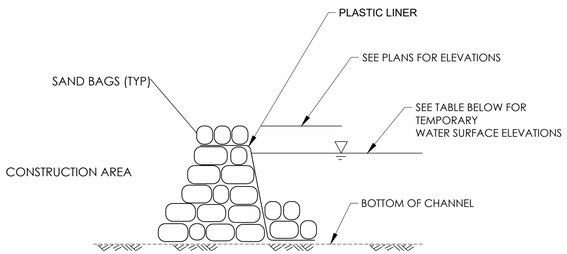
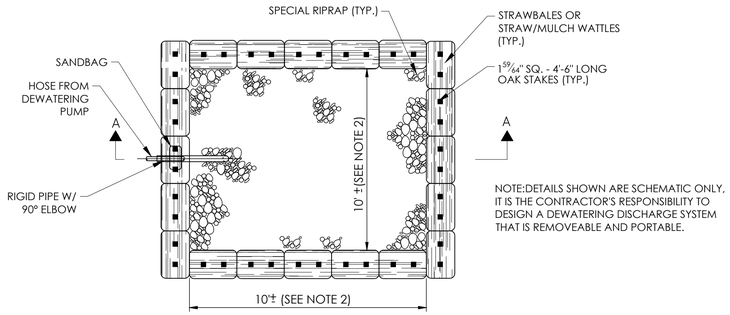


SUGGESTED WATER-HANDLING-COFFERDAM DETAIL - SANDBAGS

NOT TO SCALE



PLAN

NOT TO SCALE

UNCONFINED IN-STREAM WORK BMP:

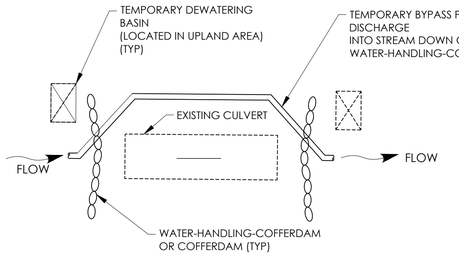
CONFINEMENT OF A WORK AREA BY COFFERDAM TECHNIQUES USING SANDBAG PLACEMENT, SHEET PILE INSTALLATION (VIBRATORY METHOD ONLY), PORTADAM, OR SIMILAR CONFINEMENT DEVICES IS ALLOWED ANY TIME OF THE YEAR. THE REMOVAL OF SUCH CONFINEMENT DEVICES IS ALLOWED ANY TIME OF THE YEAR.

ONCE A WORK AREA HAS BEEN CONFINED, IN-WATER WORK WITHIN THE CONFINED AREA IS ALLOWED ANY TIME OF THE YEAR.

THE CONFINEMENT TECHNIQUE USED SHALL COMPLETELY ISOLATE AND PROTECT THE CONFINED AREA FROM ALL FLOWING WATER. THE USE OF SILT BOOM/CURTAIN OR SIMILAR TECHNIQUE AS A MEANS FOR CONFINEMENT IS PROHIBITED.

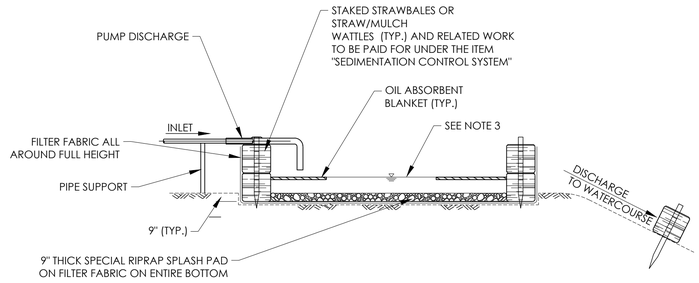
THE ENGINEER WILL REVIEW AND MAY APPROVE THE METHODS OF UNCONFINED IN-WATER WORK WITH CONSIDERATION OF THE FOLLOWING:

- PROPOSED SCHEDULE FOR WORKING OPERATIONS
- ALL UNCONFINED IN-WATER WORK SHALL BE MINOR IN NATURE
- DISTURBANCE SHALL BE LIMITED TO AREAS THAT HAVE BEEN APPROVED FOR TEMPORARY AND PERMANENT IMPACT
- BEST MANAGEMENT PRACTICES SHALL BE UTILIZED WHEREVER POSSIBLE TO MINIMIZE TURBIDITY/SEDIMENT TRANSPORT DOWNSTREAM
- DISTURBED AREAS AND THE DURATION OF DISTURBANCE SHALL BE MINIMIZED TO THE EXTENT POSSIBLE
- IN-STREAM WORK SHALL BE DONE DURING PERIODS OF LOW FLOW



TEMPORARY PUMPING

NOT TO SCALE



SECTION A-A

TEMPORARY SEDIMENT BASIN FOR DEWATERING DISCHARGE

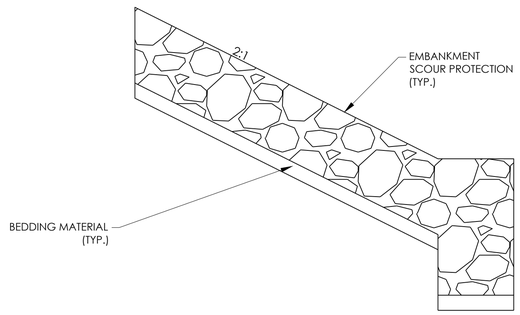
NOT TO SCALE

WATER HANDLING NOTES:

1. THE CONTRACTOR SHALL MAINTAIN WATER THROUGH THE TEMPORARY WATER-HANDLING SYSTEM AS REQUIRED DURING THE CONSTRUCTION OF THE NEW STRUCTURE.
2. EQUIPMENT SHALL NOT BE PERMITTED IN THE WATERCOURSE WHEN TEMPORARY WATER-HANDLING SYSTEM IS NOT IN PLACE WITHOUT APPROVAL FROM THE ENGINEER.
3. DEWATERING BASIN SHALL BE ESTABLISHED OUTSIDE OF THE WETLAND LIMITS. THE EXACT POSITION MAY VARY BASED ON THE PUMPING DESIGN SUBMISSION APPROVED BY THE ENGINEER.
4. WATER-HANDLING MEASURES SHALL NOT EXCEED IMPACT AREAS SHOWN ON THE WETLAND/WATERCOURSE IMPACT PLAN OF THE PERMIT PLANS.

BASIN NOTES:

1. CONTRACTOR TO BRACE STRAWBALES OR STRAW/MULCH WATTLES AS REQUIRED FOR STABILITY.
2. DIMENSIONS TO VARY DEPENDENT UPON DE-WATERING RATE.
3. VOLUME OF BASIN IS EQUAL TO THE MAXIMUM VOLUME OF WATER CAPABLE OF BEING PUMPED.
4. SPECIAL RIPRAP STONE SHALL CONFORM TO NO. 3 STONE AS SHOWN IN SECTION M.01.01 OF CONNDOT FORM 819.
5. AT THE COMPLETION OF THE WORK, THE BASIN AND ALL RELATED MATERIALS SHALL BE REMOVED FROM THE SITE, AND THE AREA SHALL BE RETURNED TO ITS ORIGINAL CONDITION BY THE CONTRACTOR AS DIRECTED BY THE ENGINEER. THE COST OF THIS WORK WILL BE INCLUDED UNDER EACH ITEM, EXCEPT THE CLEAN-UP WHICH WILL NOT BE MEASURED FOR PAYMENT BUT INCLUDED IN THE GENERAL COST OF THE WORK.
6. THE TEMPORARY SEDIMENT BASIN SHALL BE DESIGNED IN ACCORDANCE WITH CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL.



PUMP STATION EMBANKMENT PROTECTION

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SHEET TITLE

SEDIMENT AND EROSION CONTROL DETAILS 1

DATE	DRN BY	CHK BY	APP BY
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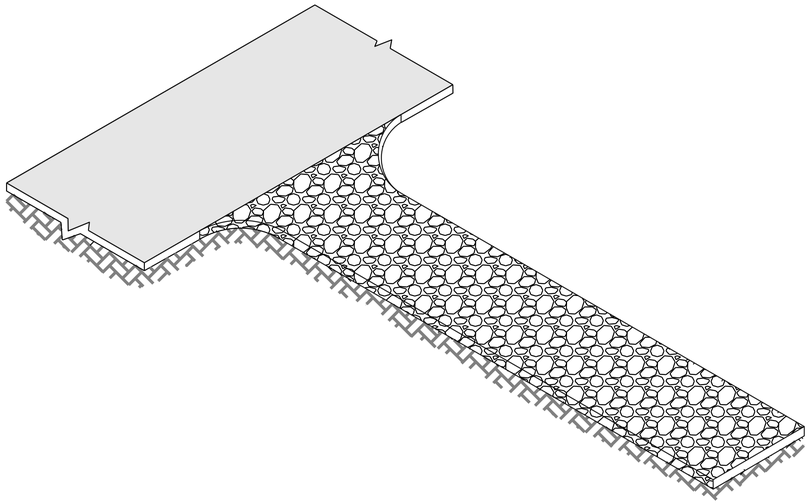
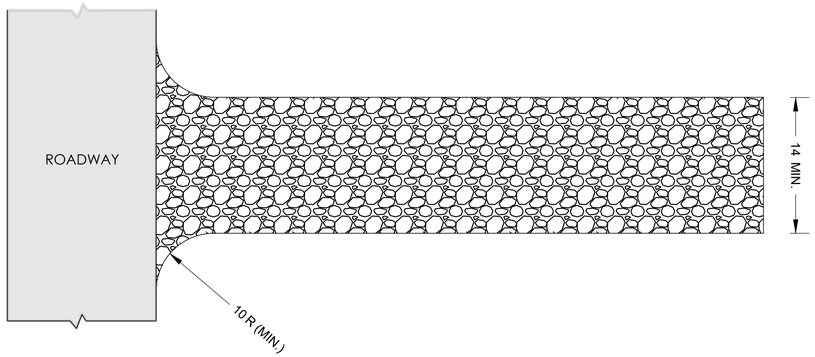
SHEET NUMBER

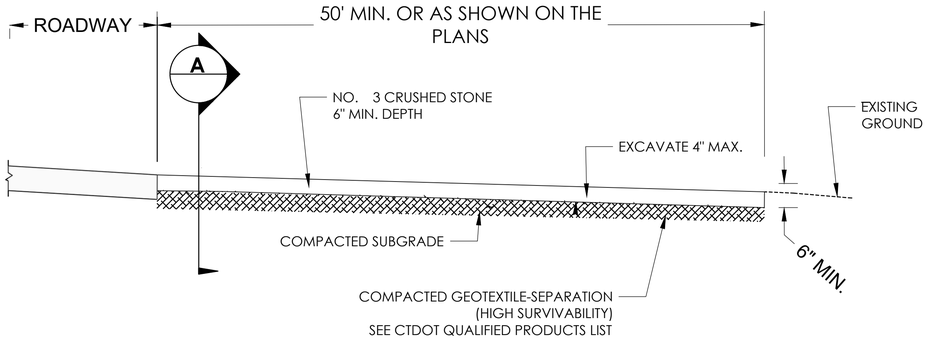
C1.04



1 C7.45 ANTI-TRACKING PAD
SCALE: NTS



PLAN



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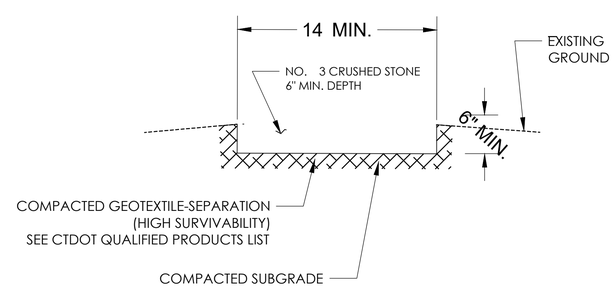

SECTION A

GENERAL NOTE:

1. THE LENGTH OF THE ANTI-TRACKING PAD SHALL BE INCREASED AS DIRECTED FOR SITES COMPOSED OF CLAY OR SILTS.

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DATE	DRN BY	CHK BY	APP BY
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SHEET NUMBER

C1.05

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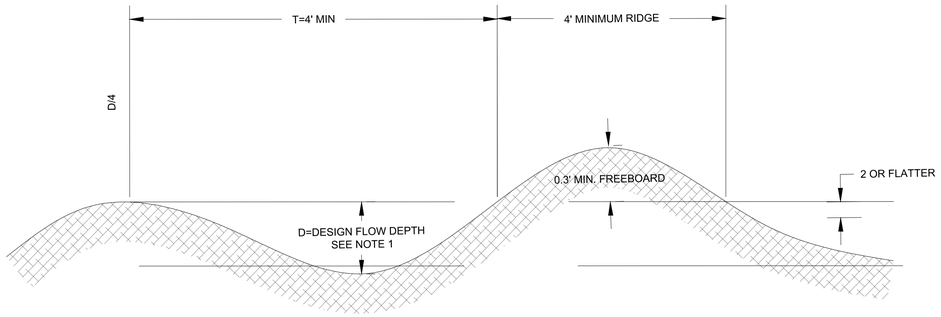

NOTES:

1. MINIMUM DESIGN CAPACITY SHALL CONVEY A 10 YR. 24 HOUR PEAK FLOW WITHOUT EROSION.
2. INSTALL EROSION CONTROL BLANKETS OR TURF REINFORCEMENT MATS AS NEEDED FOR EROSION RESISTANCE.

DIVERSION BERM

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SHEET TITLE

SEDIMENT AND EROSION CONTROL DETAILS 3

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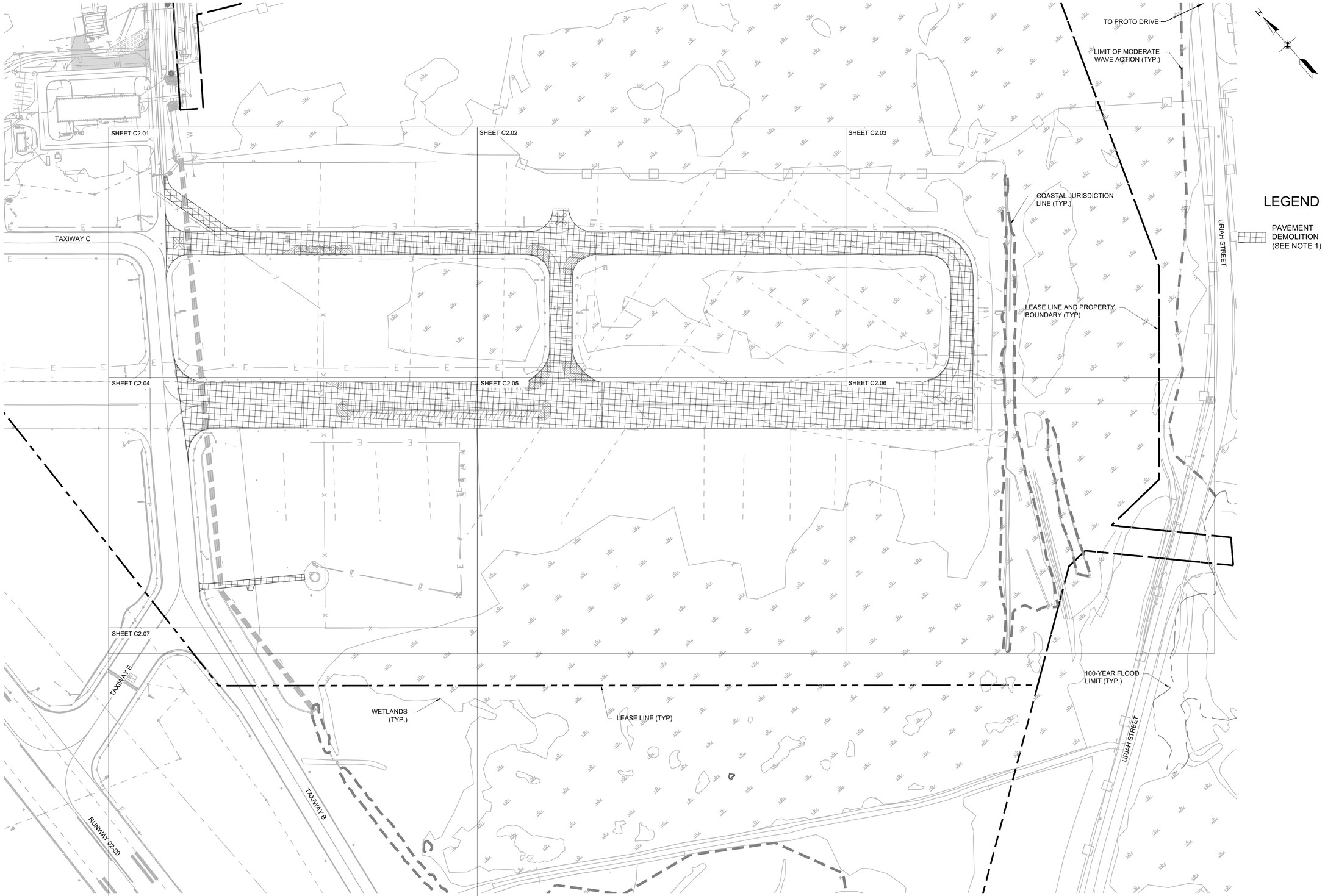
C1.06



NOTES:

1. SEE CROSS SECTIONS AND / OR GEOTECHNICAL REPORT FOR EXISTING PAVEMENT THICKNESSES.

0 50' 100' 200'
HORIZONTAL SCALE 1"=100'

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SHEET TITLE

SITE PREPARATION PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.00

HVN - 2/18/2025 6:23:24 PM - C:\Users\USRG72891\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL
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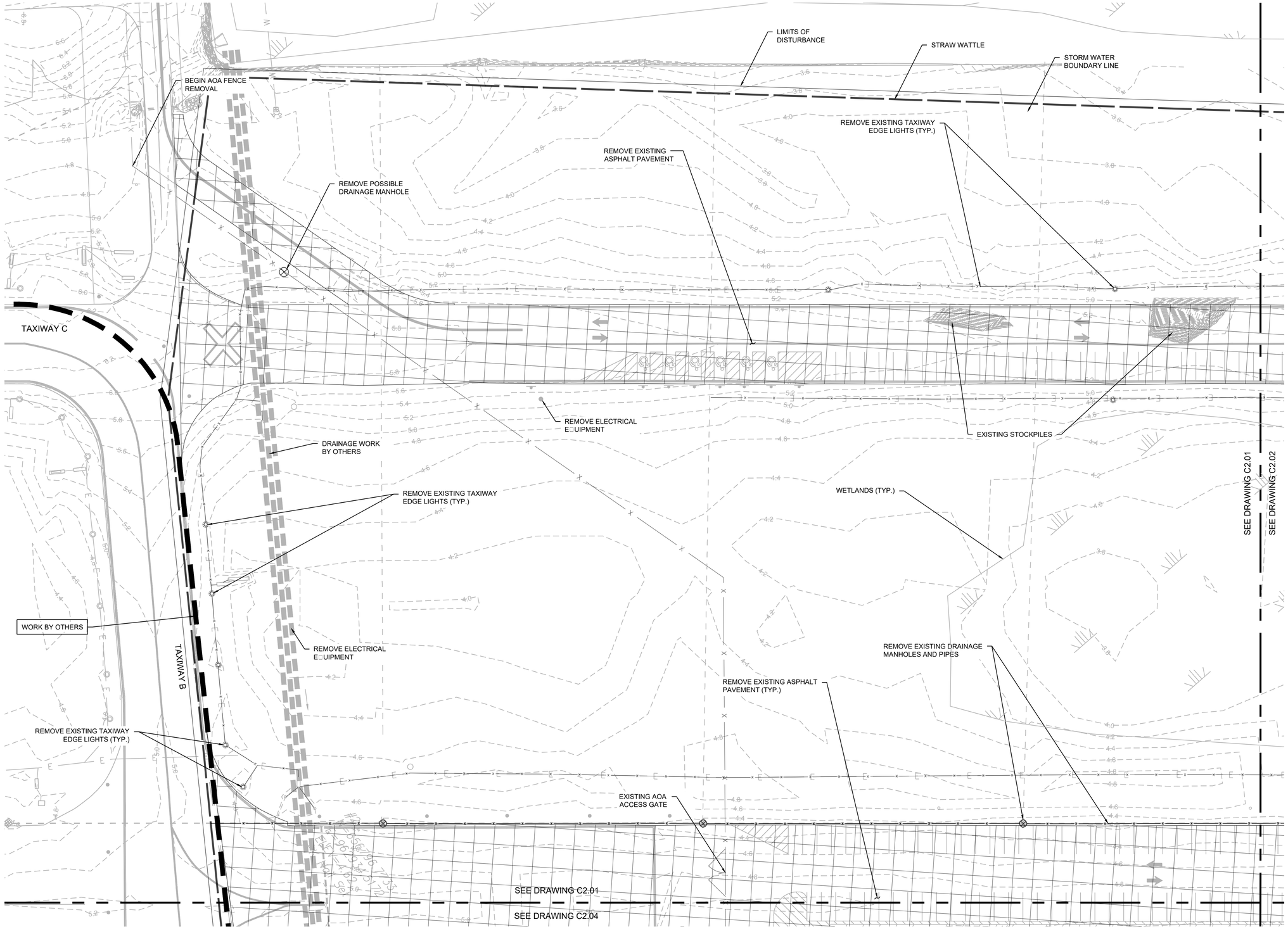

INFORMATION SHOWN IS FOR CONTRACTOR'S REFERENCE AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ANY SURFACE FEATURES THAT MAY BE A FUTURE OBSTRUCTION.

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

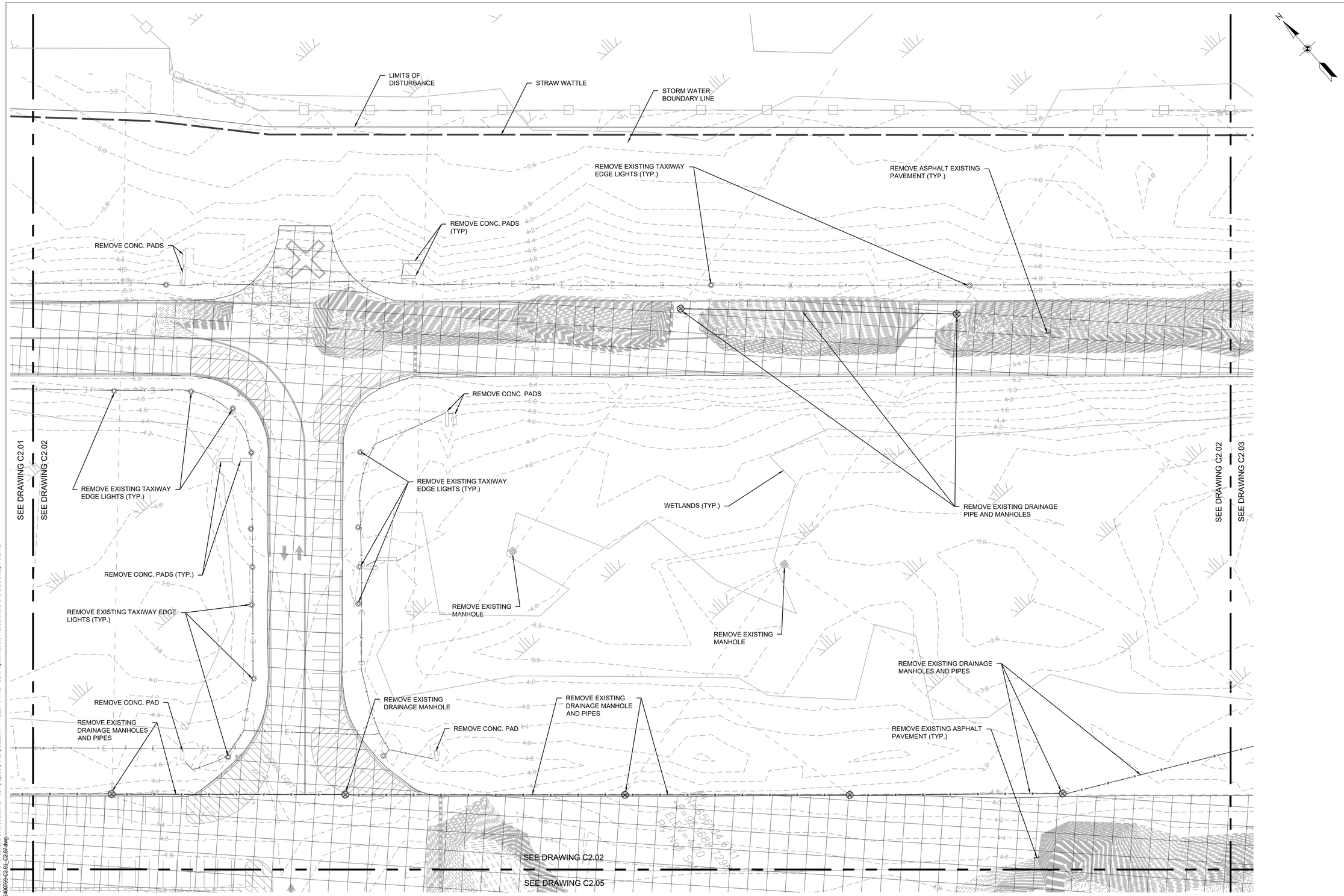
SHEET TITLE

SITE PREPARATION PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.01



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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16479 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

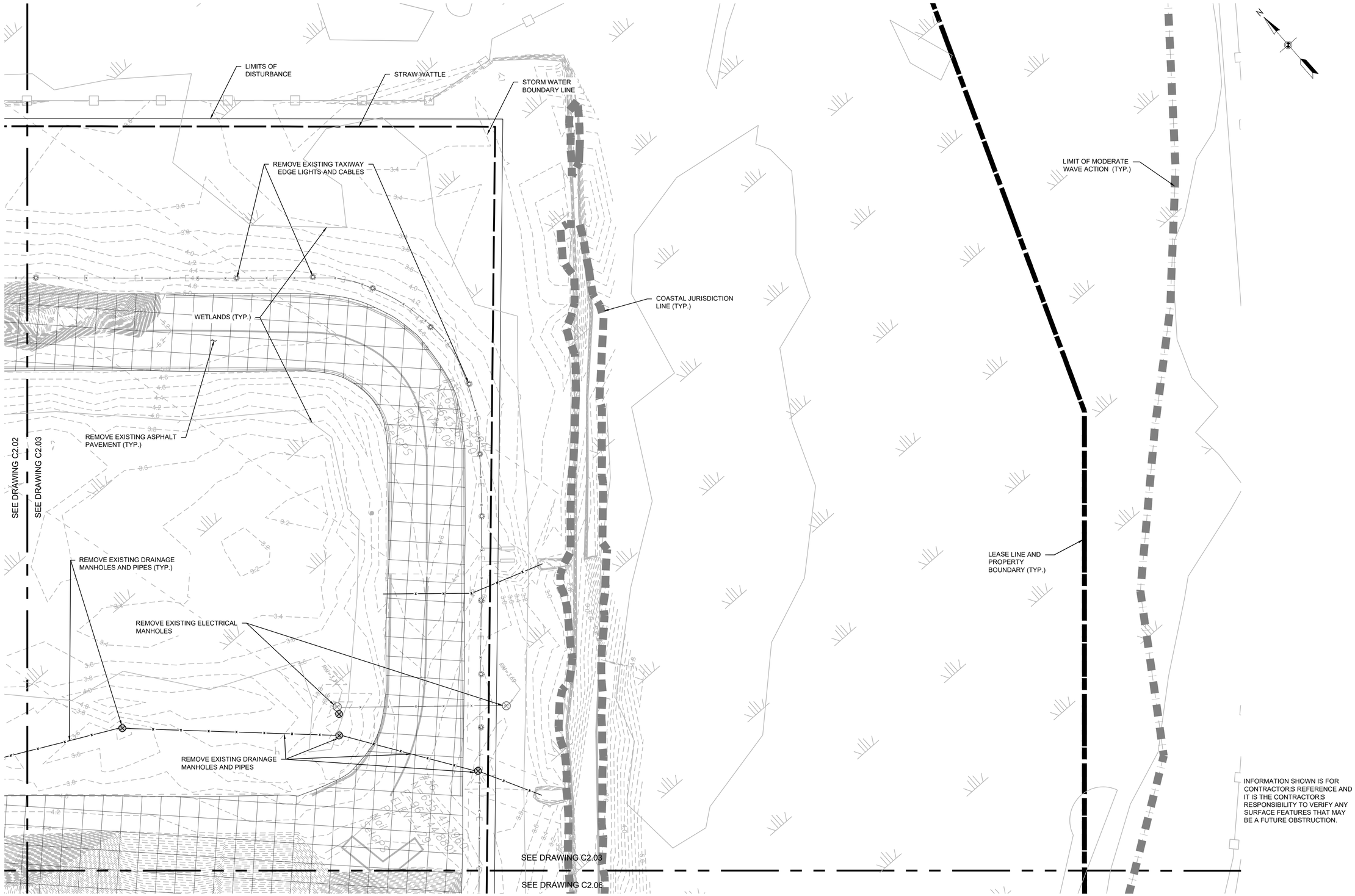
SHEET TITLE

SITE PREPARATION PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.02



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CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

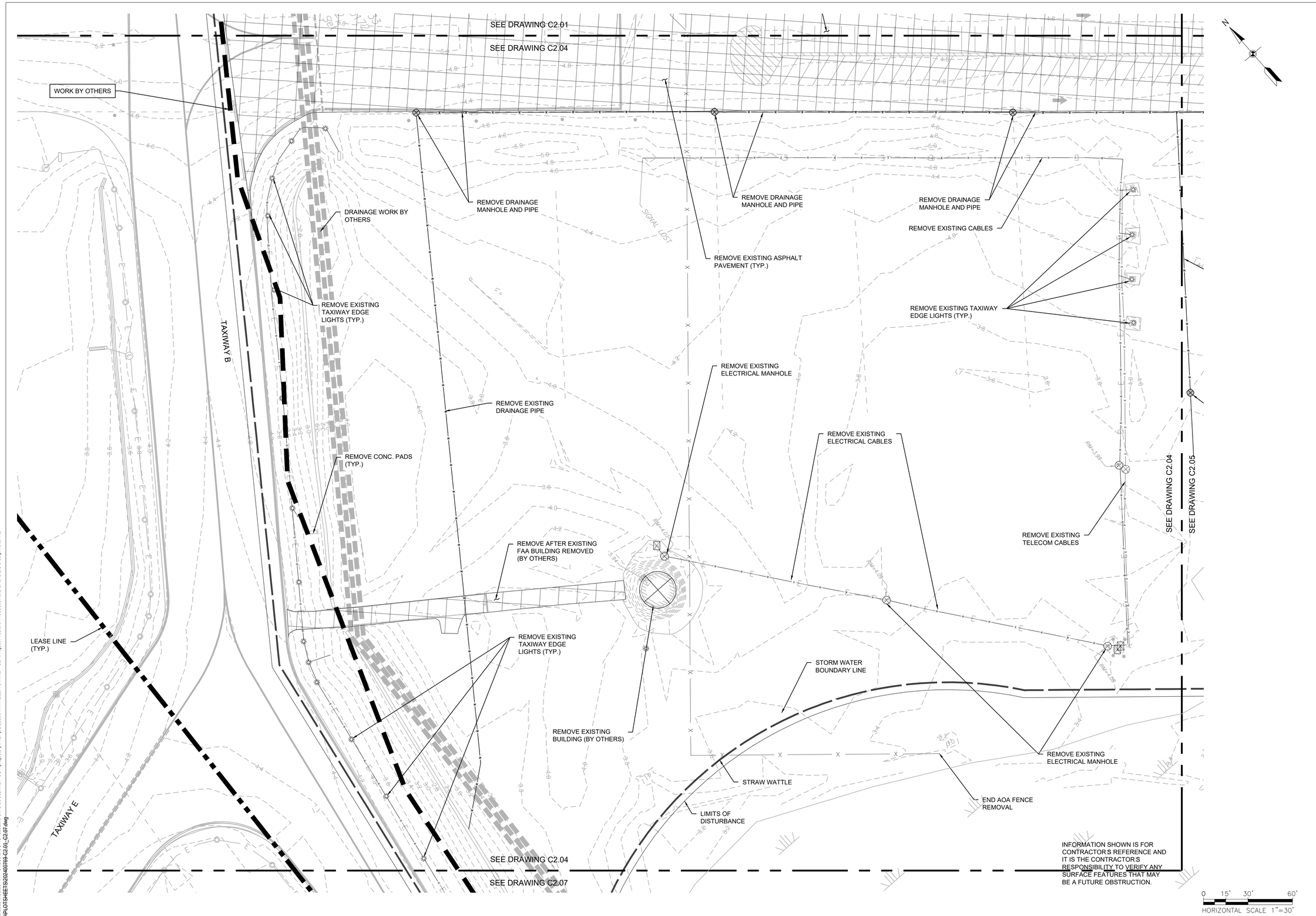
SHEET TITLE

SITE PREPARATION PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.03



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CLIENT

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PROJECT LOCATION

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PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SITE PREPARATION PLAN - SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.04

SEE DRAWING C2.02

SEE DRAWING C2.05

REMOVE EXISTING DRAINAGE PIPE

REMOVE EXISTING ASPHALT PAVEMENT (TYP.)

REMOVE EXISTING DRAINAGE PIPE

REMOVE EXISTING DRAIANGE MANHOLE AND PIPES

WETLANDS (TYP.)

REMOVE EXISTING DRAINAGE MANHOLE AND PIPES

REMOVE EXISTING DRAINAGE MANHOLES

SEE DRAWING C2.04

SEE DRAWING C2.05

#3
N=655918.7580
E=953336.2652
ELEV=3.83
Rebar Set

LIMITS OF DISTURBANCE

STRAW WATTLE

STORM WATER BOUNDARY LINE

SEE DRAWING C2.05

SEE DRAWING C2.06

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0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/19/2025 9:35:19 AM - C:\Users\USR67289180\DCACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C2\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\Civil\AIRFIELD\PLOTSHEETS\240769-C2.01_C2.07.dwg

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD J. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

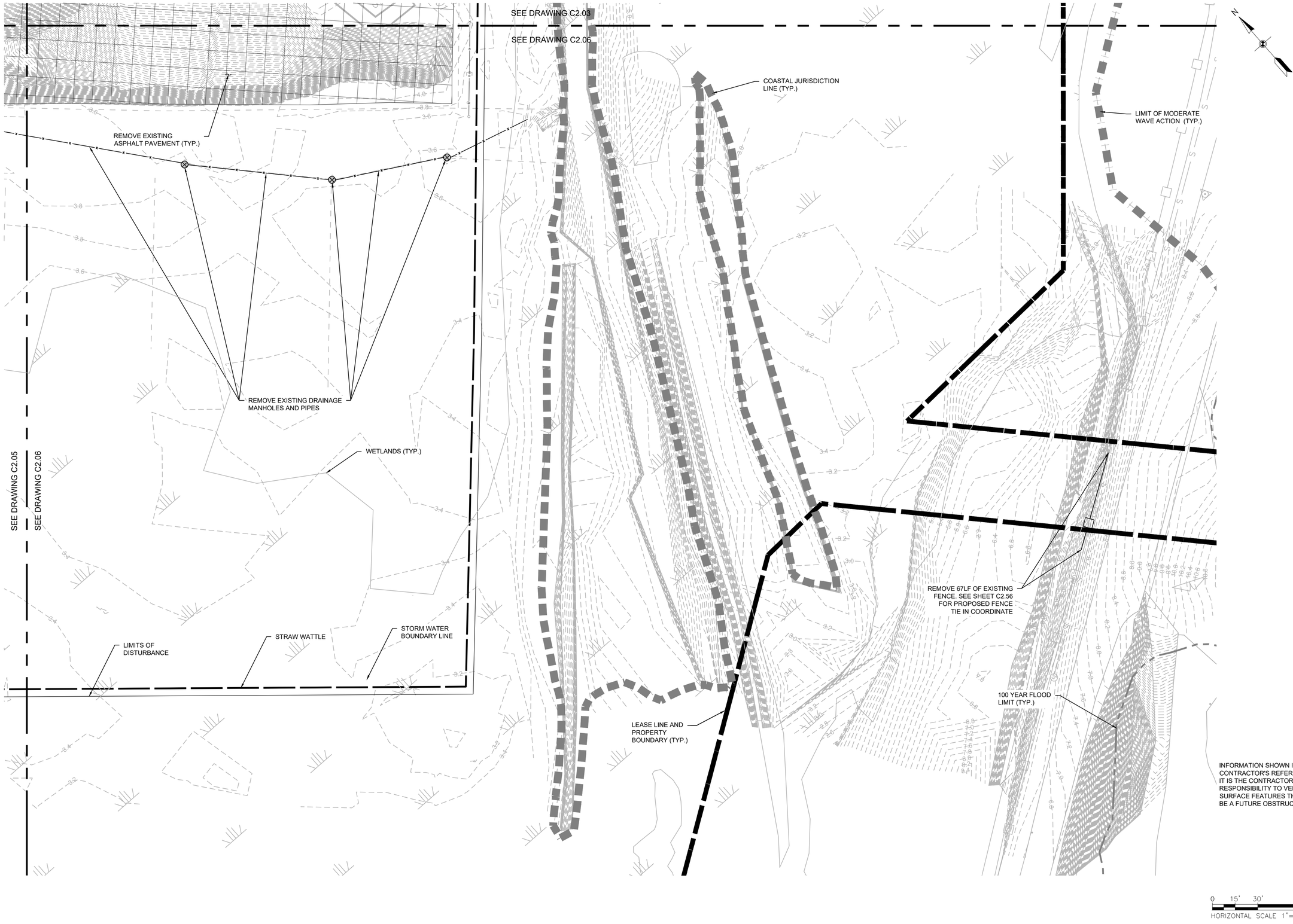
SHEET TITLE

SITE PREPARATION PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.05



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CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SITE PREPARATION PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.06

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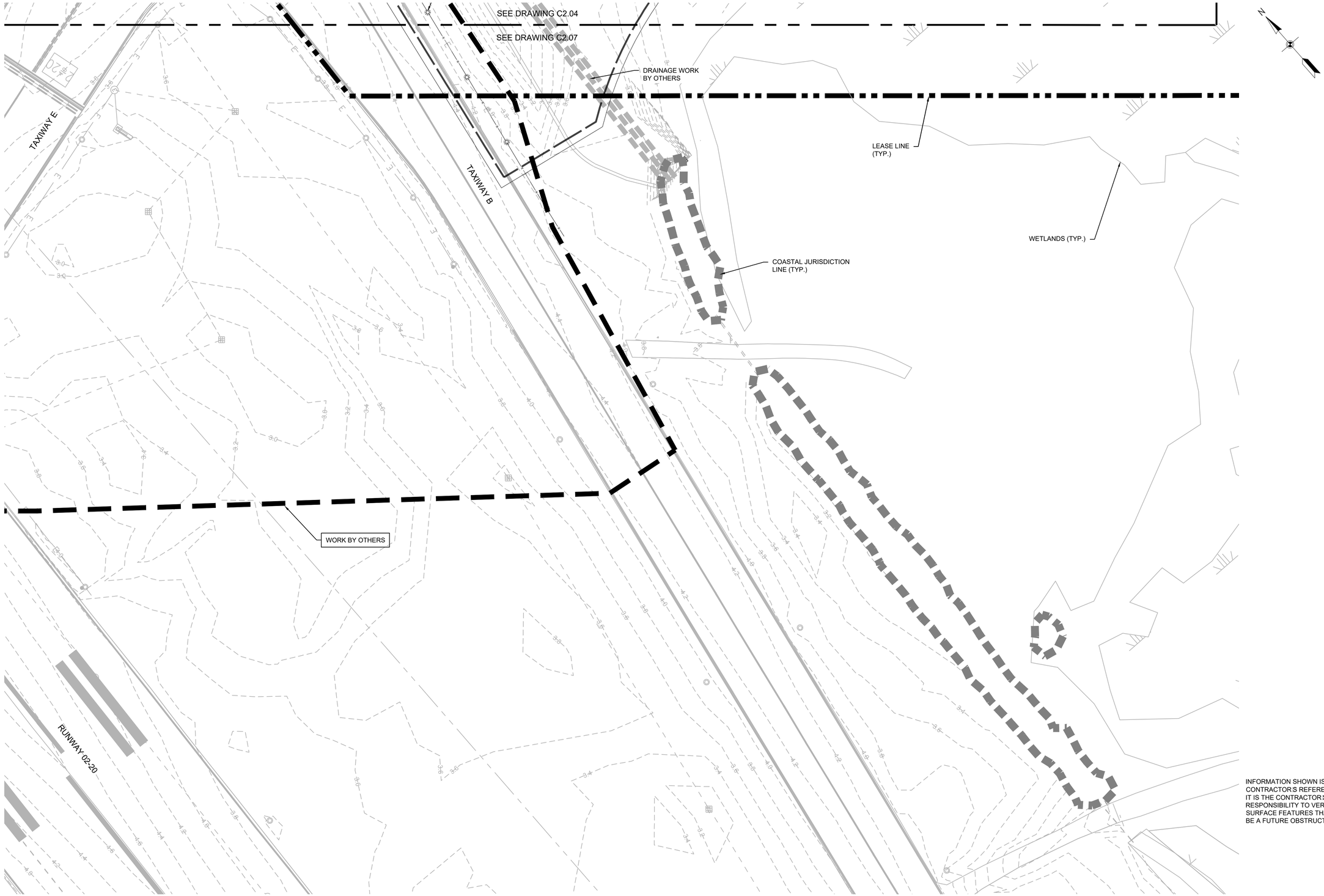

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SITE PREPARATION PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
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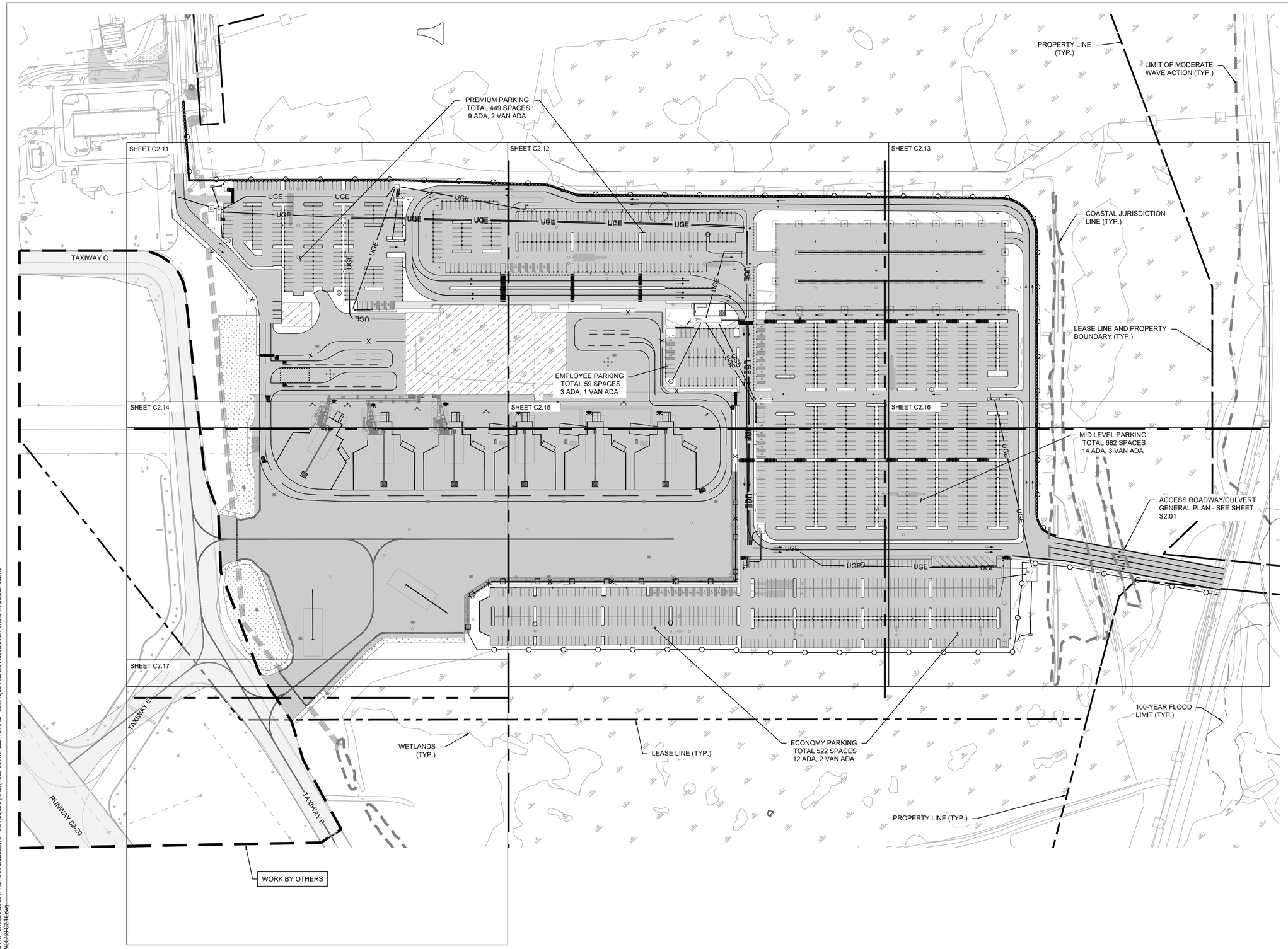
SHEET NUMBER

C2.07



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HORIZONTAL SCALE 1"=100'

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CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

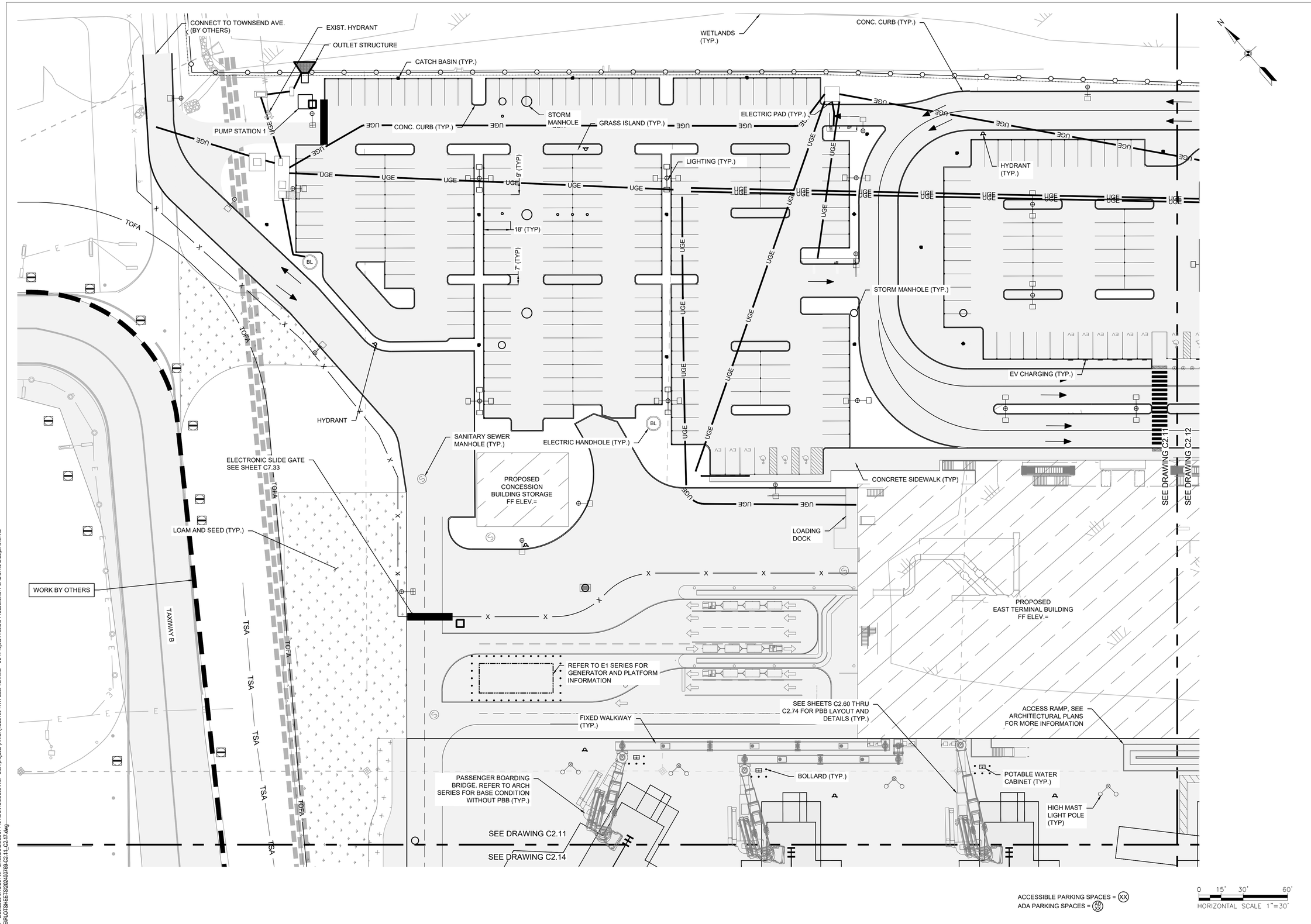
SHEET TITLE

CIVIL SITE PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.10



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CLIENT

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16679 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

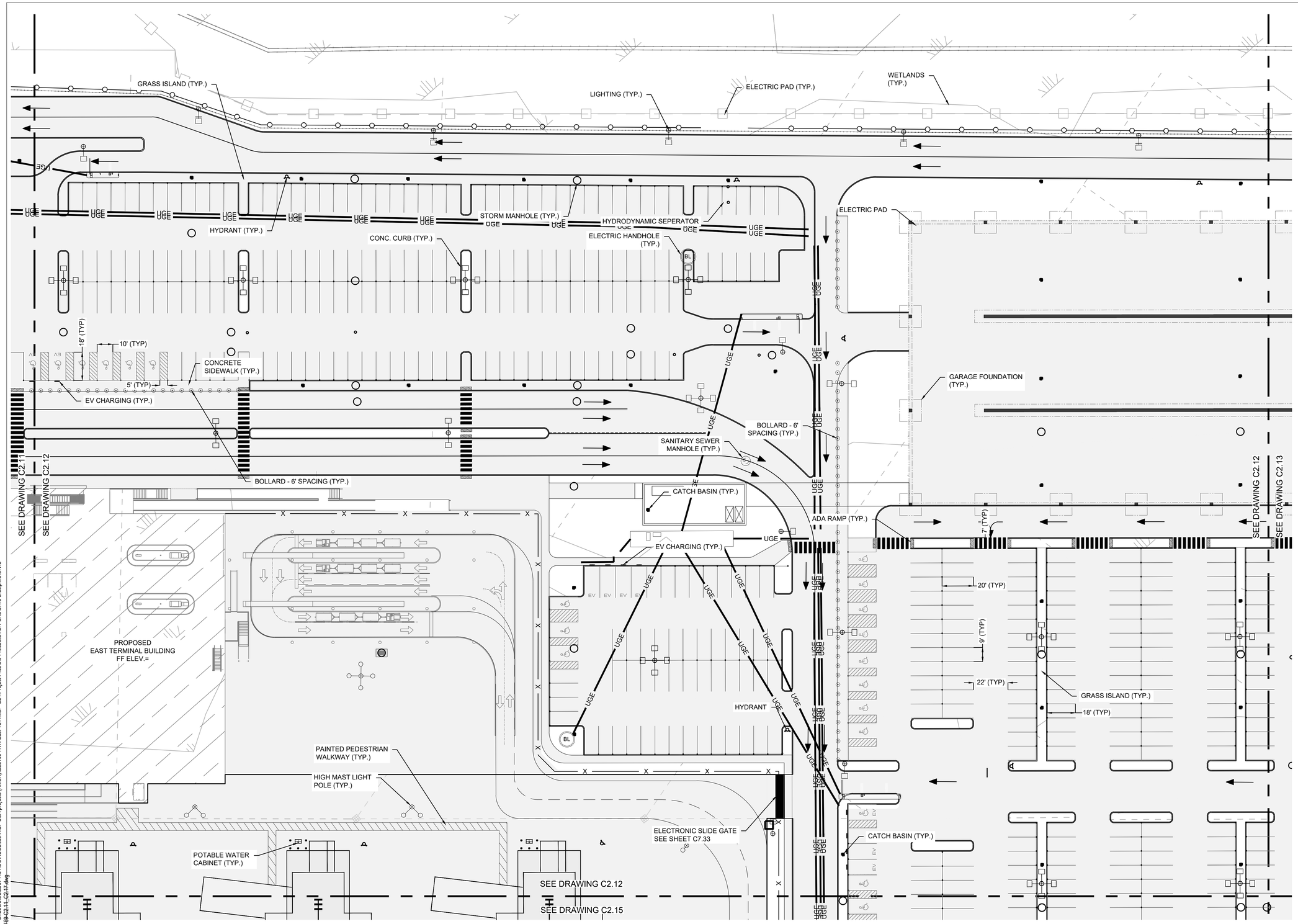
SHEET TITLE

CIVIL SITE PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.11



ACCESSIBLE PARKING SPACES = XX
ADA PARKING SPACES = AD XX

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/20/2025 8:45:55 AM - C:\Users\USSD674131\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL SITE\PLOTSHEETS\202400769-C2.11_C2.17.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

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DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

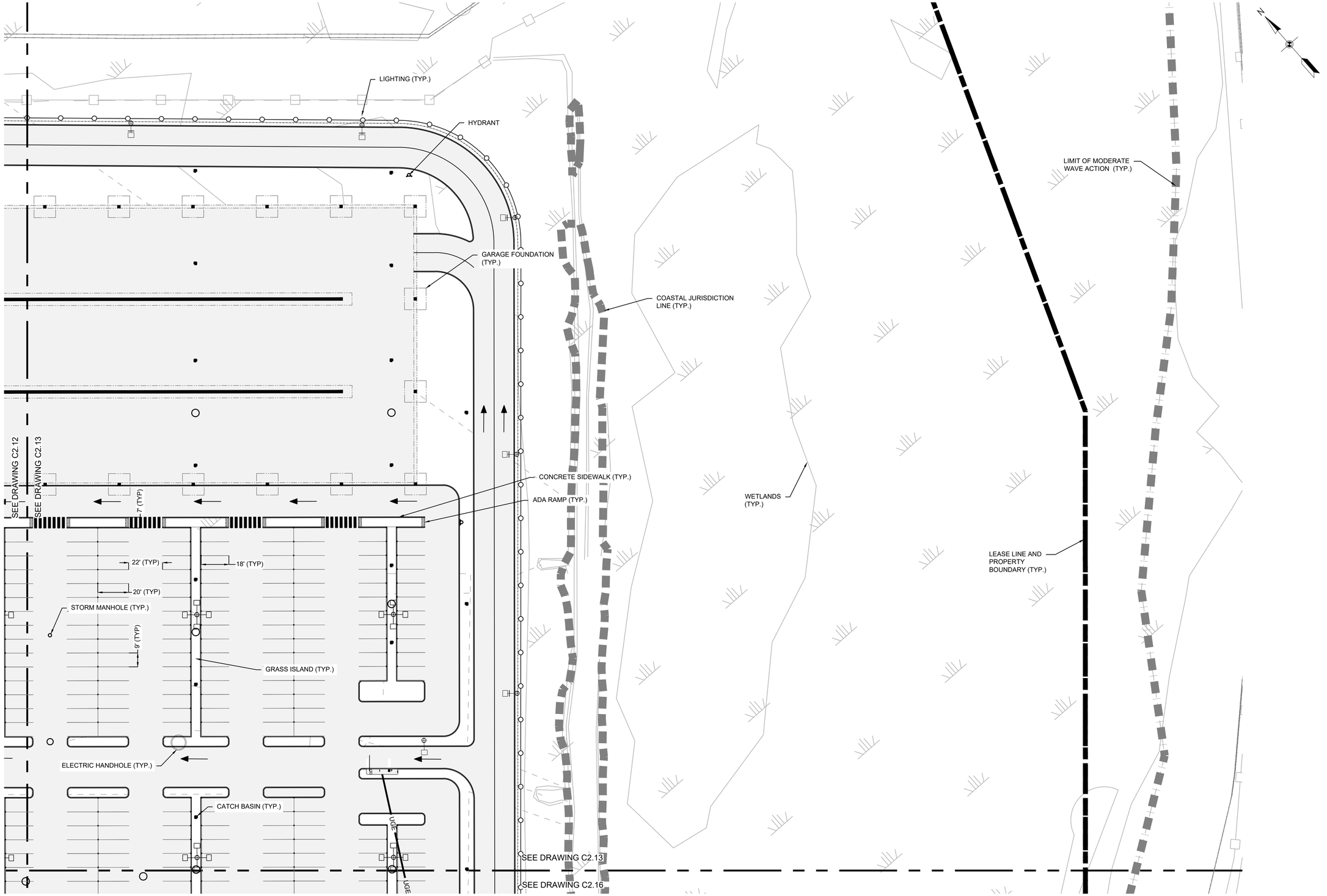
SHEET TITLE

CIVIL SITE PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.12



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CLIENT

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DRAWING HISTORY

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PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

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PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

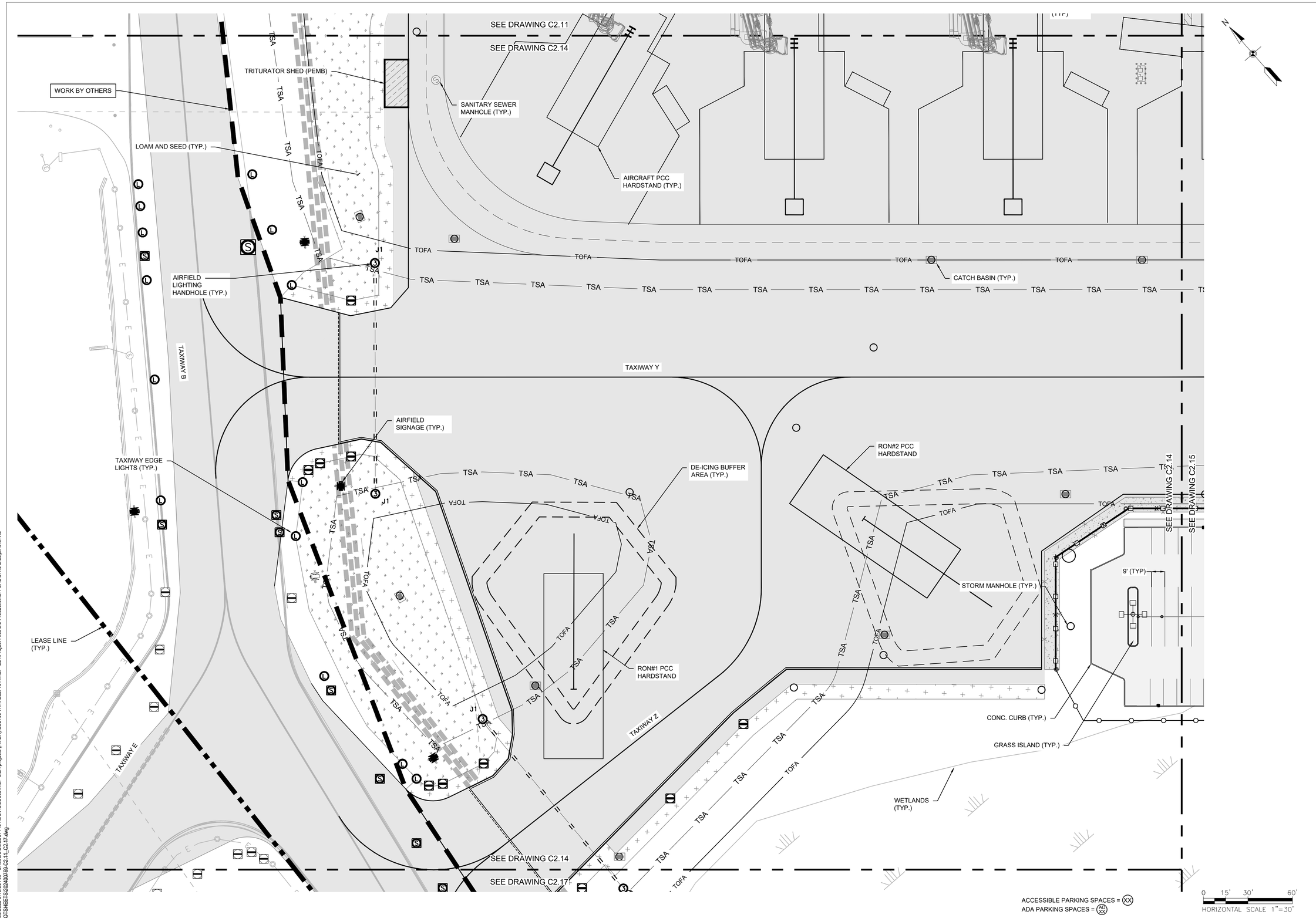
SHEET TITLE

CIVIL SITE PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.13



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DRAWING HISTORY

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PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

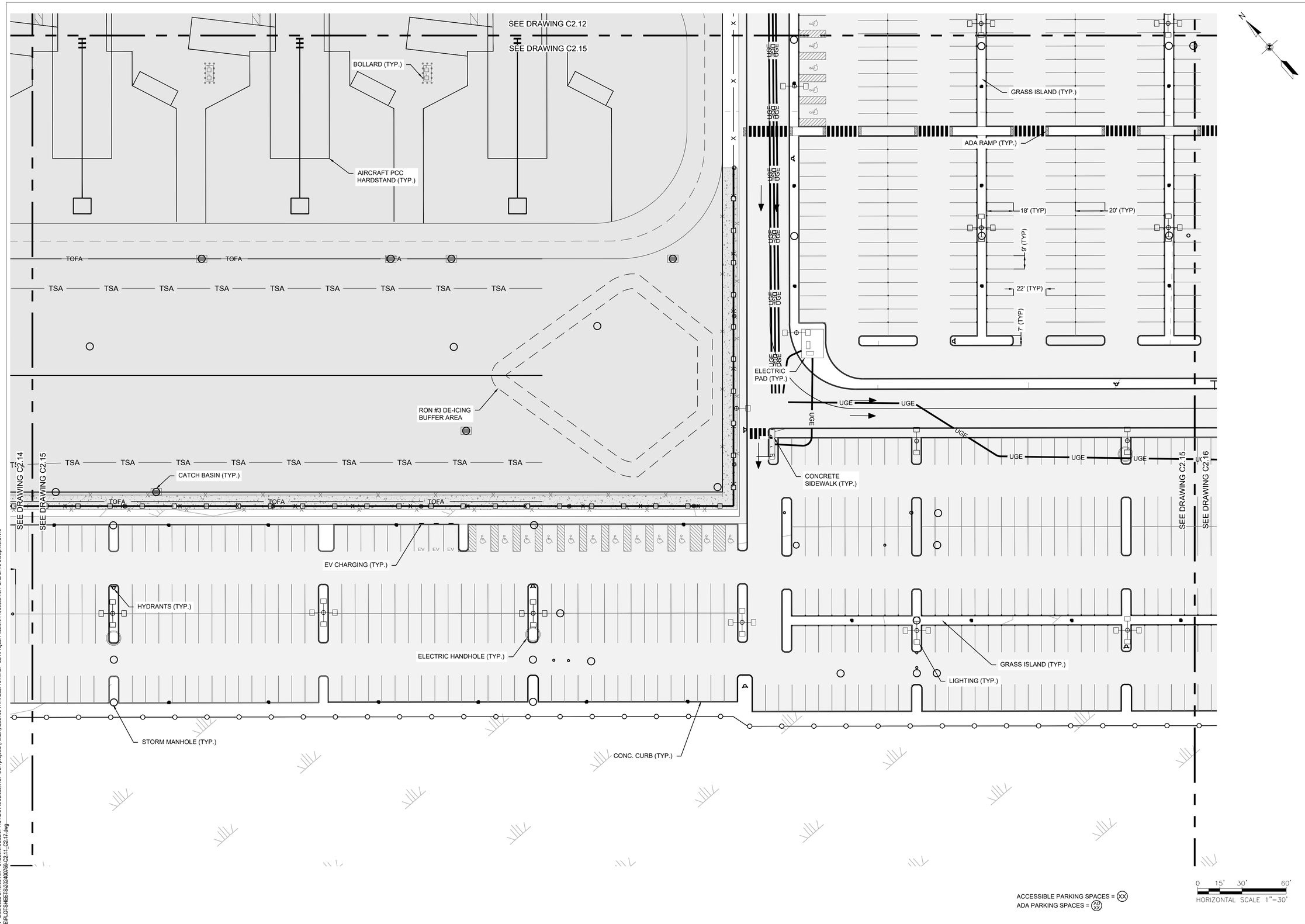
SHEET TITLE

CIVIL SITE PLAN - SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.14



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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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www.pgal.com

CONSULTANT

wsp

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500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

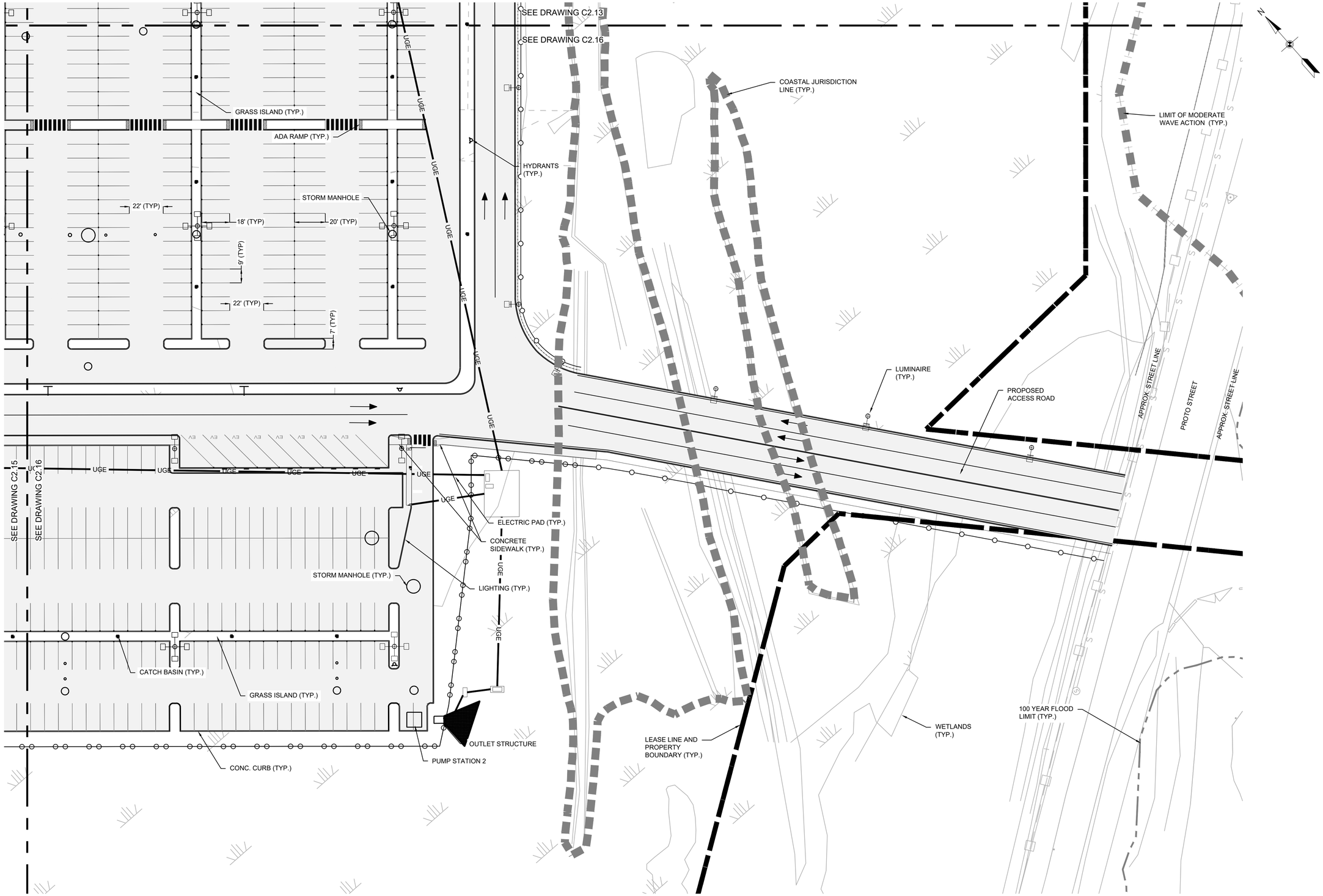
SHEET TITLE

CIVIL SITE PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.15



ACCESSIBLE PARKING SPACES = XX
ADA PARKING SPACES = AD XX

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/20/2025 8:45:55 AM - C:\Users\USSD\674131\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL SITE\PLOTSHEETS\202400769-C2.11_C2.17.dwg

CLIENT

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AVPORTS

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CIVIL SITE PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.16

SEE DRAWING C2.14

SEE DRAWING C2.17

TAXIWAY E

TAXIWAY B

RUNWAY 02-20

TSA

TOFA

AIRFIELD LIGHTING HANDHOLE (TYP.)

DRAINAGE BY OTHERS

LEASE LINE (TYP.)

WETLANDS (TYP.)

AIRFIELD SIGNAGE (TYP.)

COASTAL JURISDICTION LINE (TYP.)

TAXIWAY EDGE LIGHTS (TYP.)

WORK BY OTHERS

0 15' 30' 60'

HORIZONTAL SCALE 1"=30'

H:\N - 2/20/2025 8:45:55 AM - C:\Users\USSD67413\ID\CACCDocs\WSP USA projects (AMER)\GLL100-H\N East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL SITE\PLOTSHEETS\02640089-C2.11_C2.17.dwg

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

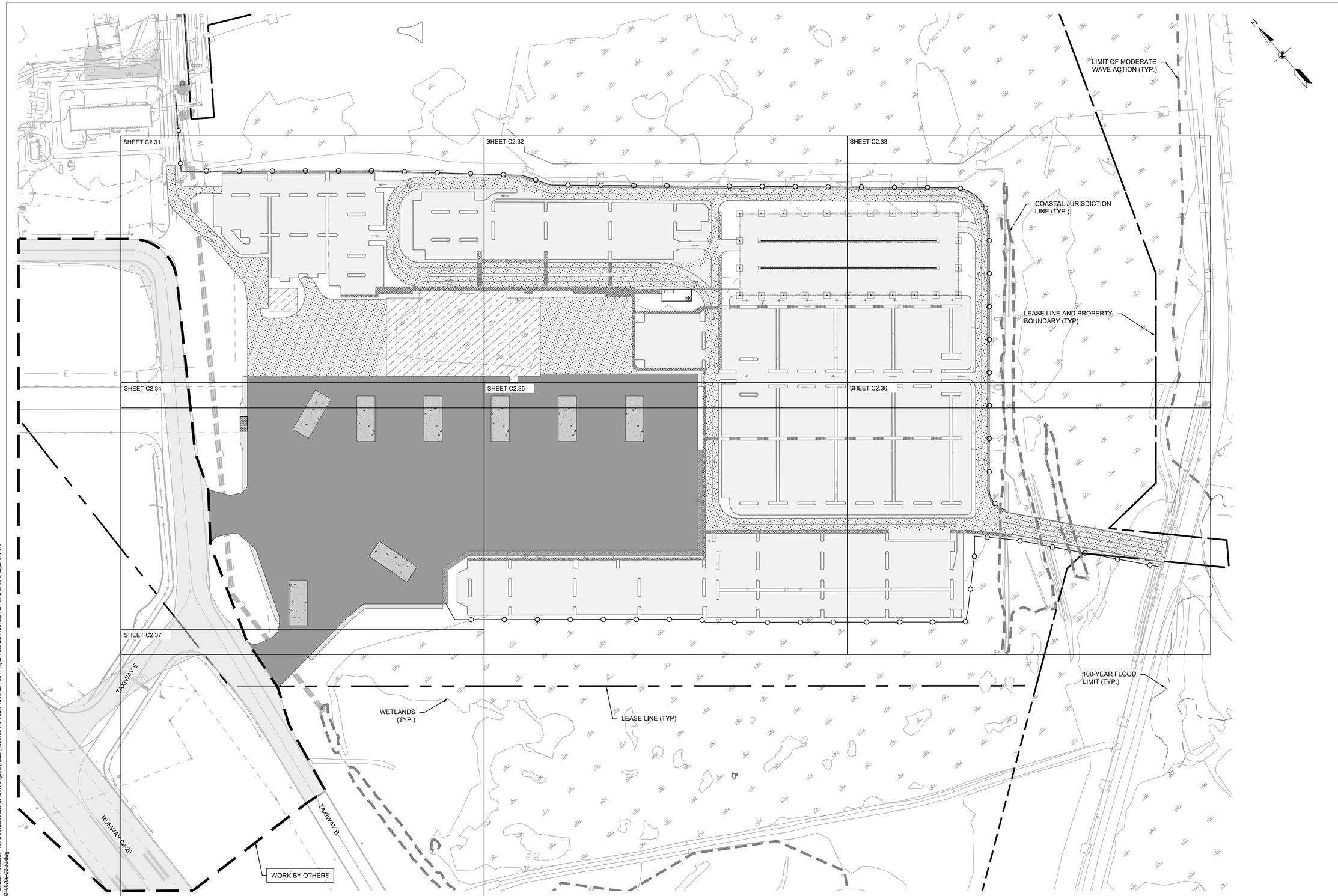
SHEET TITLE

CIVIL SITE PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.17



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CLIENT

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AVPORTS

TWEED NEW HAVEN AIRPORT
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVING PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.30

WETLANDS (TYP.)

TYPICAL PARKING LOT SECTION — 7 / C7.21

6 / C7.21 TYPICAL ACCESS ROAD SECTION

9 / C7.21 TYPICAL SIDEWALK SECTION

℄ TAXIWAY B

WORK BY OTHERS

61+50.00

61+68.13

61+00.00

60+50.00

60+00.00

59+50.00

4 / C7.21 APRON SHOULDER PAVEMENT ABUTTING ASPHALT (TYP)

TAXILANE Y STA 101+25.63 OFF 302.09℄

TAXILANE Y STA 101+35.63 OFF 302.09℄

TAXILANE Y STA 101+25.63 OFF 259.64℄

TAXILANE Y STA 101+19.63 OFF 233.21℄

10.00' (TYP)

1 / C7.21 APRON PCC FULL STRENGTH PAVEMENT (TYP)

TAXILANE Y STA 102+85.02 OFF 272.72℄

TAXILANE Y STA 103+19.68 OFF 252.76℄

3 / C7.21 APRON TAXIWAY ASPHALT FULL STRENGTH PAVEMENT(TYP)

TAXILANE Y STA 103+75.74 OFF 259.42℄

TAXILANE Y STA 104+15.74 OFF 259.46℄

TAXILANE Y STA 105+23.19 OFF 259.42℄

TAXILANE Y STA 105+63.19 OFF 259.46℄

SEE DRAWING C2.31

SEE DRAWING C2.34

SEE DRAWING C2.31

SEE DRAWING C2.32

LEGEND

- BLAST FENCE FOUNDATION
- RELIEVER SLAB
- APRON PCC FULL STRENGTH PAVEMENT
- TYPICAL SIDEWALK SECTION
- APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
- APRON SHOULDER PAVEMENT ABUTTING ASPHALT
- TYPICAL PARKING LOT SECTION
- TYPICAL ACCESS ROAD SECTION

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

H:\N - 2\19\2025 1:07:48 PM - C:\Users\USRG72891\6DCA\CCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\Civil\
AIRFIELDPLOTSHEETS\240769-C2.31_C2.37.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

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TWEED NEW HAVEN AIRPORT
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETTINELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

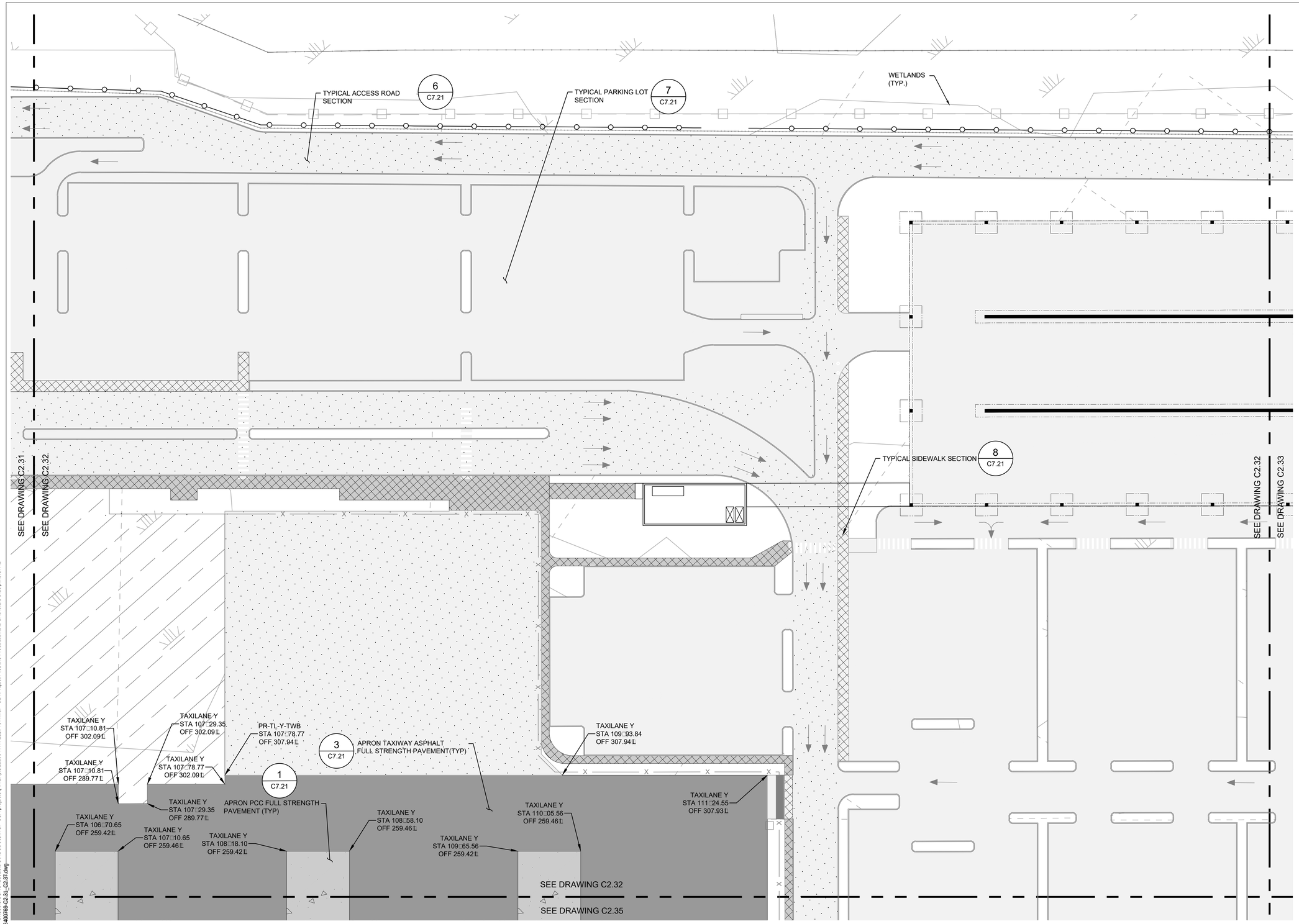
SHEET TITLE

PAVING PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.31



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AIRFIELDPLOTSHEETS\60040769-C2.31_C2.37.dwg

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

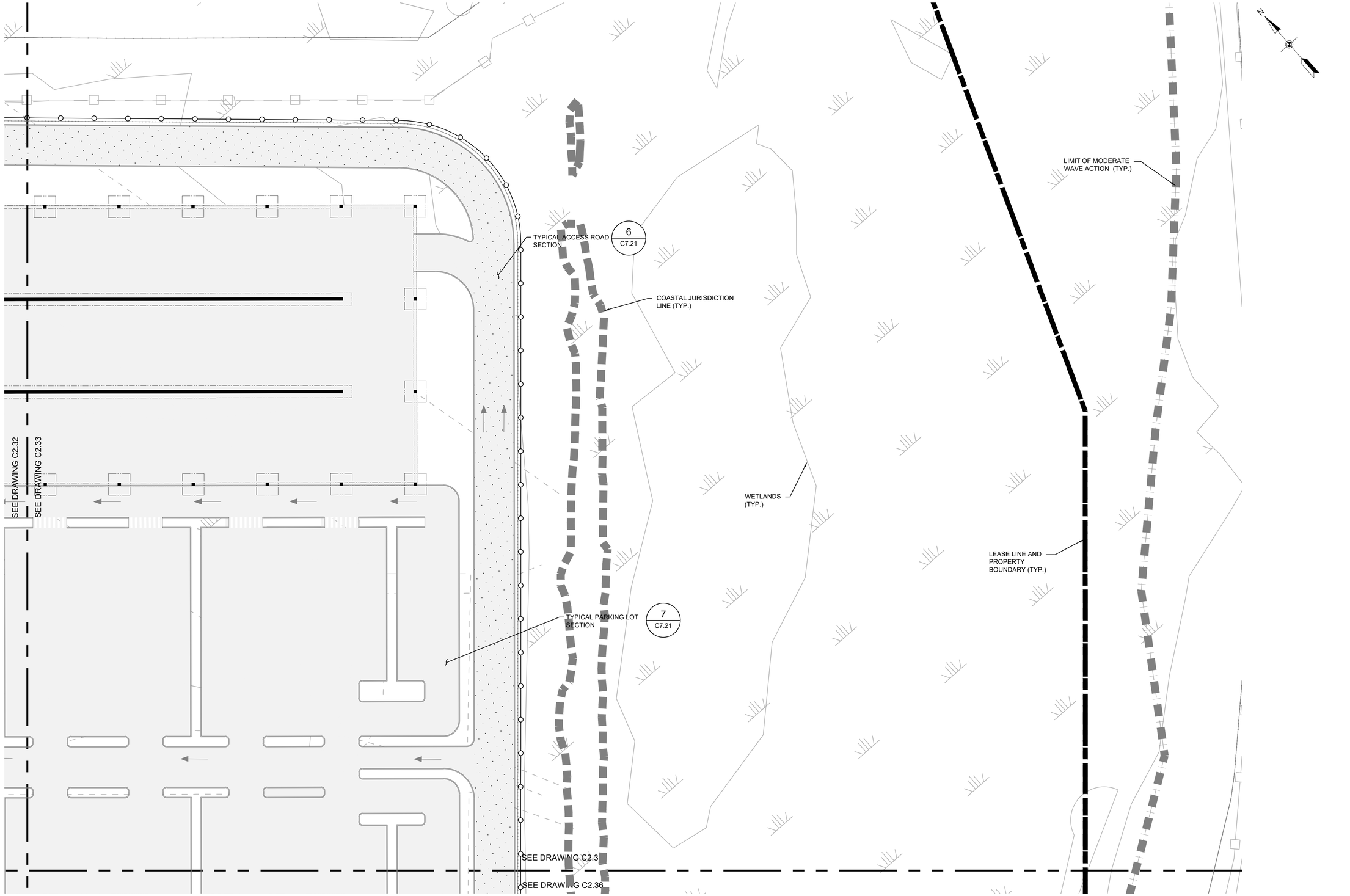
SHEET TITLE

PAVING PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.32



LEGEND

- BLAST FENCE FOUNDATION
- RELIEVER SLAB
- APRON PCC FULL STRENGTH PAVEMENT
- TYPICAL SIDEWALK SECTION
- APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
- APRON SHOULDER PAVEMENT ABUTTING ASPHALT
- TYPICAL PARKING LOT SECTION
- TYPICAL ACCESS ROAD SECTION

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/19/2025 1:07:48 PM - C:\Users\USRG728916\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C2.31_C2.37.dwg

CLIENT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVING PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.33

SEE DRAWING C2.31

SEE DRAWING C2.34

TAXILANE Y STA 102+35.11 OFF 186.06Lt

TAXILANE Y STA 102+28.87 OFF 175.23Lt

TAXILANE Y STA 102+69.77 OFF 166.10Lt

TAXILANE Y STA 102+63.53 OFF 155.27Lt

TAXILANE Y STA 103+75.85 OFF 159.42Lt

TAXILANE Y STA 103+75.86 OFF 146.92Lt

TAXILANE Y STA 104+15.85 OFF 159.46Lt

TAXILANE Y STA 104+15.86 OFF 146.96Lt

TAXILANE Y STA 105+23.30 OFF 159.42Lt

TAXILANE Y STA 105+23.32 OFF 146.92Lt

TAXILANE Y STA 105+63.30 OFF 159.46Lt

TAXILANE Y STA 105+63.32 OFF 146.96Lt

RELIEVER SLAB (TYP) 2 C7.21

TAXILANE Y STA 101+19.63 OFF 162.97Lt

WORK BY OTHERS

TAXILANE Y STA 101+25.63 OFF 136.53Lt

TAXILANE Y STA 101+25.63 OFF 48.95Lt

TAXILANE Y STA 101+23.75 OFF 46.80Lt

TAXILANE Y STA 100+49.37 OFF 53.80Lt

TAXILANE Y STA 100+96.66 OFF 41.43Lt

TAXILANE Y STA 101+35.63 OFF 60.36Lt

STA 103+73.56 PR-TL-Y-TWB □
STA 205+29.71 PR-TL-□
N:656393.70
E: 962978.33

℄ TAXILANE Y

STA 100+00.00 PR-TL-Y-TWB □
STA 56+79.06 EXIST□TAXIWAY□B
N:656640.08
E: 962697.54

℄ TAXIWAY B

TAXILANE Y STA 101+03.91 OFF 41.82Rt

TAXILANE Y STA 101+16.92 OFF 44.08Rt

TAXILANE Y STA 101+38.56 OFF 63.45Rt

TAXILANE Y STA 100+73.97 OFF 48.28Rt

TAXILANE Y STA 101+53.94 OFF 77.21Rt

TAXILANE Y STA 100+54.45 OFF 69.56Rt

TAXILANE □ STA 204+77.38 OFF 41.80Rt

TAXILANE □ STA 204+70.29 OFF 52.09Rt

APRON PCC FULL STRENGTH PAVEMENT (TYP)

1 C7.21

10 C7.34

BLAST FENCE FOUNDATION

PR-TL-Y-TWB STA 106+19.11 OFF 81.00Rt

TAXILANE □ STA 204+13.53 OFF 134.42Rt

PR-TL-Y-TWB STA 105+64.55 OFF 117.44Rt

TAXILANE □ STA 204+37.35 OFF 29.38Rt

TAXILANE □ STA 204+44.45 OFF 19.09Rt

TAXILANE □ STA 203+84.60 OFF 111.83Rt

TAXILANE □ STA 203+72.06 OFF 196.57Rt

TAXILANE □ STA 203+47.03 OFF 32.10Rt

TAXILANE □ STA 202+69.56 OFF 127.24Lt

TAXILANE □ STA 202+61.82 OFF 117.43Lt

TAXILANE □ STA 203+00.96 OFF 102.47Lt

TAXILANE □ STA 202+93.22 OFF 92.66Lt

10.00□ (TYP)

LEASE LINE (TYP.)

TAXILANE □ STA 201+95.31 OFF 67.98Lt

TAXILANE □ STA 201+99.89 OFF 38.91Lt

TAXILANE □ STA 201+83.43 OFF 70.57Lt

TAXILANE □ STA 201+85.25 OFF 69.48Lt

TAXILANE □ STA 202+31.29 OFF 14.14Lt

TAXILANE □ STA 202+23.55 OFF 4.33Lt

TAXILANE □ STA 201+85.79 OFF 55.25Lt

TAXILANE □ STA 203+11.56 OFF 25.89Rt

TAXILANE □ STA 201+78.30 OFF 44.12Lt

TAXILANE □ STA 203+42.60 OFF 40.40Rt

TAXILANE □ STA 203+12.31 OFF 35.88Rt

7 C7.21 TYPICAL PARKING LOT SECTION

TAXILANE □ STA 203+69.38 OFF 198.76Rt

APRON SHOULDER PAVEMENT ABUTTING ASPHALT (TYP)

4 C7.21

WETLANDS (TYP.)

TAXILANE □ STA 201+92.15 OFF 29.10Lt

TAXILANE □ STA 201+26.10 OFF 48.30Lt

TAXILANE □ STA 201+57.95 OFF 41.48Lt

℄ TAXILANE □

APRON TAXIWAY ASPHALT FULL STRENGTH PAVEMENT(TYP)

3 C7.21

TAXILANE □ STA 201+89.89 OFF 41.29Rt

TAXILANE □ STA 201+90.41 OFF 51.31Rt

SEE DRAWING C2.34

SEE DRAWING C2.37

SEE DRAWING C2.34

SEE DRAWING C2.35

100+00.00 100+50.00 101+00.00 101+50.00 102+00.00 102+50.00 103+00.00 103+50.00 104+00.00 104+50.00 105+00.00 105+50.00 106+00.00 106+50.00

205+29.71 205+00.00 204+50.00 204+00.00 203+50.00 203+00.00 202+50.00 202+00.00 201+50.00 201+00.00

59+00.00 58+50.00 58+00.00 57+50.00 57+00.00 56+50.00 56+00.00 55+50.00 55+00.00 54+50.00 54+00.00 53+50.00 53+00.00

LEGEND

- BLAST FENCE FOUNDATION
- RELIEVER SLAB
- APRON PCC FULL STRENGTH PAVEMENT
- TYPICAL SIDEWALK SECTION
- APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
- APRON SHOULDER PAVEMENT ABUTTING ASPHALT
- TYPICAL PARKING LOT SECTION
- TYPICAL ACCESS ROAD SECTION

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

H:\N - 215\2025 1:07:48 PM - C:\Users\USRG728916\DOCACCDocs\WSP USA projects (AMER)\GL1100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL ARRELDP\GT\SHEETS\02400\R64-02.34_C2.37.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00250063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVING PLAN - SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.34

SEE DRAWING C2.32

SEE DRAWING C2.35

TAXILANE Y
STA 108□18.21
OFF 159.42Ł

TAXILANE Y
STA 107□10.76
OFF 159.46Ł

TAXILANE Y
STA 108□58.21
OFF 159.46Ł

TAXILANE Y
STA 109□65.66
OFF 159.42Ł

TAXILANE Y
STA 110□05.66
OFF 159.46Ł

TAXILANE Y
STA 107□10.77
OFF 146.96Ł

TAXILANE Y
STA 108□18.22
OFF 146.92Ł

TAXILANE Y
STA 108□58.22
OFF 146.96Ł

TAXILANE Y
STA 109□65.68
OFF 146.92Ł

TAXILANE Y
STA 110□05.68
OFF 146.96Ł

TAXILANE Y
STA 106□70.76
OFF 159.42Ł

TAXILANE Y
STA 106□70.77
OFF 146.92Ł

APRON PCC FULL STRENGTH PAVEMENT (TYP)

1 / C7.21

RELIEVER SLAB (TYP)

2 / C7.21

TYPICAL ACCESS ROAD SECTION

6 / C7.21

℄ TAXILANE Y

06□50.00 | 107□00.00 | 107□50.00 | 108□00.00 | 108□50.00 | 109□00.00 | 109□50.00 | 110□00.00 | 110□50.00 | 111□00.00

111□50.00

111□50.93

END PR-TL-Y-TWB
STA 111□50.93
N:655880.99
E: 963562.65

10 / C7.34

BLAST FENCE FOUNDATION

3 / C7.21 APRON TAXIWAY ASPHALT FULL STRENGTH PAVEMENT(TYP)

PR-TL-Y-TWB
STA 111□24.55
OFF 81.00Ŕ

SEE DRAWING C2.34

SEE DRAWING C2.35

SEE DRAWING C2.35

SEE DRAWING C2.36

8 / C7.21 TYPICAL SIDEWALK SECTION

7 / C7.21 TYPICAL PARKING LOT SECTION

LEGEND

- BLAST FENCE FOUNDATION
- RELIEVER SLAB
- APRON PCC FULL STRENGTH PAVEMENT
- TYPICAL SIDEWALK SECTION
- APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
- APRON SHOULDER PAVEMENT ABUTTING ASPHALT
- TYPICAL PARKING LOT SECTION
- TYPICAL ACCESS ROAD SECTION

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/19/2025 1:07:48 PM - C:\Users\USR0728918\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C2\k\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL\ARHELEVOT\SHEETS\c2x\240769-C2.31_C2.37.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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ARCHITECT

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CONSULTANT

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19479 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

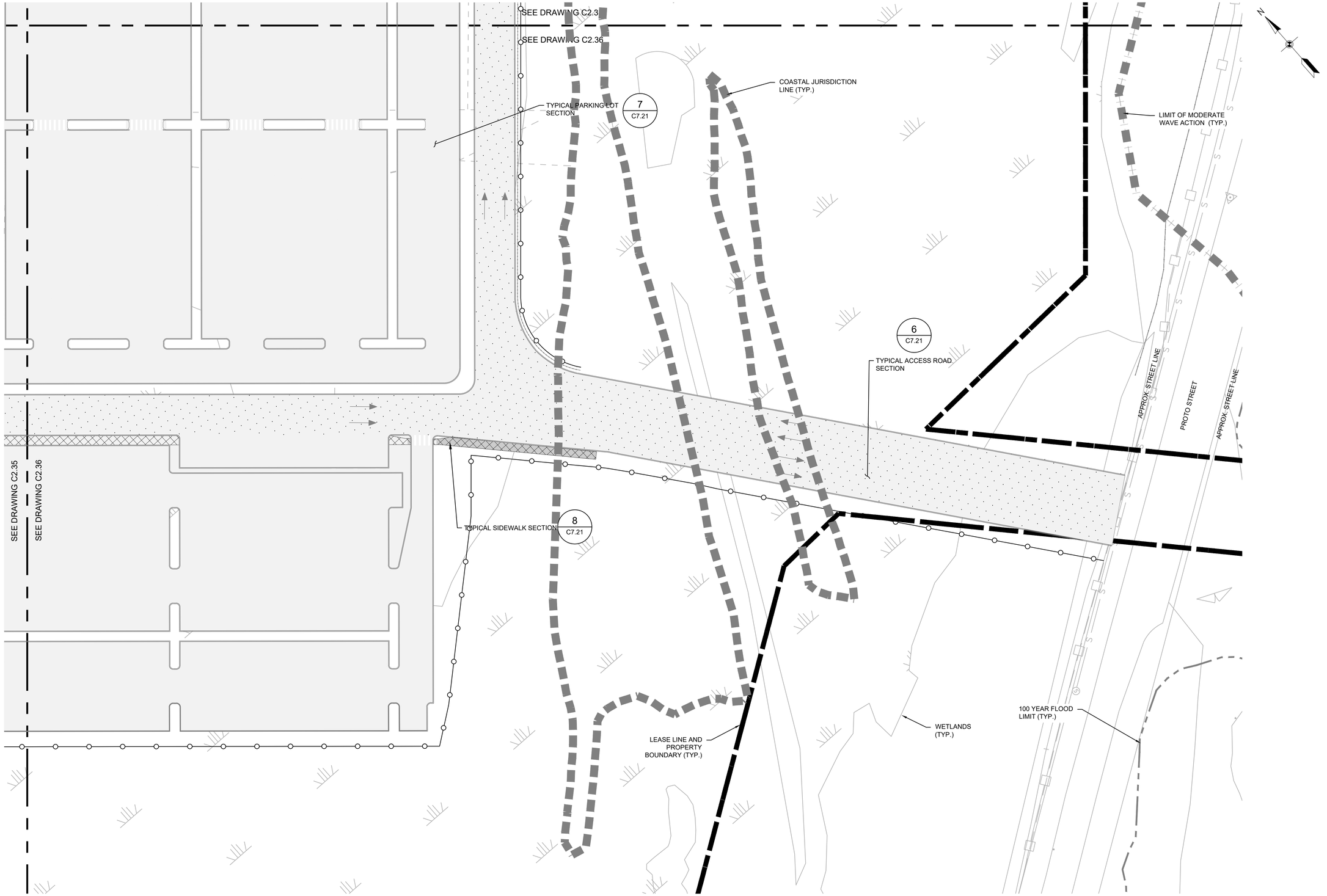
SHEET TITLE

PAVING PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.35



LEGEND

- BLAST FENCE FOUNDATION
- RELIEVER SLAB
- APRON PCC FULL STRENGTH PAVEMENT
- TYPICAL SIDEWALK SECTION
- APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
- APRON SHOULDER PAVEMENT ABUTTING ASPHALT
- TYPICAL PARKING LOT SECTION
- TYPICAL ACCESS ROAD SECTION

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16679
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

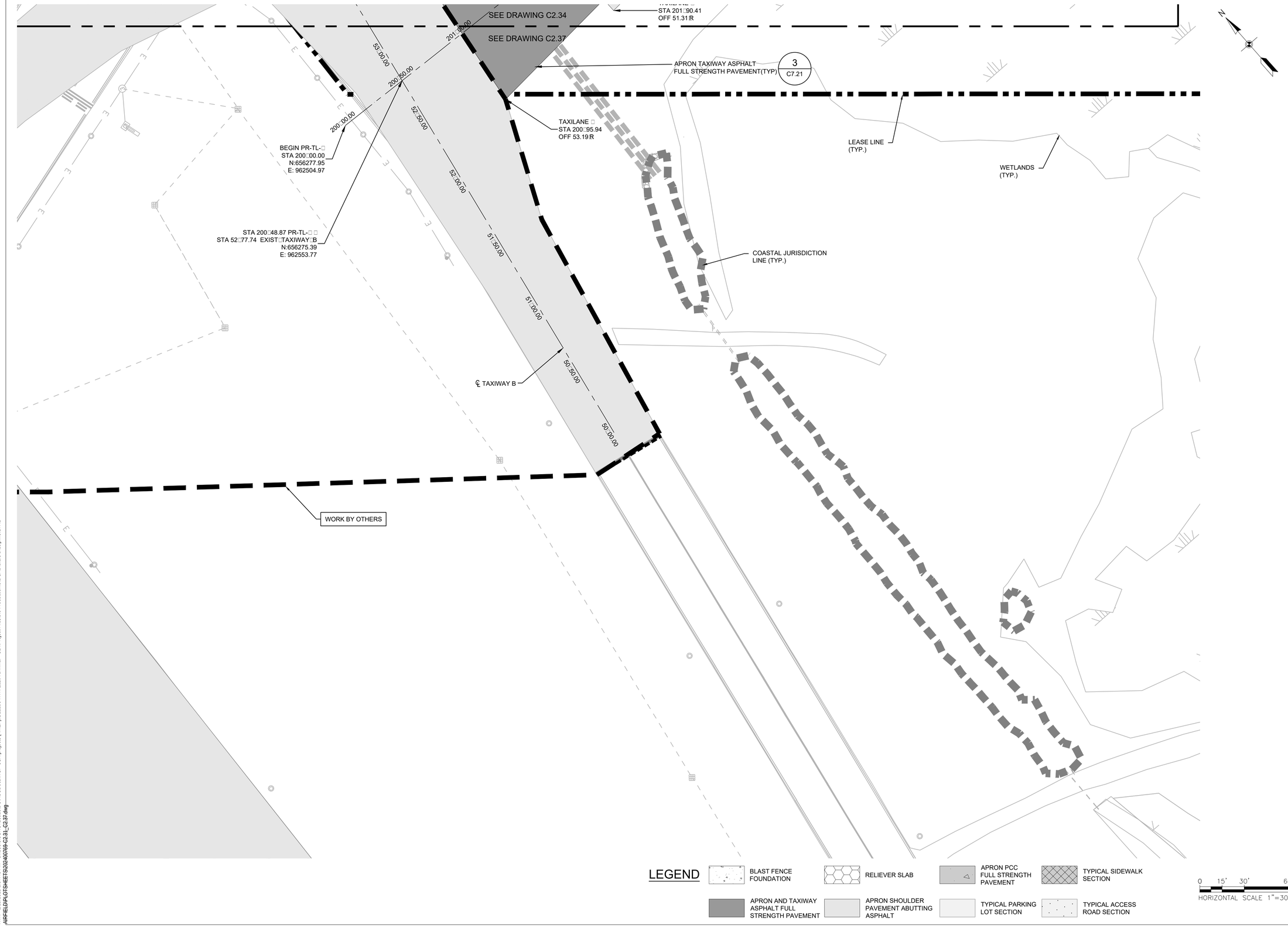
SHEET TITLE

PAVING PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.36



LEGEND

- BLAST FENCE FOUNDATION
- RELIEVER SLAB
- APRON PCC FULL STRENGTH PAVEMENT
- TYPICAL SIDEWALK SECTION
- APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
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- TYPICAL PARKING LOT SECTION
- TYPICAL ACCESS ROAD SECTION

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

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REGISTRATION

STATE OF CONNECTICUT
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No. 16679
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PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

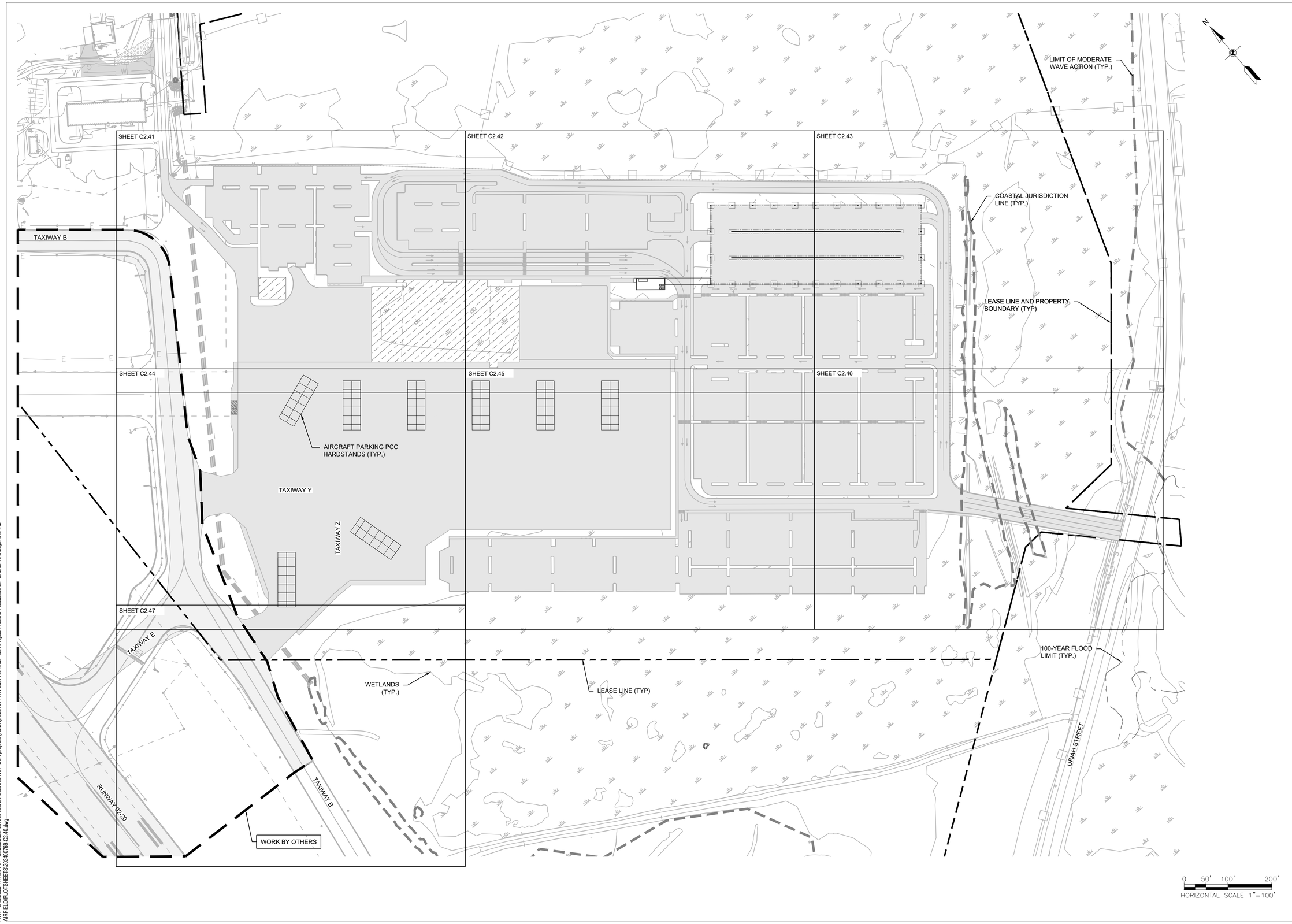
SHEET TITLE

PAVING PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	IAE	IAE

SHEET NUMBER

C2.37



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CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVEMENT JOINTING PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.40

WETLANDS
(TYP.)

℄ TAXIWAY B

WORK BY OTHERS

61+50.00

61+68.13

61+00.00

60+50.00

60+00.00

59+50.00

+00.00

SEE DRAWING C2.41

SEE DRAWING C2.42

TERMINAL BUILDING

20.0'
(TYP)

20.0'
(TYP)

AIRCRAFT PARKING PCC
HARDSTANDS (TYP.)

SEE DRAWING C2.41

SEE DRAWING C2.44

LEGEND

—C— TYPE "C" - DOWELED CONTRACTION JOINT (1 / C7.22)

—E— TYPE "E" - DOWELED CONSTRUCTION JOINT (2 / C7.22)

—K— TYPE "K" - ASPHALT/CONCRETE JOINT (5 / C7.22)

—G— TYPE "G" - RELIEVER SLAB JOINT (2 / C7.21)

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/20/2025 12:12:23 PM - C:\Users\US3S574131\DCA\CDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Disciplines\CIVIL AIRFIELD\PLOTSHEETS\240478-C2.41_C2.47.dwg

CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19475
REGISTERED
PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

C2.41

WETLANDS
(TYP.)

SEE DRAWING C2.41

SEE DRAWING C2.42

SEE DRAWING C2.42

SEE DRAWING C2.43

TERMINAL BUILDING

20.0'
(TYP)

20.0'
(TYP)

AIRCRAFT PARKING PCC
HARDSTANDS (TYP.)

SEE DRAWING C2.42

SEE DRAWING C2.45

LEGEND

—C— TYPE "C" - DOWELED CONTRACTION JOINT (1 / C7.22)

—E— TYPE "E" - DOWELED CONSTRUCTION JOINT (2 / C7.22)

—K— TYPE "K" - ASPHALT/CONCRETE JOINT (5 / C7.22)

—G— TYPE "G" - RELIEVER SLAB JOINT (2 / C7.21)

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

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AIRFIELD\PLOTSHEETS\240498-C2.41_C2.47.dwg

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 18478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

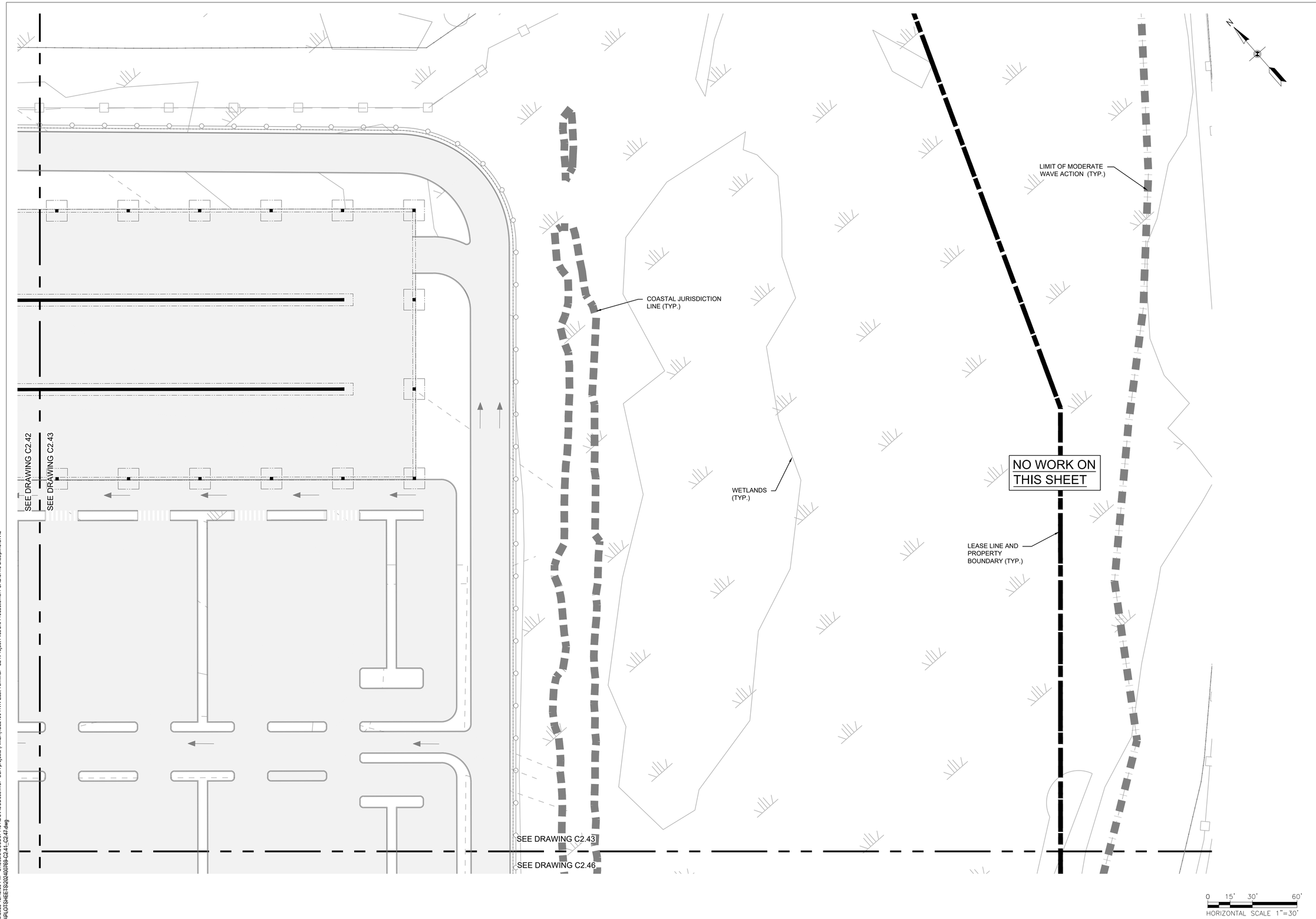
SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

C2.42



CLIENT

HVN TWEED NEW HAVEN AIRPORT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

C2.43

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

C2.44



LEGEND

—C— TYPE "C" - DOWELED CONTRACTION JOINT (1 / C7.22)

—E— TYPE "E" - DOWELED CONSTRUCTION JOINT (2 / C7.22)

—K— TYPE "K" - ASPHALT/CONCRETE JOINT (5 / C7.22)

—G— TYPE "G" - RELIEVER SLAB JOINT (2 / C7.21)

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/20/2025 12:12:33 PM - C:\Users\USSD5674131\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C2.41_C2.47.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

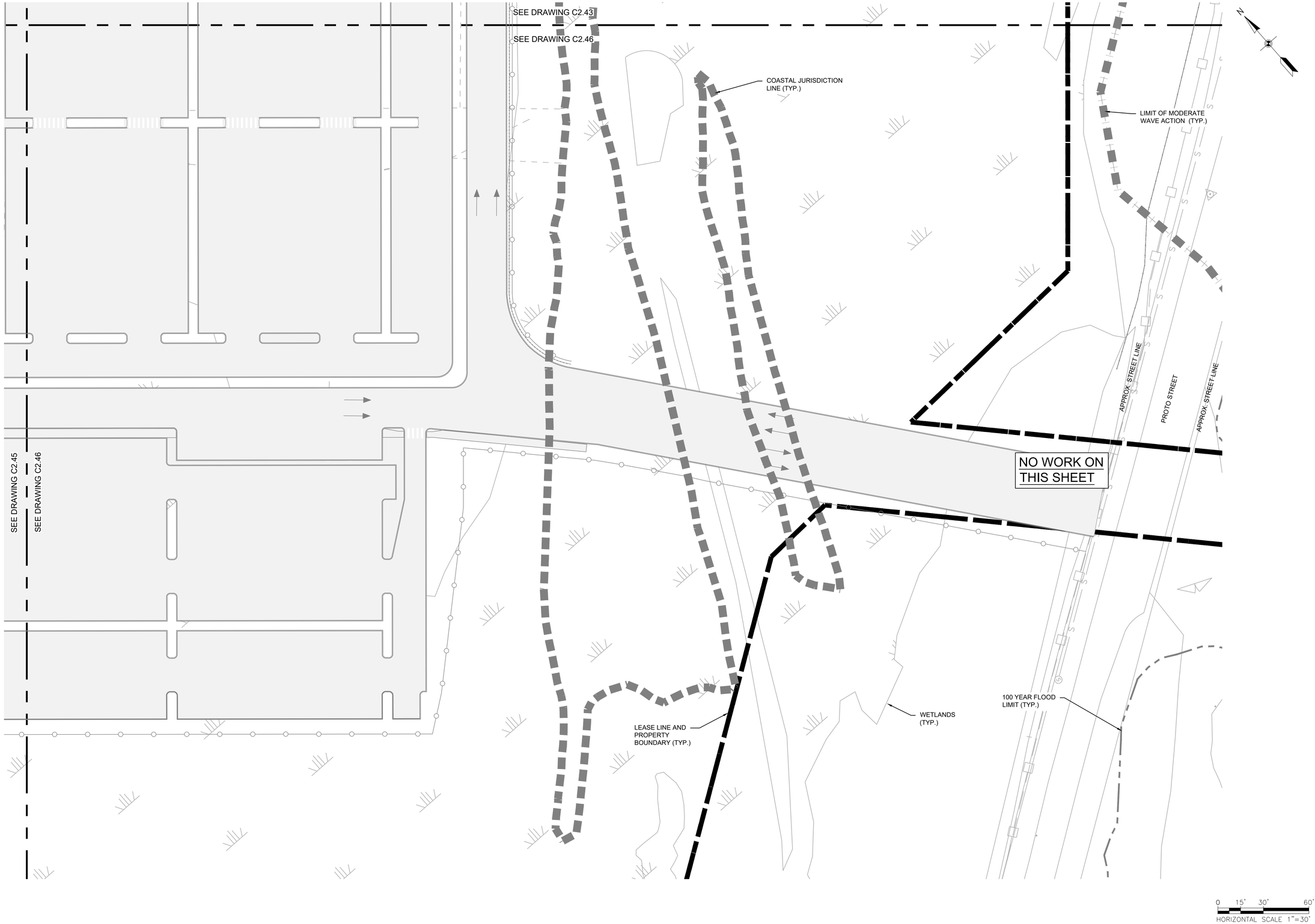
SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

C2.45



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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

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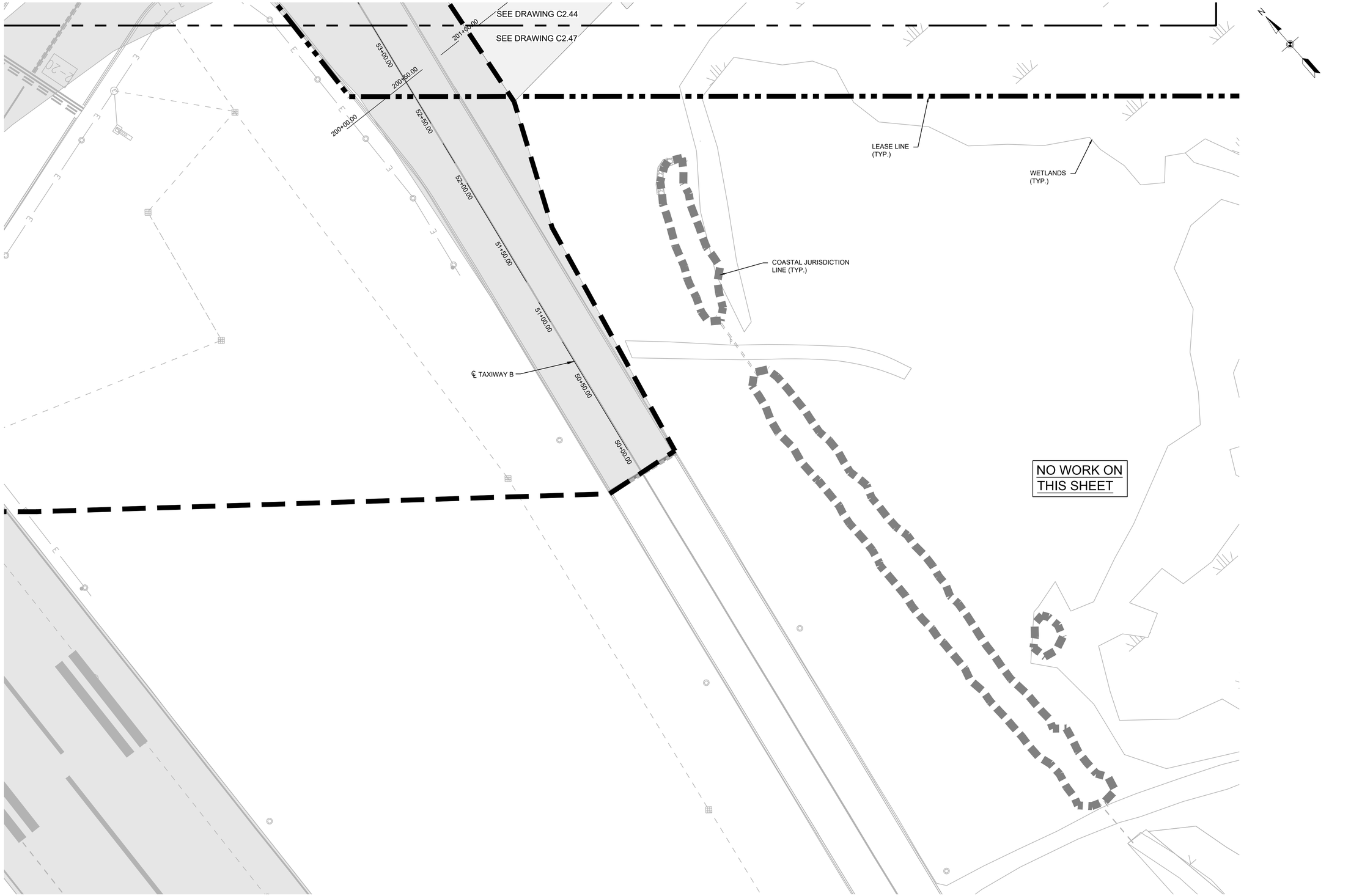

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AVPORTS

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16678
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

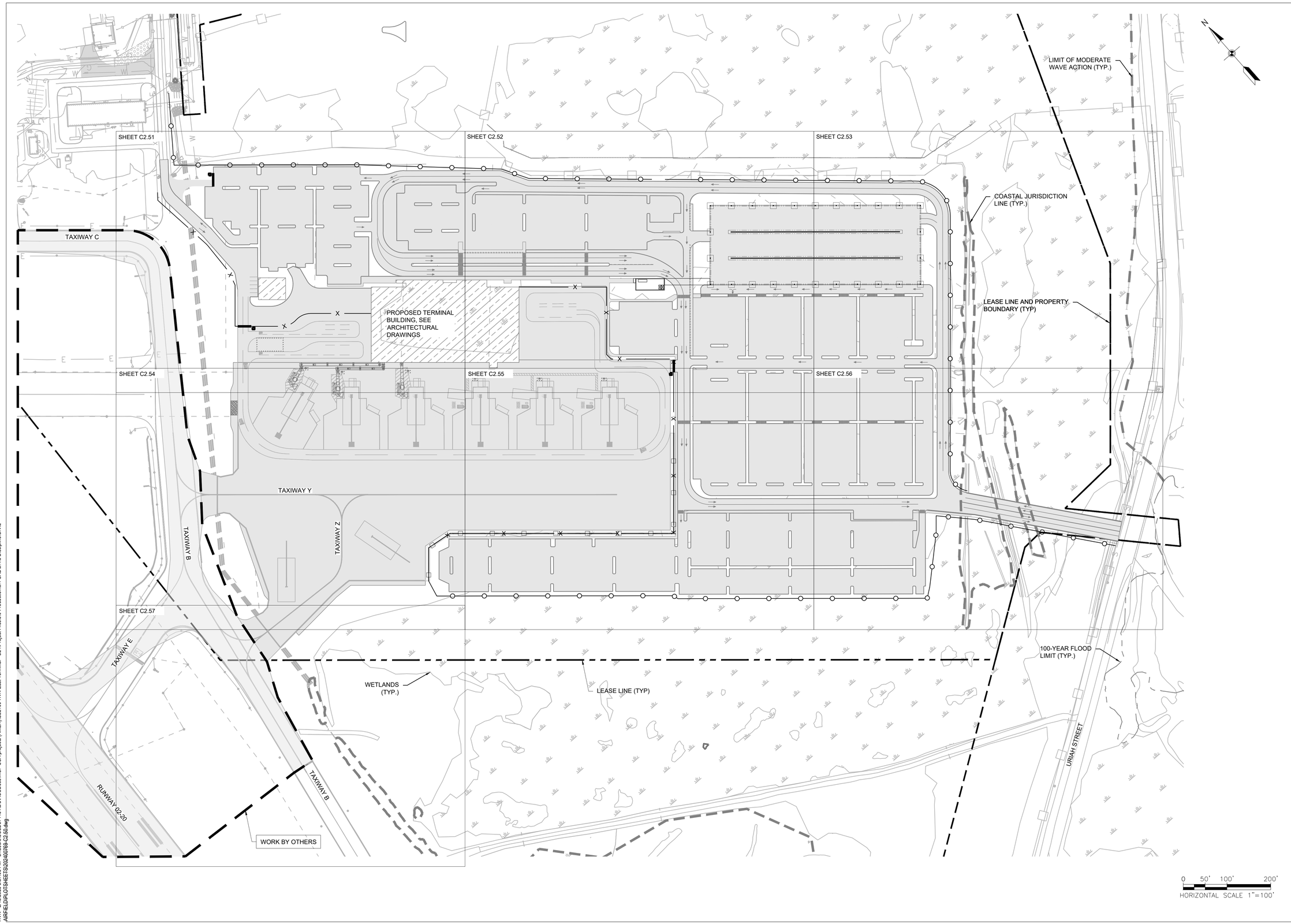
SHEET TITLE

PAVEMENT JOINTING PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BF	GFR	CBC

SHEET NUMBER

C2.47



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CLIENT

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AVPORTS

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

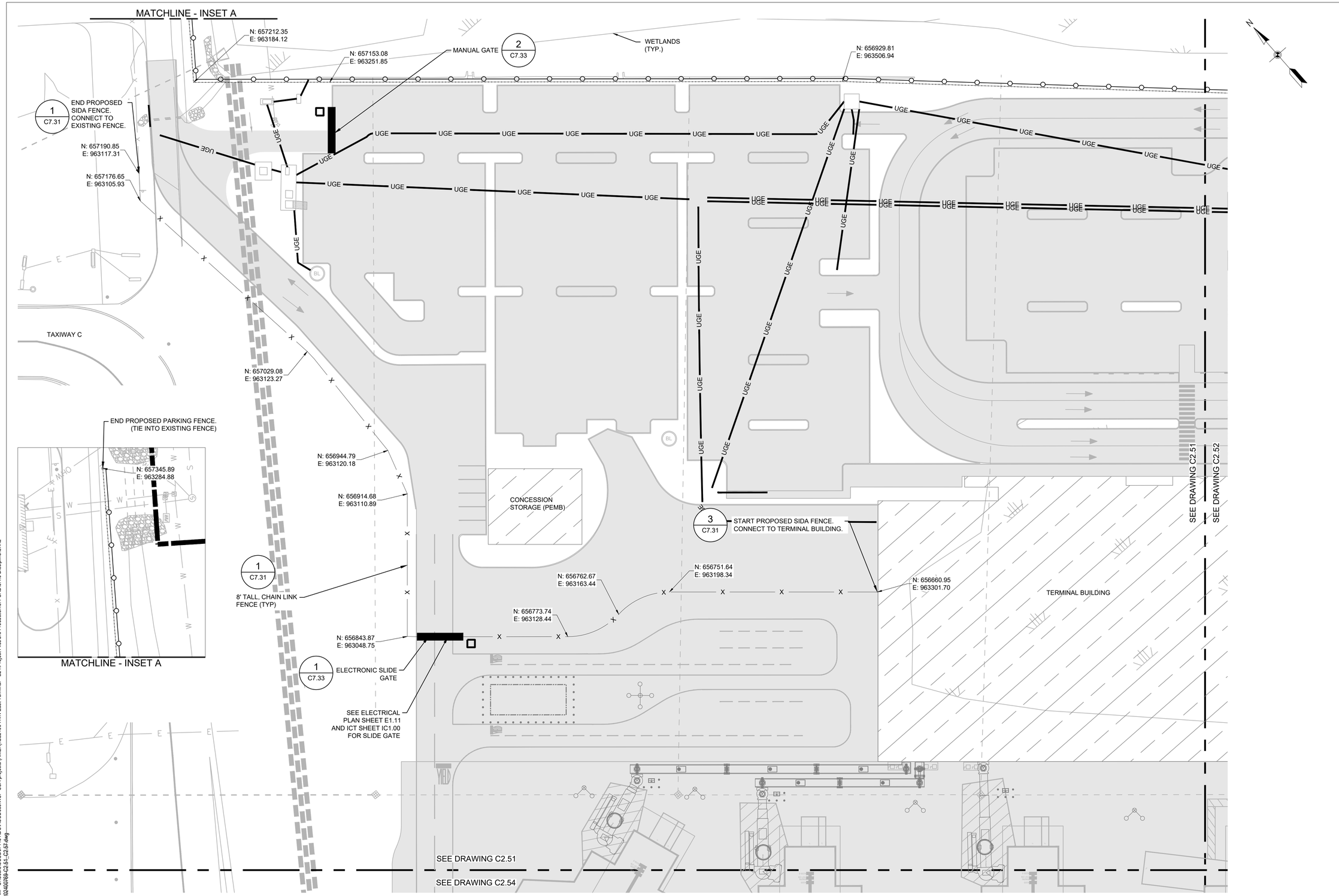
SHEET TITLE

FENCING PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C2.50



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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

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ARCHITECT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16679
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

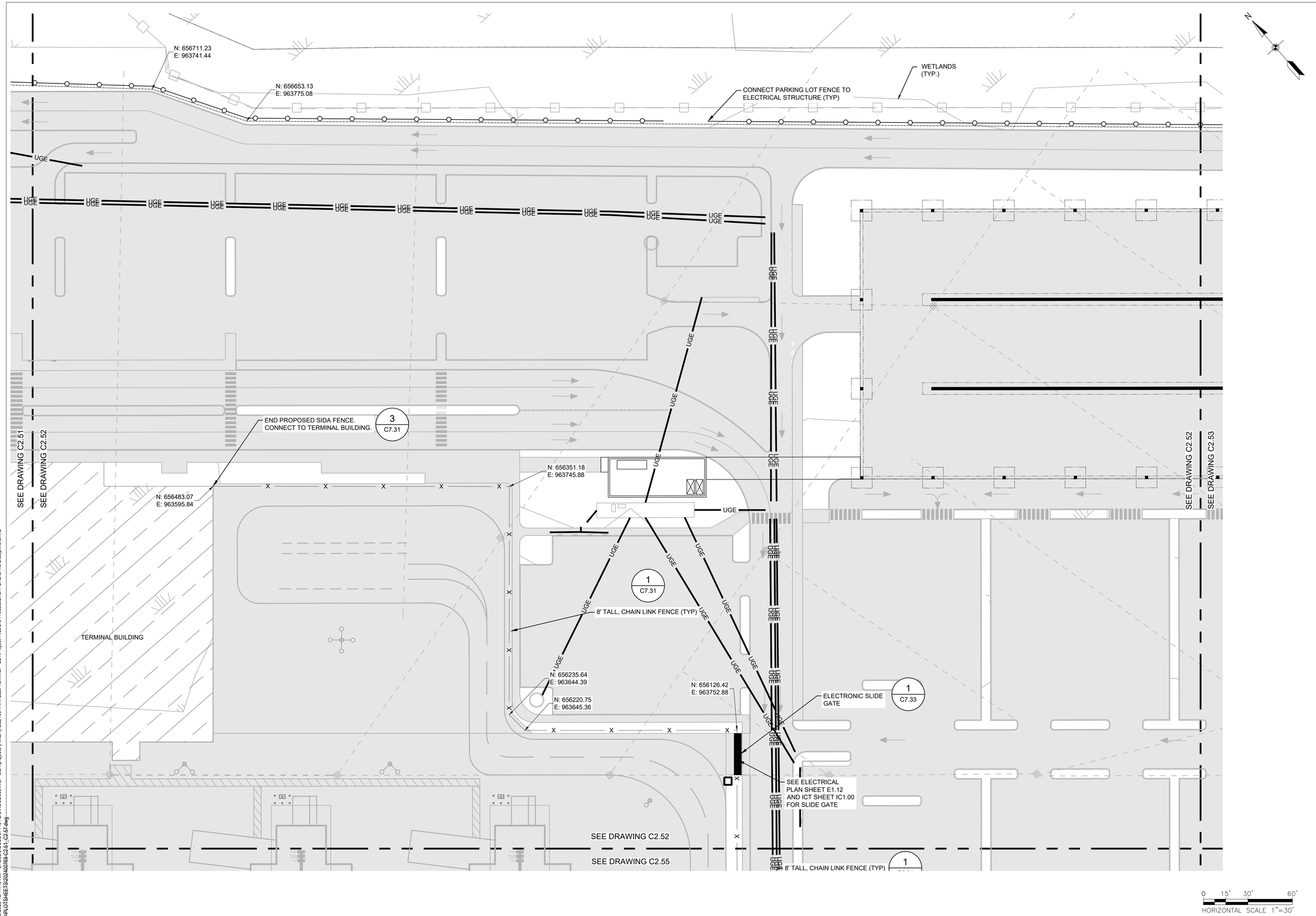
SHEET TITLE

FENCING PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.51



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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16479
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

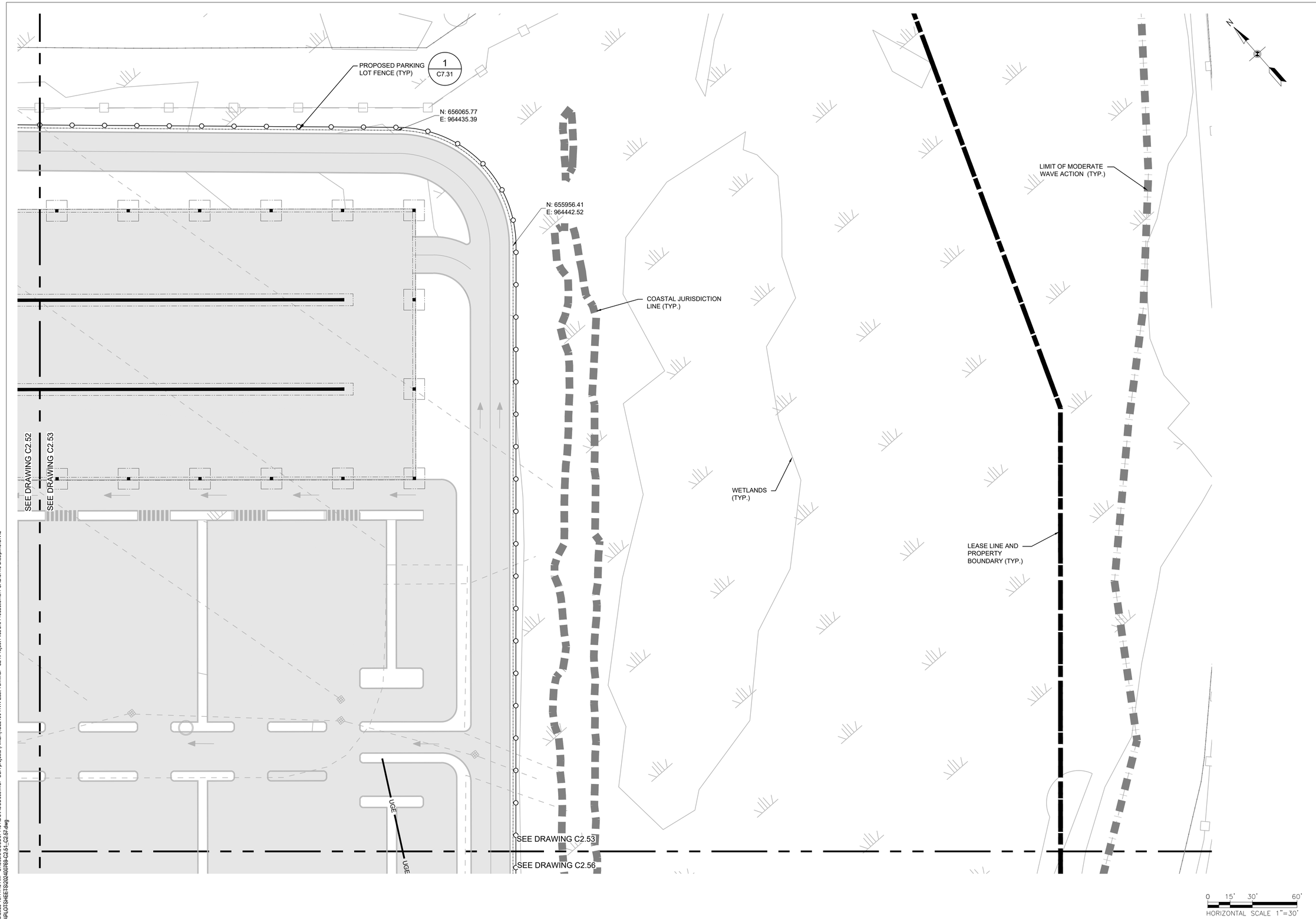
SHEET TITLE

FENCING PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.52



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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

FENCING PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.53

SEE DRAWING C2.51

SEE DRAWING C2.54

TAXIWAY B

TAXIWAY Y

TAXIWAY Z

TAXIWAY E

LEASE LINE
(TYP.)

N: 656163.73
E: 963106.24

N: 656171.50
E: 963047.43

N: 656114.58
E: 962997.48

N: 656076.31
E: 962988.78

1
C7.34
BEGIN COMBINED BLAST
DEFLECTOR AND SIDA FENCE

WETLANDS
(TYP.)

1
C7.31
8' TALL, CHAIN LINK FENCE (TYP)

SEE DRAWING C2.54

SEE DRAWING C2.55

SEE DRAWING C2.54

SEE DRAWING C2.57

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L PETTINELLI
No. 19478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

FENCING PLAN -
SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.54

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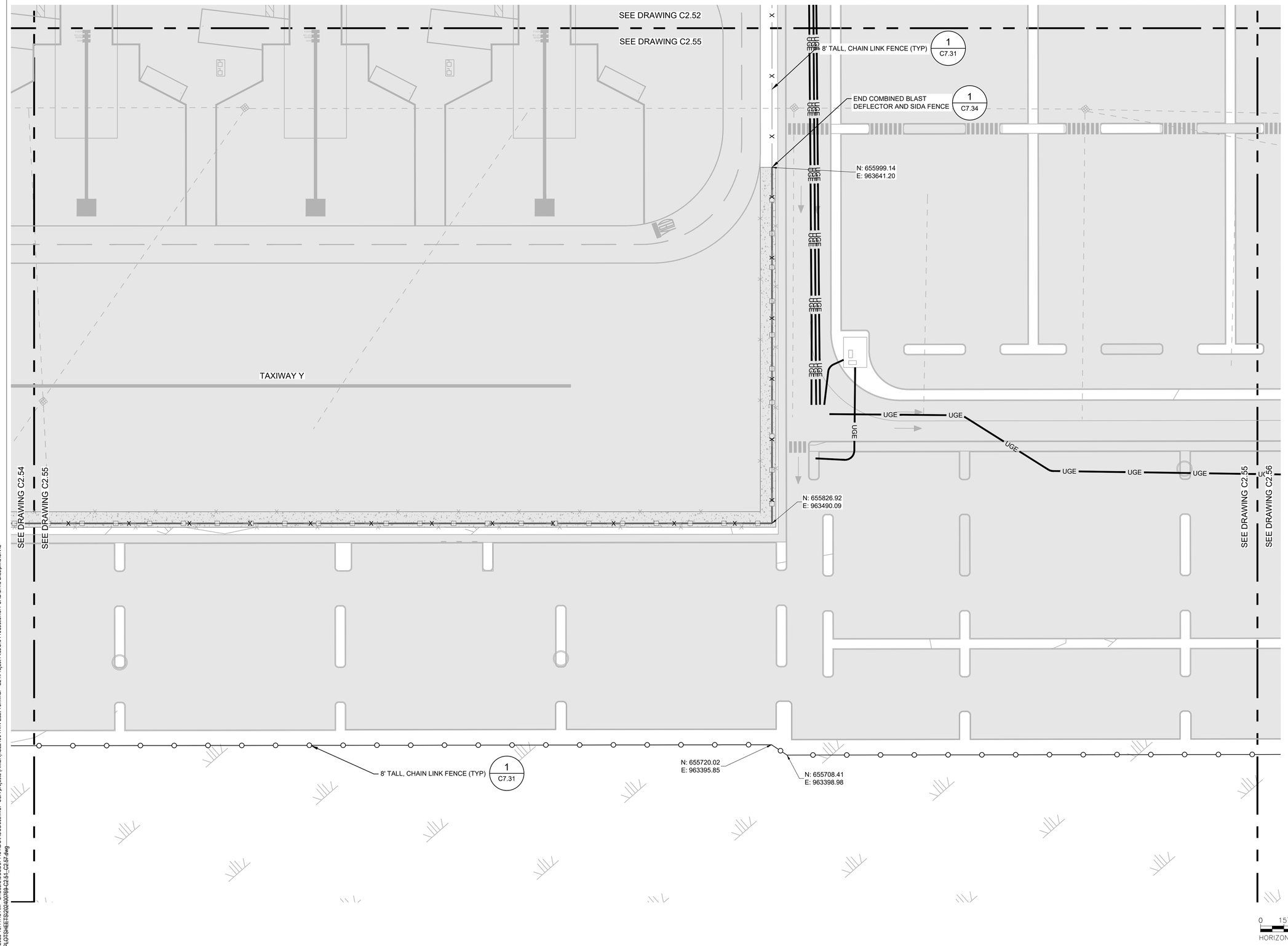

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

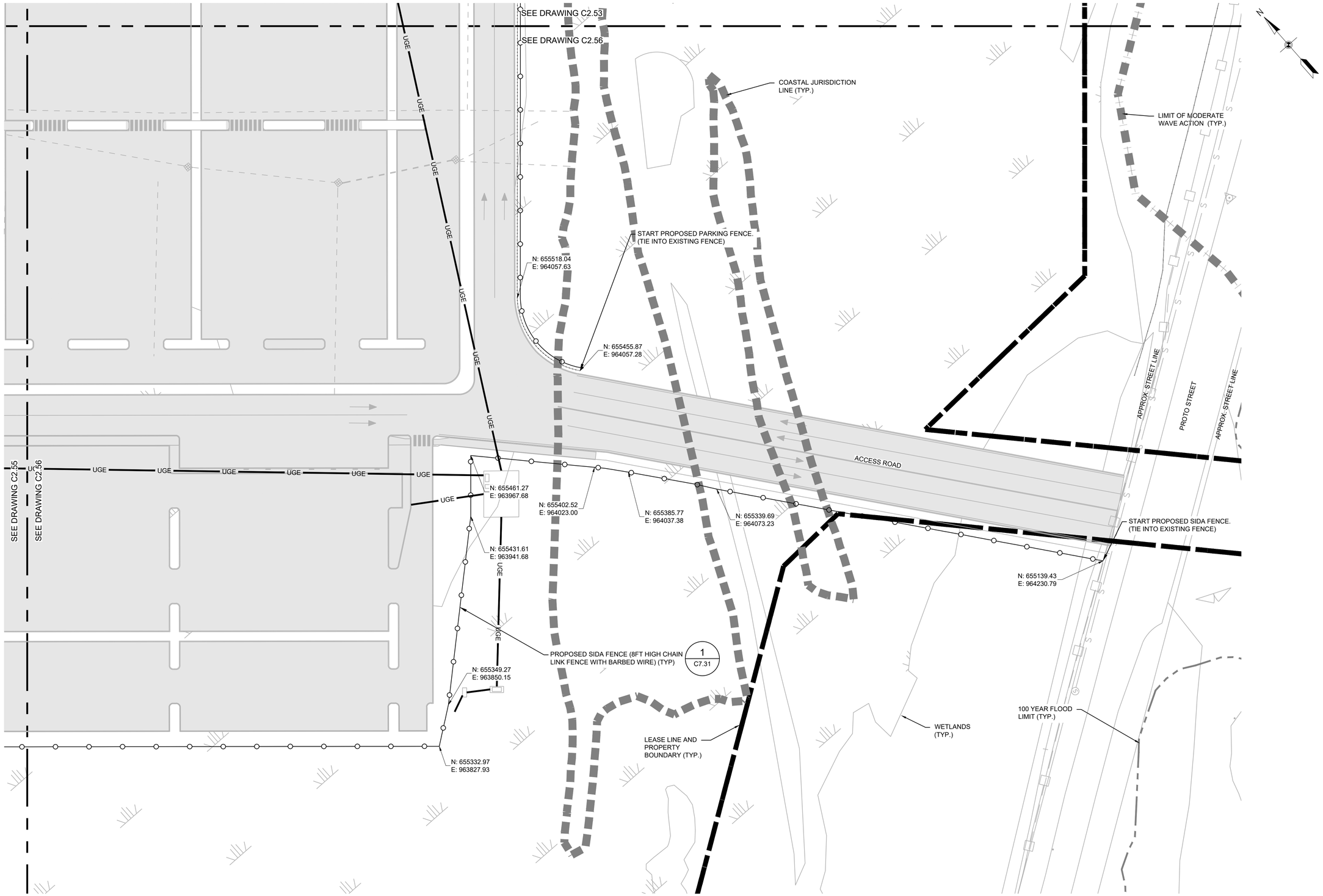
SHEET TITLE

FENCING PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.55



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CLIENT

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16678 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

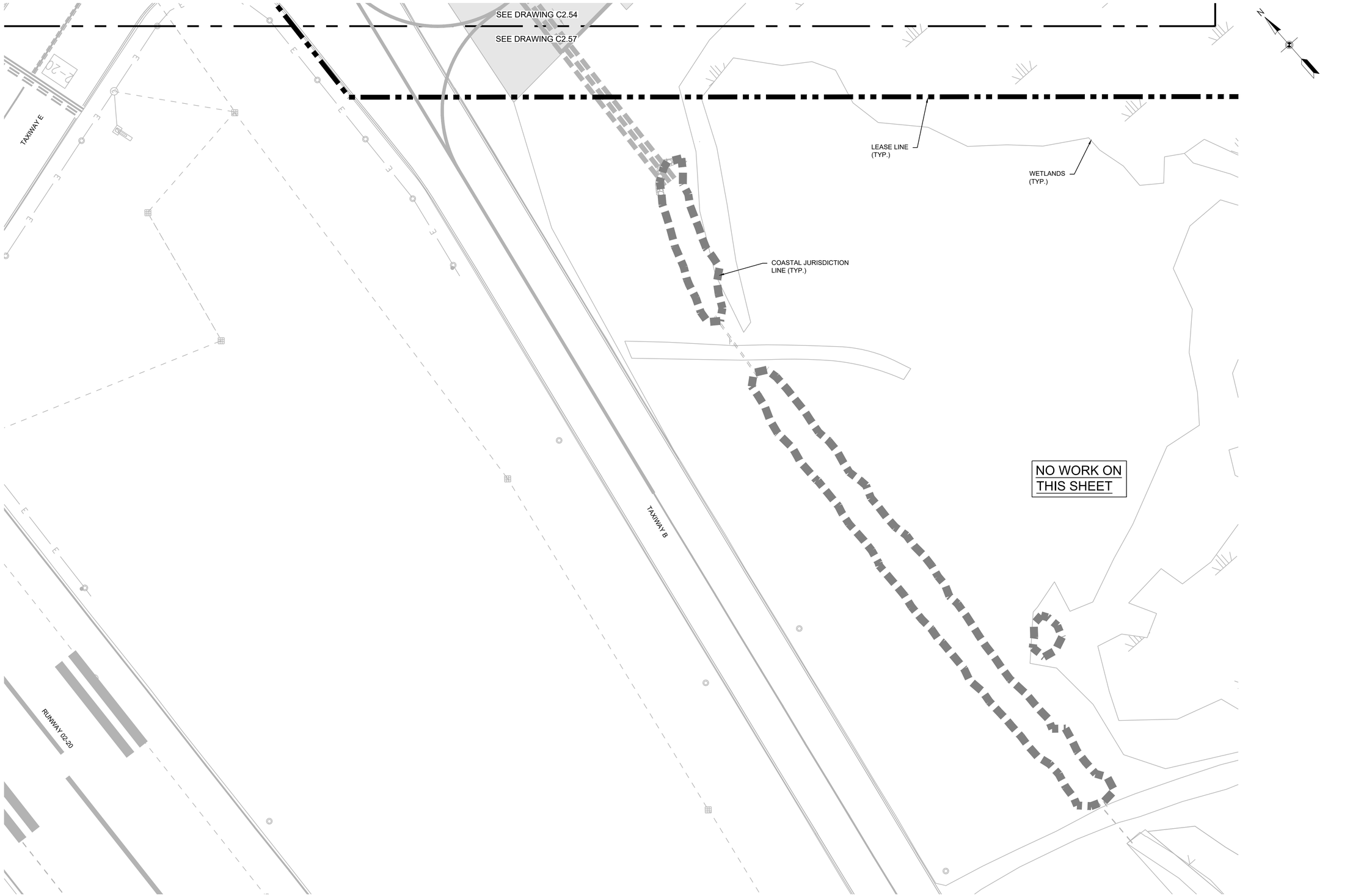
SHEET TITLE

FENCING PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.56



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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

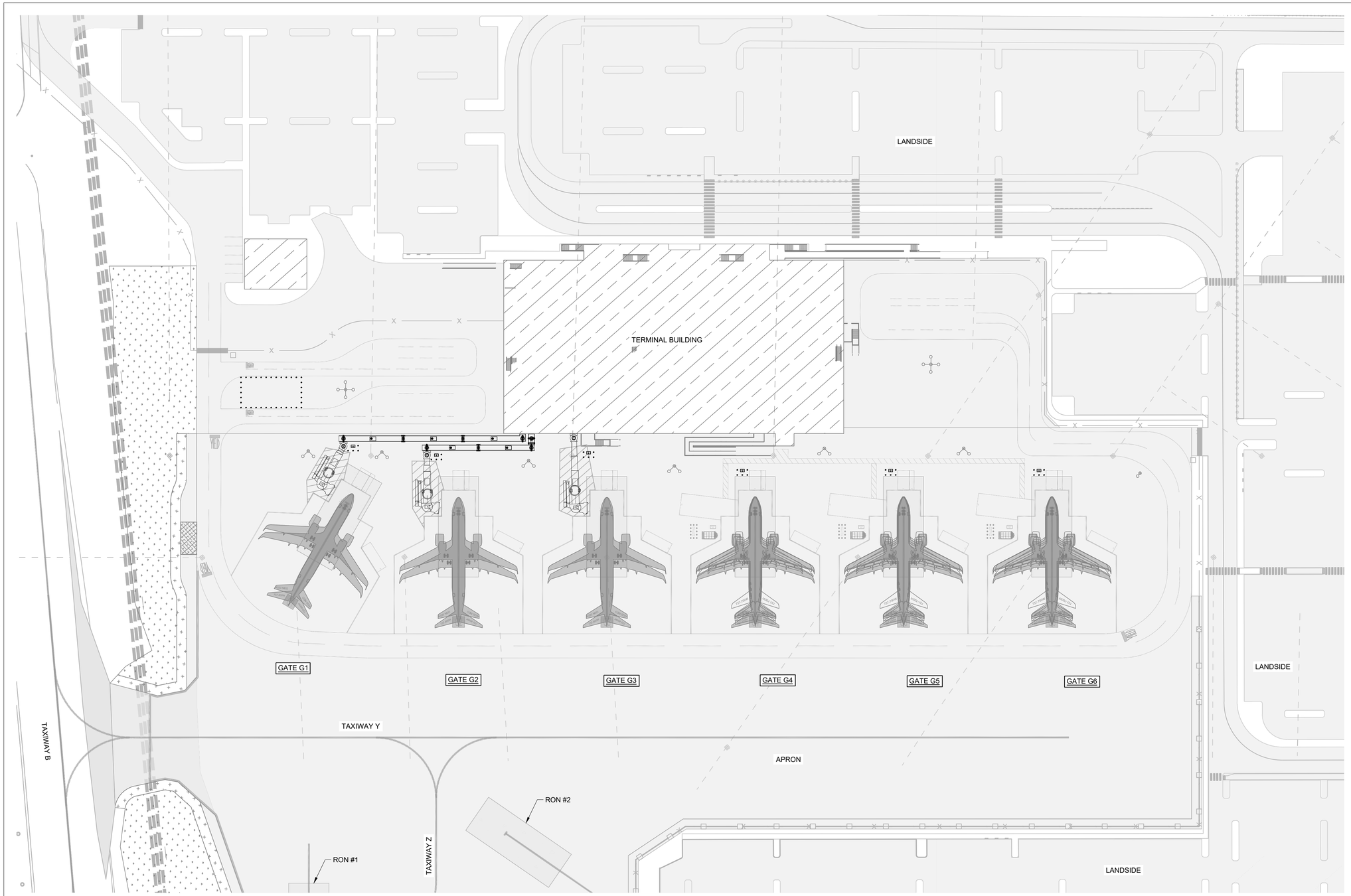
SHEET TITLE

FENCING PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.57



GENERAL NOTES:

1. SEE SHEETS C2.61 AND C2.62 FOR AIRCRAFT LAYOUT PLANS.
2. SEE SHEET C2.63 FOR GATE COMPATIBILITY MATRIX.
3. SEE SHEETS C2.64 AND C2.65 FOR FOUNDATION, PWC AND BOLLARDS PLAN.
4. SEE SHEETS C2.70 THROUGH C2.74 FOR PBB DETAILS.
5. SEE ARCHITECTURAL SERIES FOR BASE CONDITION (NO PASSENGER BOARDING BRIDGES).

LEGEND:

B737-800W/A320-NEO

PROPOSED PBB - STOWED

0 25' 50' 100'
HORIZONTAL SCALE 1"=50'

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AIRFIELD\PLOTSHEETS\240249-C2.60.dwg

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 18478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
10052559.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

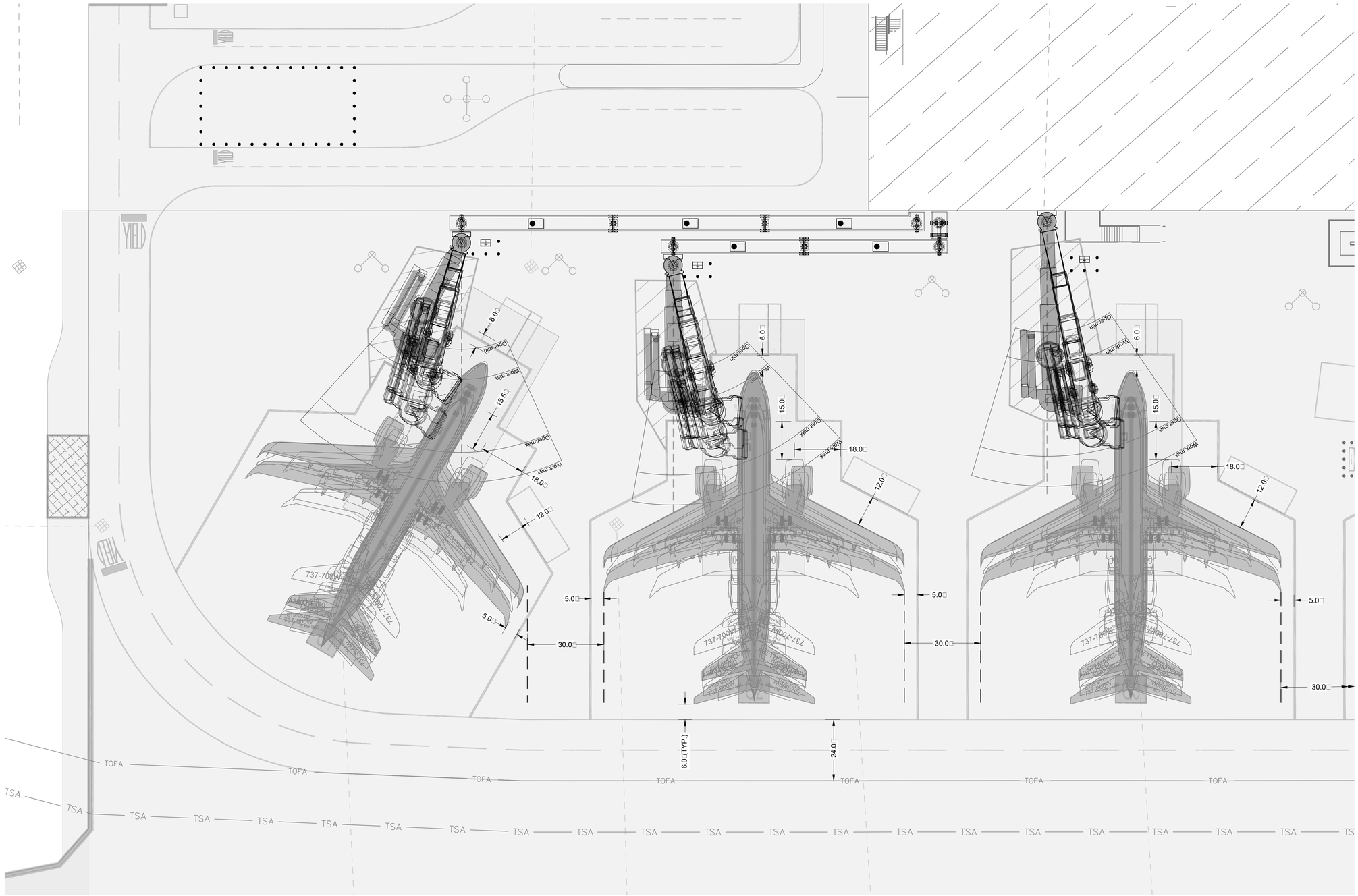
SHEET TITLE

AIRCRAFT PARKING LAYOUT PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.60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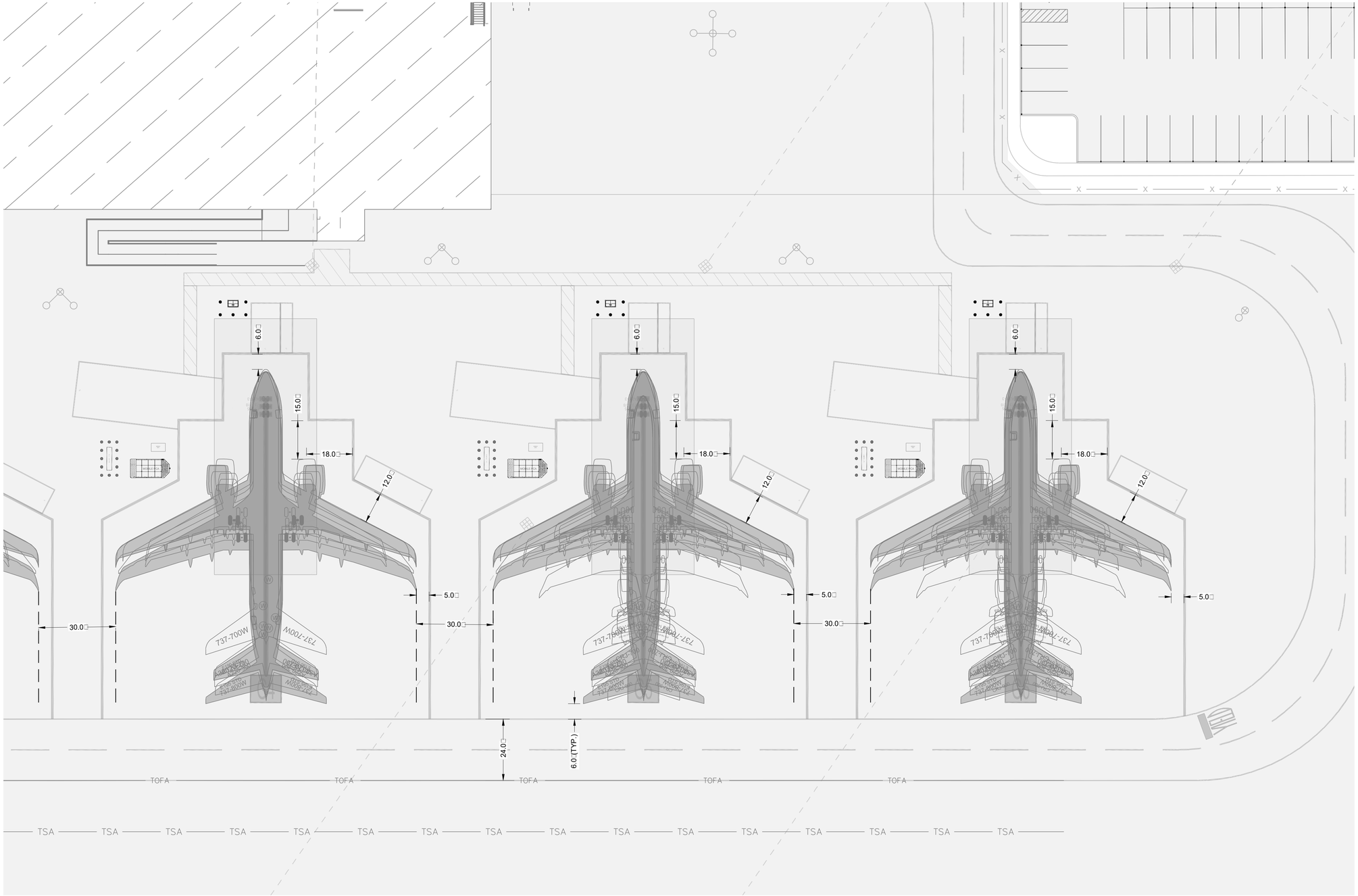
YIELD
737-700W
737-700W
737-700W



GENERAL NOTES:

1. CONTRACTOR MUST SURVEY AS-BUILT CONDITIONS PRIOR TO COMMENCING PBB AND FIXED WALKWAY MANUFACTURING. THESE CONDITIONS MAY INCLUDE, BUT NOT LIMITED TO, PBB AND FIXED WALKWAY FOUNDATIONS, APRON ELEVATIONS, AND TERMINAL FINISHED FLOOR ELEVATIONS..
2. CONTRACTOR IS RESPONSIBLE TO VERIFY THE PROPOSED PBB MODEL CAN ACCOMMODATE THE AIRCRAFT FLEET MIX AS SPECIFIED ON SHEET C2.63.
3. AIRCRAFT MIX SHOWN BASED ON INFORMATION FROM THE FAA APPROVED EA AND PROVIDED BY HVN AND IS SUBJECT TO CONFIRMATION BY THE CONTRACTOR PRIOR TO MANUFACTURING OF BOARDING BRIDGES AND MARKING OF GATES.
4. MAXIMUM PBB SLOPE FOR ALL AIRCRAFT IS E□UAL TO OR LESS THAN 8.33□ (INCLUDING MISPARKING) UNLESS OTHERWISE NOTED.
5. ALL AIRCRAFT HAVE BEEN MODELED WITH THE PBB DOCKED TO THE L1 DOOR ONLY AND DOCKED 3 INCHES BELOW AIRCRAFT DOOR SILL.
6. AIRCRAFT PARKING LAYOUT BASED ON XXXXXXXX DATED ON XX/XX/XXXX.

LEGEND:



B737-800W/A320-NEO

ADDITIONAL AIRCRAFT IN FLEET MIX

0 10' 20' 40'
HORIZONTAL SCALE 1"=20'

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CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

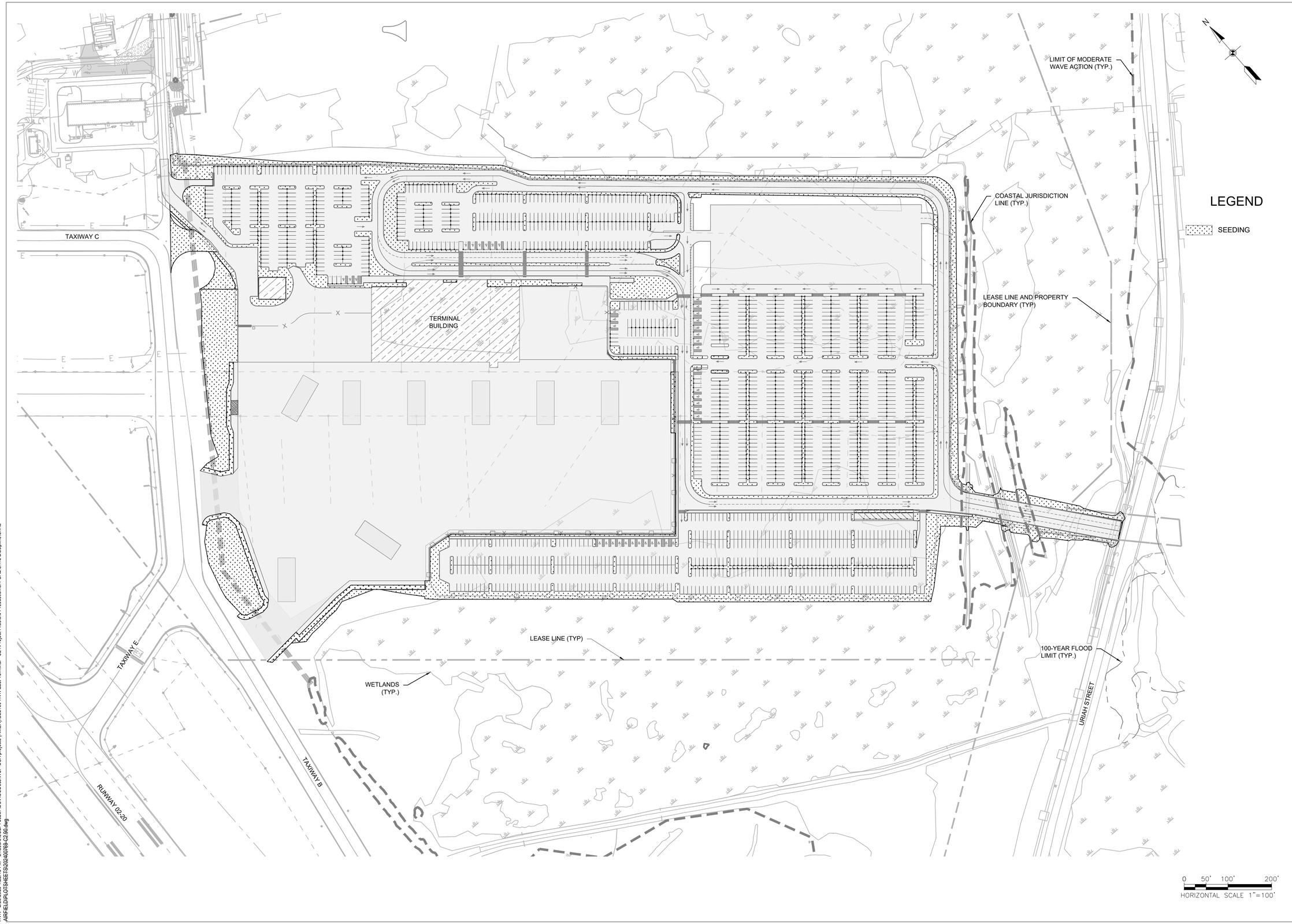
SHEET TITLE

AIRCRAFT PARKING LAYOUT PLAN - SHEET 2 OF 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.62



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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16479
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

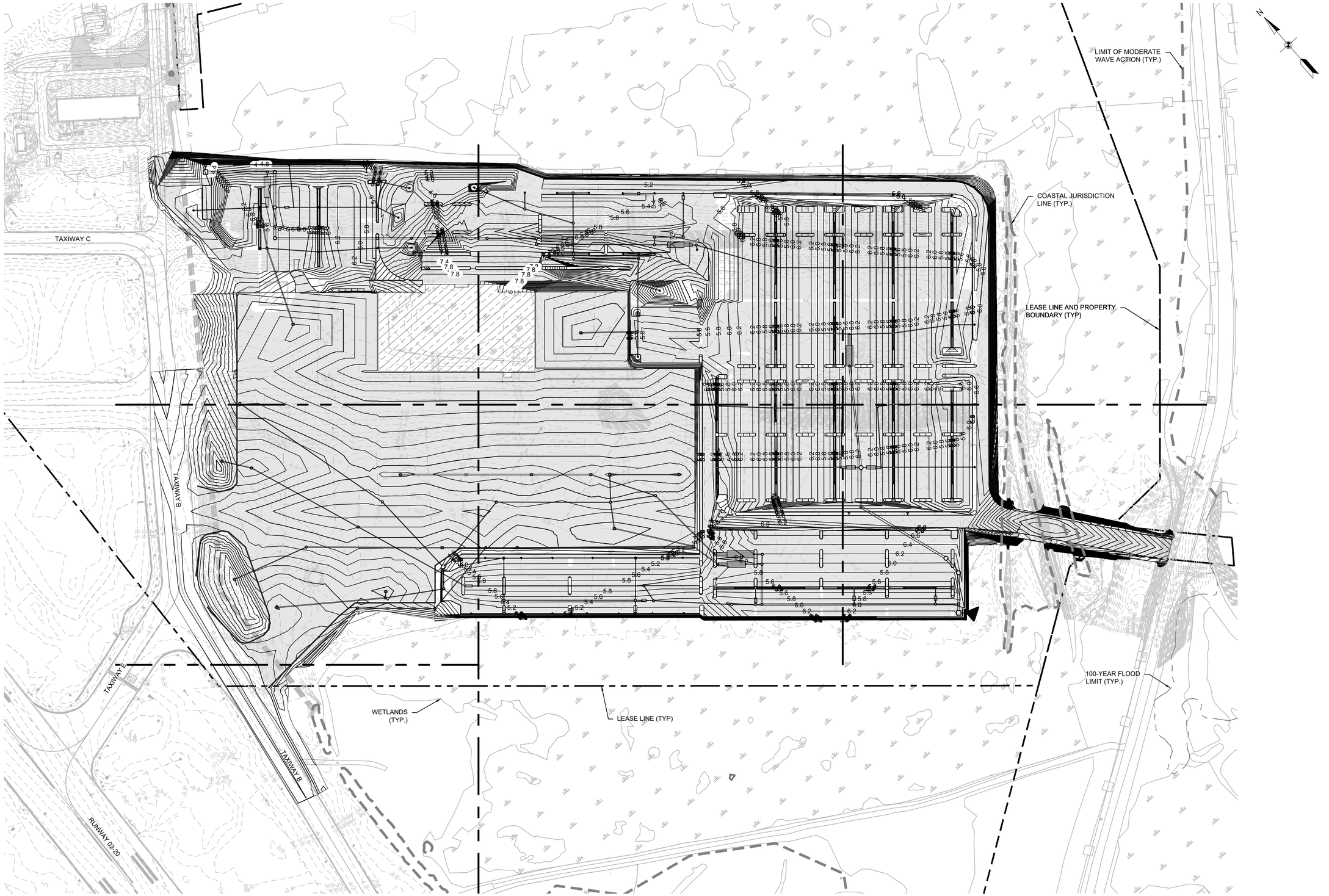
SHEET TITLE

LANDSCAPE PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C2.90



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REGISTRATION

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RICHARD L. PETTINELLI
No. 19479
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
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06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

GRADING AND DRAINAGE PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.00

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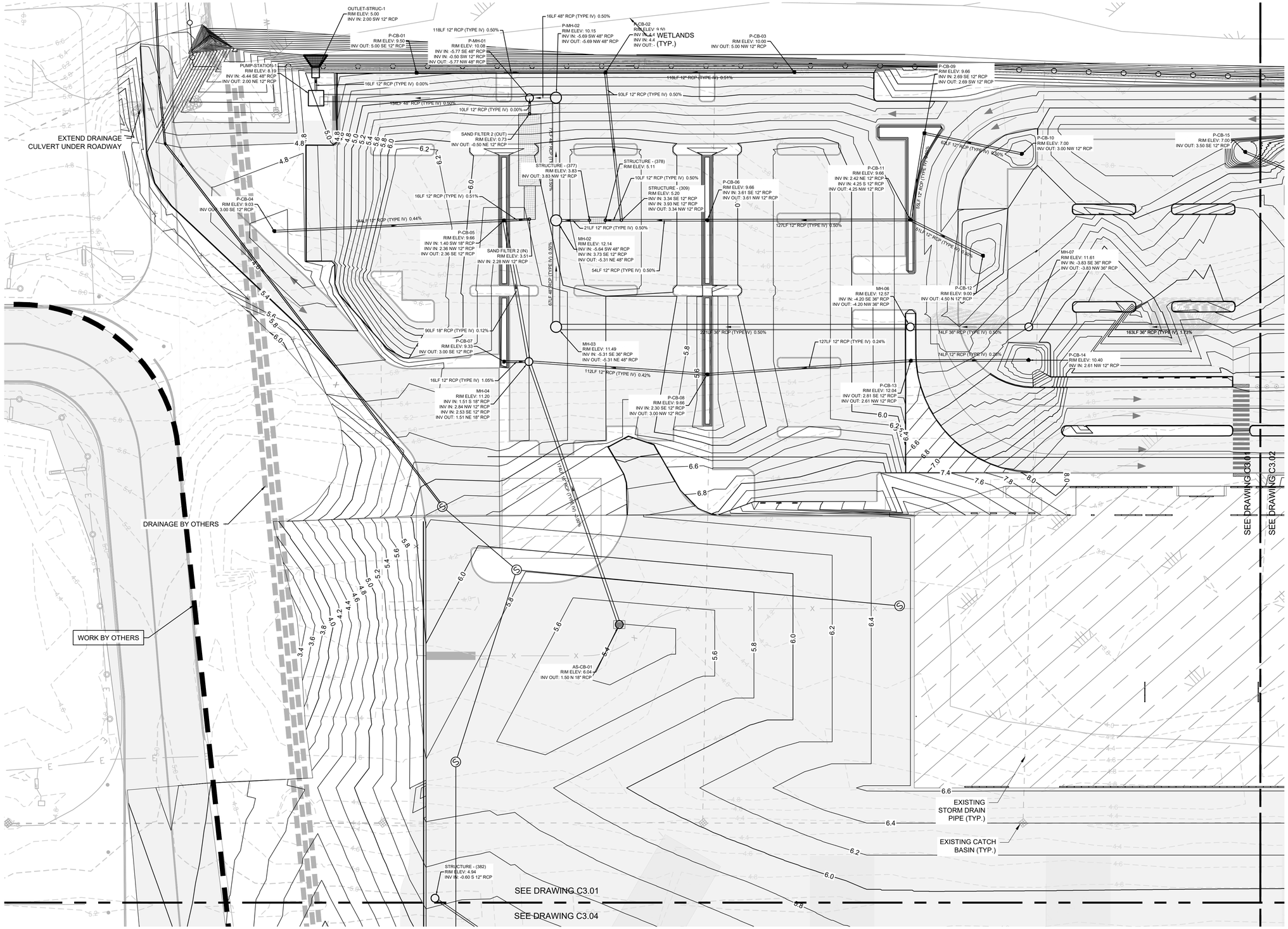

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AIRFIELD\PLOTSHEETS\240248-C3.01_C4.01.dwg

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

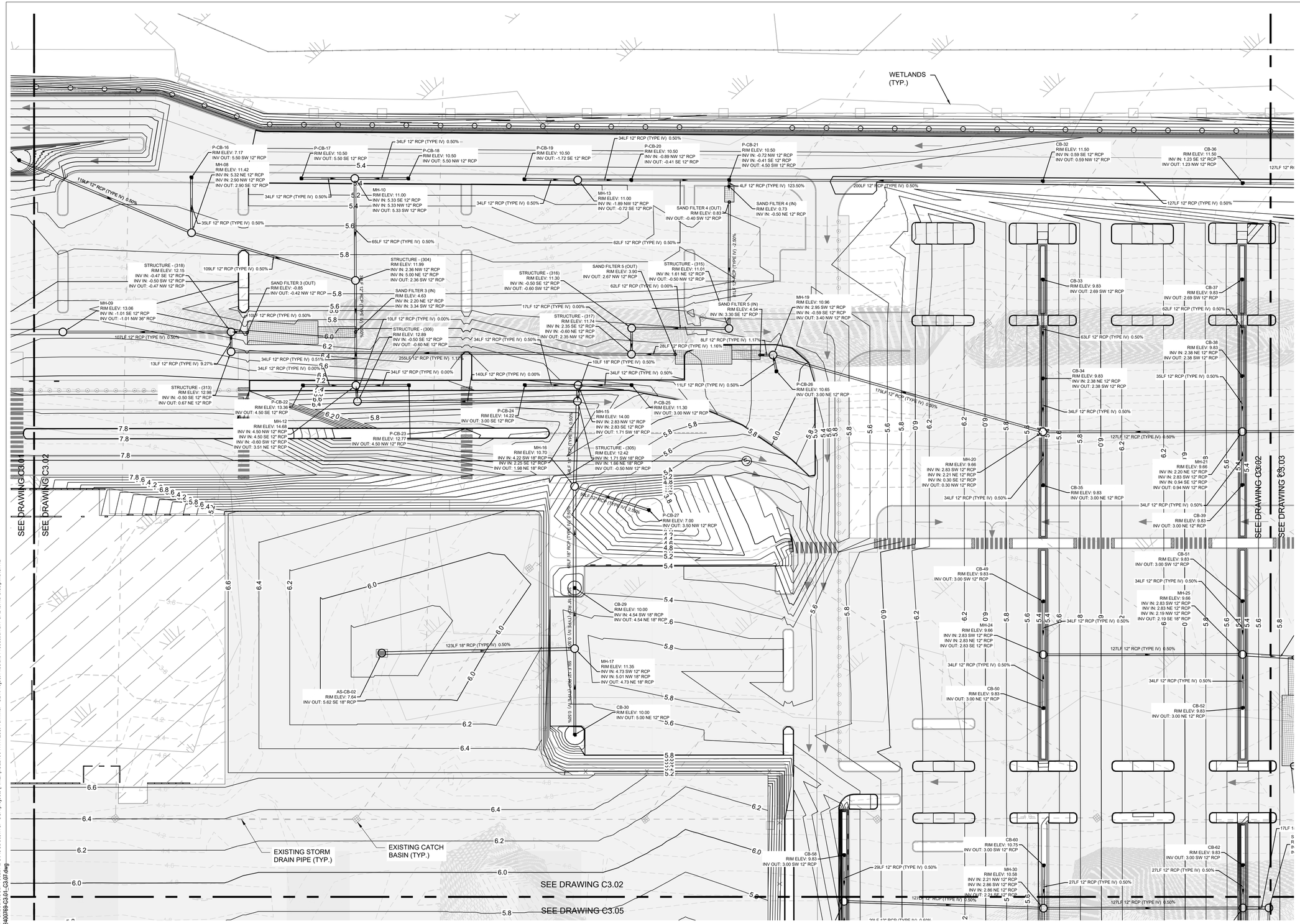
SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.01



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CLIENT

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AVPORTS

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

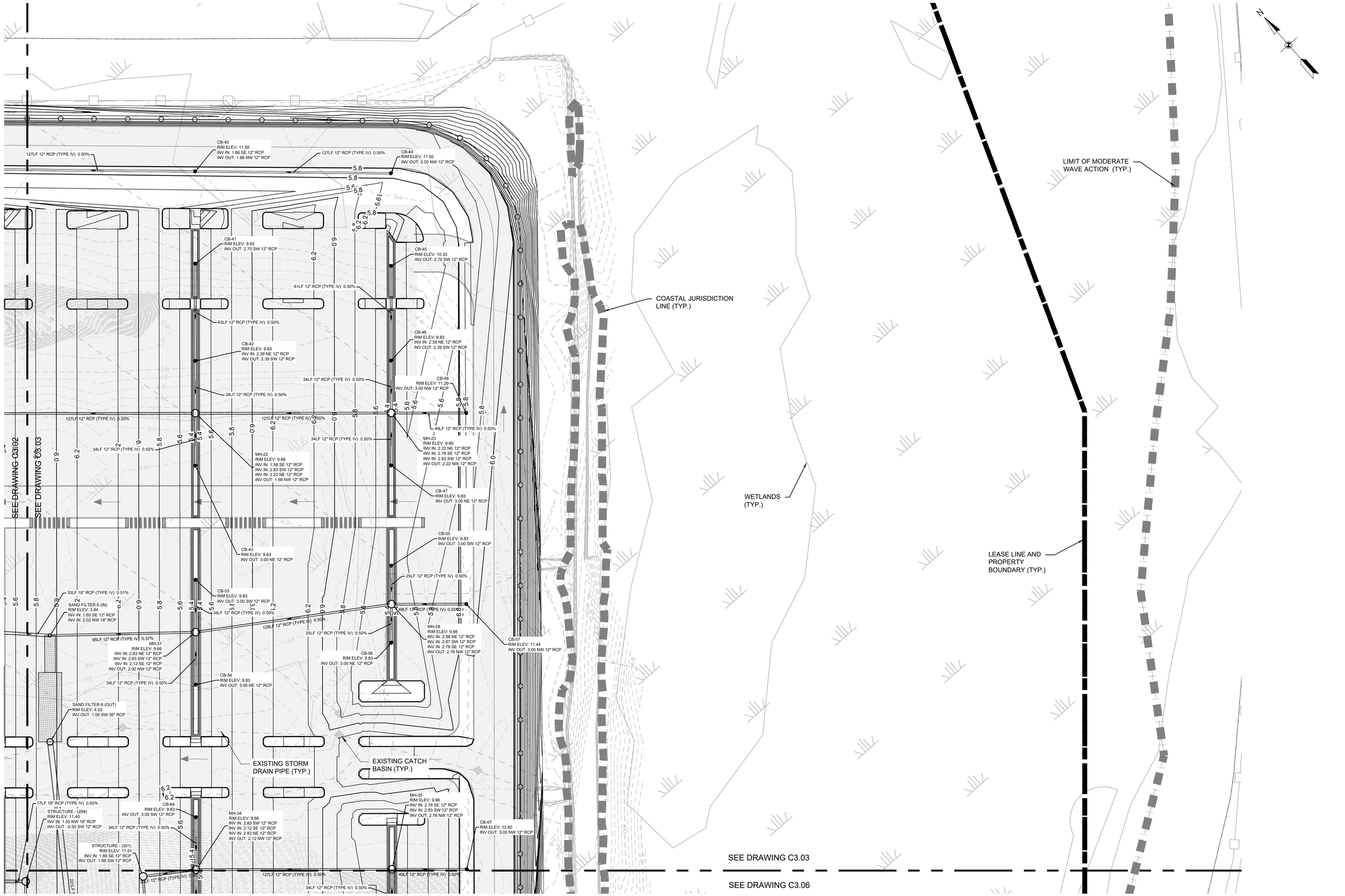
SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.02



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RICHARD L. PETTINELLI
No. 19478
LICENSED
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PROJECT LOCATION

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06512

PROJECT NUMBER

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1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.03

SEE DRAWING C3.01

SEE DRAWING C3.04

EXISTING STORM DRAIN PIPE (TYP.)

EXISTING CATCH BASIN (TYP.)

WORK BY OTHERS

AS-CB-03
RIM ELEV: 3.17
INV OUT: -0.50 SE 12" RCP

AS-CB-04
RIM ELEV: 8.39
INV IN: 4.39 NW 12" RCP
INV OUT: 4.39 S 12" RCP

37ALF 12" RCP (TYPE IV) 0.68%

66LF 12" RCP (TYPE IV) -7.46%

AS-CB-05
RIM ELEV: 4.76
INV OUT: -0.60 SE 24" RCP

AS-CB-06
RIM ELEV: 4.66
INV IN: -1.09 NW 24" RCP
INV OUT: -1.09 SE 24" RCP

142LF 24" RCP (TYPE IV) 0.35%

263LF 12" RCP (TYPE IV) 4.93%

STRUCTURE - (381)
RIM ELEV: 5.32
INV IN: 2.90 S 12" RCP
INV OUT: -0.60 N 12" RCP

94LF 12" RCP (TYPE IV) 0.93%

AS-CB-14
RIM ELEV: 4.64
INV IN: -0.19 NW 18" RCP
INV OUT: 1.33 SE 12" RCP

108LF 12" RCP (TYPE IV) 1.18%

81LF 12" RCP (TYPE IV) 1.62%

STRUCTURE - (296)
RIM ELEV: 6.65
INV IN: 2.65 W 12" RCP
INV OUT: 0.74 SE 18" RCP

STRUCTURE - (348)
RIM ELEV: 5.20
INV IN: 1.94 N 12" RCP
INV OUT: 1.94 S 12" RCP

294LF 18" RCP (TYPE IV) 0.32%

269LF 12" RCP (TYPE IV) 0.93%

SEE DRAWING C3.04

SEE DRAWING C3.05

170LF 12" RCP (TYPE IV) -0.44%

AS-CB-11
RIM ELEV: 3.57
INV OUT: 1.90 E 12" RCP

GLYCOL DEICING TANK
RIM ELEV: 9.80
INV IN: 3.97 SW 12" RCP
INV IN: -0.50 E 12" RCP
INV OUT: 5.13 N 12" RCP

AS-CB-13
RIM ELEV: 3.93
INV OUT: -0.50 SW 12" RCP

47LF 12" RCP (TYPE IV) 3.58%

173LF 12" RCP (TYPE IV) 2.25%

SAND FILTER A2 (S)
RIM ELEV: 1.85
INV OUT: 0.62

14LF 12" RCP (TYPE IV) -34.96%

128LF 12" RCP (TYPE IV) 0.00%

LEASE LINE (TYP.)

AS-CB-12
RIM ELEV: 3.37
INV OUT: 1.14 SE 18" RCP

236LF 18" RCP (TYPE IV) 0.08%

SAND FILTER A3 (N)
RIM ELEV: 0.73
INV IN: -0.50 N 12" RCP

STRUCTURE - (332)
RIM ELEV: 10.40
INV IN: -0.60 NW 12" RCP
INV OUT: 5.67 NE 12" RCP

29LF

CB-84
RIM ELEV: 10.00
INV OUT: 7.41 SE 12" RCP

167LF 12" RCP (TYPE IV) 0.00%

STRUCTURE - (324)
RIM ELEV: 5.97
INV IN: 4.30 NE 12" RCP
INV IN: 0.94 NW 18" RCP
INV OUT: -0.60 SE 12" RCP

STRUCTURE - (393)
RIM ELEV: 5.17
INV IN: 3.50 W 12" RCP
INV OUT: 3.40 SE 12" RCP

STRUCTURE - (394)
RIM ELEV: 9.32
INV IN: 3.40 NW 12" RCP
INV OUT: 3.30 E 12" RCP

164LF 12" RCP (TYPE IV) -0.73%

WETLANDS (TYP.)

SEE DRAWING C3.04

SEE DRAWING C3.07

AS-CB-17
RIM ELEV: 3.97
INV OUT: 2.30 E 12" RCP

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

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ARFIELD\PLOTSHEETS\26040099-C3401-C3.04.dwg

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19475
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.04

SEE DRAWING C3.02

SEE DRAWING C3.05

EXISTING CATCH BASIN (TYP.)

EXISTING STORM DRAIN PIPE (TYP.)

SEE DRAWING C3.04

SEE DRAWING C3.05

SEE DRAWING C3.05

SEE DRAWING C3.06

AS-CB-07
RIM ELEV: 4.61
INV IN: -1.58 NW 24" RCP
INV OUT: -1.58 SE 24" RCP

AS-CB-08
RIM ELEV: 4.60
INV IN: -2.72 NW 24" RCP
INV OUT: -0.50 SE 12" RCP

AS-CB-09
RIM ELEV: 8.07
INV IN: 0.50 SE 12" RCP
INV OUT: 4.07 SW 12" RCP

AS-CB-10
RIM ELEV: 4.58
INV OUT: 2.00 NW 12" RCP

141LF 24" RCP (TYPE IV) 0.35%

128LF 24" RCP (TYPE IV) 0.89%

150LF 12" RCP (TYPE IV) 1.00%

147LF 12" RCP (TYPE IV) 0.00%

60LF 12" RCP (TYPE IV) 7.65%

98LF 12" RCP (TYPE IV) 0.00%

247LF 12" RCP (TYPE IV) 0.24%

STRUCTURE - (384)
RIM ELEV: 1.75
INV IN: 0.08 SE 12" RCP
INV OUT: 0.08 W 12" RCP

STRUCTURE - (380)
RIM ELEV: 5.07
INV IN: -0.50 NE 12" RCP
INV IN: 0.67 SW 12" RCP
INV OUT: 0.67 SE 12" RCP
INV OUT: 0.67 NW 12" RCP

STRUCTURE - (390)
RIM ELEV: 5.07
INV IN: -0.50 NW 12" RCP
INV IN: 0.67 NW 12" RCP
INV OUT: 4.34 S 18" RCP

57LF 12" RCP (TYPE IV) 0.00%

AS-CB-15
RIM ELEV: 9.34
INV IN: -0.17 NW 12" RCP
INV OUT: -0.27 SE 12" RCP

AS-CB-16
RIM ELEV: 5.84
INV OUT: 4.17 NE 12" RCP
INV OUT: 5.25 SE 18" RCP

175LF 18" RCP (TYPE IV) 0.52%

AS-MH-01
RIM ELEV: 6.55
INV IN: 4.34 NW 18" RCP
INV IN: -0.27 NW 12" RCP
INV OUT: -4.32 S 18" RCP

STRUCTURE - (395)
RIM ELEV: 9.81
INV IN: 0.46 NW 12" RCP
INV IN: -0.50 W 12" RCP
INV OUT: 0.46 SE 12" RCP

68LF 12" RCP (TYPE IV) 0.93%

380LF 12" RCP (TYPE IV) 0.00%

CB-80
RIM ELEV: 10.00
INV IN: 1.30 SE 12" RCP
INV OUT: 7.54 NW 12" RCP

40LF 12" RCP (TYPE IV) 0.50%

38LF 12" RCP (TYPE IV) 0.50%

68LF 12" RCP (TYPE IV) 0.30%

93LF 12" RCP (TYPE IV) 0.46%

101LF 12" RCP (TYPE IV) 0.50%

CB-79
RIM ELEV: 10.15
INV OUT: 7.55 SE 12" RCP

MH
RIM ELEV: 10.01
INV IN: 7.35 SE 12" RCP
INV IN: 7.35 NW 12" RCP
INV OUT: 7.35 SW 12" RCP

CB-81
RIM ELEV: 10.00
INV OUT: 1.50 NW 12" RCP

CB-82
RIM ELEV: 10.00
INV OUT: 1.50 SE 12" RCP

CB-83
RIM ELEV: 10.00
INV OUT: 1.50 NW 12" RCP

STRUCTURE - (289)
RIM ELEV: 10.01
INV IN: 1.07 NW 12" RCP
INV IN: 0.99 SE 12" RCP
INV OUT: 5.94 SW 12" RCP

90LF 12" RCP (TYPE IV) 0.50%

14LF 12" RCP (TYPE IV) 0.50%

STRUCTURE - (346)
RIM ELEV: 12.00
INV IN: -0.50 NW 12" RCP
INV OUT: -0.70 S 12" RCP

SAND FILTER 9A (IN)
RIM ELEV: 2.04
INV IN: 5.41 NW 12" RCP

371LF 12" RCP (TYPE IV) 0.30%

39LF 12" RCP (TYPE IV) 0.00%

15LF 12" RCP (TYPE IV) 0.50%

STRUCTURE - (347)
RIM ELEV: 10.76
INV IN: 5.41 NW 12" RCP
INV IN: -0.70 N 12" RCP
INV OUT: 5.41 SE 12" RCP

MH-54
RIM ELEV: 10.91
INV IN: 5.48 NW 12" RCP
INV IN: 5.48 SW 12" RCP
INV IN: 5.48 NE 12" RCP
INV OUT: 5.48 SE 12" RCP

MH-56
RIM ELEV: 10.92
INV IN: 6.90 SW 12" RCP
INV IN: 6.90 NE 12" RCP
INV OUT: 6.90 SE 12" RCP

SAND FILTER A3 (OUT)
RIM ELEV: 1.85
INV OUT: 0.62 SE 12" RCP

284LF 12" RCP (TYPE IV) 0.50%

169LF 12" RCP (TYPE IV) 0.50%

MH-55
RIM ELEV: 11.00
INV IN: 2.47 NW 12" RCP
INV IN: 2.48 SE 12" RCP
INV OUT: 2.47 NE 12" RCP

SAND FILTER 9A (OUT)
RIM ELEV: 6.72
INV OUT: 5.49 SE 12" RCP

36LF 12" RCP (TYPE IV) 0.50%

29LF 12" RCP (TYPE IV) 0.50%

37LF 12" RCP (TYPE IV) 0.50%

68LF 12" RCP (TYPE IV) 0.50%

69LF 12" RCP (TYPE IV) 0.50%

69LF 12" RCP (TYPE IV) 0.50%

CB-85
RIM ELEV: 10.00
INV IN: 2.66 SE 12" RCP
INV OUT: 7.24 NW 12" RCP

CB-86
RIM ELEV: 10.00
INV OUT: 3.00 NW 12" RCP

CB-87
RIM ELEV: 10.00
INV OUT: 3.00 SE 12" RCP

CB-88
RIM ELEV: 10.04
INV IN: 2.66 NW 12" RCP
INV OUT: 2.66 SE 12" RCP

CB-89
RIM ELEV: 10.00
INV IN: 2.66 SE 12" RCP
INV OUT: 2.66 NW 12" RCP

CB-90
RIM ELEV: 10.00
INV OUT: 3.00 NW 12" RCP

29LF 12" RCP (TYPE IV) -10.52%

37LF 12" RCP (TYPE IV) 0.50%

MH-57
RIM ELEV: 11.00
INV IN: 7.05 NW 12" RCP
INV IN: 7.05 SE 12" RCP
INV OUT: 7.05 NE 12" RCP

71LF 12" RCP (TYPE IV) 0.50%

MH-29
RIM ELEV: 9.66
INV IN: 2.85 SW 12" RCP
INV IN: 2.85 NE 12" RCP
INV OUT: 2.85 SE 12" RCP

29LF 12" RCP (TYPE IV) 0.50%

CB-59
RIM ELEV: 9.83
INV OUT: 3.00 NE 12" RCP

CB-68
RIM ELEV: 9.83
INV OUT: 3.00 SW 12" RCP

MH-36
RIM ELEV: 9.66
INV IN: 2.83 SW 12" RCP
INV IN: 2.83 NE 12" RCP
INV OUT: 2.83 SE 12" RCP

34LF 12" RCP (TYPE IV) 0.50%

CB-69
RIM ELEV: 9.83
INV OUT: 3.00 NE 12" RCP

MH-30
RIM ELEV: 10.58
INV IN: 2.21 NW 12" RCP
INV IN: 2.86 SW 12" RCP
INV IN: 2.86 NE 12" RCP
INV OUT: 2.21 SE 12" RCP

127LF 12" RCP (TYPE IV) 0.50%

27LF 12" RCP (TYPE IV) 0.50%

CB-61
RIM ELEV: 10.75
INV OUT: 3.00 NE 12" RCP

34LF 12" RCP (TYPE IV) 0.50%

127LF 12" RCP (TYPE IV) 0.50%

CB-70
RIM ELEV: 9.83
INV OUT: 3.00 SW 12" RCP

MH-37
RIM ELEV: 9.66
INV IN: 2.83 SW 12" RCP
INV IN: 2.83 NE 12" RCP
INV IN: 2.19 NW 12" RCP
INV OUT: 2.19 SE 12" RCP

34LF 12" RCP (TYPE IV) 0.50%

CB-71
RIM ELEV: 9.83
INV OUT: 3.00 NE 12" RCP

MH-31
RIM ELEV: 9.66
INV IN: 1.58 NW 12" RCP
INV IN: 2.86 NE 12" RCP
INV IN: 2.86 SW 12" RCP
INV OUT: 1.58 SE 18" RCP

27LF 12" RCP (TYPE IV) 0.50%

CB-63
RIM ELEV: 9.83
INV OUT: 3.00 NE 12" RCP

129LF

13LF 18" RCP (TYPE IV) 0.59%

CB-72
RIM ELEV: 9.83
INV OUT: 3.00 SW 12" RCP

34LF 12" RCP (TYPE IV) 0.50%

MH-38
RIM ELEV: 9.66
INV IN: 2.83 SW 12" RCP
INV IN: 1.55 NW 12" RCP
INV IN: 2.83 NE 12" RCP
INV OUT: 1.55 SE 18" RCP

34LF 12" RCP (TYPE IV) 0.50%

CB-73
RIM ELEV: 9.83
INV OUT: 3.00 NE 12" RCP

SAND FILTER 7 (IN)
RIM ELEV: 3.37
INV IN: 1.47 NW 18" RCP
INV IN: -0.50 NE 12" RCP

SAND FILTER
RIM E
INV OUT: 1.41 SE

STRUCTURE - (334
RIM ELEV: 12.1
INV IN: 3.72 NE 12" RCF
INV OUT: 3.72 S 48" RCF

SAND FILTER A2 (IN)
RIM ELEV: 0.73
INV IN: -0.50 N 18" RCP

SAND FILTER A2 (OUT)
RIM ELEV: 1.10
INV OUT: -0.70 SE 18" RCP

18LF 18" RCP (TYPE IV) 0.00%

STRUCTURE - (338)
RIM ELEV: 12.24
INV IN: -0.70 NW 18" RCP
INV OUT: -0.60 SW 18" RCP

STRUCTURE - (337)
RIM ELEV: 11.96
INV IN: -0.50 NW 18" RCP
INV IN: -0.60 NE 18" RCP
INV OUT: -0.60 SW 36" RCP

36LF 18" RCP (TYPE IV) 0.00%

SAND FILTER A1 (IN)
RIM ELEV: -1.38
INV IN: -4.90 N 18" RCP

SAND FILTER A1 (OUT)
RIM ELEV: 0.73
INV OUT: -0.50 SE 18" RCP

87LF 36" RCP (TYPE IV) 0.00%

37LF 12" RCP (TYPE IV) 0.50%

MH-51
RIM ELEV: 11.00
INV IN: 2.78 NW 12" RCP
INV IN: 2.47 SE 12" RCP
INV OUT: 5.00 SW 12" RCP

CB-92
RIM ELEV: 9.83
INV IN: 2.66 SE 12" RCP
INV OUT: 2.66 NW 12" RCP

34LF 12" RCP (TYPE IV) 0.50%

CB-94
RIM ELEV: 9.83
INV OUT: 3.00 SE 12" RCP

68LF 12" RCP (TYPE IV) 0.50%

CB-91
RIM ELEV: 9.83
INV OUT: 3.00 SE 12" RCP

CB-93
RIM ELEV: 9.83
INV OUT: 3.00 NW 12" RCP

SAND FILTER 9B (IN)
RIM ELEV: 0.73
INV IN: -0.50 NE 12" RCP

44LF 12" RCP (TYPE IV) 0.50%

SAND FILTER 9B (OUT)
RIM ELEV: 0.73
INV OUT: -0.50 SW 12" RCP

41LF 12" RCP (TYPE IV) -163.23%

199LF 36" RCP (TYPE IV) 0.50%

MH-53
RIM ELEV: 12.09
INV IN: 4.56 NW 12" RCP
INV OUT: 4.56 SE 12" RCP

STRUCTURE - (341)
RIM ELEV: 11.96
INV IN: 4.23 NW 12" RCP
INV IN: -0.60 NE 36" RCP
INV OUT: 4.23 SE 36" RCP

52LF 12" RCP (TYPE IV) 0.50%

STRUCTURE - (312)
RIM ELEV: 11.96
INV IN: 4.30 NW 12" RCP
INV IN: 5.84 NE 12" RCP
INV OUT: 4.30 SE 12" RCP

14LF 12" RCP (TYPE IV) 0.50%

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

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CLIENT

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DRAWING HISTORY

No.	DATE	DESCRIPTION

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EAST HAVEN, CT
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PROJECT NUMBER

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23-006724	SYSKA

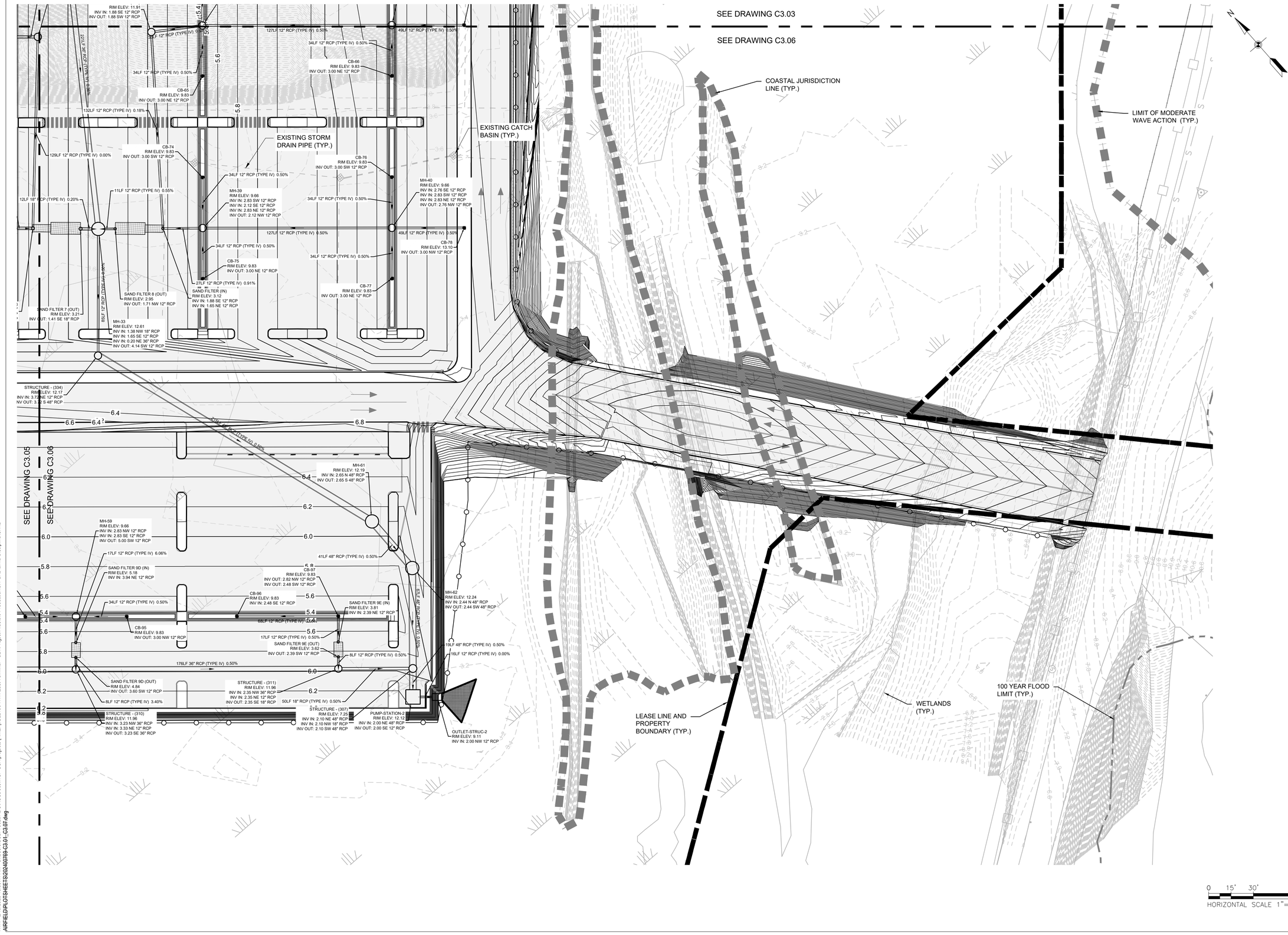
SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.05



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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
PROFESSIONAL ENGINEER
No. 19475
LICENSED

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.06

SEE DRAWING C3.04

SEE DRAWING C3.07

AS-CB-17
RIM ELEV: 3.97
INV OUT: 2.30 E 12" RCP

LEASE LINE
(TYP.)

WETLANDS
(TYP.)

COASTAL JURISDICTION
LINE (TYP.)

WORK BY OTHERS

0 15' 30' 60'
HORIZONTAL SCALE 1"=30'

HVN - 2/19/2025 10:33:41 AM - C:\Users\USBF73320\7DCAACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL
\ARHELEVPLOT\SHEET-FS\02640099-CA3-01-CA4P.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19479 · LICENSED · PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

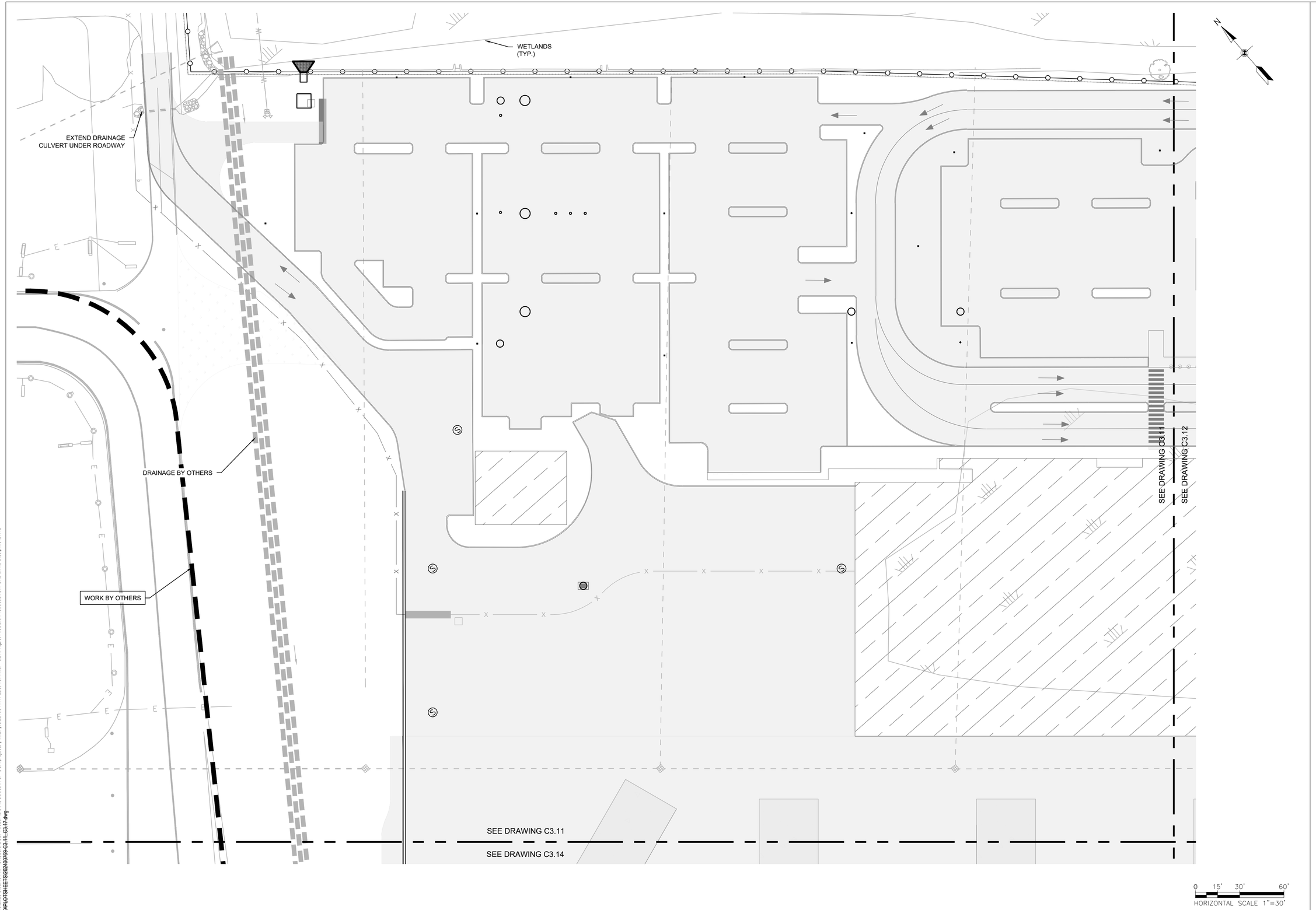
SHEET TITLE

GRADING AND DRAINAGE PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.07



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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

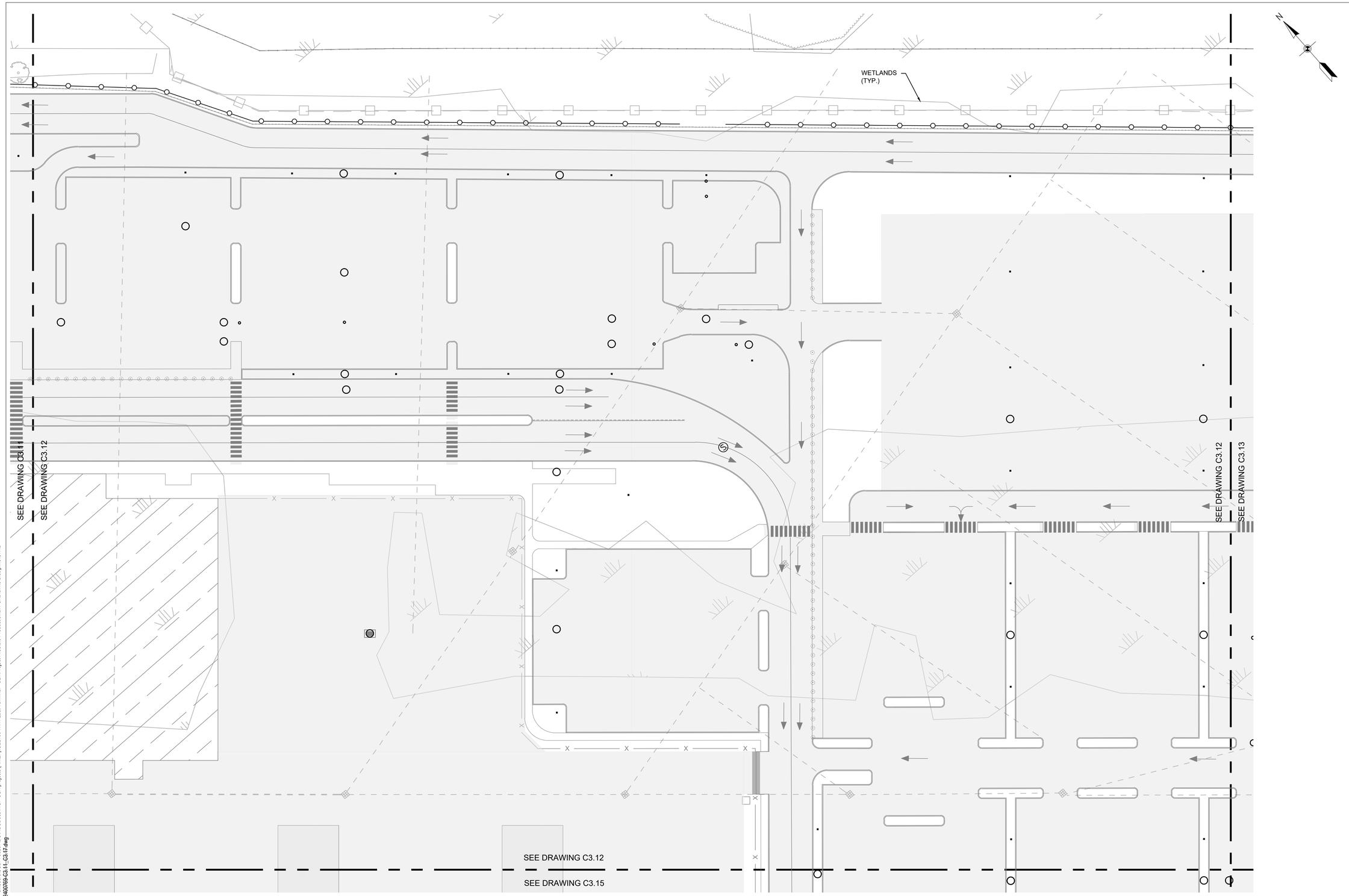
SHEET TITLE

SPOT ELEVATION PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.11



CLIENT

HVN TWEED NEW HAVEN AIRPORT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

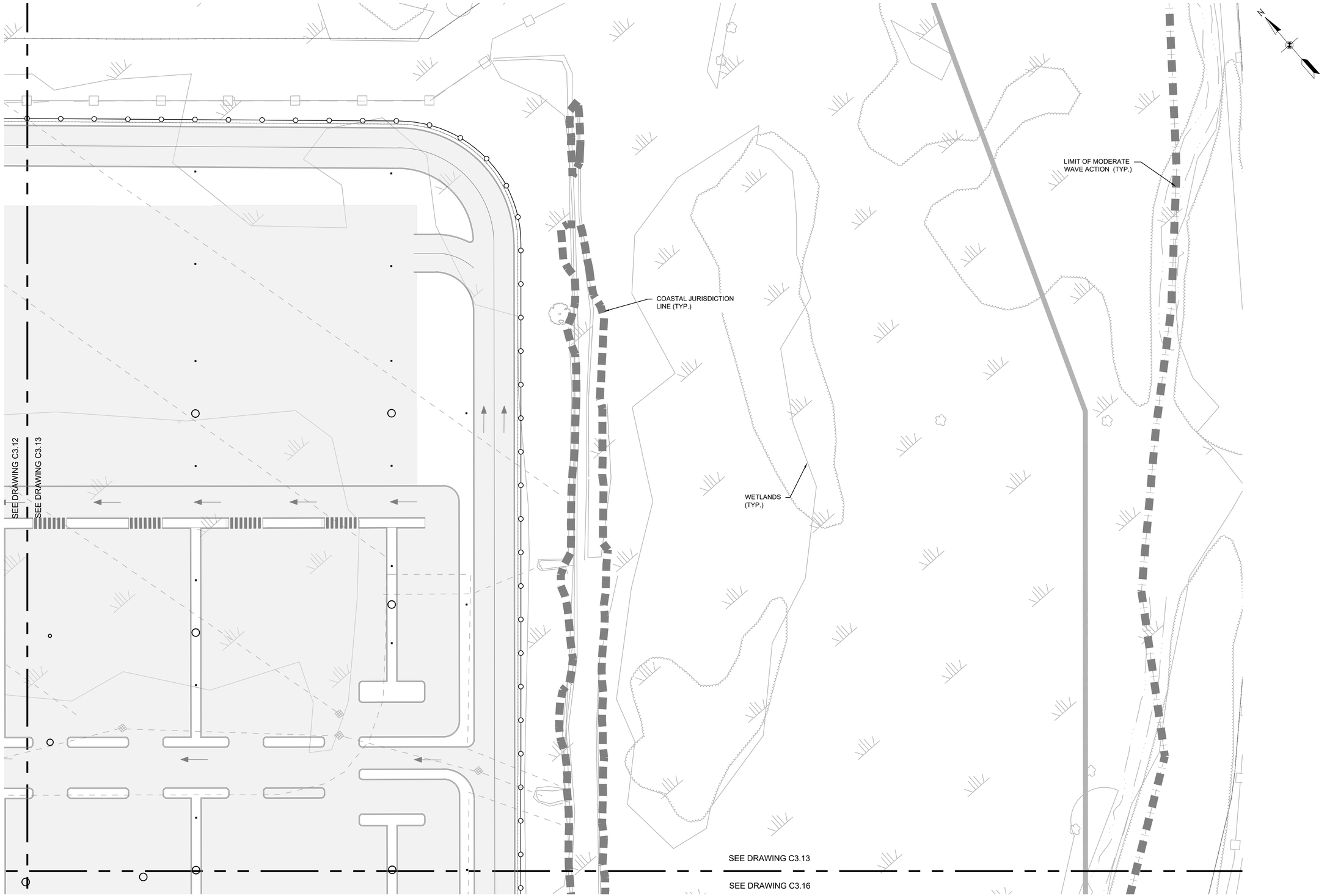
SPOT ELEVATION PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.12

HVN - 2/18/2025 8:08:45 PM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C3.11_C3.17.dwg



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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

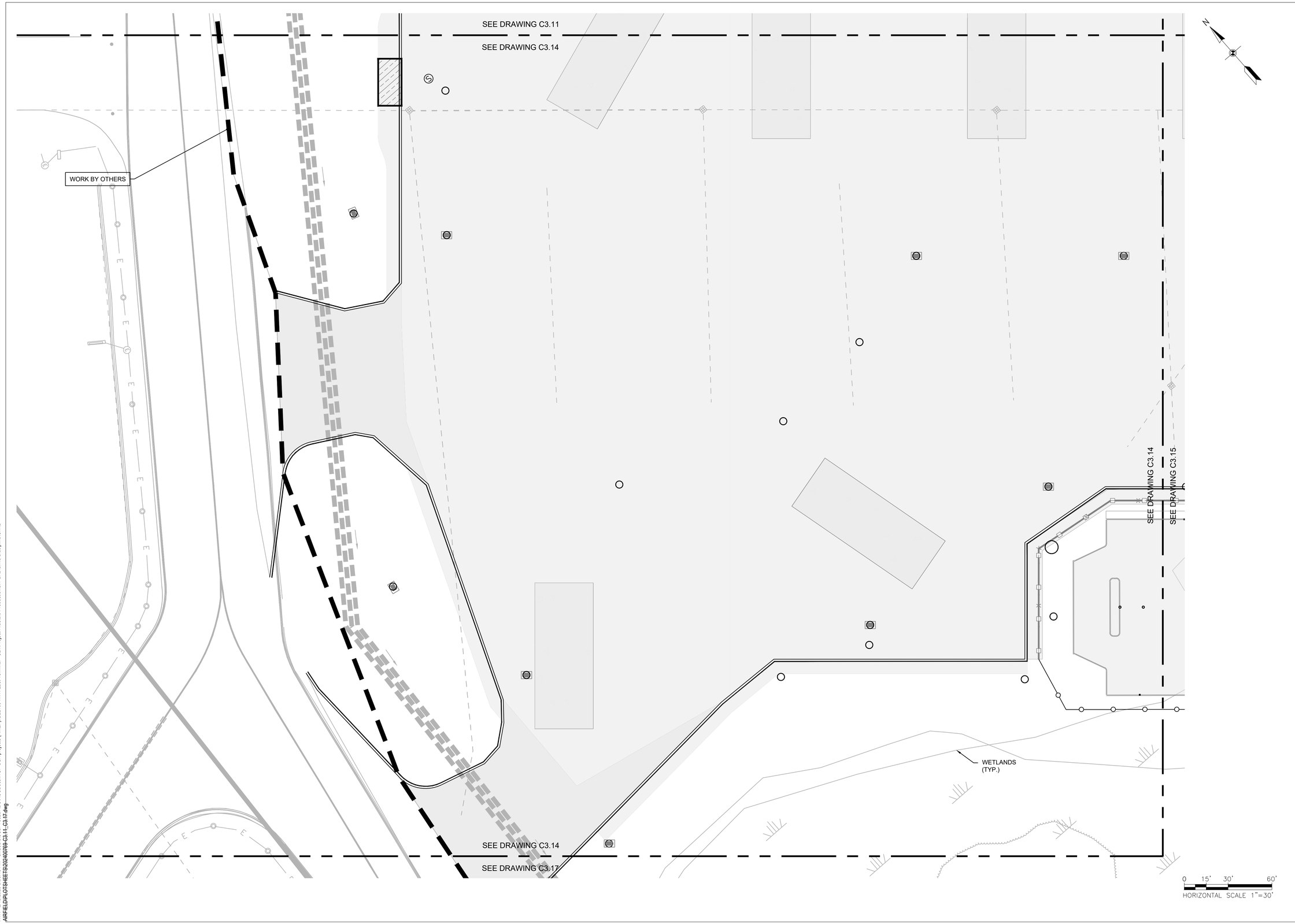
SHEET TITLE

SPOT ELEVATION PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.13



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CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SPOT ELEVATION PLAN - SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.14

SEE DRAWING C3.12

SEE DRAWING C3.15

SEE DRAWING C3.14

SEE DRAWING C3.15

SEE DRAWING C3.15

SEE DRAWING C3.16

0 15' 30' 60'

HORIZONTAL SCALE 1"=30'

H:\N - 2/18/2025 8:08:45 PM - C:\Users\USBF730207\DOCACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\240248\9-C3.H1_C3.H7.dwg

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · REGISTERED · PROFESSIONAL ENGINEER

DRAWING HISTORY

№.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00250630.0769	WSP
10052590.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

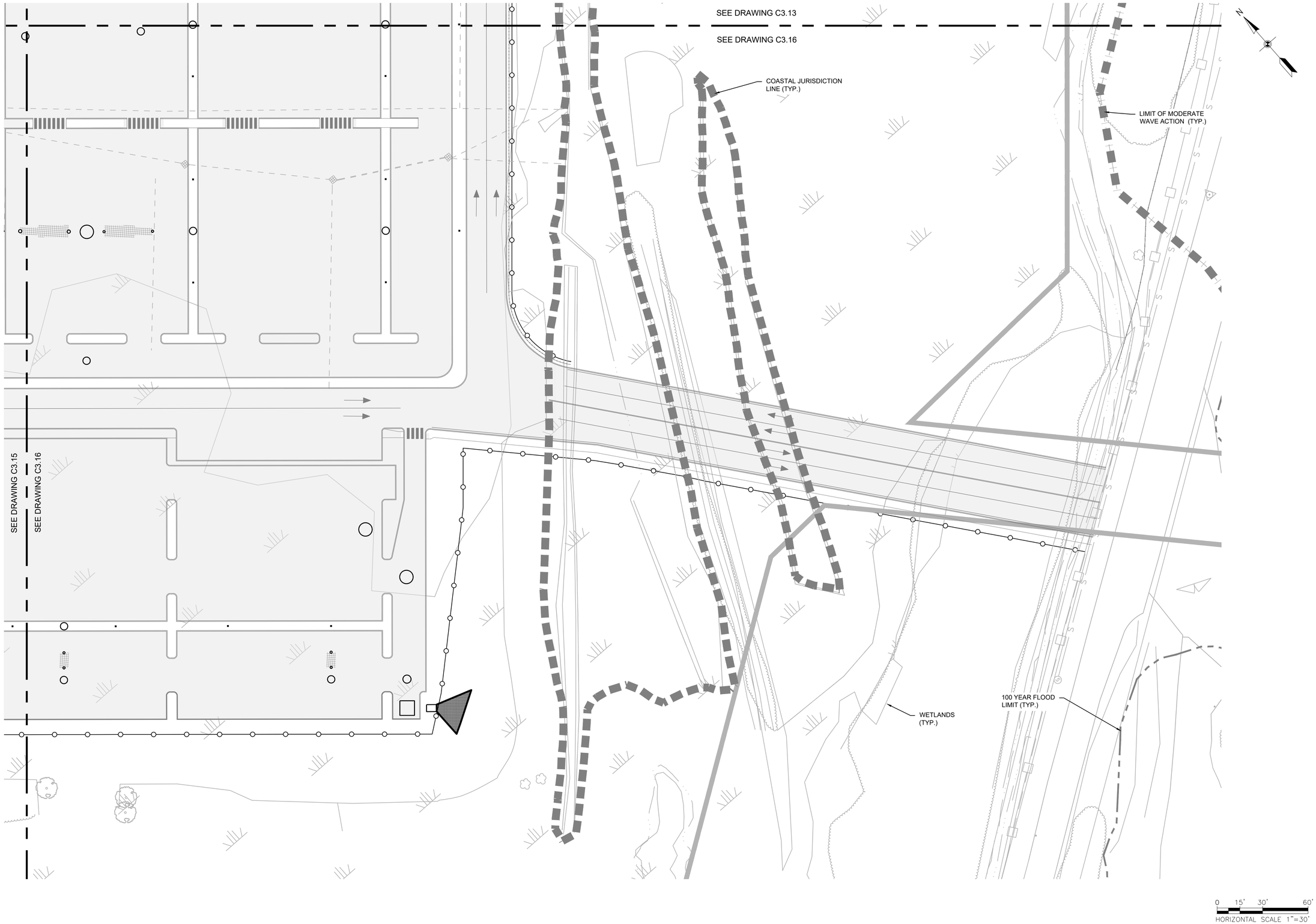
SHEET TITLE

SPOT ELEVATION PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.15



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CLIENT

HVN TWEED NEW HAVEN AIRPORT

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ARCHITECT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16678
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

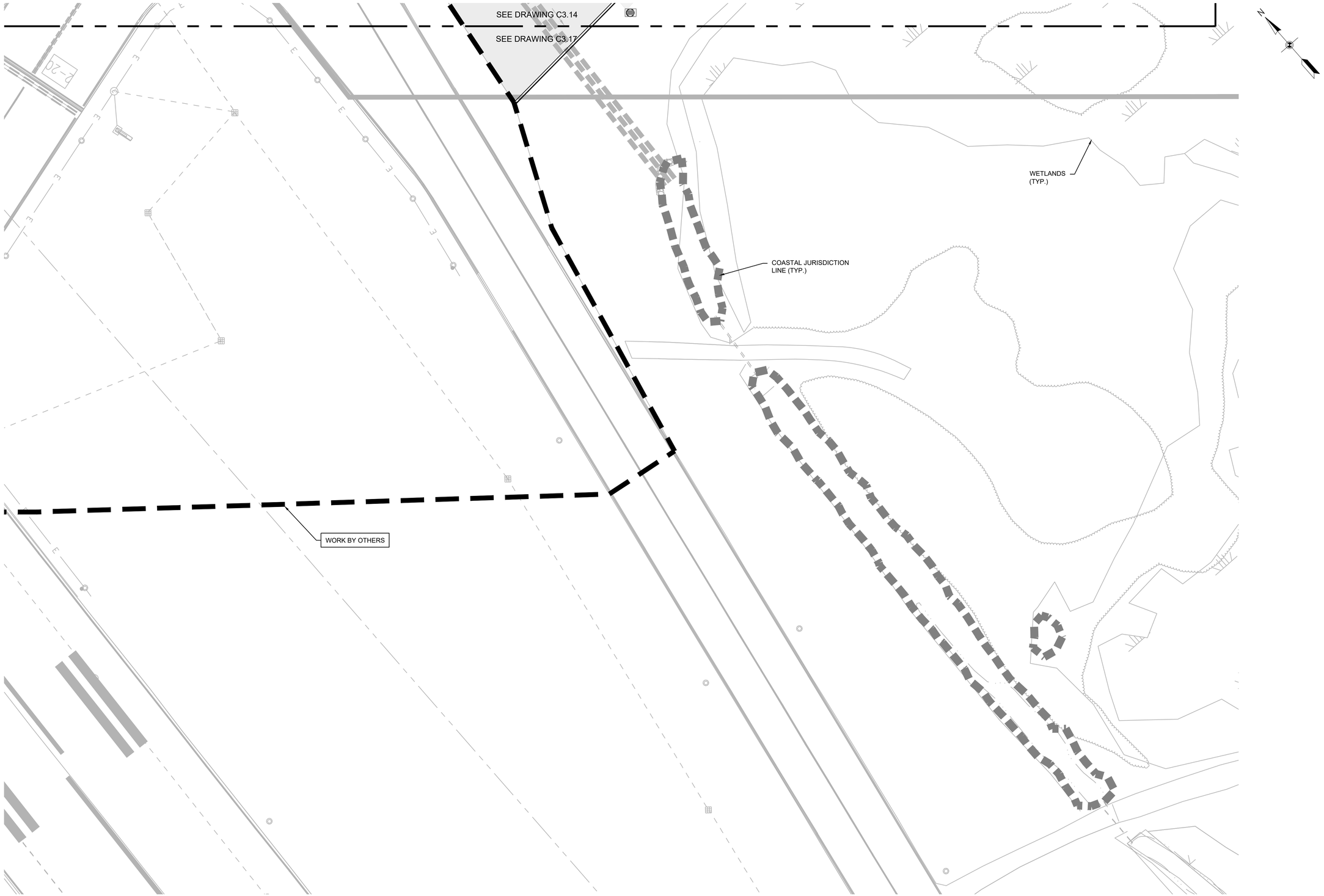
SHEET TITLE

SPOT ELEVATION PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.16



CLIENT

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AVPORTS

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16679 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SPOT ELEVATION PLAN - SHEET 7 OF 7

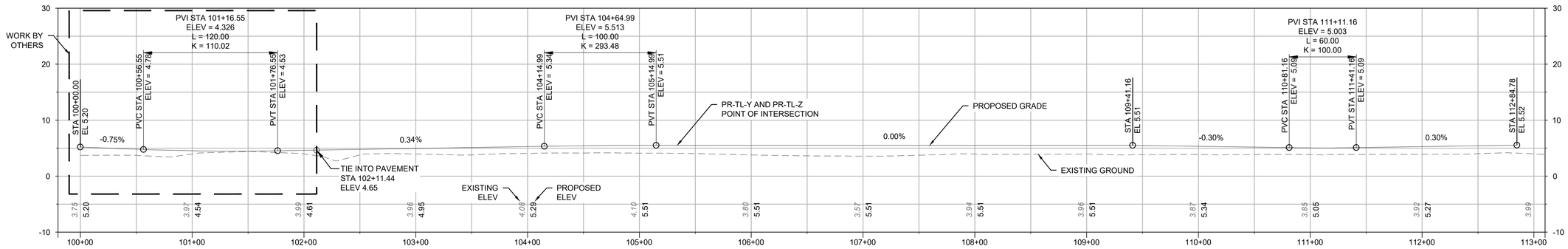
DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

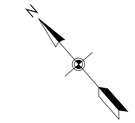
SHEET NUMBER

C3.17

HVN - 2/18/2025 8:08:45 PM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C3.11_C3.17.dwg







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VERTICAL SCALE 1"=5'

0 25' 50' 100'
HORIZONTAL SCALE 1"=50'

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CLIENT

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AVPORTS

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155 BURR STREET
EAST HAVEN, CT 06512
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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PESTINELLA · No. 18478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

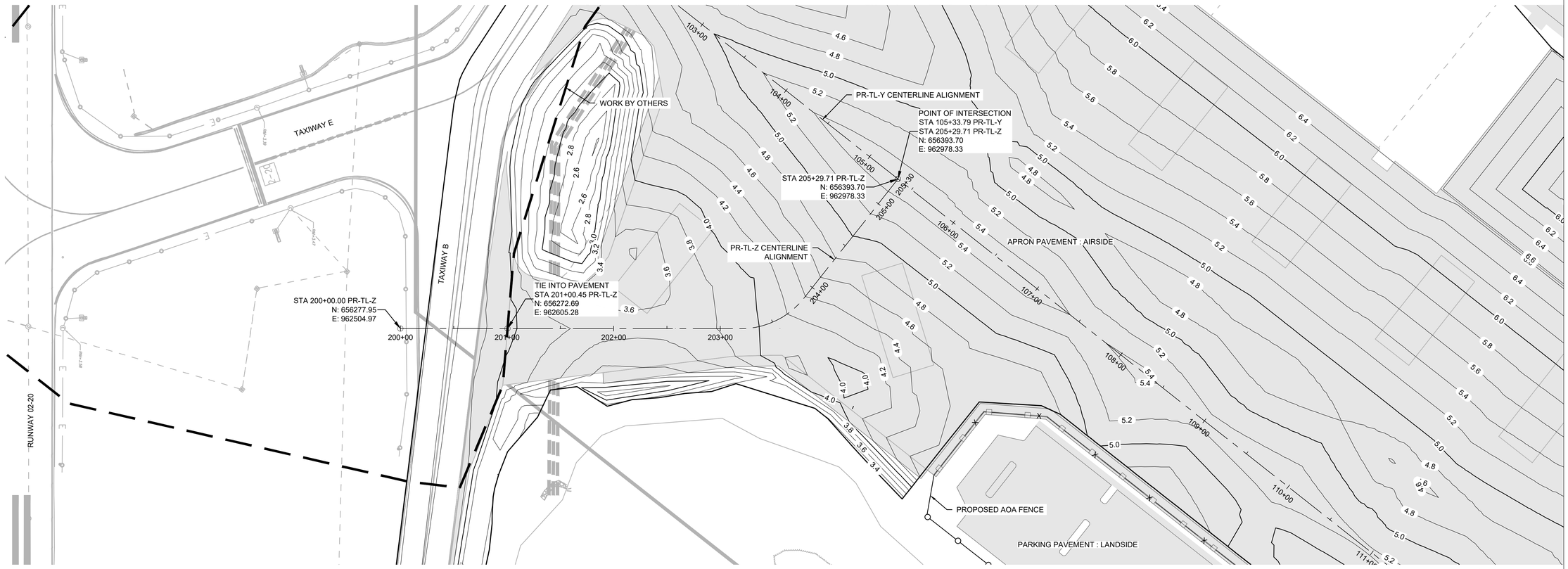
SHEET TITLE

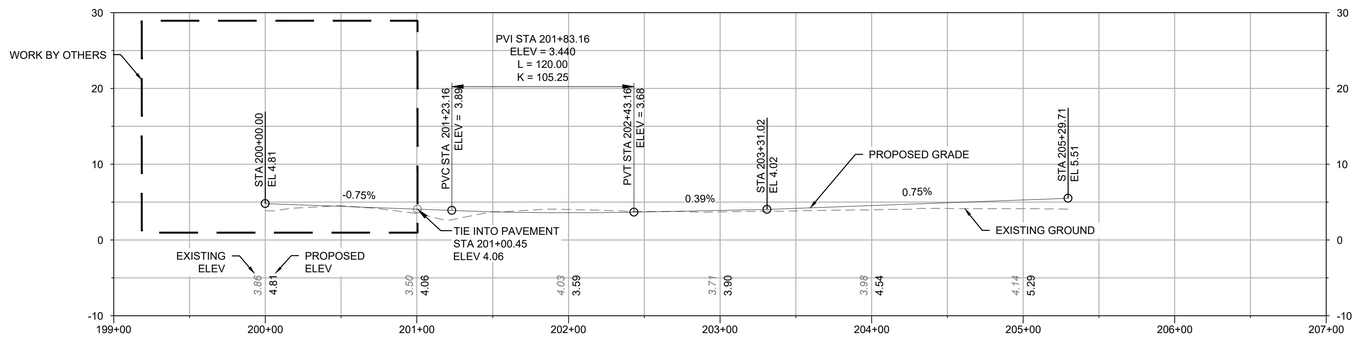
PLAN AND PROFILE - TAXILANE Y

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.20





0 2.5' 5' 10'
VERTICAL SCALE 1"=5'

0 25' 50' 100'
HORIZONTAL SCALE 1"=50'

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

Nº.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

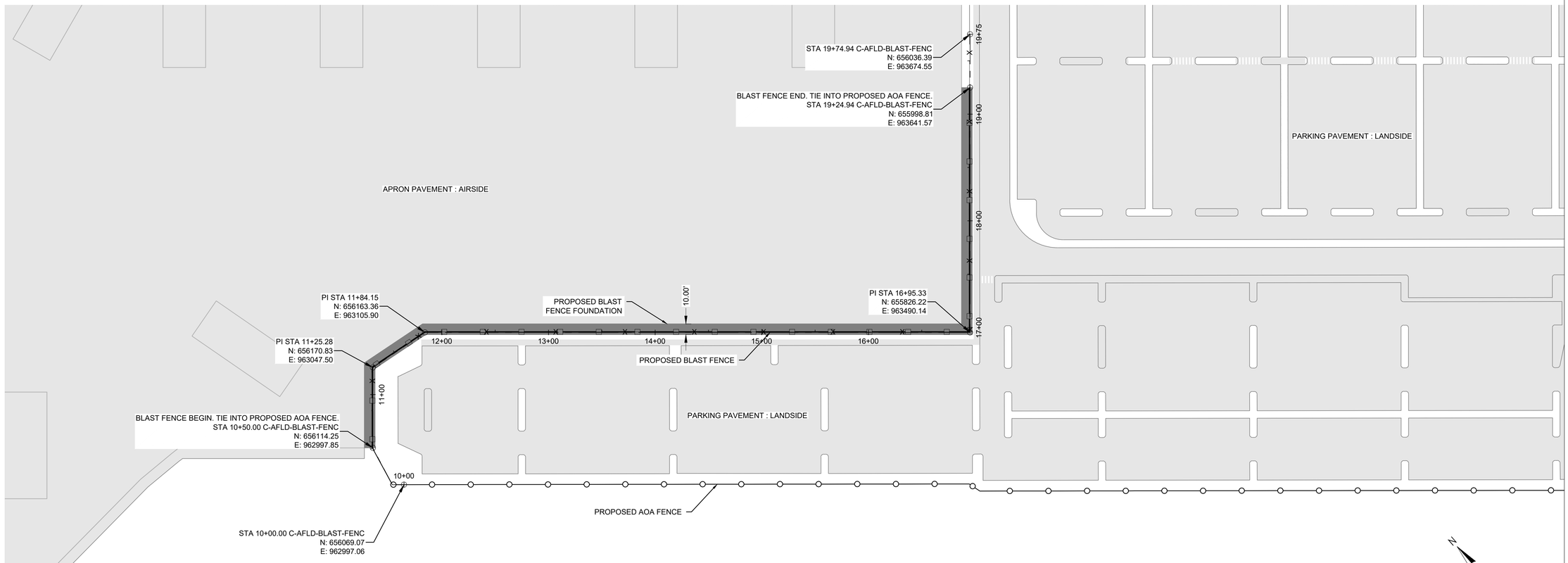
PLAN AND PROFILE - TAXILANE Z

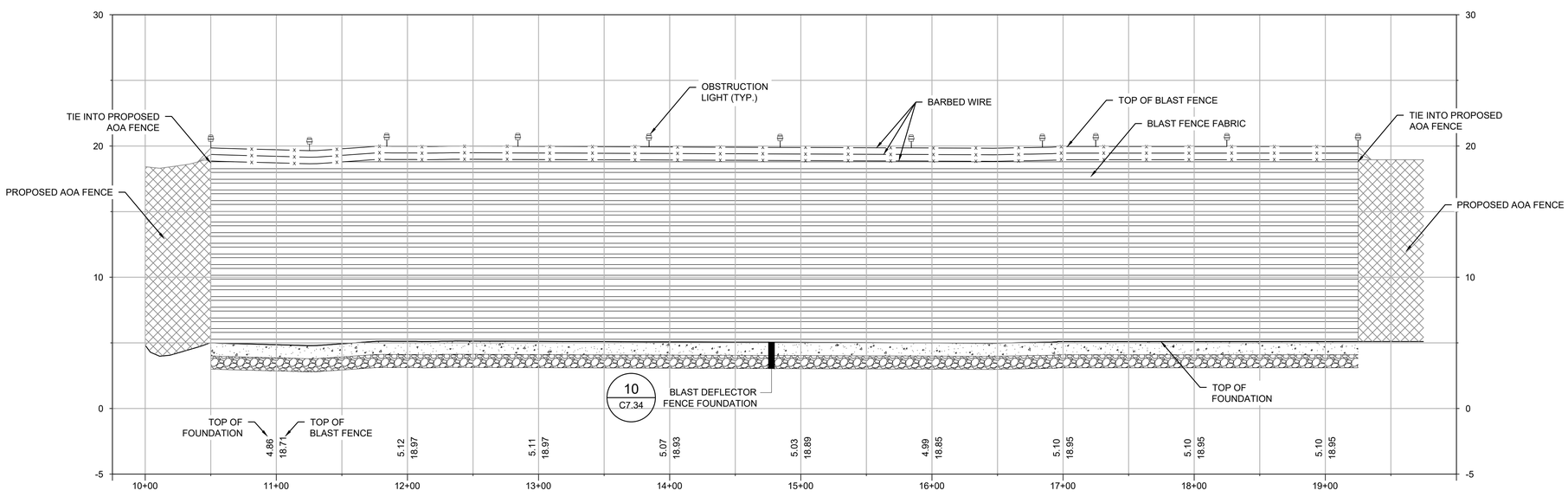
DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C3.21

HVN - 1/24/2025 3:07:06 PM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C3.20-C3.21.dwg





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VERTICAL SCALE 1"=5'

0 25' 50' 100'
HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
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EAST HAVEN, CT 06512
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ARCHITECT

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PERMIT SET -
NOT FOR
CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · 28179 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

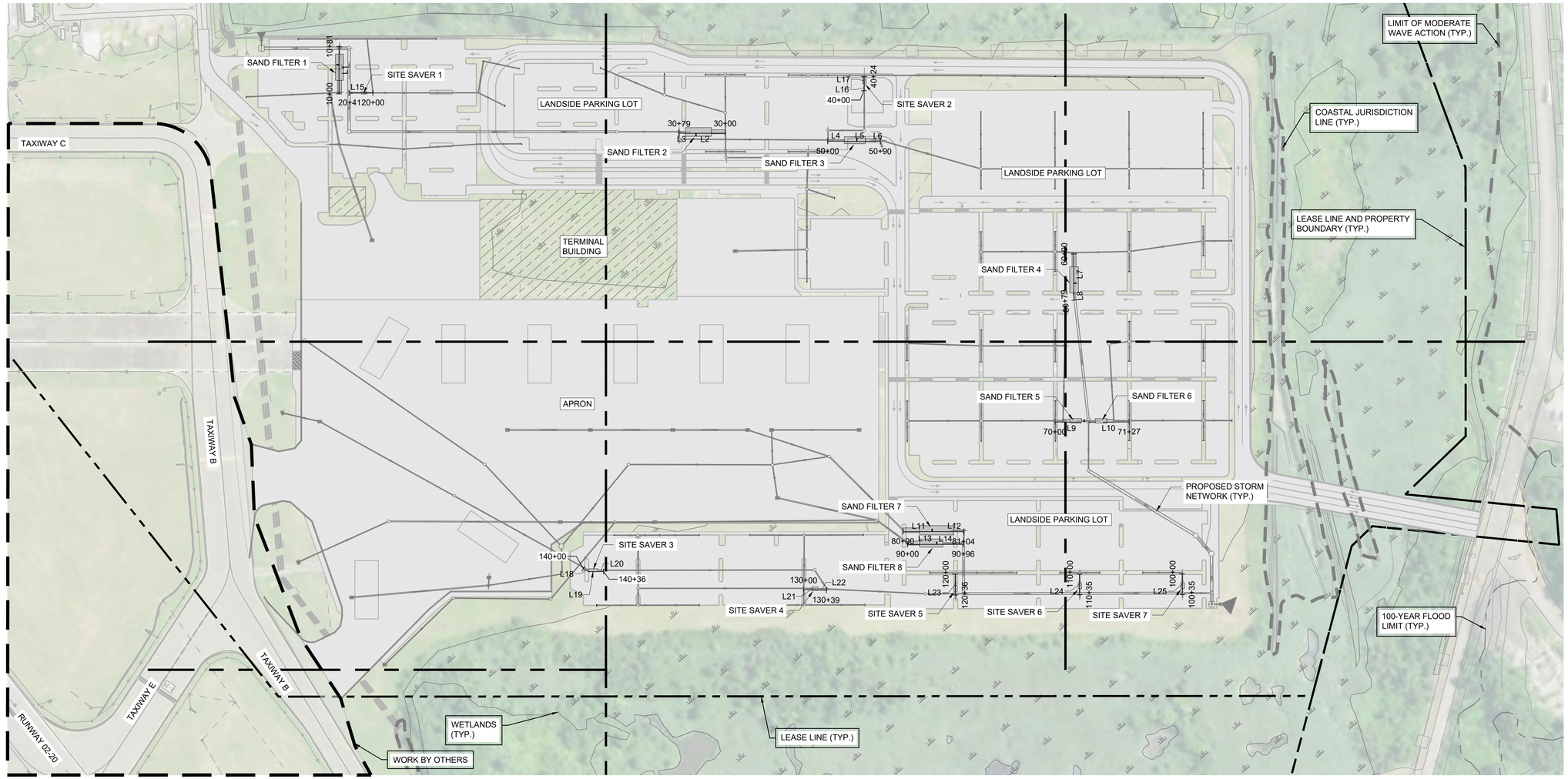
SHEET TITLE

PLAN AND PROFILE - BLAST DEFLECTOR FENCE

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C3.22



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SAND_FILTER-ALIGN_2				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L2	30+00.00	30+69.00	N: 656513.87 E: 963732.79	N: 656559.12 E: 963680.70
L3	30+69.00	30+79.35	N: 656559.12 E: 963680.70	N: 656566.20 E: 963673.15

SAND_FILTER-ALIGN_3				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L4	50+00.00	50+27.90	N: 656387.37 E: 963855.50	N: 656368.84 E: 963876.35
L5	50+27.90	50+81.93	N: 656368.84 E: 963876.35	N: 656332.95 E: 963916.74
L6	50+81.93	50+90.16	N: 656332.95 E: 963916.74	N: 656327.48 E: 963922.89

SAND_FILTER-ALIGN_4				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L7	60+00.00	60+69.00	N: 655963.93 E: 964044.99	N: 655912.01 E: 963999.54
L8	60+69.00	60+79.00	N: 655912.01 E: 963999.54	N: 655903.80 E: 963993.83

SAND_FILTER-ALIGN_5_AND_6				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L9	70+00.00	70+56.99	N: 655768.62 E: 963830.85	N: 655730.71 E: 963873.40
L10	70+56.99	71+27.00	N: 655730.71 E: 963873.40	N: 655684.98 E: 963926.42

SAND_FILTER-ALIGN_7				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L11	80+00.00	80+86.00	N: 655799.44 E: 963511.12	N: 655742.72 E: 963575.76
L12	80+86.00	81+04.13	N: 655742.72 E: 963575.76	N: 655730.53 E: 963589.20

SAND_FILTER-ALIGN_8				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L13	90+00.00	90+60.00	N: 655777.62 E: 963502.62	N: 655738.05 E: 963547.72
L14	90+60.00	90+95.52	N: 655738.05 E: 963547.72	N: 655714.66 E: 963574.45

SITE_SAVER-ALIGN_1				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L15	20+00.00	20+40.84	N: 656963.82 E: 963324.61	N: 656990.68 E: 963293.84

SITE_SAVER-ALIGN_2				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L16	40+00.00	40+10.00	N: 656411.65 E: 963959.66	N: 656419.15 E: 963966.27
L17	40+10.00	40+24.04	N: 656419.15 E: 963966.27	N: 656429.78 E: 963975.44

SITE_SAVER-ALIGN_3				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L18	140+00.00	140+10.00	N: 656112.72 E: 963057.41	N: 656103.31 E: 963060.80
L19	140+10.00	140+26.00	N: 656103.31 E: 963060.80	N: 656092.77 E: 963072.84
L20	140+26.00	140+36.00	N: 656092.77 E: 963072.84	N: 656086.18 E: 963080.36

SITE_SAVER-ALIGN_4				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L21	130+00.00	130+24.08	N: 655837.01 E: 963317.41	N: 655820.63 E: 963335.06
L22	130+24.08	130+39.46	N: 655820.63 E: 963335.06	N: 655810.16 E: 963346.33

SITE_SAVER-ALIGN_5				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L23	120+00.00	120+35.78	N: 655685.47 E: 963530.32	N: 655658.53 E: 963506.79

SITE_SAVER-ALIGN_6				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L24	110+00.00	110+35.44	N: 655545.13 E: 963690.54	N: 655518.54 E: 963667.11

SITE_SAVER-ALIGN_7				
NUMBER	START STATION	END STATION	START NORTHING/EASTING	END NORTHING/EASTING
L25	100+00.00	100+35.18	N: 655429.18 E: 963822.94	N: 655402.67 E: 963799.80

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

SAND FILTER CROSS SECTIONS - OVERALL /LOCATION PLAN

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C3.30

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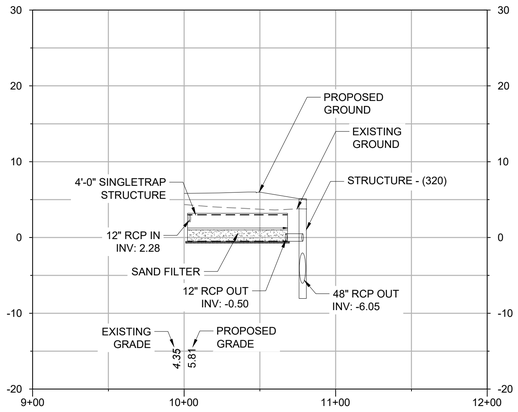

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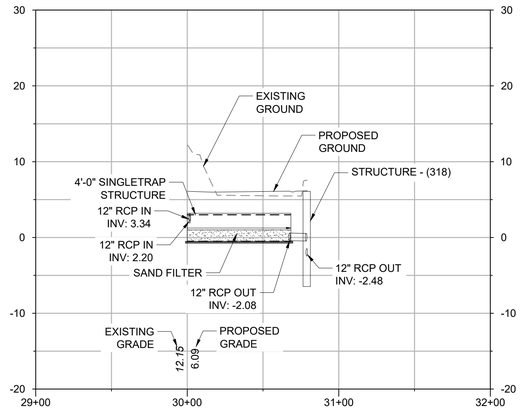

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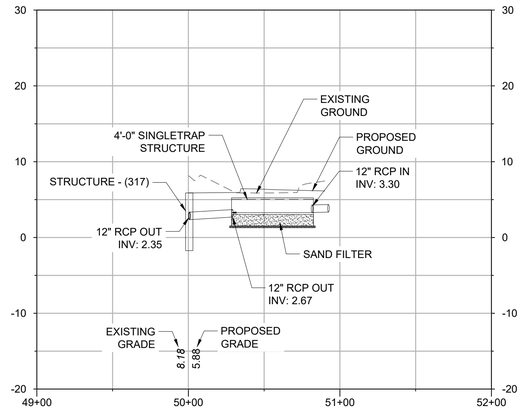

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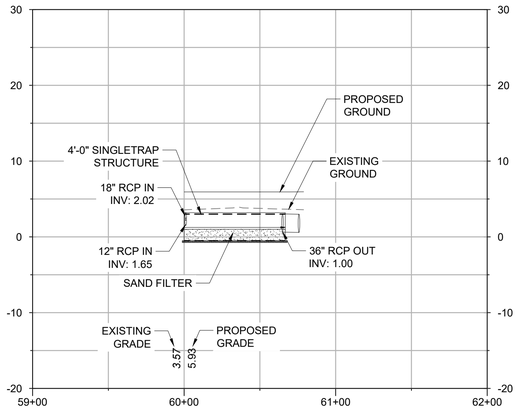

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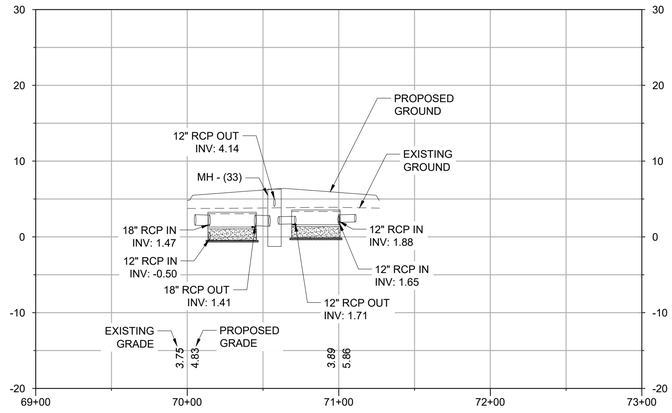

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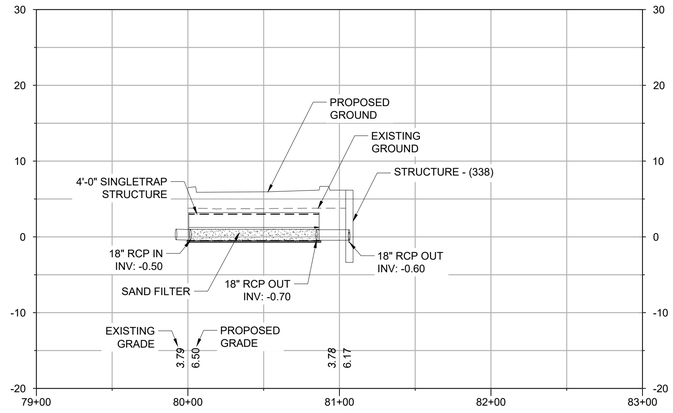
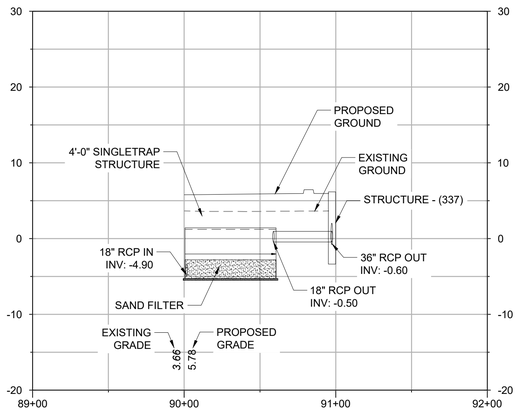


SAND_FILTER-ALIGN_7



SAND_FILTER-ALIGN_8

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VERTICAL SCALE 1"=10'

0 25' 50' 100'
HORIZONTAL SCALE 1"=50'

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CLIENT

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

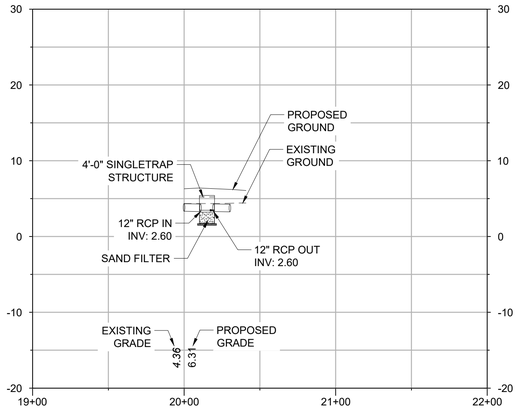
SHEET TITLE

SAND FILTER CROSS SECTIONS - SHEET 1 OF 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C3.31



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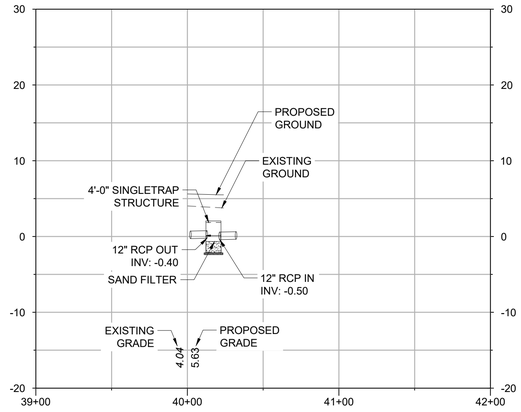

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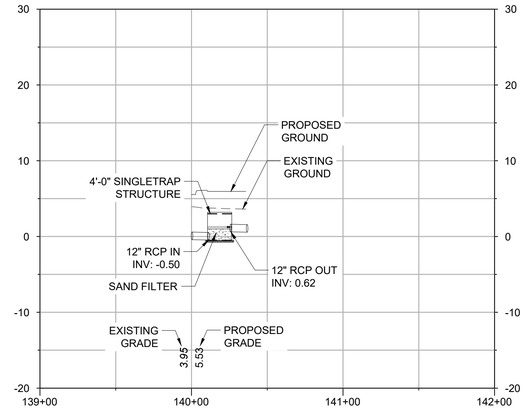

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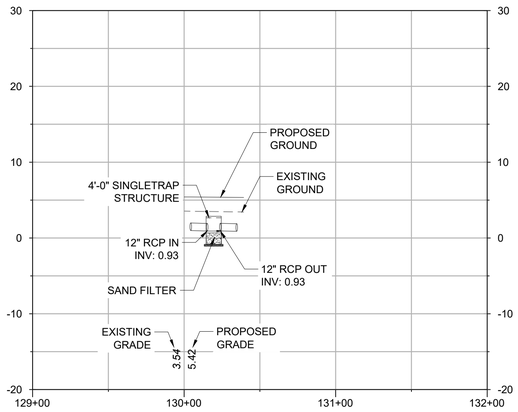

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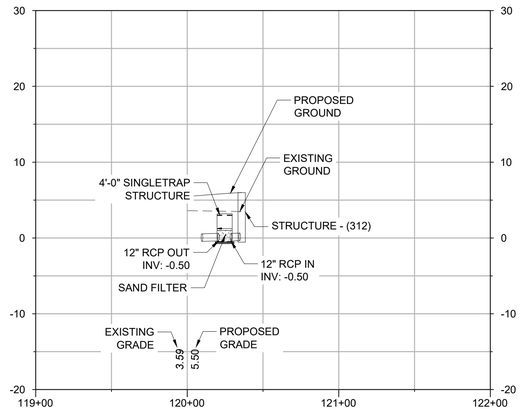

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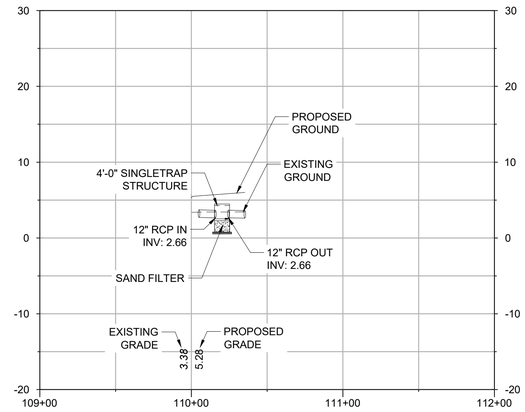

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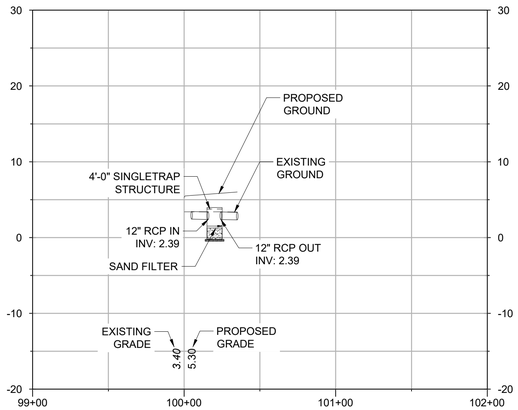

SITE_SAVER-ALIGN_7

0 5' 10' 20'
VERTICAL SCALE 1"=10'

0 25' 50' 100'
HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

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155 BURR STREET
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

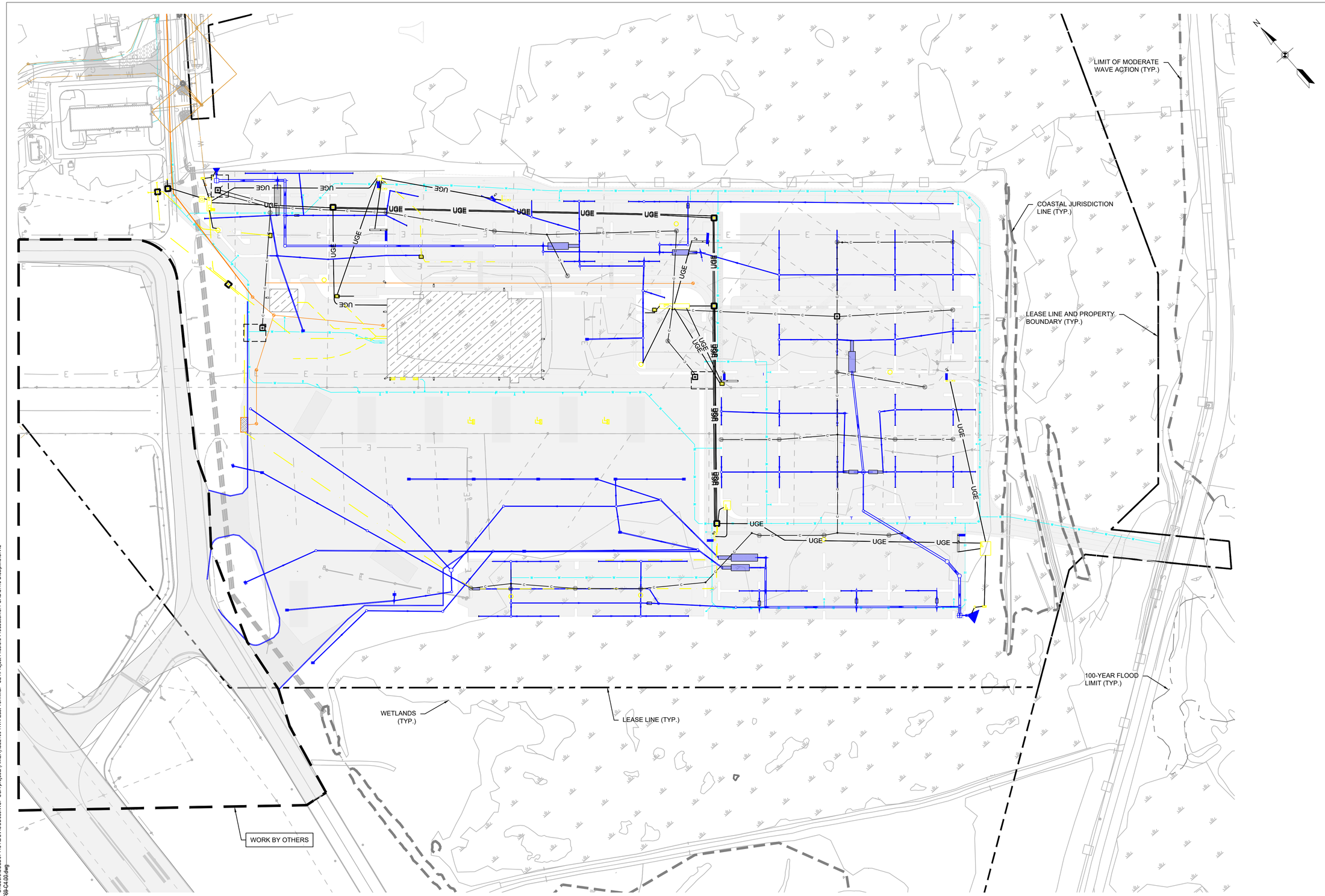
SHEET TITLE

SAND FILTER CROSS SECTIONS - SHEET 2 OF 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C3.32



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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19479 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITIES PLAN - OVERALL

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.00

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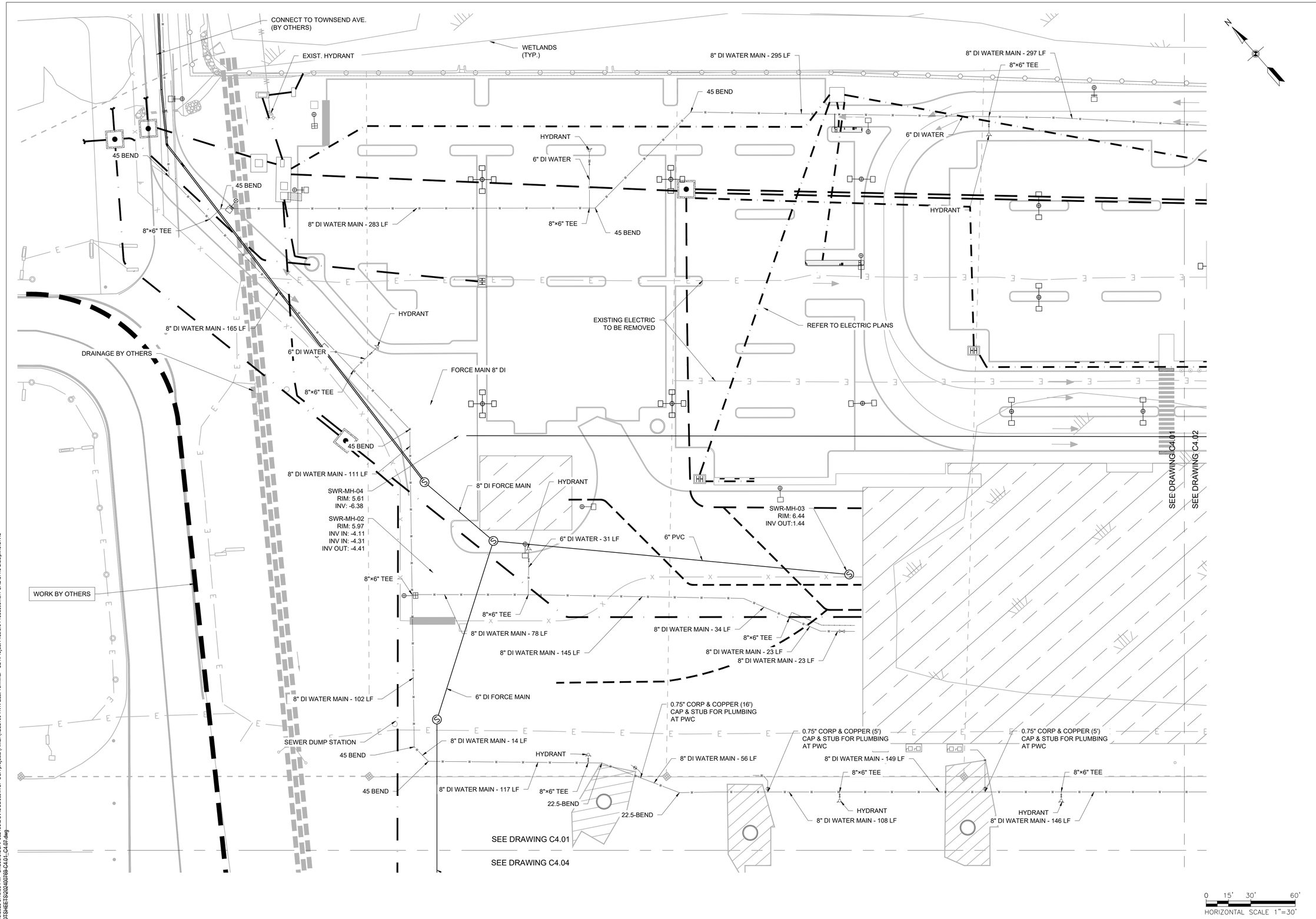

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REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

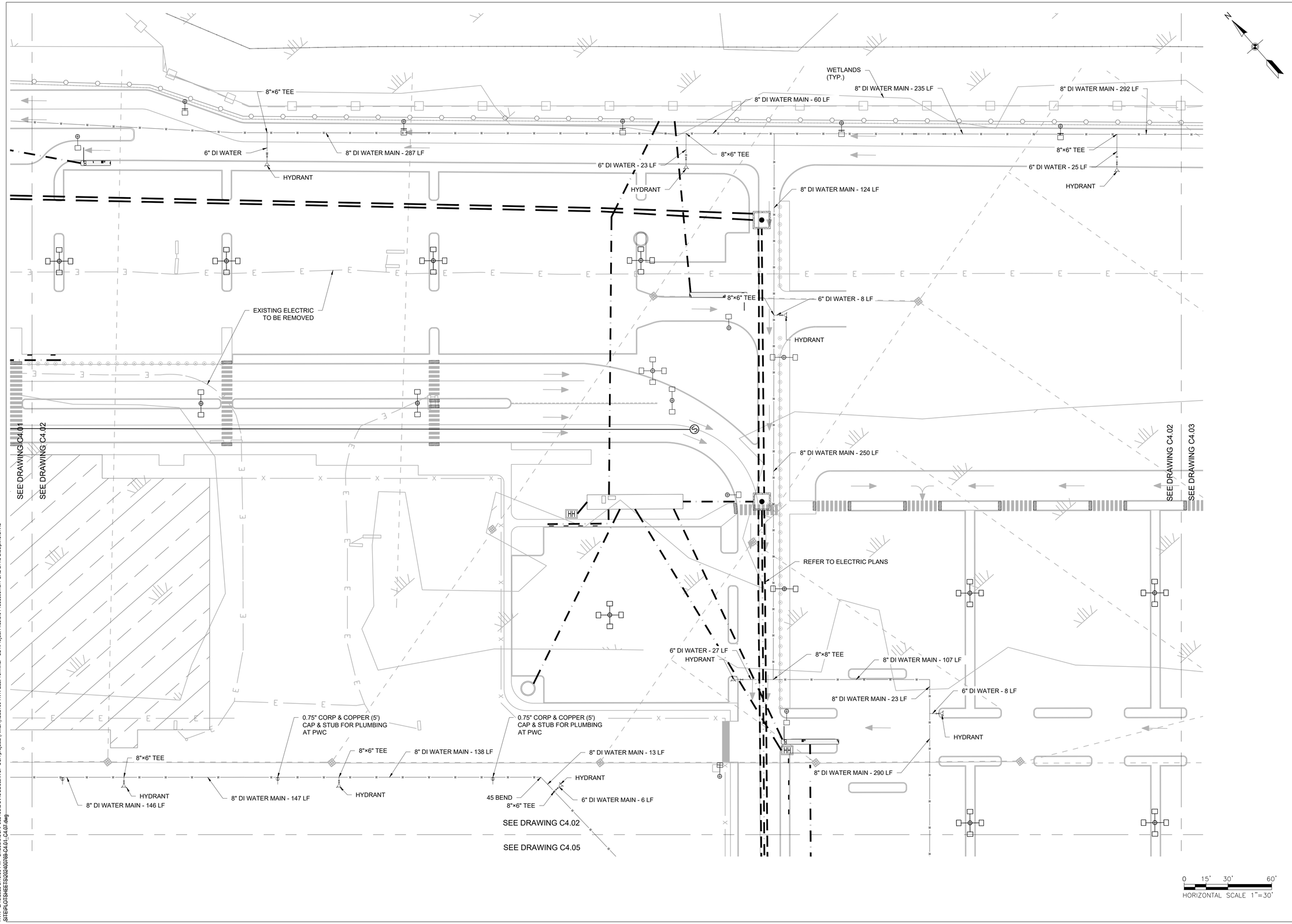
SHEET TITLE

UTILITIES PLAN - SHEET 1 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.01



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DRAWING HISTORY

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KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

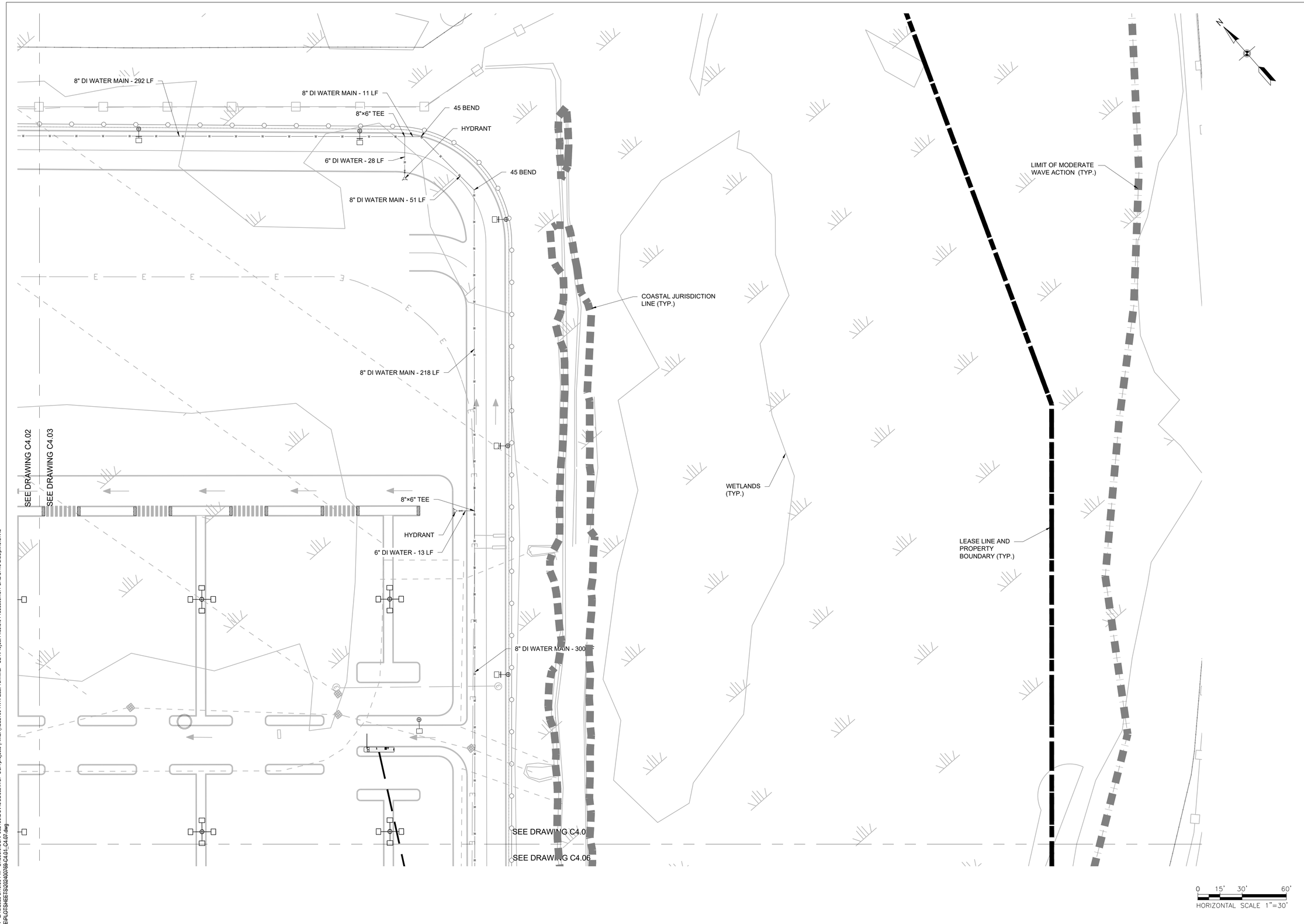
SHEET TITLE

UTILITIES PLAN - SHEET 2 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.02



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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16479
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITIES PLAN - SHEET 3 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.03

SEE DRAWING C4.01

SEE DRAWING C4.04

24" RCP

WORK BY OTHERS

EJECTOR STATION

SWR-MH-01
RIM: 5.00
INV OUT: 0.00

24" RCP

REFER TO ELECTRIC PLANS

SEE DRAWING C4.04

SEE DRAWING C4.05

LEASE LINE
(TYP.)

WETLANDS
(TYP.)

SEE DRAWING C4.04

SEE DRAWING C4.07

0 15' 30' 60'

HORIZONTAL SCALE 1"=30'

HVN - 2/19/2025 5:10:39 PM - C:\Users\USAPR82138DOA\CCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Dasipline\CIVIL SITE\PLOTSHEETS\240249B-04.01_C4.01.dwg

CLIENT

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REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19479
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

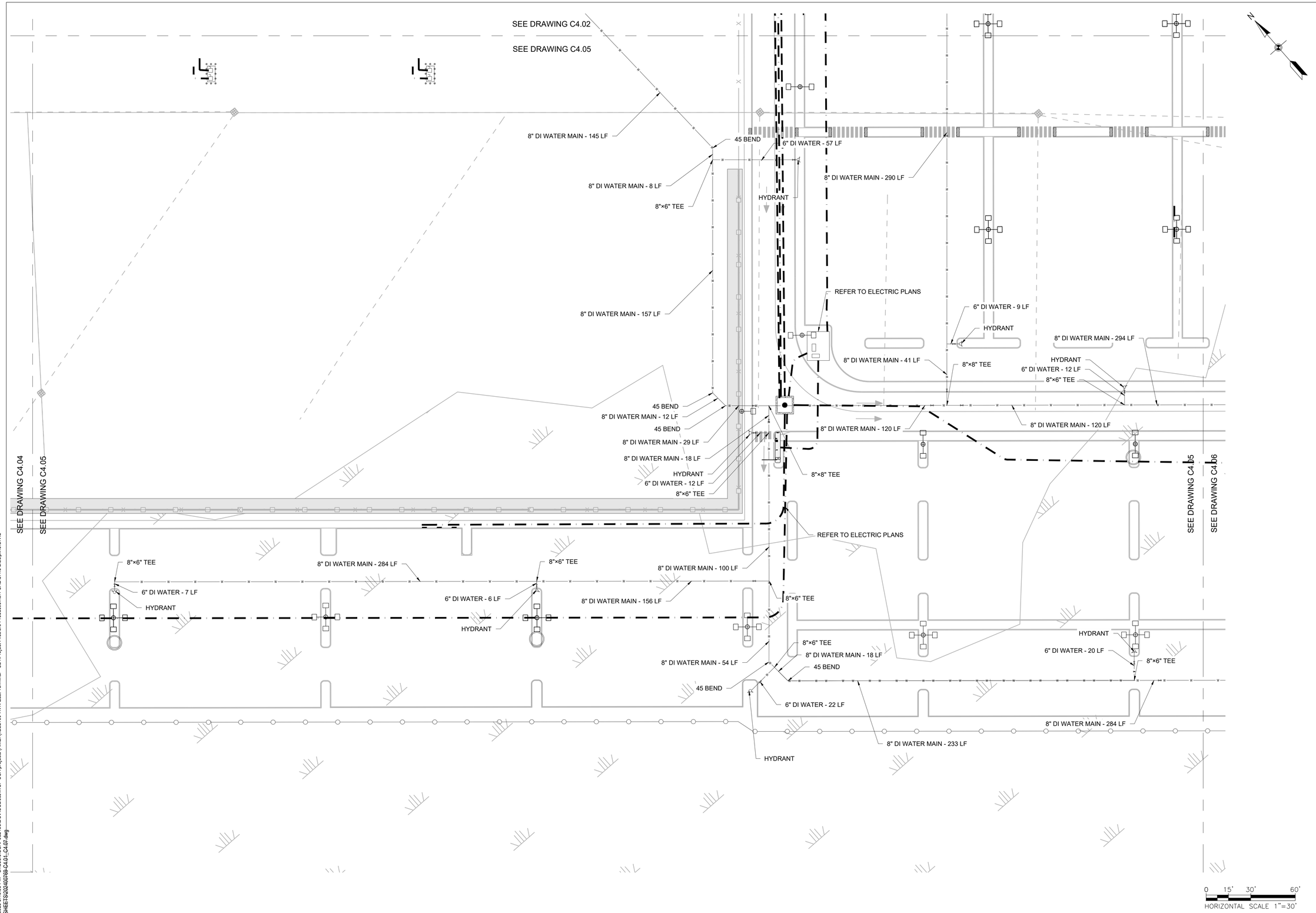
SHEET TITLE

UTILITIES PLAN -
SHEET 4 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.04



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240248.01	DESIMONE
23-006724	SYSKA

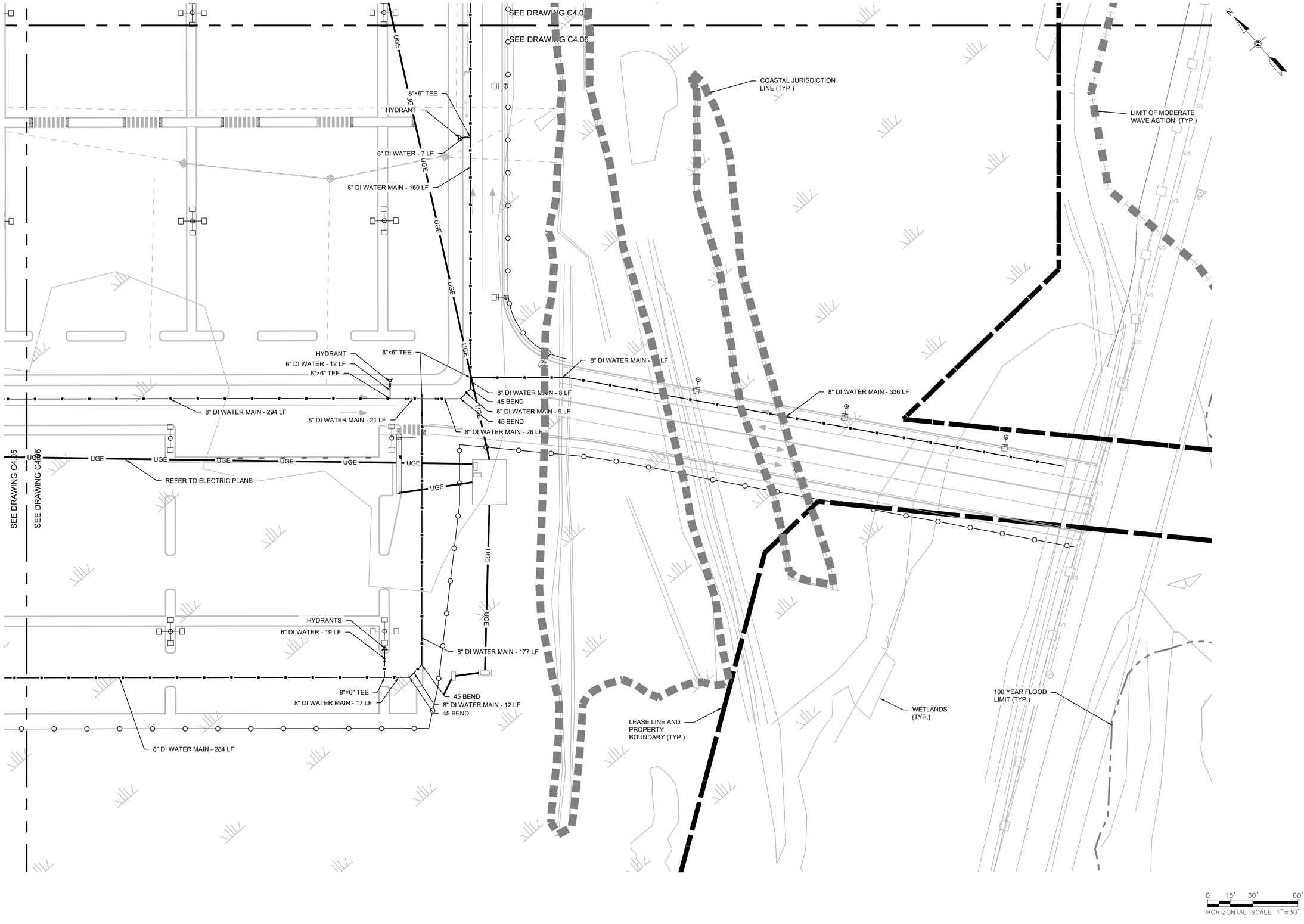
SHEET TITLE

UTILITIES PLAN - SHEET 5 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.05



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SHEET TITLE

UTILITIES PLAN - SHEET 6 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

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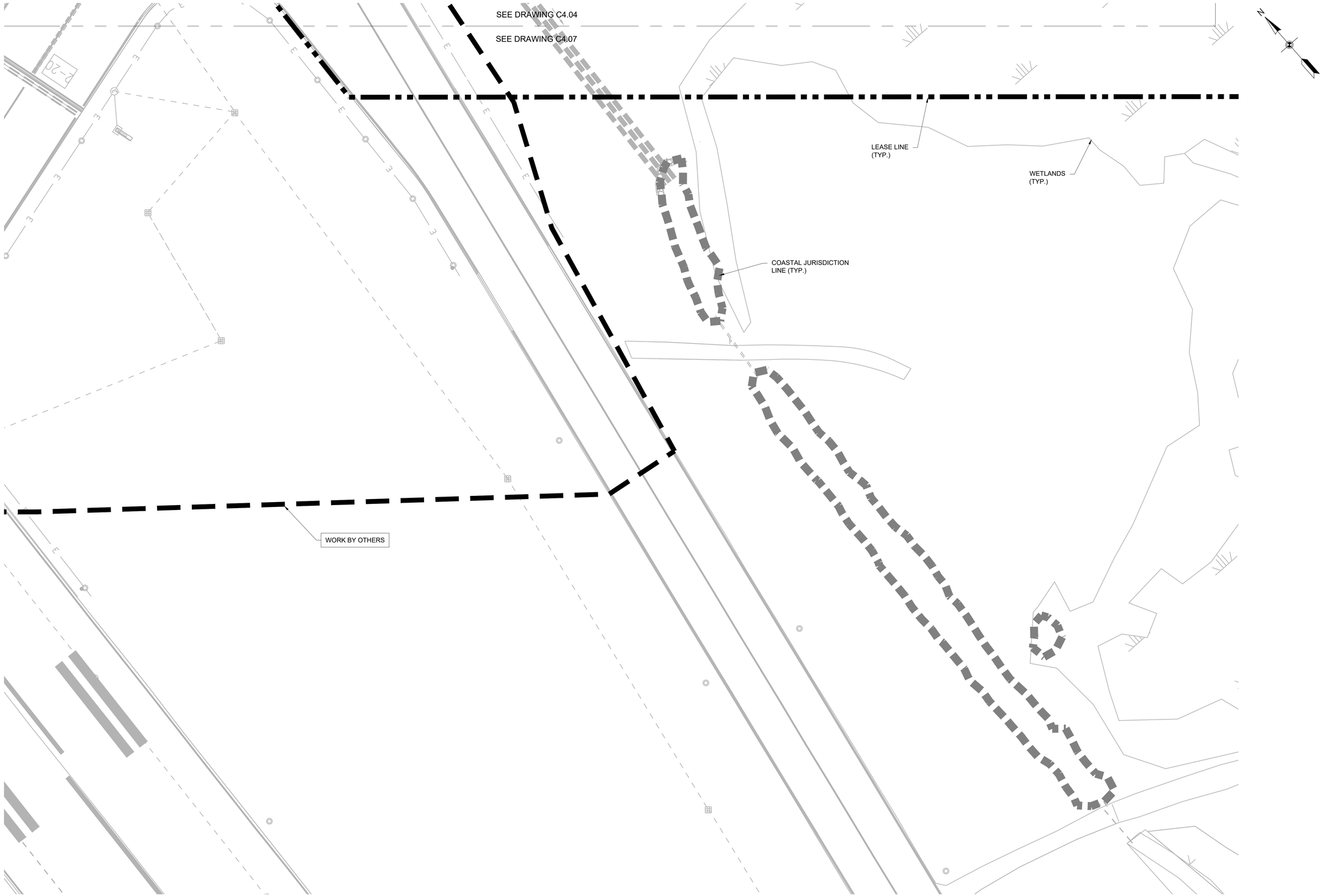

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23-006724	SYSKA

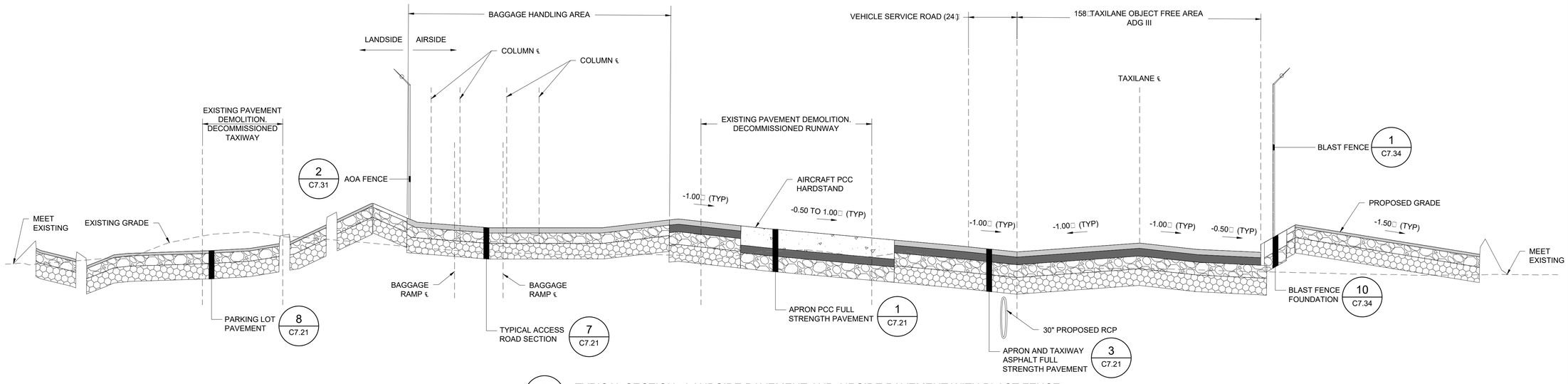
SHEET TITLE

UTILITIES PLAN - SHEET 7 OF 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C4.07



1 C7.01 TYPICAL SECTION - LANDSIDE PAVEMENT AND AIRSIDE PAVEMENT WITH BLAST FENCE

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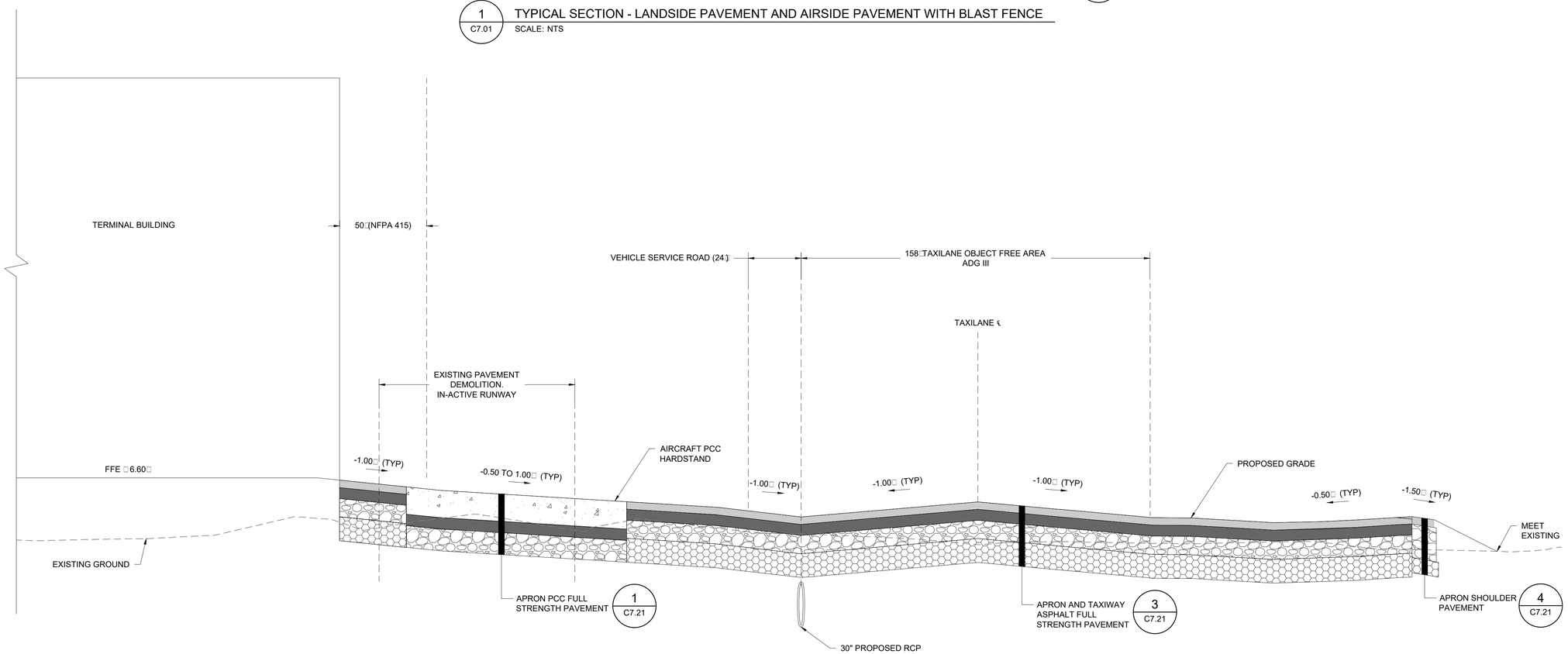

2 C7.01 TYPICAL SECTION - AIRSIDE PAVEMENT

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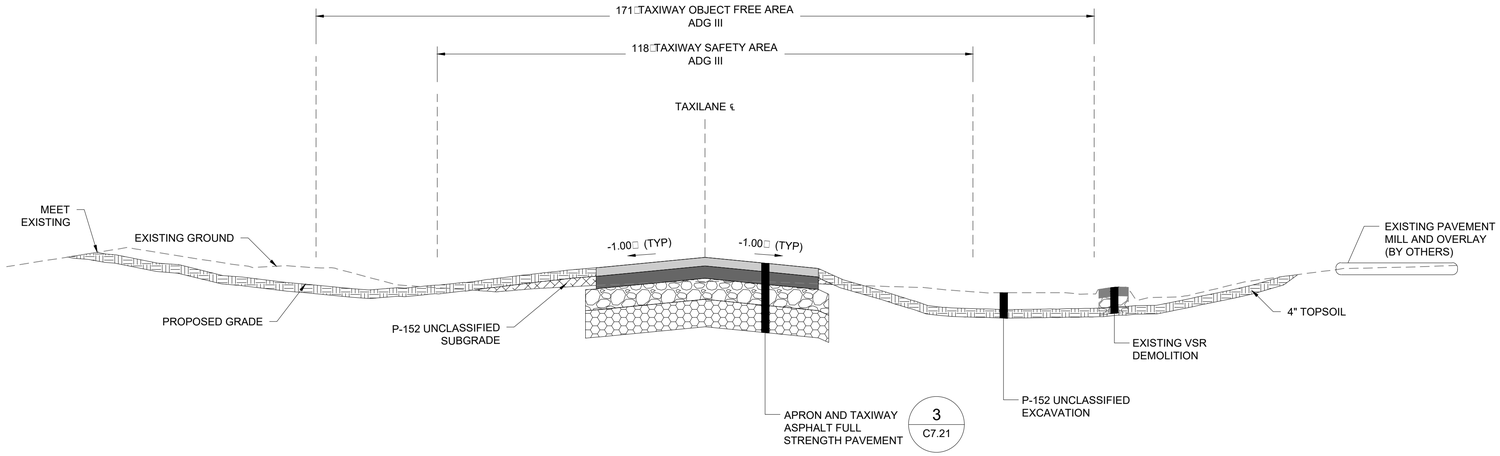
SHEET TITLE

TYPICAL SECTIONS 1

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C7.01



1 C7.02 TYPICAL SECTION - TAXILANE Y
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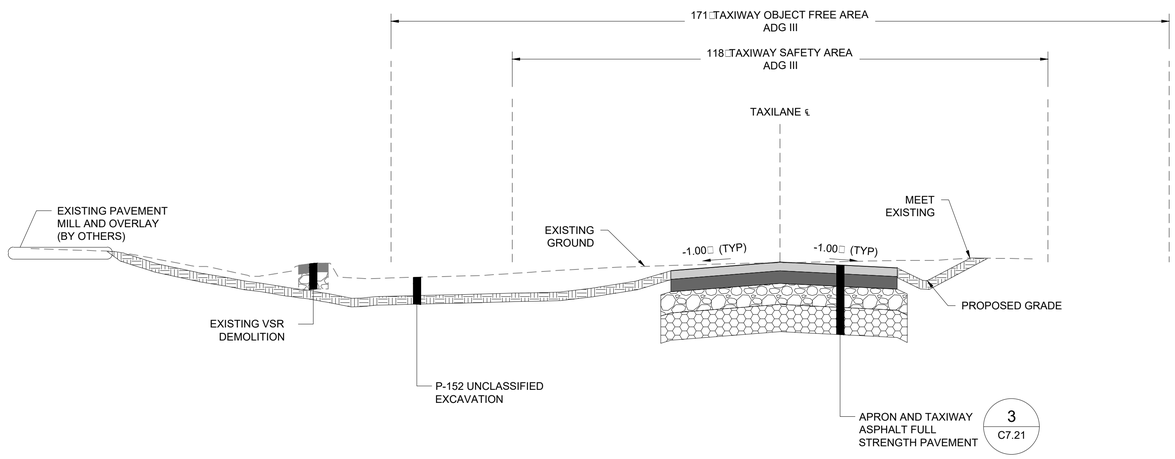

2 C7.02 TYPICAL SECTION - TAXILANE
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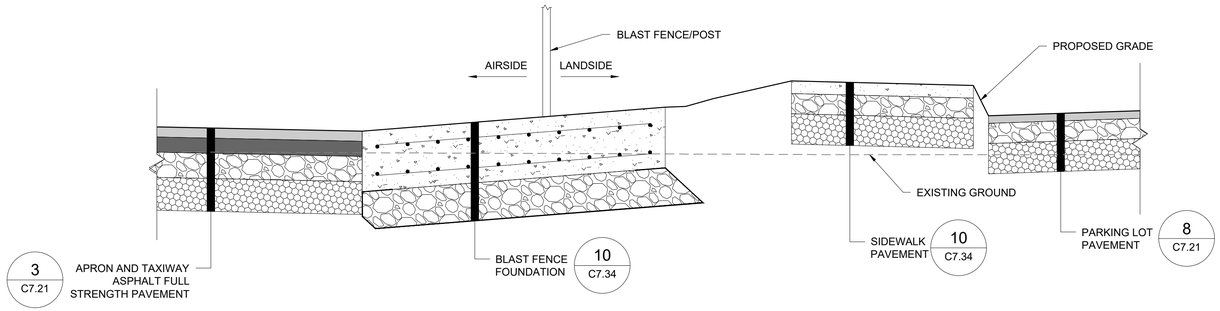
SHEET TITLE
TYPICAL SECTIONS 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER
C7.02



1 C7.03 TYPICAL SECTION - BLAST FENCE FOUNDATION
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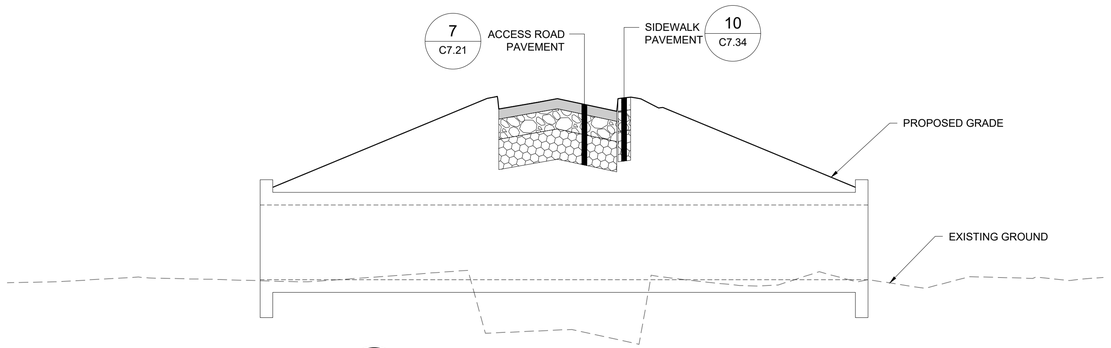

2 C7.03 TYPICAL SECTION - ACCESS ROAD
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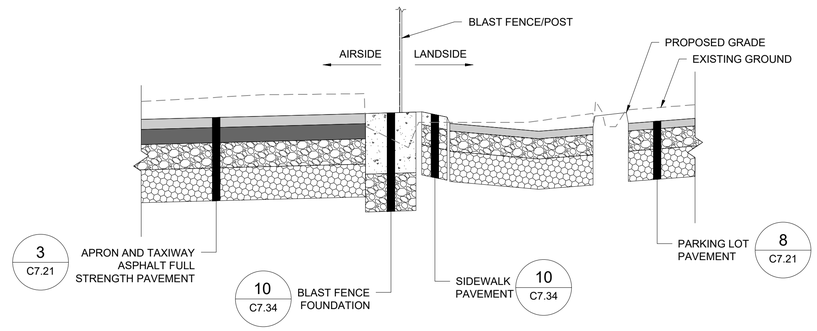

3 C7.03 TYPICAL SECTION - APRON, BLAST FENCE FOUNDATION, SIDEWALK, PARKING PAVEMENT - EAST SIDE
SCALE: NTS

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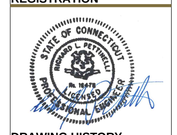

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

TYPICAL SECTIONS 3

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

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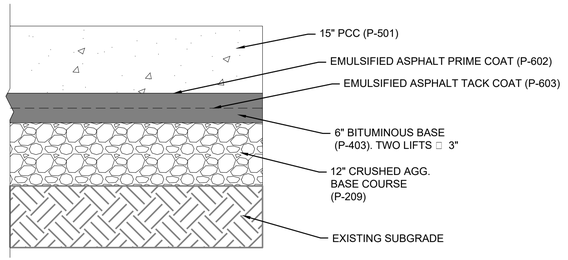

1 C7.21 APRON PCC FULL STRENGTH PAVEMENT
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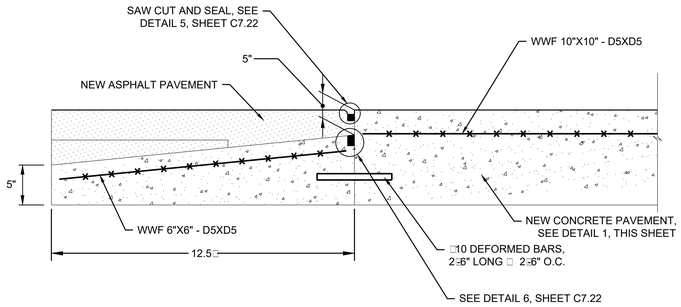

2 C7.21 TYPE "G" - RELIEVER SLAB
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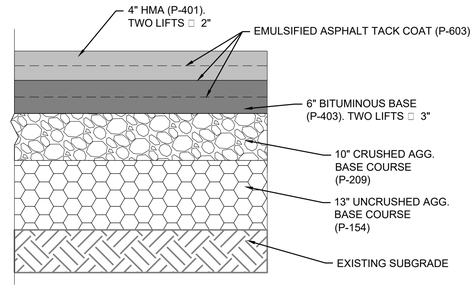

3 C7.21 APRON AND TAXIWAY ASPHALT FULL STRENGTH PAVEMENT
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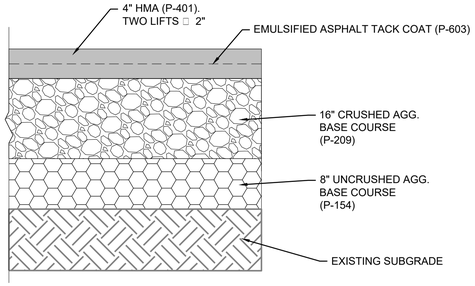

4 C7.21 APRON SHOULDER PAVEMENT ABUTTING ASPHALT
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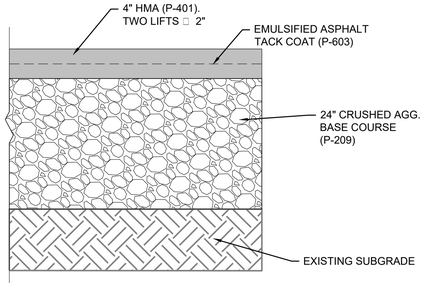

5 C7.21 APRON SHOULDER PAVEMENT ABUTTING PCC
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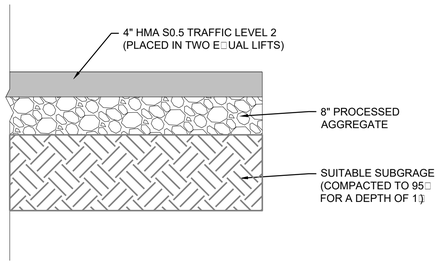
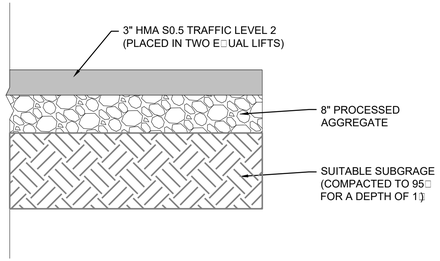


6 C7.21 TYPICAL ACCESS ROAD SECTION
SCALE: NTS



7 C7.21 TYPICAL PARKING LOT SECTION
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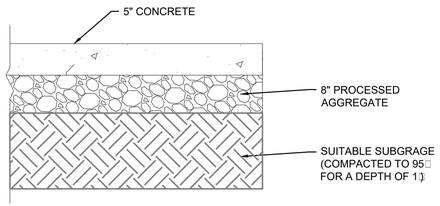

8 C7.21 TYPICAL SIDEWALK SECTION
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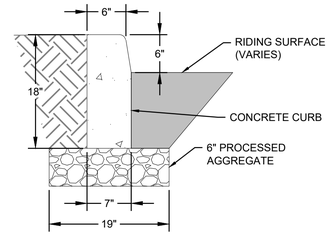

9 C7.21 TYPICAL CONCRETE CURB SECTION
SCALE: NTS

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DRAWING HISTORY

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PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
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US0025063.0769	WSP
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SHEET TITLE
PAVEMENT DETAILS 1

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
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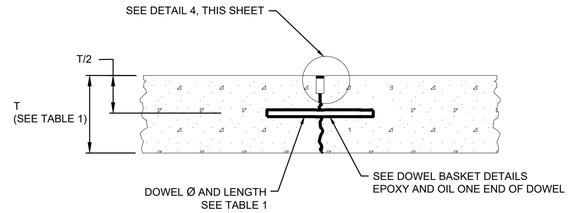

1 C7.22 TYPE "C" - DOWELED CONTRACTION JOINT
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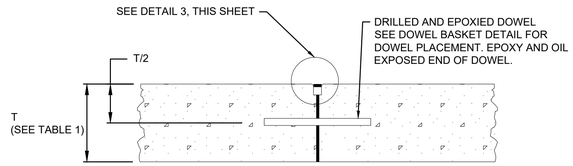

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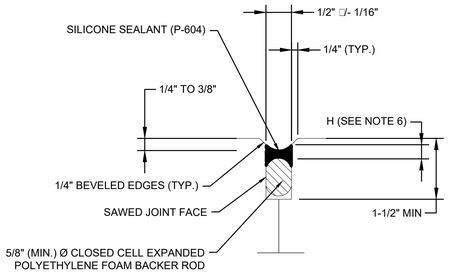

3 C7.22 DETAIL B - CONSTRUCTION JOINT
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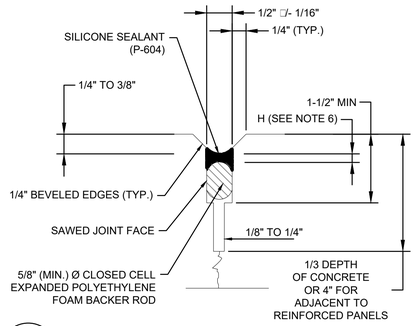

4 C7.22 DETAIL C - CONTRACTION JOINT
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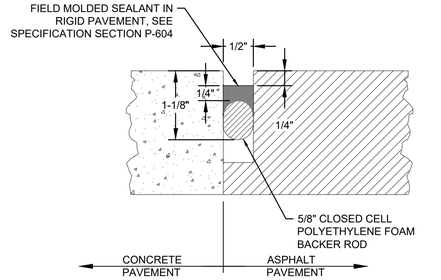
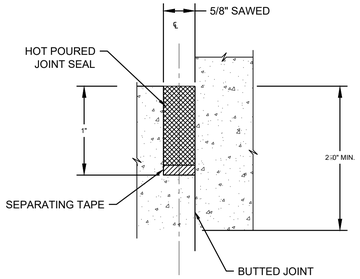


5 C7.22 TYPE "K" - ASPHALT/CONCRETE JOINT
SCALE: NTS

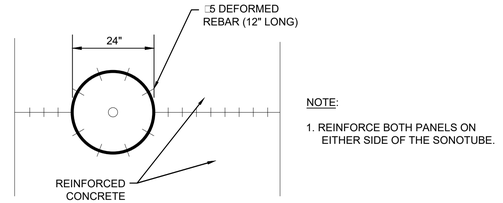


6 C7.22 DETAIL F - HOT POUR JOINT
SCALE: NTS

TABLE 1: DIMENSIONS AND SPACING OF STEEL DOWELS			
SLAB THICKNESS (T)	DIAMETER	LENGTH	SPACING
15	1 1/4"	20"	15"

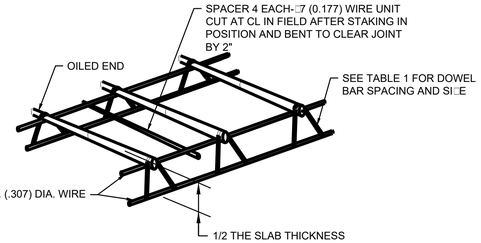
JOINT DETAIL NOTES:

1. JOINTS MUST NOT INTERSECT THE EDGE OF THE PAVEMENT NOR ANY OTHER JOINT AT AN ANGLE OF LESS THAN 90°.
2. DOWEL BASKETS MUST BE FIRMLY ATTACHED TO THE EXISTING UNDERLYING COURSE PRIOR TO PLACING P.C.C.
3. PAVEMENT AREAS WHERE THICKENED EDGE JOINTS OCCUR MUST BE CONSTRUCTED SO THAT DOWEL BARS ARE PLACED PARALLEL TO THE FINAL SURFACE AND MAINTAIN A MINIMUM DEPTH OF 10" (1.25T/2) FOR 15" PCC, AND 6.25" (1.25T/2) FOR 10.5" PCC - FROM THE FINAL SURFACE.
4. ANY PAVEMENT SHOWN WITH THICKENED EDGE JOINTS WILL BE PAID FOR AS NOMINAL THICKNESS (T) PAVEMENT.
5. DOWEL DRILLING METHOD MUST BE CAPABLE OF MAINTAINING DRILL HOLES PARALLEL TO THE CONCRETE SURFACE AND NORMAL TO THE JOINT LINE WITHIN 1/4"± AT THE END OF THE DOWEL. DRILL HOLES MUST BE ACCURATELY LAID OUT SO THAT THE MAXIMUM DEVIATION DOES NOT EXCEED 1" IN THE HORI□ONTAL DIRECTION AND 1/2" IN THE VERTICAL DIRECTION. DRILL HOLE DIAMETER TO BE APPROXIMATELY 1-3/4" FOR 1-1/4" DOWELS. BAR POSITIONING MUST BE WITHIN A 1/4" TOLERANCE IN HORI□ONTAL AND VERTICAL PLANES.
6. SEALANT DIMENSION H IS BASED ON MANUFACTURE RECOMMENDATIONS.
7. RECOMMEND CONCRETE FACES FOR ALL JOINTS TO BE CONSTRUCTED VERTICAL.
8. THE DOWEL BAR OR TIE BAR SPACING MUST BE STARTED FROM THE INSIDE OF THE JOINT AT 13 INCH TO 15 INCH (12 INCH MIN.) SPACING FROM THE JOINT EDGE. IF THE SPACING DOES NOT ALLOW FOR A 15 INCH SPACING AT THE CENTER OF THE SLAB AND AND THE REMAINING OPENING IS GREATER THAN 15 INCHES THEN A BAR MUST BE PLACED IN THE CENTER OF THE REMAINING SPACE. IF THE REMAINING SPACE IS LESS THAN 15 INCHES, NO ADDITIONAL BAR MUST BE RE□UIRED.
9. FOR TYPES "A" AND "B", THICKENED EDGE SLABS, THE HOT MIX ASPHALT BASE LEVELING COURSES MUST BE CONSTRUCTED TO FULL DEPTHS. COST FOR MODIFYING THESE COURSES MUST BE CONSIDERED INCIDENTAL TO ITEM P-501.

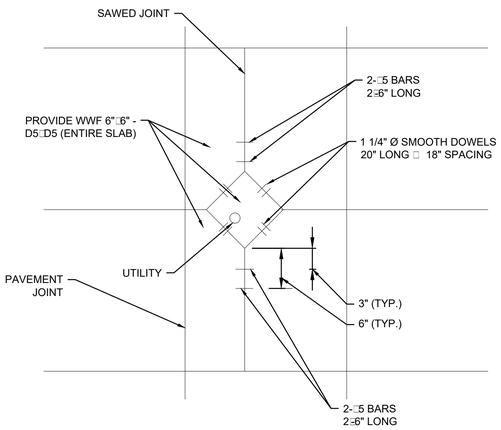


NOTE:
1. REINFORCE BOTH PANELS ON EITHER SIDE OF THE SONOTUBE.

7 C7.22 DOWELED SONOTUBE
SCALE: NTS



8 C7.22 CONTRACTION JOINT DOWEL BASKET
SCALE: NTS



9 C7.22 DOWEL PLACEMENT AT STRUCTURES
SCALE: NTS

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REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00250630.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
PAVEMENT DETAILS 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.22

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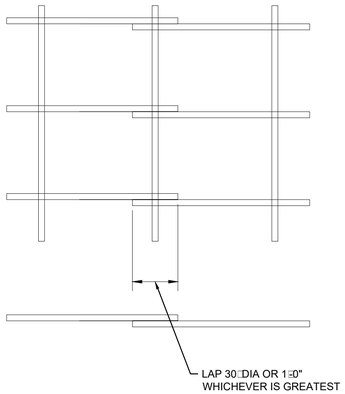
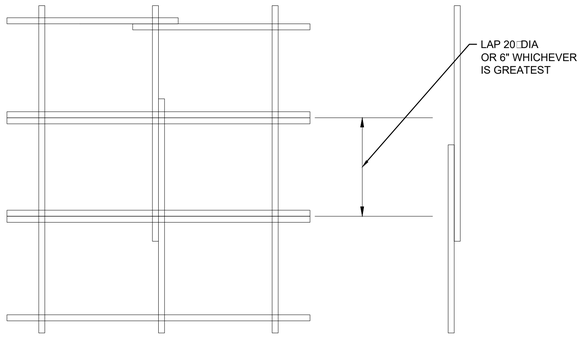


END LAP

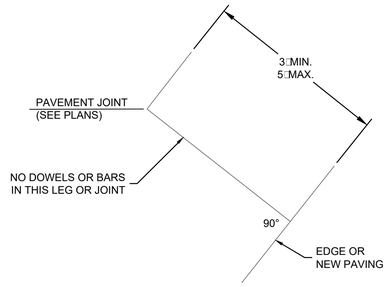


SIDE LAP

NOTE:

1. PCC PAVEMENT 6"□6" - D5□D5 DEFORMED WWF
2. ALL IRREGULAR SHAPED SLABS MUST BE REINFORCED AS IDENTIFIED ON THE PCC JOINT LAYOUT PLANS.
3. □4 REBAR MAT 12" ON CENTER MAY BE SUBSTITUTED.

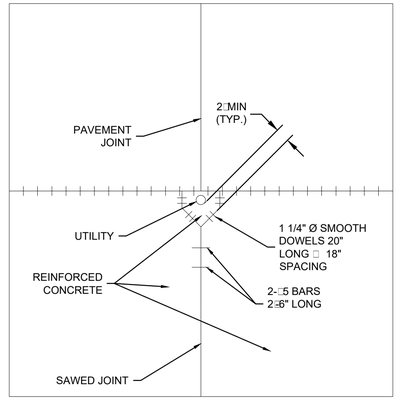
1 / C7.23 WELDED FABRIC LAYOUT
SCALE: NTS



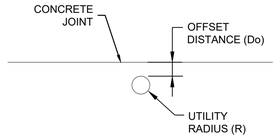
NOTES:

1. THIS DETAIL MUST BE USED AT ALL NON-PERPENDICULAR JOINT INTERSECTIONS.
2. THERE ARE CIRCUMSTANCES OF PERPENDICULAR OPTIONS THAT ARE GREATER THAN 5-FT. THESE OPTIONS MUST BE CONSTRUCTED BASED ON EOR APPROVAL.

2 / C7.23 PERPENDICULAR PAVING DETAIL
SCALE: NTS



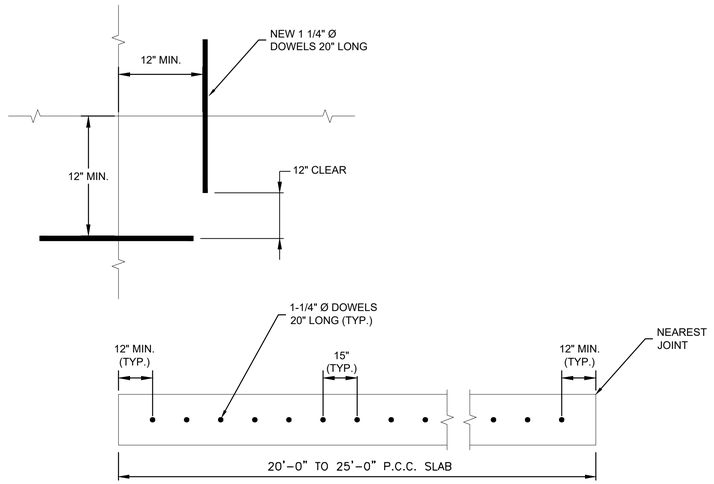
3 / C7.23 SINGLE PANEL BLOCKOUT
SCALE: NTS



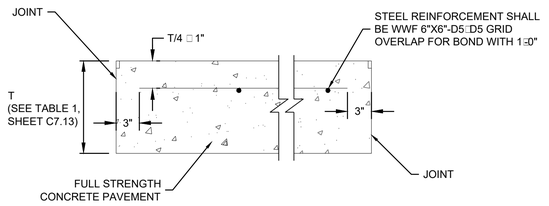
NOTES:

1. SMALL UTILITY STRUCTURE THAT HAS A RADIUS OF 12-INCH OR LESS OR AN AREA OF ONE S□UARE FOOT PR LESS.
2. IF Do IS 12-INCHES TO 18-INCHES, A BLOCKOUT IS NOT RE□UIRED AND A □5 DEFORMED BAR MUST BE PLACED BETWEEN THE COVER/RISER/LID AND THE JOINT WITH 3-INCH CLEARANCE.
3. IF Do IS LESS THAN 12-INCHES THEN A BLOCKOUT WILL BE RE□UIRED PER DETAILS SHOWN ON THIS PLAN, OR USE OF A 24-INCH DIAMETER SONOTUBE SHOWN IN DETAIL 8, SHEET C7.13.

4 / C7.23 SMALL UTILITY STRUCTURES BLOCKOUT
SCALE: NTS



5 / C7.23 TYPICAL DOWEL LAYOUT - NEW AIRCRAFT APRON
SCALE: NTS



NOTES:

1. SLAB REINFORCEMENT IS RE□UIRED FOR ALL SLABS, INCLUDING IRREGULAR SLABS, AS SHOWN ON THE JOINT LAYOUT PLANS.

6 / C7.23 REINFORCED PAVEMENT DETAIL
SCALE: NTS

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SHEET TITLE
PAVEMENT DETAILS 3

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.23

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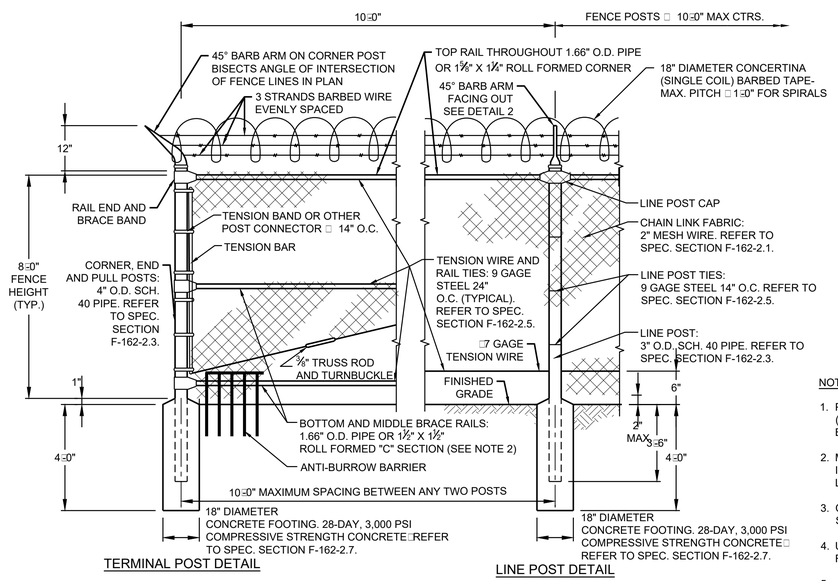


TERMINAL POST DETAIL

LINE POST DETAIL

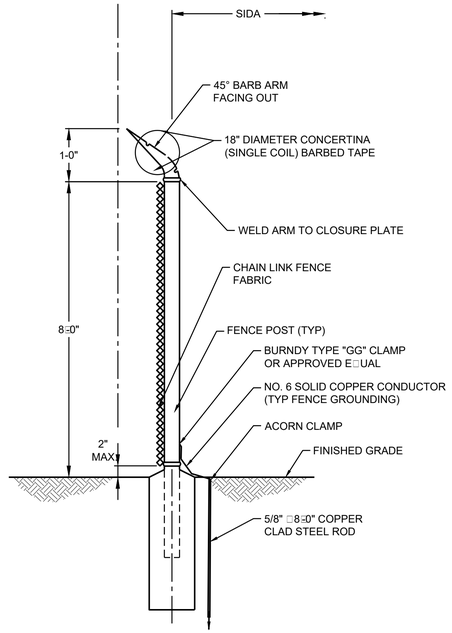
TYPICAL ELEVATION

NOTES:

1. PIPE SECTIONS SHOWN ARE ASTM F1083 FOR STANDARD WEIGHT (SCHEDULE 40) PIPE. E□UIVALENT STEEL SECTIONS FOR FRAME SHALL BE BASED ON PIPE SECTION SHOWN (SEE SPECIFICATIONS).
2. MIDDLE AND BOTTOM BRACE RAILS AND BRACE ROD ONLY TO BE INSTALLED EACH SIDE OF CORNERS, ENDS AND GATE POSTS FOR ONE BAY LENGTH.
3. CONTRACTOR IS TO SALVAGE AND REUSE EXISTING AIRPORT SECURITY SIGNS.
4. USE 6 - □12 GALVANI□ED WIRE TIES FOR INSTALLING SIGN ON CHAIN LINK FENCE.
5. ANTI-BURROW BARRIER TO BE HOOKED INTO BOTTOM BRACE RAIL AND SECURED WITH HOG RINGS EVERY 2□SEE DETAIL 3 THIS SHEET. ANTI-BURROW BARRIER IS RE□UIRED ON ALL FINAL FENCE INSTALLATION BUT NOT RE□UIRED FOR ANY TEMPORARY FENCE INSTALLED, UNLESS OTHERWISE STATED ON PLANS OR DIRECTED BY HVN.

1 / C7.31 — 8□TALL, CHAIN LINK FENCE WITH BARBED WIRE AND CONCERTINA (F-162)

SCALE: NTS



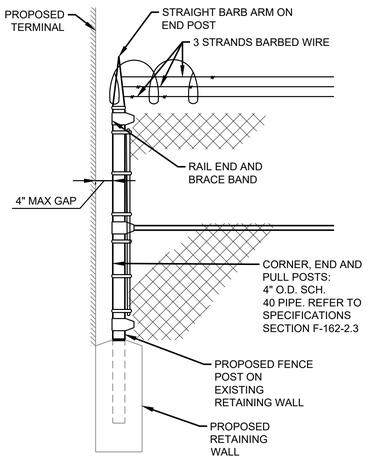
SIDE ELEVATION

NOTE:

1. ANTI-BURROW BARRIER NOT SHOWN FOR CLARITY.

2 / C7.31 — 8□TALL, CHAIN LINK FENCE WITH BARBED WIRE AND CONCERTINA (F-162)

SCALE: NTS



3 / C7.31 — PROPOSED SIDE FENCE TERMINATION AT PROPOSED TERMINAL

SCALE: NTS

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EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

FENCE DETAILS 1

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.31

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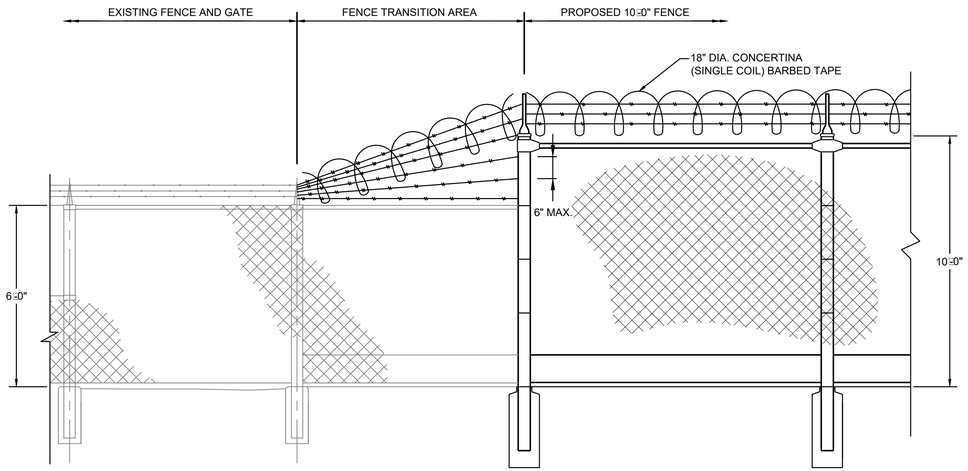
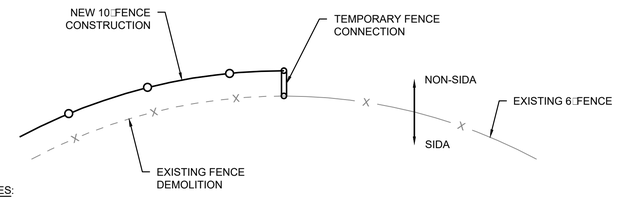


NOTE:

1. THIS DETAIL IS RE□UIRED PRIMARILY AT LOCATIONS WHERE THE PROPOSED FENCE TIES TO AN EXISTING FENCE THAT IS SHORTER IN HEIGHT BUT IS RELEVANT AT ANY CONNECTION POINT WITH A HEIGHT DISCREPANCY.

1 / C7.32 — EXISTING FENCE TO NEW FENCE TRANSITION ELEVATION
SCALE: NTS



NOTES:

1. THE INFORMATION SHOWN IN THE FENCE LAYOUT PLANS REFLECTS THE LOCATION OF THE EXISTING, 6□TALL FENCE. DUE TO PHASING AND SECURITY RE□UIREMENTS, CONSTRUCTION OF THE PROPOSED FENCE WILL RE□UIRE COORDINATION IN A MANNER THAT ELIMINATES EXPOSURE OF THE EXISTING SIDA/AOA PERIMETER FOR EXTENDED PERIODS OF TIME AND WILL NEVER OCCUR WHEN THE CONTRACTOR IS NOT ON-SITE.
2. THE CONTRACTOR WILL BE RE□UIRED TO SUBMIT A DETAILED FENCE PHASING PLAN, AS IT RELATES TO DAILY SITE CONDITIONS AND PREPARING THE SITE TO LEAVE FOR THE NIGHT. THIS DETAIL REFLECTS A GENERAL PHASING OF THE WORK, AS IT RELATES TO INSTALLATION OF THE NEW FENCE FABRIC.
3. SHOULD THE CONTRACTOR DESIRE TO CONSTRUCT THE NEW FENCE IN CONJUNCTION WITH THE DEMOLITION OF THE EXISTING FENCE, APPLICATION OF THIS TRANSITION DETAIL IS RE□UIRED.
4. THE TEMPORARY FENCE CONNECTION BETWEEN THE EXISTING AND PROPOSED FENCES WILL BE SUBMITTED AS A SHOP DRAWING TO THE ENGINEER FOR REVIEW AND APPROVAL BY HVN AND TSA. THE TEMPORARY CONNECTION WILL CONSIST OF, AT A MINIMUM, 6□FABRIC AND MAY NOT SPAN MORE THAN FIVE FEET (5□) IN LENGTH. THE TEMPORARY CONNECTION WILL BE PROVIDED BETWEEN LINE POSTS AND THE FABRIC WILL BE SECURED ON EACH END WITH STANDARD HOG RINGS, PER THE PROJECT MANUAL.
5. GIVEN THE EXISTING TOPOGRAPHY OF THE AIRFIELD, THE PROPOSED FENCE MAY BE CONSTRUCTED WITHIN THE EXISTING AOA WITH PRIOR APPROVAL AND COORDINATION. THE PROPOSED FENCE LOCATION MUST NOT DEVIATE SIGNIFICANTLY FROM THE EXISTING FENCE LOCATION AND MUST REMAIN FREE FROM EXISTING ROADWAY RIGHTS OF WAY, ROADWAY CLEAR□ONES, RUNWAY/TAXIWAY OBJECT FREE AREAS, AND OTHER AIRFIELD INFRASTRUCTURE. CONTRACTOR IS TO COORDINATE PROPOSED FENCE DEVIATIONS WITH HVN FOR APPROVAL.
6. THE CONTRACTOR MUST MAINTAIN SECURITY DURING THE REMOVAL AND REPLACEMENT OF THE SECURITY FENCING BY PREVENTING ACCESS TO ANIMALS AND UNAUTHORI□ED PERSONNEL. DURING DAYTIME WORK, THE CONTRACTOR IS RE□UIRED TO PROVIDE PROPERLY TRAINED, BADGED PERSONNEL TO MONITOR THE LIMITS OF DOWNED FENCE TO ENSURE AIRPORT SAFETY STANDARDS ARE MAINTAINED. ANY FENCE LINE LEFT DOWNED/DEMOLISHED BETWEEN WORK SHIFTS (OVERNIGHT) WILL RE□UIRE FULL-TIME SITE LIGHTING AND A PROPERLY TRAINED, BADGED PERSONNEL TO MONITOR THE OPEN FENCE AND BE STATIONED EVERY 100 LINEAR FEET OF DOWNED FENCE. THE CONTRACTOR WILL BEAR THE COSTS ASSOCIATED WITH THIS FULL-TIME FENCE MONITORING.

2 / C7.32 — TEMPORARY SECURE FENCE TRANSITION
SCALE: NTS

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SHEET TITLE
FENCE DETAILS 2

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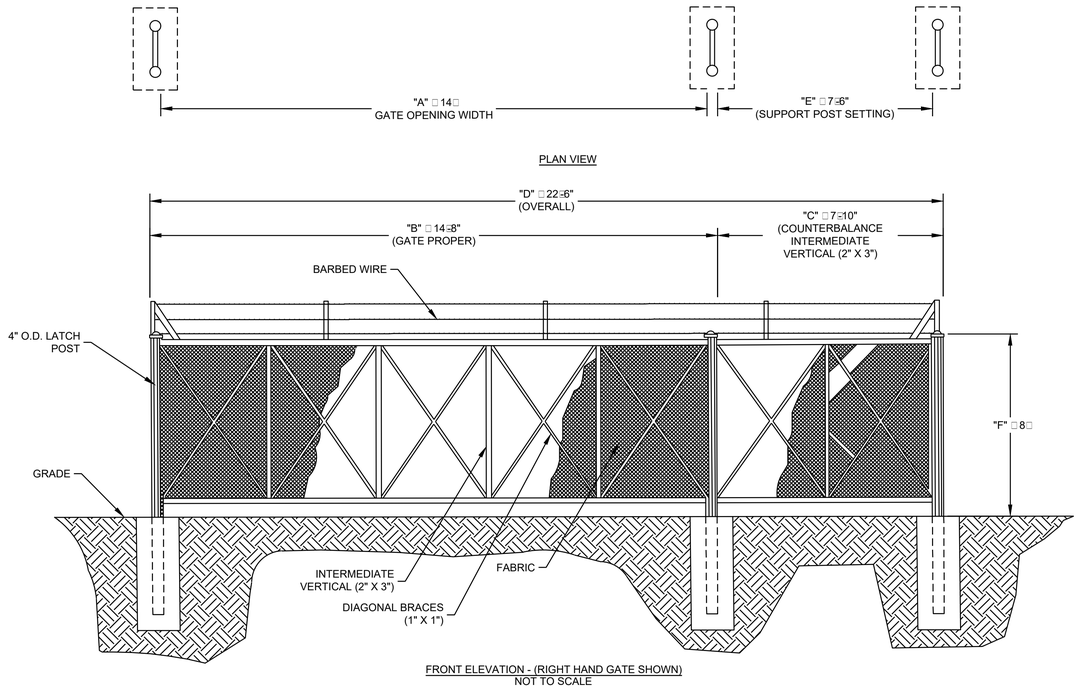

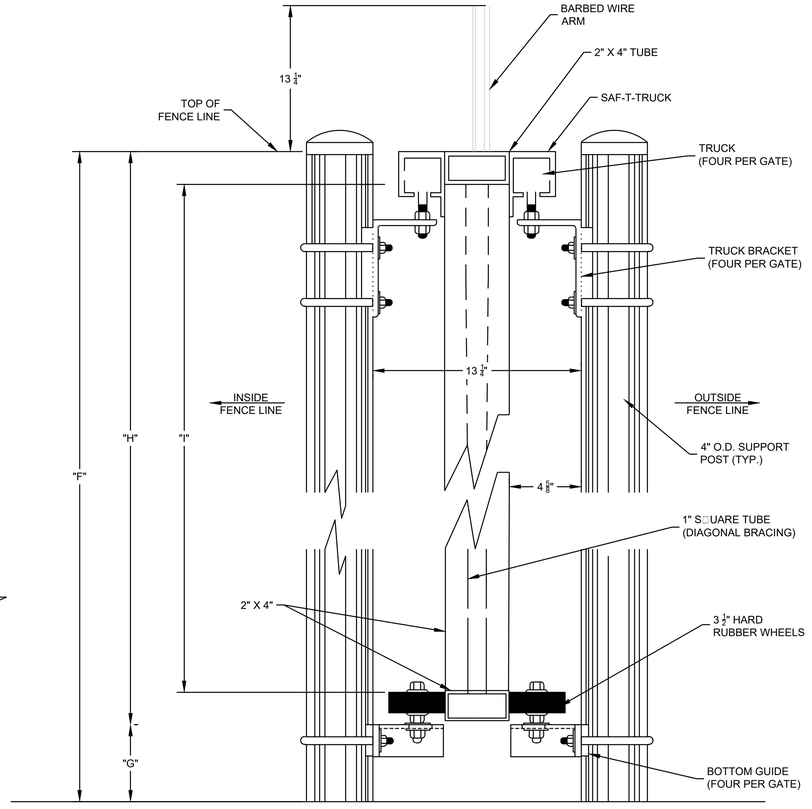

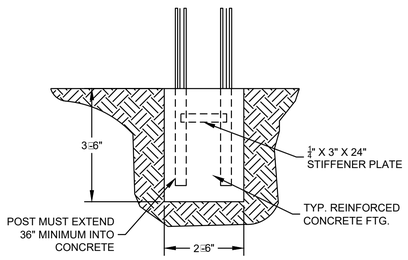

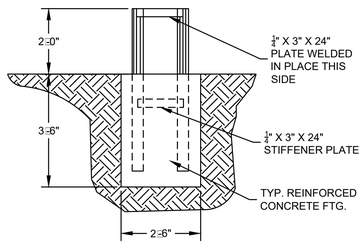

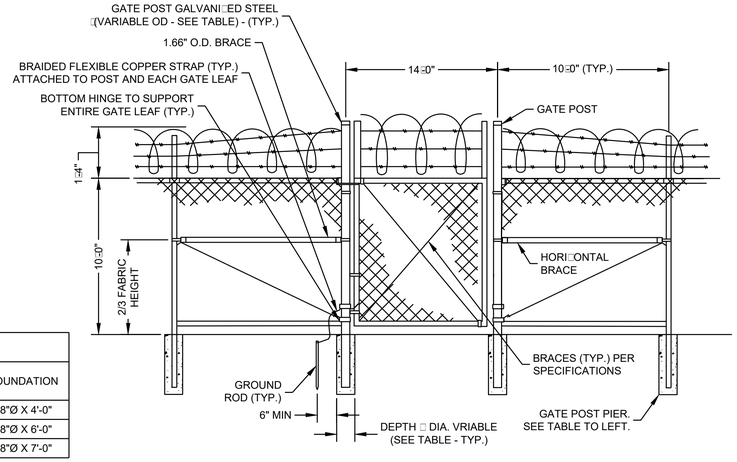

DIMENSION DESCRIPTION	DIM.	DETERMINE DIMENSION BY	ACTUAL
GATE OPENING	"A"	INSIDE TO INSIDE MEASURE	14□
GATE PROPER (SINGLE)	"B"	GATE PROPER (SINGLE) A□8"	14□8"
COUNTERBALANCE LENGTH	"C"	MIN B / 2	7□10"
OVERALL GATE LENGTH	"D"	B □ C	22□6"
SUPPORT POST SETTING	"E"	C - 4"	7□6"
NOMINAL GATE HEIGHT	"F"	E□UAL TO FENCE LINE HEIGHT	8□
GRADE CLEARANCE	"G"	GRADE CLEARANCE	4"
ACTUAL GATE HEIGHT	"H"	F - G	7□8"
GATE FABRIC HEIGHT	"I"	F - 9"	7□3"

NOTE:
1. ALL GATES AND FENCING FOR REGULATORY FENCE LINES ARE TO HAVE A MINIMUM HEIGHT OF 10□
2. COSTS FOR INSTALLATION OF NEW 12□SWING GATES WILL BE INCLUDED IN F-166-5.1 PAY ITEM.

NOTE:
1. PROVIDE FORKED LATCH WITH PADLOCK EYE PER SPECIFICATIONS.
2. GATE FABRIC MUST BE A CHAIN LINK MESH AS SPECIFIED IN X-XXXX. COATING MUST BE IF A SIMILAR TYPE AS ADJOINING. USE KNUCKLE SELVAGE TOP AND BOTTOM.

GATE POSTS

PIPE SI□E		SWING GATE OPENINGS		FOUNDATION
NOM. O.D. PIPE	WEIGHT LB/FT	SINGLE GATE	DOUBLE GATE	
3.5"	7.5800	UP THRU 6□	UP THRU 12□	18"Ø X 4'-0"
4.0"	9.1100	7□THRU 13□	12□THRU 26□	18"Ø X 6'-0"
6.625"	18.9700	14□THRU 18□	27□THRU 36□	18"Ø X 7'-0"

1 C7.33 ELECTRONIC SLIDE GATE
SCALE: NTS

2 C7.33 MANUAL GATE DETAIL
SCALE: NTS

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REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19479 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
FENCE DETAILS 3

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.33

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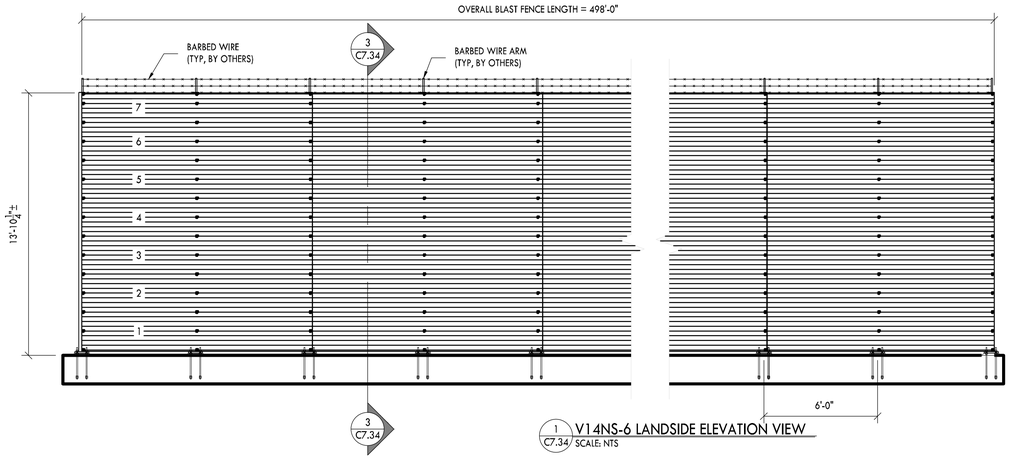
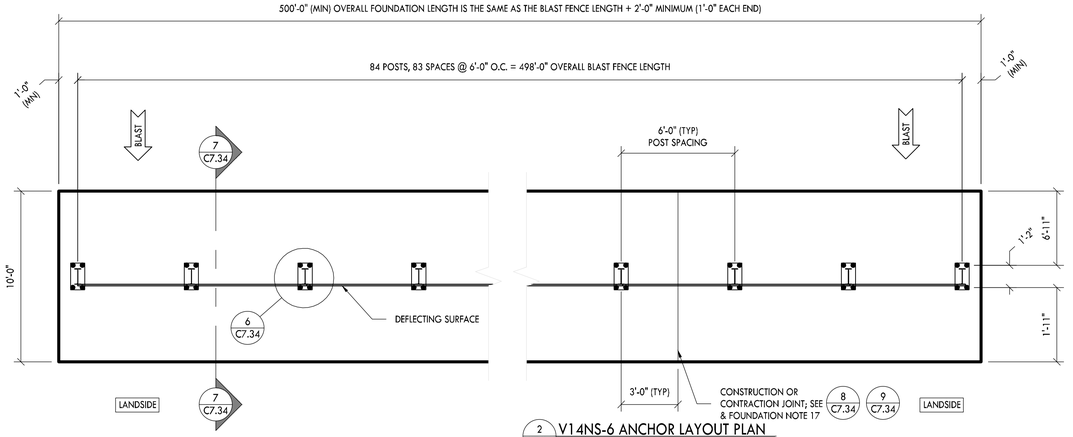
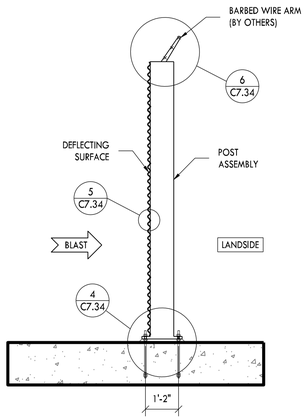


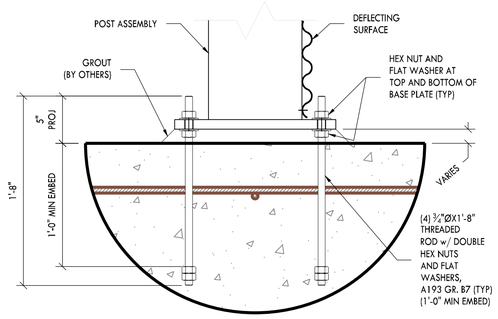
1 C7.34 V14NS-6 LANDSIDE ELEVATION VIEW
SCALE: NTS



2 C7.34 V14NS-6 ANCHOR LAYOUT PLAN
SCALE: NTS



3 C7.34 V14NS-6 SECTION VIEW
SCALE: NTS



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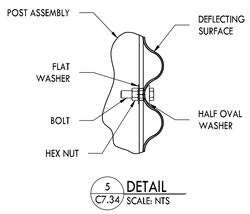

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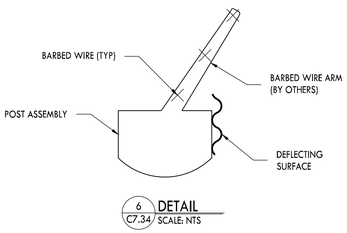

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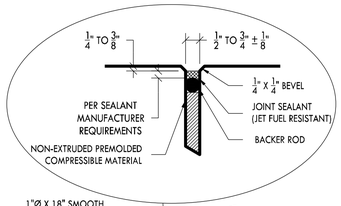

8 C7.34 SUGGESTED CONSTRUCTION JOINT DETAIL
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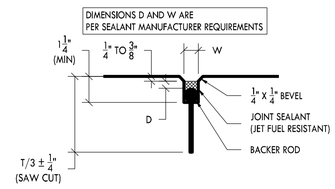

9 C7.34 SUGGESTED CONTRACTION JOINT DETAIL
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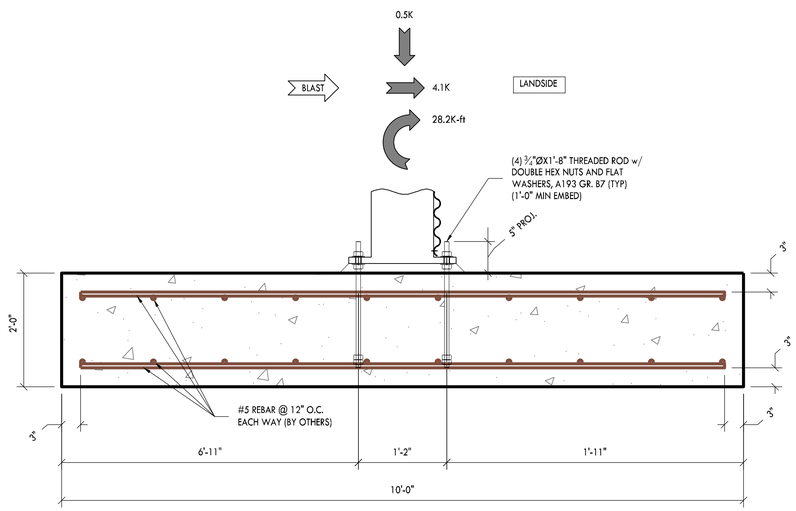
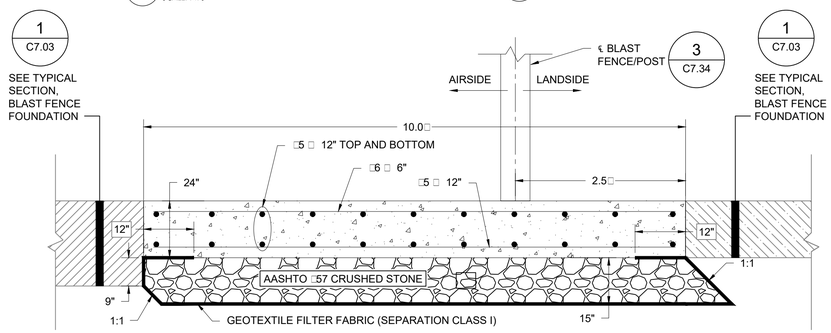


7 C7.34 V14NS-6 SUGGESTED FOUNDATION SECTION VIEW
SCALE: NTS



10 C7.34 BLAST FENCE FOUNDATION DETAIL
SCALE: NTS

BLAST FENCE NOTES:

1. BLAST FENCE SHALL WITHSTAND TAXI/BREAKAWAY EXHAUST VELOCITIES OF COMMERCIAL AND MILITARY AIRCRAFT. DESIGN LOADS ARE:
   - 140 MPH JET BLAST PER FAA GUIDELINES — 50.2 PSF (NOM.)
   - 121 MPH (ULT.) WIND PER ASCE 7-16 — 73.2 PSF (ULT.) = 43.9 PSF (NOM.)
2. NO AIRCRAFT SHALL BE OPERATED WITH ENGINE NOZZLE CLOSER THAN 60' AND NO TAIL CLOSER THAN 35' TO THE LEADING EDGE OF THE BLAST FENCE.
3. THE BLAST FENCE HAS A NOMINAL HEIGHT OF 14'.
4. POST ASSEMBLIES SHALL BE FABRICATED FROM ASTM A992 STEEL (SECTION) AND ASTM A572 GRADE 50 STEEL (BASE PLATE). THE ENTIRE ASSEMBLY SHALL BE HOT-DIP GALVANIZED TO 2 OZ/FT² PER ASTM A123.
5. DEFLECTING SURFACES SHALL BE CORRUGATED STEEL SHEETS DESIGNED TO SUPPORT LOADS IN A TWO-SPAN CONDITION. SHEET THICKNESS SHALL BE 16 GA WITH A MINIMUM 2.10 OZ/FT² (G210) HOT-DIP GALVANIZED FINISH PER ASTM A653. SHEET SECTION MODULUS SHALL BE A MINIMUM OF 0.196 IN³/FT.
6. ALL FIELD CONNECTIONS SHALL BE BOLTED (NO FIELD WELDING PERMITTED). FASTENERS SHALL BE SAE J429 GRADE 5, ASTM A449, OR ASTM F593 (ALLOY GROUP 2) WITH AN APPROPRIATE COATING FOR CORROSION RESISTANCE (WHERE APPLICABLE). ADEQUATE LOCKING PROPERTIES SHALL BE PROVIDED TO PREVENT FASTENERS FROM WORKING LOOSE DURING NORMAL OPERATION (SUBJECT TO MANUFACTURER MAINTENANCE GUIDELINES).
7. ALL ANCHORAGE SHALL BE SUPPLIED BY THE BLAST FENCE MANUFACTURER AND SHALL BE CAST-IN-PLACE BY THE GENERAL CONTRACTOR DURING FOUNDATION CONSTRUCTION.
8. NON-SHRINK CEMENTITIOUS OR EPOXY GROUT SHALL BE SUPPLIED BY THE GENERAL CONTRACTOR.
9. BLAST FENCE MANUFACTURER ONSITE SUPERVISION IS REQUIRED DURING INSTALLATION FOR PRODUCT GUARANTEE.
10. ELECTRICAL, LIGHTING, SECURITY ATTACHMENTS, ETC. (IF REQUIRED) SHALL BE BY OTHERS.

FOUNDATION NOTES:

11. FOUNDATION DESIGN SHOWN IS SUGGESTED ONLY. FINAL FOUNDATION/SUBGRADE DESIGN AND APPROVALS ARE BY OTHERS AND SHALL BE BASED ON SERVICE ANCHOR LOADS SHOWN, SITE SOIL CONDITIONS, AND GOVERNING CODES. DESIGN SHOWN CONSIDERS JET EXHAUST CHARACTERISTICS AND INCORPORATES LOAD REDUCTIONS AT FRAMES ADJACENT TO THE ENGINE CENTERLINES. THIS SUGGESTED DESIGN IS BASED ON THE FOLLOWING ASSUMPTIONS:
    - ALLOWABLE SOIL BEARING CAPACITY — 2000 PSF
    - SOIL LATERAL (PASSIVE) PRESSURE — 250 PSF/FT DEPTH
    - STATIC FRICTION COEFFICIENT — 0.40
12. PROJECT DESIGNER SHALL VERIFY FOUNDATION SUITABILITY AND DESIGN BASED ON SITE CONDITIONS AND DETAILS.
13. GENERAL CONTRACTOR SHALL VERIFY CORRECT LOCATION AND ELEVATION OF FOUNDATION.
14. BLAST FENCE MANUFACTURER SHALL FURNISH ALL ANCHORAGE (TO INCLUDE THREADED ROD, FLAT WASHERS, AND HEX NUTS) PRIOR TO FOUNDATION CONSTRUCTION.
15. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PLACEMENT OF EMBEDDED ANCHORAGE DURING FOUNDATION CONSTRUCTION. FINISHED FOUNDATION SURFACE SHALL BE A SINGLE PLANE AND MAY SLOPE UP TO 2% IN ANY SINGLE DIRECTION TO ACCOMMODATE DRAINAGE OR TO MATCH EXISTING GRADES. THE FOLLOWING TOLERANCES SHALL APPLY:
    - FINISHED FOUNDATION ELEVATIONS — ±1/4"
    - ANCHORAGE PLUMBNESS (OVER PROJ. HEIGHT) — ±1/16"
    - ANCHORAGE LAYOUT (NON-CUMULATIVE) — ±1/16" O.C.
    - FOUNDATION DIMENSIONS — ±1/2"
16. PORTLAND CEMENT CONCRETE SHALL DEVELOP A MINIMUM COMPRESSIVE STRENGTH OF 4500 PSI IN 28 DAYS (SUBJECT TO CHANGE BASED ON LOCAL REQUIREMENTS).
17. CONSTRUCTION AND CONTRACTION JOINTS SHALL BE PLACED 18' O.C. (MAX.) OR PER APPROVED DESIGN, BUT NOT WITHIN 12" OF ANY BLAST FENCE ANCHOR LOCATION.
18. FOUNDATION CONSTRUCTION, CIVIL WORKS, GROUNDING, AND ELECTRICAL (IF REQUIRED) ARE BY OTHERS.
19. APPROVED BLAST FENCE MANUFACTURER:

BLAST DEFLECTORS, INC.
8620 TECHNOLOGY WAY
RENO, NV 89521 USA

TEL: +1 775.856.1928
WEB: WWW.BDI.AERO
EMAIL: CONTACTBDI@BDI.AERO

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REGISTRATION
STATE OF CONNECTICUT — RICHARD L. PETTINELLI — 18479 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

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EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
FENCE DETAILS 4

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.34

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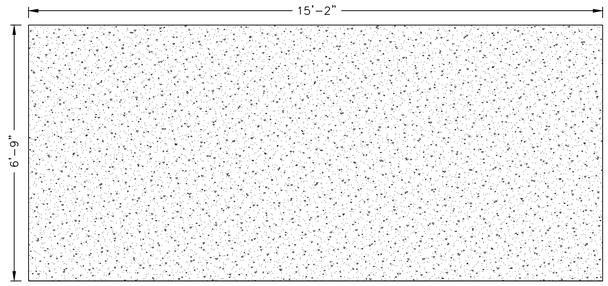
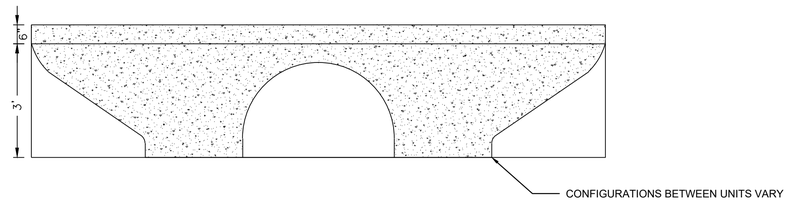


1 C7.41 TYPICAL UNDERGROUND STORMWATER DETENTION UNIT - PLAN VIEW
SCALE: NTS



2 C7.41 TYPICAL UNDERGROUND STORMWATER DETENTION UNIT - ELEVATION
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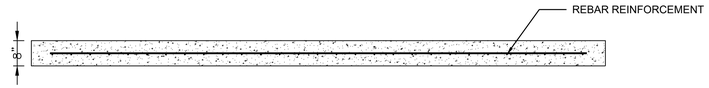

3 C7.41 TYPICAL UNDERGROUND STORMWATER DETENTION UNIT - BOTTOM SLAB
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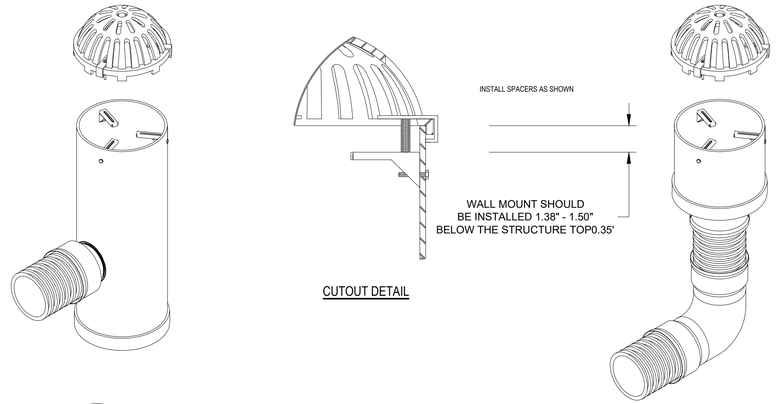

4 C7.41 NYLOPLAST WITH DOME LOCKING GRATE ASSEMBLY
SCALE: NTS

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23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 1

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.41

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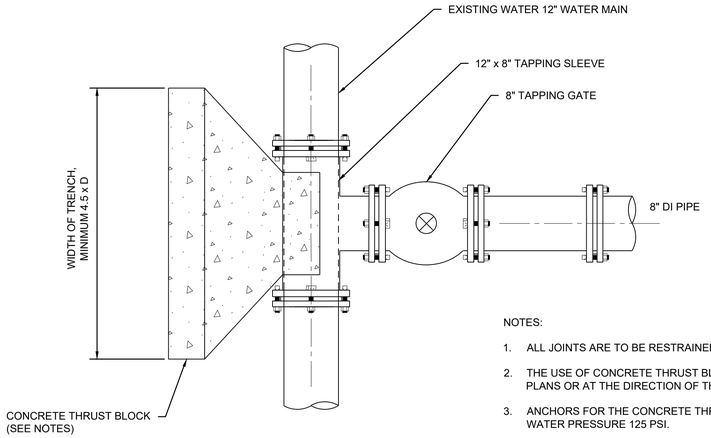
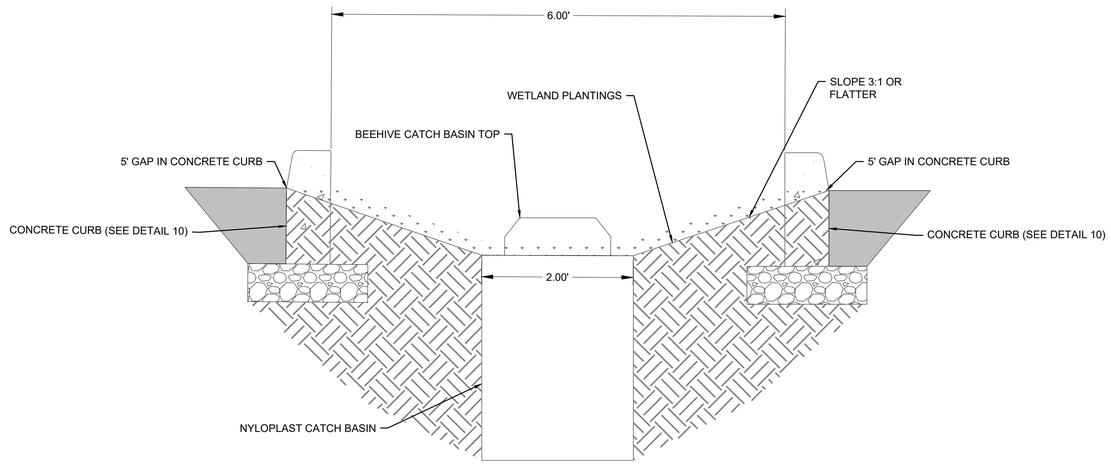


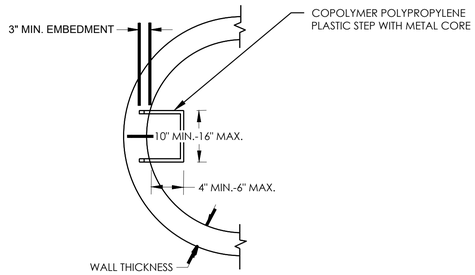
NOTES:

1. ALL JOINTS ARE TO BE RESTRAINED USING "MEGA-LUGS" OR APPROVED EQUAL.
2. THE USE OF CONCRETE THRUST BLOCKS SHALL BE ONLY AS SHOWN ON THE PLANS OR AT THE DIRECTION OF THE DESIGNER/ENGINEER.
3. ANCHORS FOR THE CONCRETE THRUST BLOCKS BASED ON MAXIMUM ALLOWABLE WATER PRESSURE 125 PSI.

1 C7.42 TYPICAL THRUST BLOCK TAPPING DETAIL - PLAN
SCALE: NTS



2 C7.42 TYPICAL SWALE WITH CURB SECTION
SCALE: NTS



3 C7.42 STEP DETAIL
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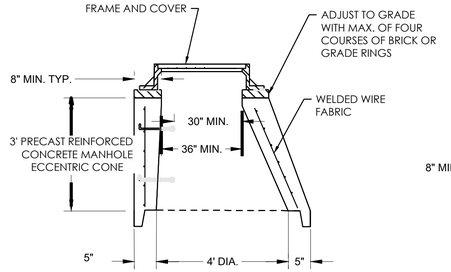

4 C7.42 ECCENTRIC CONE SECTION
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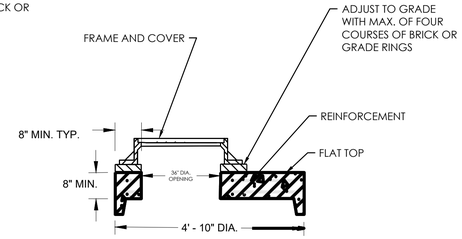

5 C7.42 FLAT SLAB TOP FOR RISER SECTION
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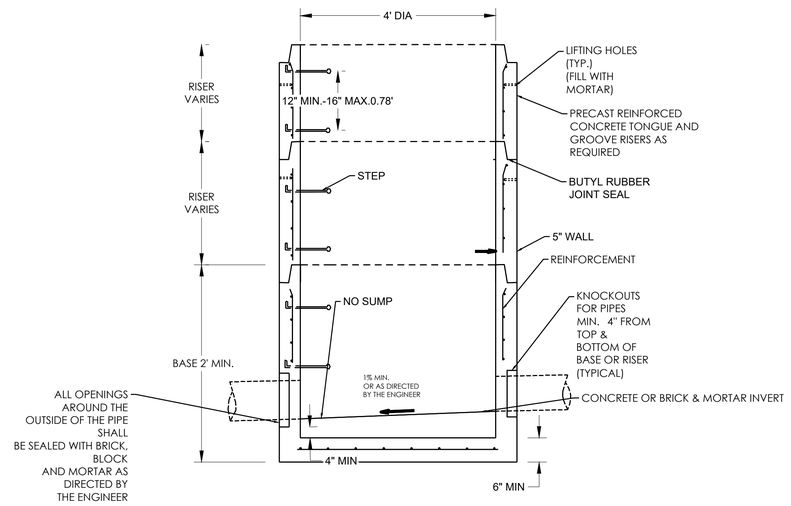

6 7.42 NYLOPLAST WITH DOME LOCKING GRATE 4' DIAMETER REINFORCED PRECAST CONCRETE MANHOLE SECTION
SCALE: NTS

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

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KEY PLAN

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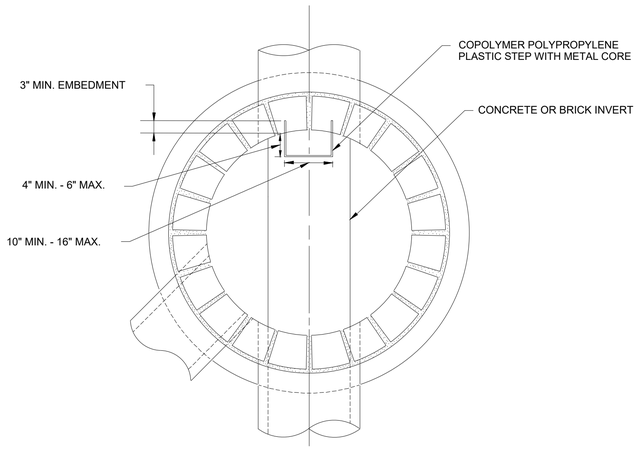
SHEET TITLE

UTILITY DETAILS 2

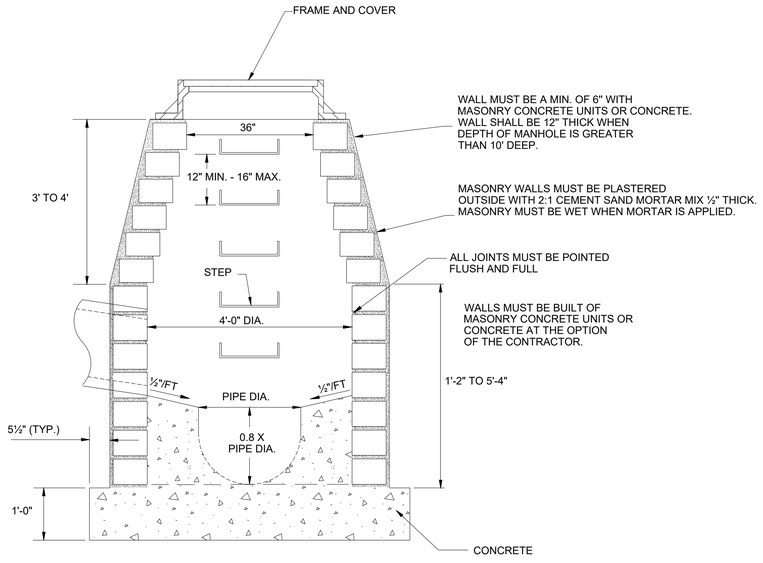
DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.42



PLAN



MANHOLE SECTION

GENERAL NOTES:

1. SEE SHEET NO. HW-586_10A OR HW-586_10B FOR MANHOLE FRAME, GRATE AND COVER DETAIL, FROM CTDOR STANDARD SHEETS.

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UTILITY DETAILS 3

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C7.43

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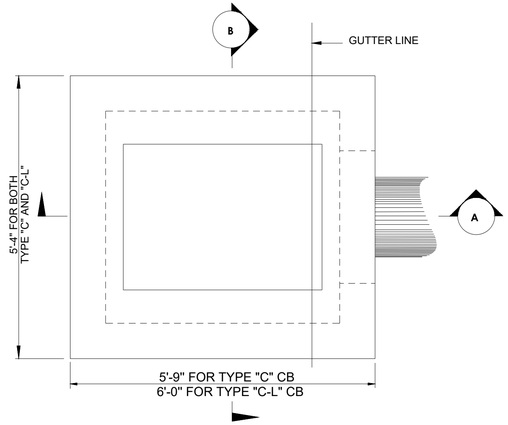
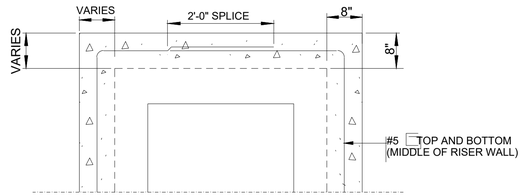


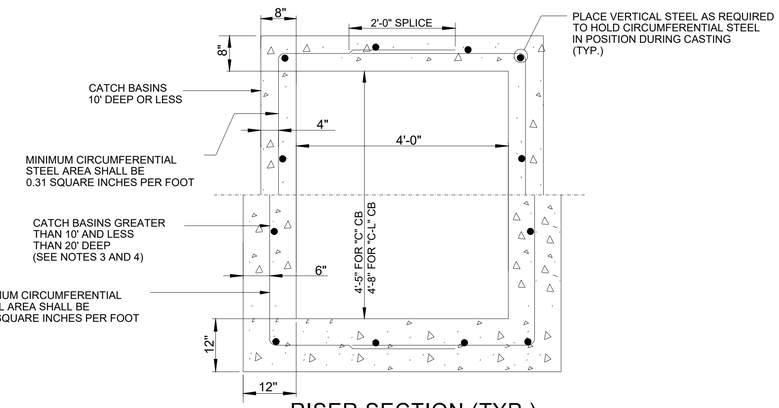
PLAN



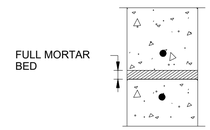
HALF REDUCER SECTION (TYP.)

GENERAL NOTES:

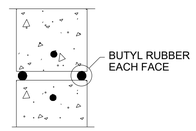
1. WELDED WIRE FABRIC WITH AN AREA EQUAL TO OR GREATER THAN THE REINFORCING SHOWN MAY BE SUBSTITUTED AS APPROVED BY THE ENGINEER.
2. ALL REINFORCEMENT MUST HAVE A MINIMUM CLEAR COVER OF 2 INCHES, EXCEPT FOR BENEATH BOTTOM REINFORCEMENT IN TOP SLABS, WHERE THE MINIMUM MAY BE 1 1/2 INCHES.
3. WALL THICKNESS OF ALL CATCH BASINS OVER 10 FEET DEEP SHALL BE INCREASED TO 12 INCHES. INSIDE DIMENSIONS SHALL REMAIN THE SAME. THE 12 INCH THICKNESS MUST START AFTER THE FIRST 10 FEET.
4. BASES AND RISERS AT A DEPTH OF 20 FEET AND GREATER MUST BE DESIGNED BY THE CONTRACTOR AND WORKING DRAWINGS MUST BE SUBMITTED TO THE ENGINEER FOR REVIEW.
5. RISERS MAY BE PREFABRICATED WITH PIPE OPENINGS IN ALL FOUR WALLS. ADEQUATE REINFORCING AROUND PIPE OPENINGS MUST BE PROVIDED. RISERS USED WHERE A PIPE OPENING IS TO REMAIN IN PLACE MUST BE FORMED UP WITH BRICK AS DIRECTED BY THE ENGINEER.
6. RISERS MUST NEVER HAVE CORNER PIPE ENTRIES. ROUND STRUCTURES MUST BE USED WHEN PIPES CANNOT ALIGN WITH A RECTANGULAR STRUCTURE KNOCK OUT.
7. FOR CATCH BASIN TOPS, SEE SHEET NO. HW-586_07 FROM CTDOT STANDARD SHEETS.



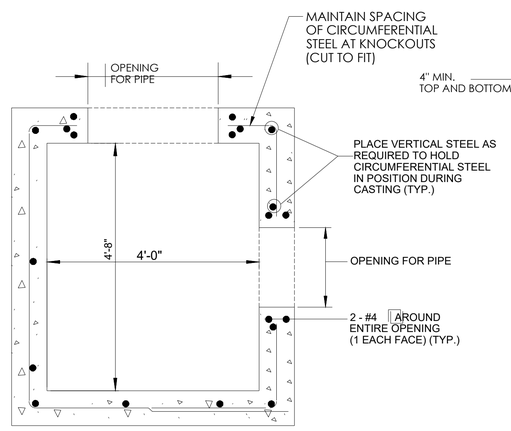
RISER SECTION (TYP.)



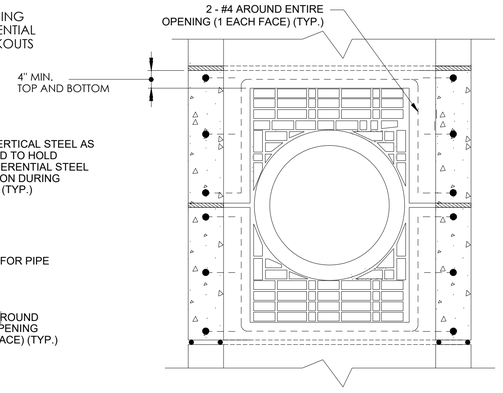
MORTAR JOINT



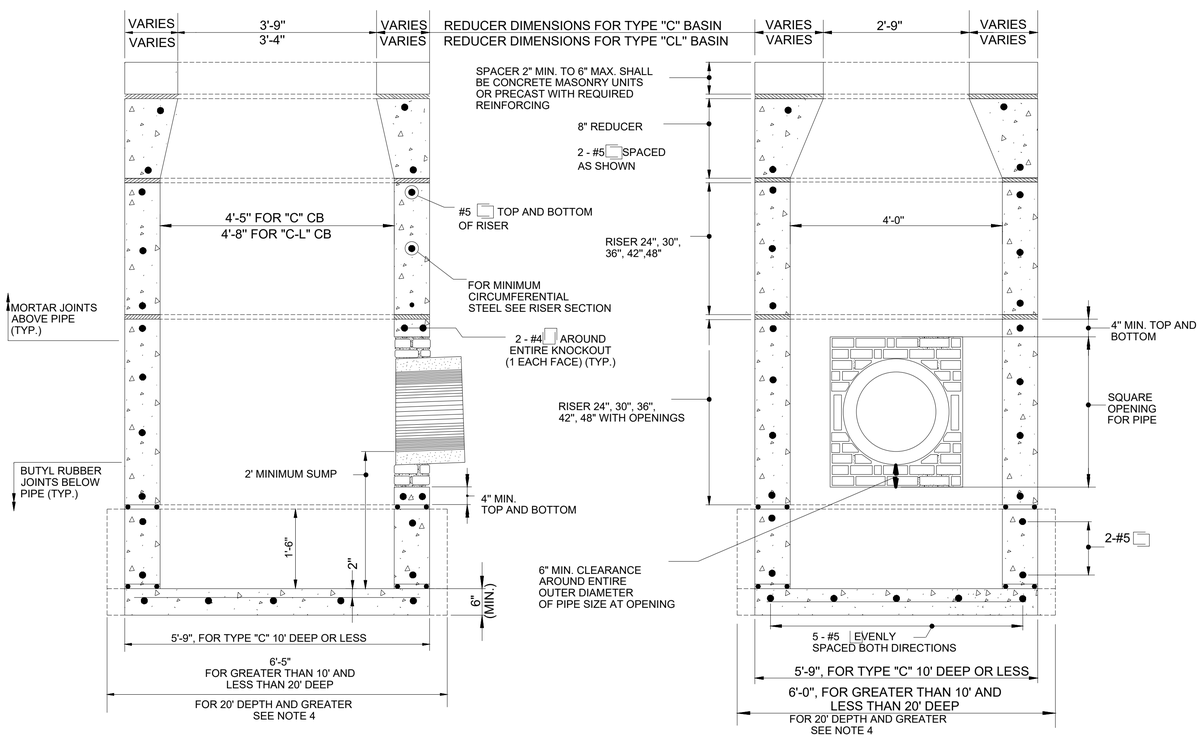
BUTYL RUBBER JOINT



TYPICAL SECTION THRU
SINGLE RISER WITH OPENING



DOUBLE RISER OPENING (TYP.)
PIPES GREATER THAN 24"
OUTSIDE DIAMETER



SECTION A

SECTION B

PRECAST CONCRETE TYPE "C" AND "C-L" DOUBLE
GRATE TYPE I CATCH BASIN

(UNDER 10' DEEP SHOWN)

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

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AIRPORT
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CONSULTANT

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GLASTONBURY, CT 06033
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CONSTRUCTION

REGISTRATION

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION
AND TERMINAL
EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 4

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C7.44

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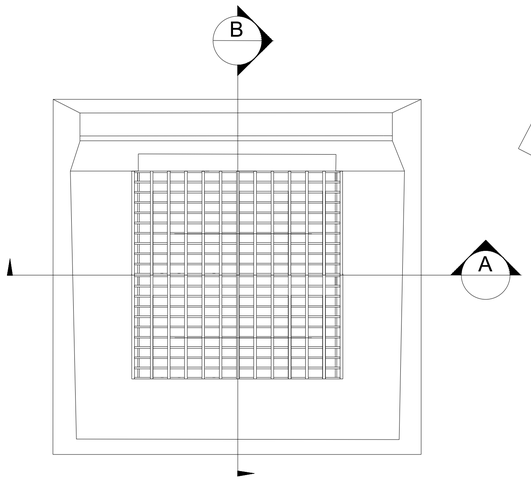
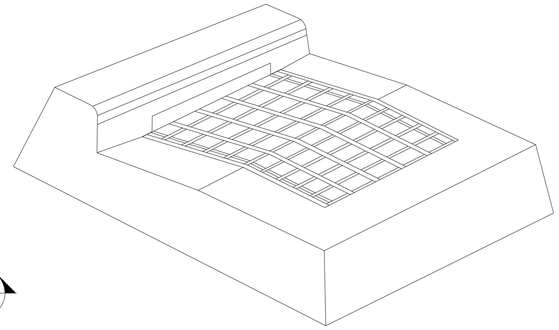
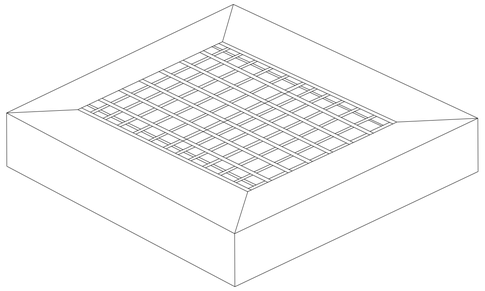


TYPE "C" CATCH BASIN DOUBLE GRATE TYPE I TOP PLAN



TYPE "C" CATCH BASIN DOUBLE GRATE TYPE I TOP



TYPE "C-L" CATCH BASIN DOUBLE GRATE TYPE I TOP

GENERAL NOTES:

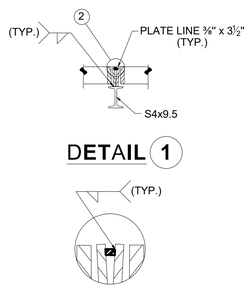
1. SEE SHEET HW-586_08 FOR CATCH BASIN FRAMES AND GRATES, AND HW-586_09 CATCH BASIN LOCK DOWN TOPS, FROM CTDOT STANDARD SHEETS.

2. SEE SHEET HW-586_02 CATCH BASIN TOPS (TYPES "C" AND "C-L") FOR DOUBLE GRATE TYPE I TO DETERMINE THE TOP OF FRAME AT THE GUTTER, FROM CTDOT STANDARD SHEETS.

3. ALL BARS SHALL HAVE A MINIMUM 2" COVER.

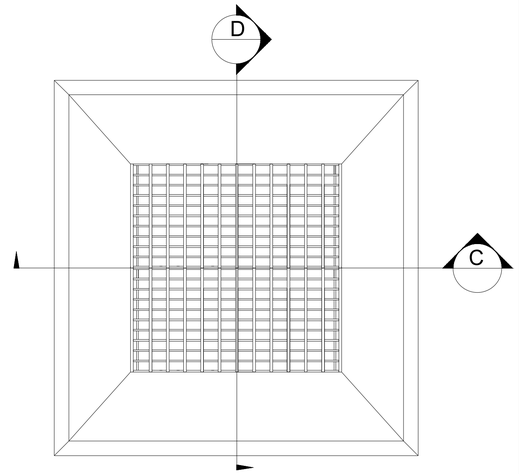
4. MANUFACTURING DIMENSIONAL TOLERANCE TABLE

ANY DIMENSION (D)	ALLOWABLE TOLERANCE
D < 5"	± 1/4"
5" ≤ D ≤ 10"	± 1/2"
D > 10"	± 1"

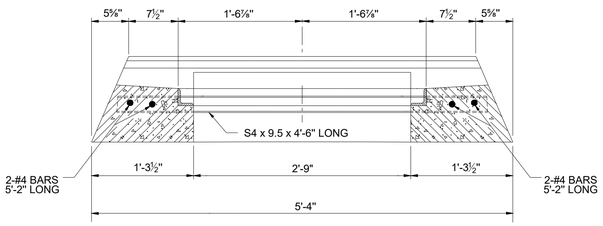


DETAIL 1

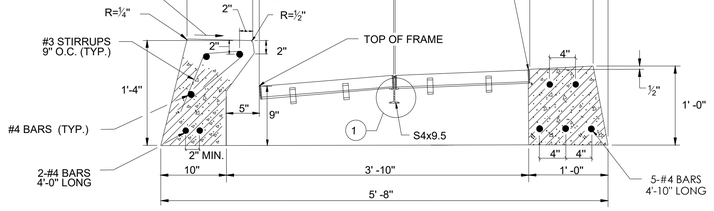
DETAIL 2



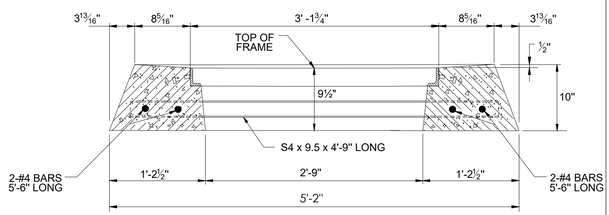
TYPE "C-L" CATCH BASIN DOUBLE GRATE TYPE I TOP PLAN



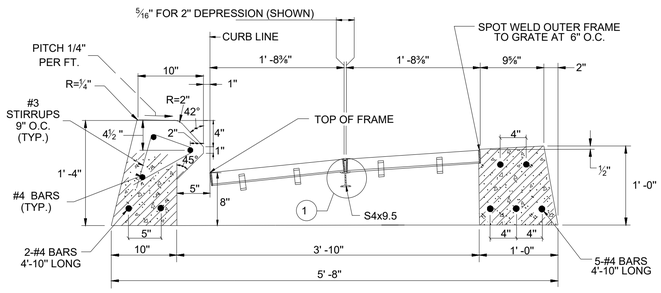
A TYPE "C" CATCH BASIN DOUBLE GRATE TYPE I TOP
SCALE: NTS



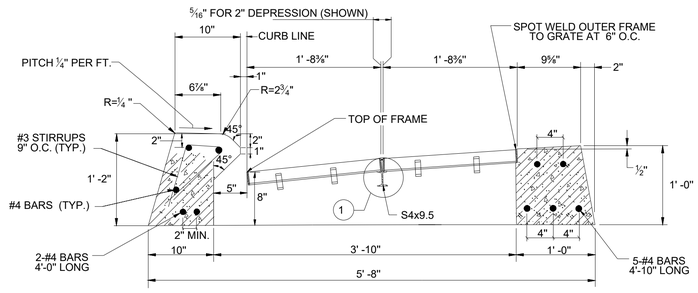
B TYPE "C" CATCH BASIN DOUBLE GRATE TYPE I TOP FOR 6" CONCRETE CURBING OR 6" STONE CURBING
SCALE: NTS



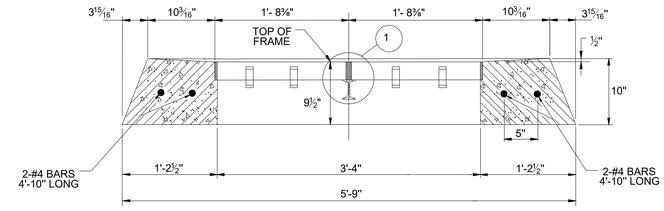
C TYPE "C-L" CATCH BASIN DOUBLE GRATE TYPE I TOP
SCALE: NTS



B TYPE "C" CATCH BASIN DOUBLE GRATE TYPE I FOR 6" BITUMINOUS CONCRETE LIP CURBING
SCALE: NTS



B TYPE "C" CATCH BASIN DOUBLE GRATE TYPE I TOP FOR 4" CONCRETE PARK CURBING OR 4" BITUMINOUS CONCRETE PARK CURBING
SCALE: NTS



D TYPE "C-L" CATCH BASIN DOUBLE GRATE TYPE I TOP
SCALE: NTS

CLIENT

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AVPORTS

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CONSULTANT

WSP

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 16979 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 5

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.45

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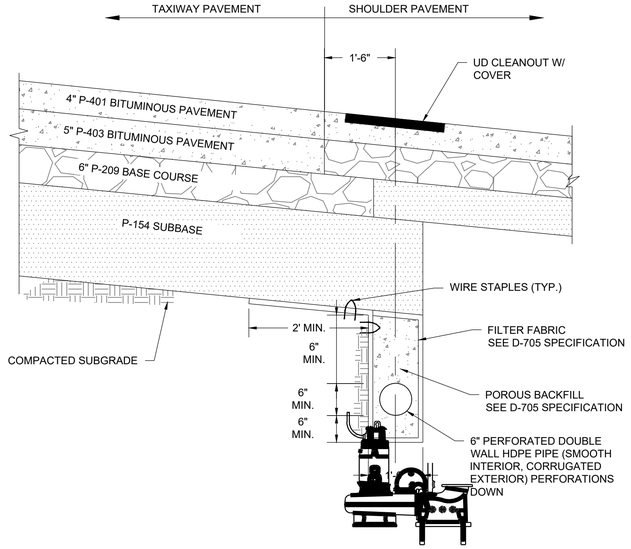
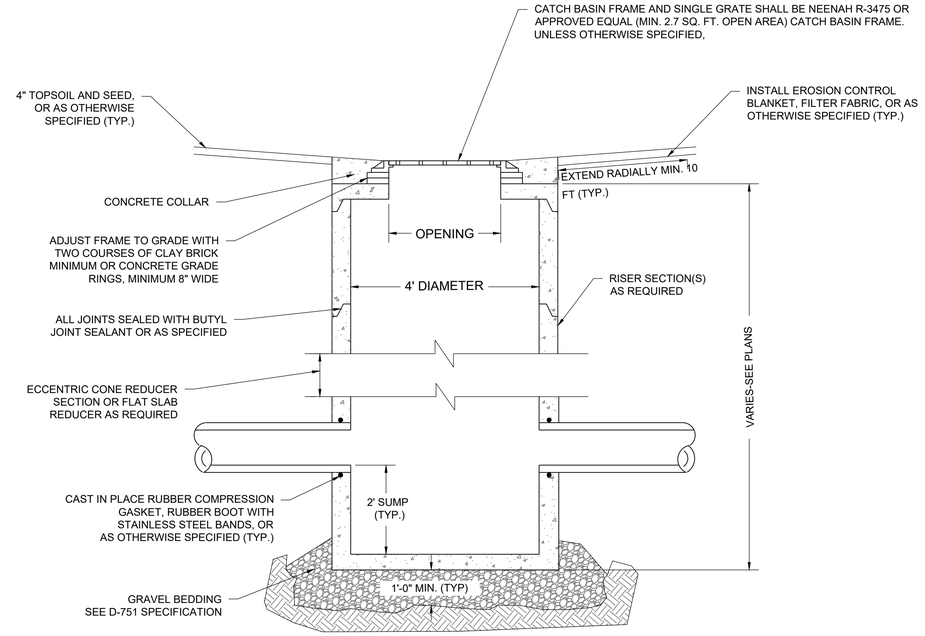
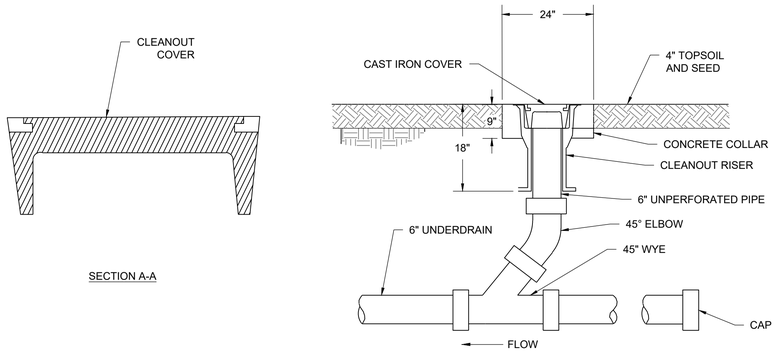


1 C7.46 TYPICAL UNDERDRAIN DETAIL
SCALE: NTS



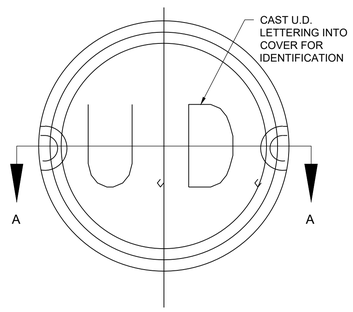
NOTES:
1. ALL PREFABRICATED REINFORCED CONCRETE CATCH BASINS AND FRAMES AND GRATES SHALL BE DESIGNED AND CONSTRUCTED TO SUPPORT A 200,000 LB. DUAL WHEEL AIRCRAFT LOAD. THE CONTRACTOR IS REQUIRED TO SUPPLY SHOP DRAWINGS AND MANUFACTURERS' CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.

2 C7.46 TYPICAL CATCH BASIN DETAIL
SCALE: NTS



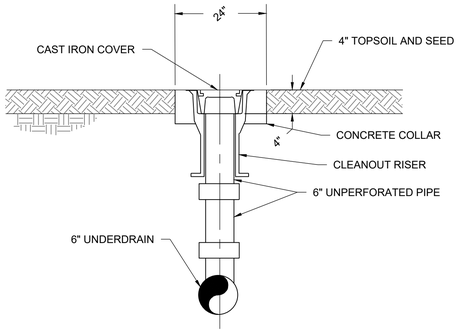
SECTION A-A

PROFILE VIEW



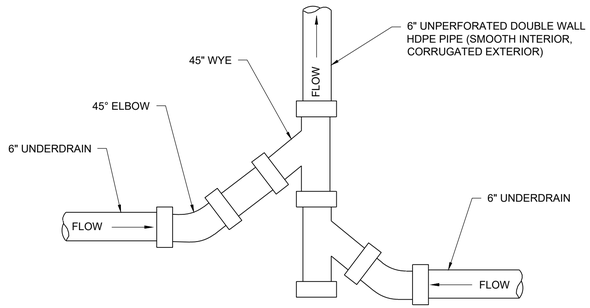
PLAN VIEW

THE CONTRACTOR MUST SUPPLY SHOP DRAWINGS AND MANUFACTURER'S CERTIFICATIONS TO THE ENGINEER FOR REVIEW PRIOR TO INSTALLATION.



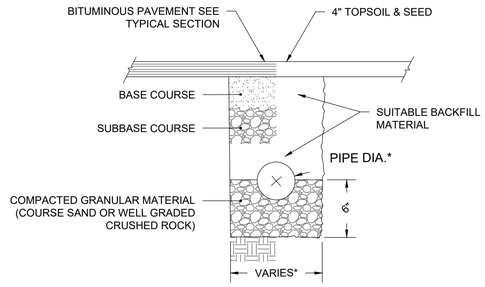
CROSS SECTION VIEW

3 C7.46 UNDERDRAIN CLEANOUT
SCALE: NTS



PLAN VIEW

4 C7.46 UNDERDRAIN JUNCTION
SCALE: NTS



CONTRACTOR SHALL SHORE TRENCH SIDES WHEN REQUIRED

* PIPE DIA.	TRENCH WIDTH
UP TO 12"	36"
12" TO 24"	I.D. PLUS 24"
GREATER THAN 24"	2 X I.D.

WHERE DIFFERENT FROM THAT INDICATED ON THIS DETAIL, CONTRACTOR SHALL FOLLOW MANUFACTURER RECOMMENDATIONS FOR PIPE TRENCH, BEDDING, AND BACKFILL

CONTRACTOR SHALL SHORE TRENCH SIDES WHEN REQUIRED OR AS ORDERED BY THE ENGINEER

5 C7.46 TYPICAL TRENCH DETAIL
SCALE: NTS

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HVN TWEED NEW HAVEN AIRPORT
AVPORTS
TWEED NEW HAVEN AIRPORT
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REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19475 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 6

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.46

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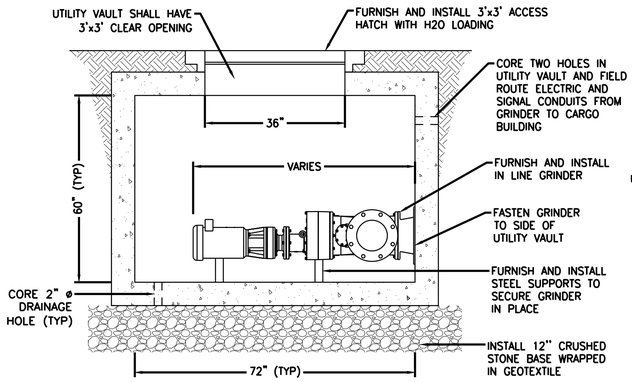
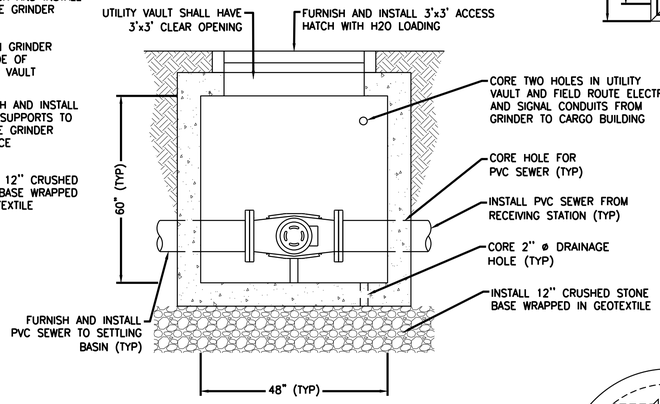


SECTION A–A'



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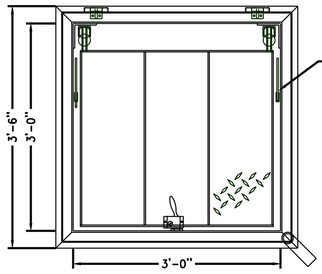
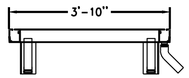
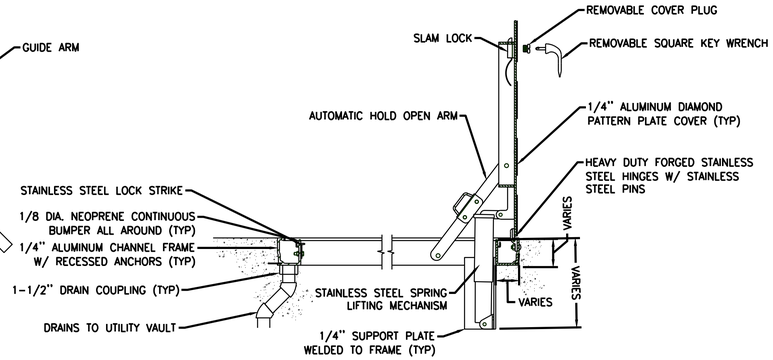


PLAN VIEW



SECTION VIEW (CLOSED)



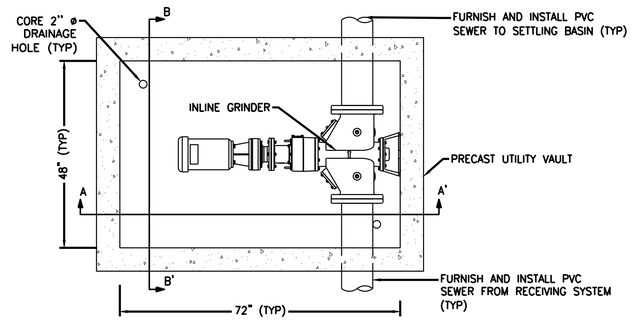
SECTION VIEW (OPEN)

NOTES:

1. THE CONTRACTOR SHALL MOUNT ACCESS HATCH ON THE UTILITY VAULT AS SHOWN ON THE UTILITY VAULT DETAIL.

2 ACCESS HATCH DETAIL

NOT TO SCALE



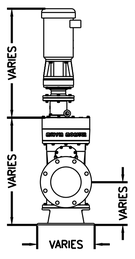
PLAN VIEW

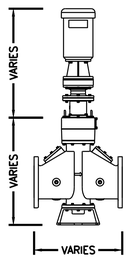
NOTES:

1. THE CONTRACTOR SHALL VERIFY THE LOCATION, DIAMETER, AND ELEVATION OF THE EXISTING GRAVITY SEWER EXITING THE RECEIVING STATION PRIOR TO INSTALLATION OF UTILITY VAULT AND IN LINE GRINDER. THIS INFORMATION SHALL BE DETERMINED PRIOR TO SUBMITTAL OF THE UTILITY VAULT AND GRINDER SHOP DRAWINGS.
2. THE CONTRACTOR SHALL CUT THE EXISTING GRAVITY SEWER FROM THE RECEIVING STATION AND INSTALL A FLANGED CONNECTION ON THE EXISTING GRAVITY SEWER.
3. THE CONTRACTOR SHALL SECURE THE GRINDER USING STEEL SUPPORTS AND EPOXY BOLTS.

1 UTILITY VAULT DETAIL

NOT TO SCALE



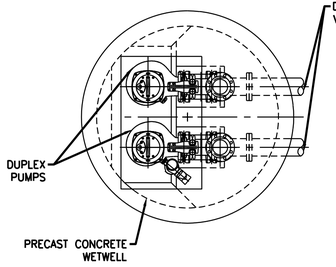


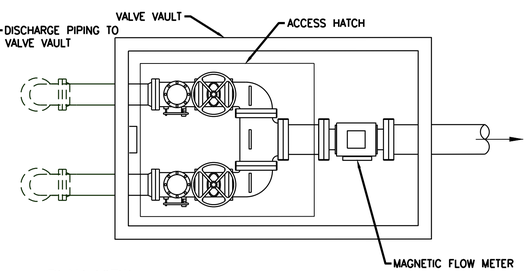
NOTES:

1. THE CONTRACTOR SHALL VERIFY THE INFLUENT PIPE DIAMETER PRIOR TO SUBMISSION OF THE GRINDER SHOP DRAWING.

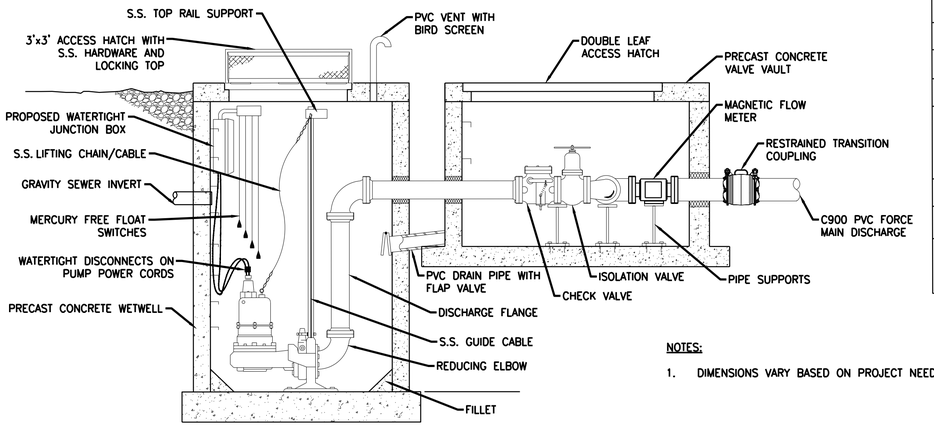
3 IN–LINE GRINDER DETAIL

NOT TO SCALE





PLAN VIEW



SECTION VIEW

PUMP STATION DATA TABLE	
SEWER INLET INV	TBD
WETWELL INV	TBD
WETWELL DIAM.	VARIES
CONTROLS: HIGH ALARM LAG PUMP ON LEAD PUMP ON PUMP OFF	 TBD TBD TBD TBD
DISCHARGE LINE/ FM INV	TBD
PUMP HP, DUPLEX	TBD
PUMP & (IMPELLER), DUPLEX	TBD

NOTES:

1. DIMENSIONS VARY BASED ON PROJECT NEEDS.

4 TYPICAL DUPLEX PUMP STATION DETAIL

NOT TO SCALE

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 7

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.47

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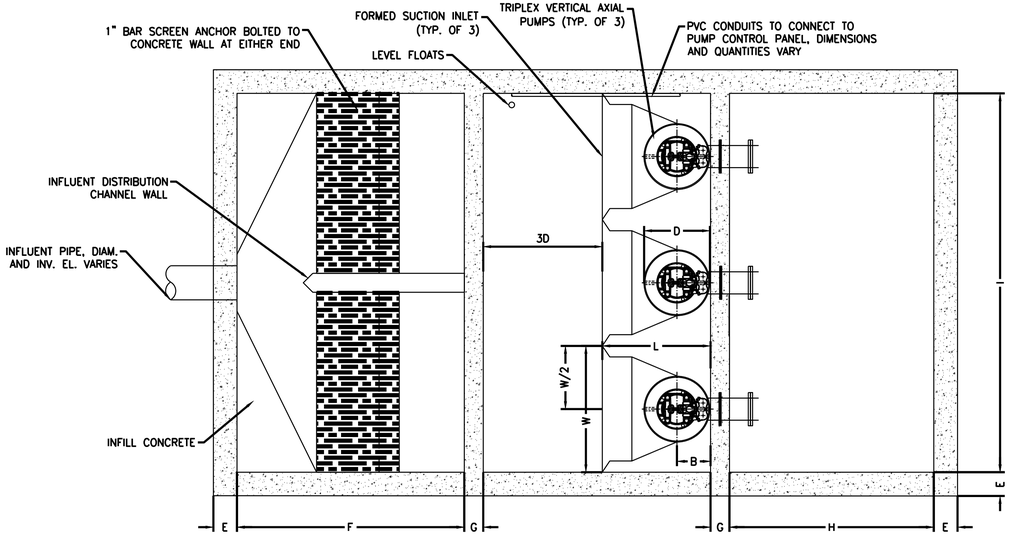
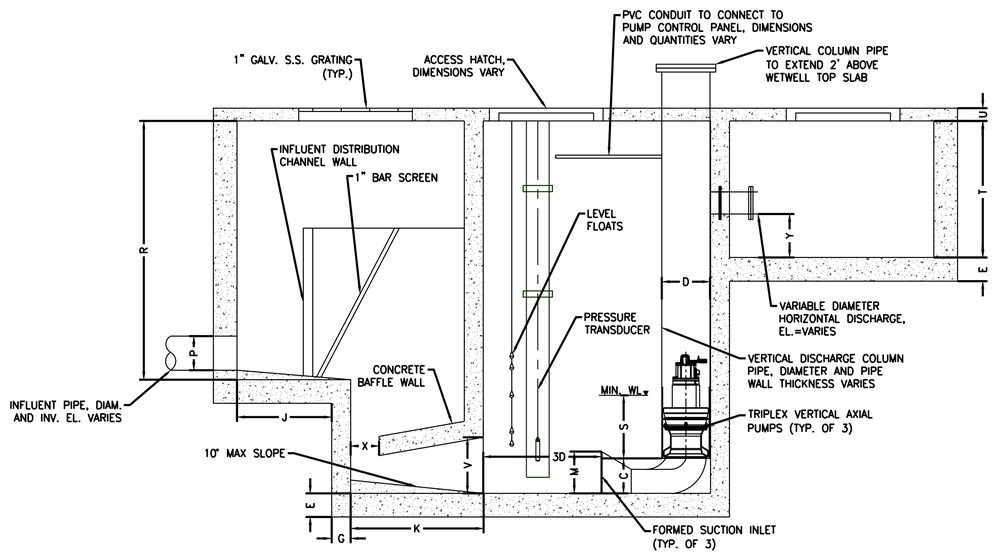


PLAN VIEW



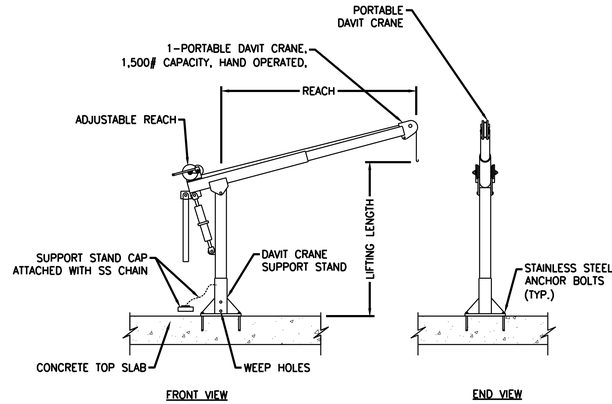
SECTION VIEW

1 TYPICAL STORMWATER AXIAL PUMP STATION
NOT TO SCALE

STORMWATER PUMP STATION DIMENSIONS TABLE		
	PUMP TYPE/STATION NAME	
	PL 7061/ STATION #1	PL 7065/ STATION #2
B	1.31	1.31
C	1.57	1.57
D	2.67	2.67
E	0.67	0.67
F	VARIES	VARIES
G	0.50	0.50
H	5.00	6.00
I	13.00	13.00
J	VARIES	VARIES
K	VARIES	VARIES
L	5.74	5.74
M	2.07	2.07
P	VARIES	VARIES
R	VARIES	VARIES
S	2.62	2.62
T	VARIES	VARIES
U	0.33	0.33
V	VARIES	VARIES
W	4.33	4.33
X	VARIES	VARIES
Y	VARIES	VARIES

STORMWATER PUMP STATION DATA TABLE		
PUMP STATION NAME	STATION #1	STATION #2
INFLUENT INV. EL.	TBD.00'	TBD.00'
WETWELL INV. EL.	TBD.00'	TBD.00'
WETWELL DIMENSIONS	VARIES	VARIES
CONTROLS: HIGH ALARM LAG PUMP ON LEAD PUMP ON PUMP OFF	 TBD.00' TBD.00' TBD.00' TBD.00'	 TBD.00' TBD.00' TBD.00' TBD.00'
HORIZONTAL DISCHARGE EL.	TBD.00'	TBD.00'
PUMP HP, TRIPLEX	70	135
PUMP & (IMPELLER), TRIPLEX	PL 7061/605, (474.6mm)	PL 7065/705, (515mm)

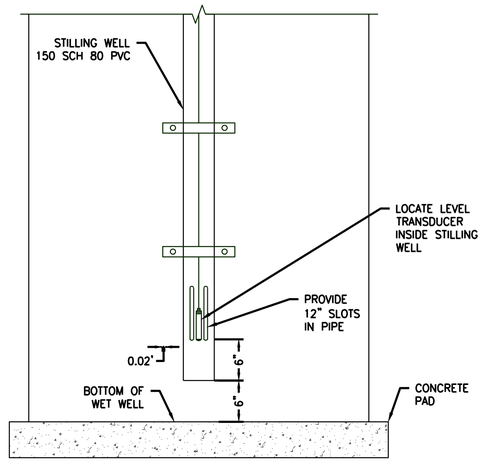
NOTES:
1. FLOAT ELEVATIONS PROVIDED ARE FOR INITIAL SETTINGS, FLOATS TO BE ADJUSTED TO ACCOMMODATE FLOW CONDITIONS.
2. ALL PIPING INSIDE THE WETWELL AND VALVE VAULT SHALL BE CLASS 52 DUCTILE IRON PIPE UNLESS NOTED OTHERWISE.



FRONT VIEW END VIEW

NOTE:
1. COORDINATE REACH ADJUSTMENT, CAPACITY, SOCKET AND LOCATIONS LIFTING LENGTH WITH PUMPS WITH MATCHING EMBEDDED SOCKETS.
2. SUPPORT STAND SHALL BE PROVIDED WITH STAND CAP AND WEEP HOLES ON ALL SIDES TO PREVENT WATER ACCUMULATION.

2 DAVIT CRANE
NOT TO SCALE



3 PRESSURE TRANSDUCER
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STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 19478 LICENSED PROFESSIONAL ENGINEER

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US0025063.0769	WSP
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SHEET TITLE
UTILITY DETAILS 8

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.48

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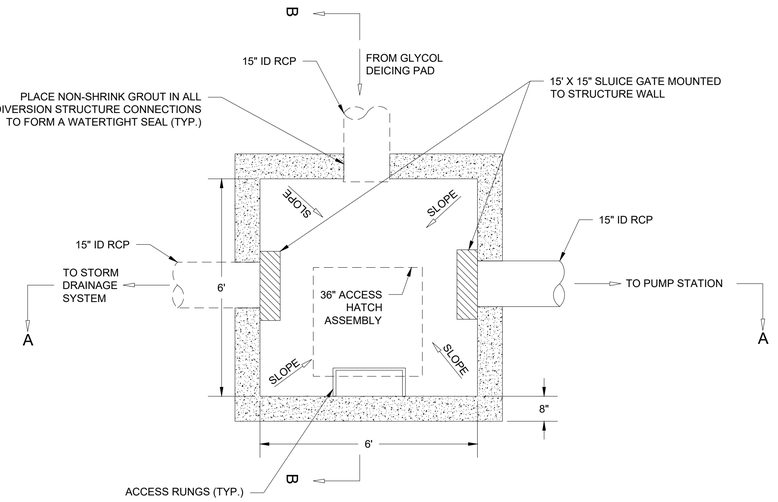
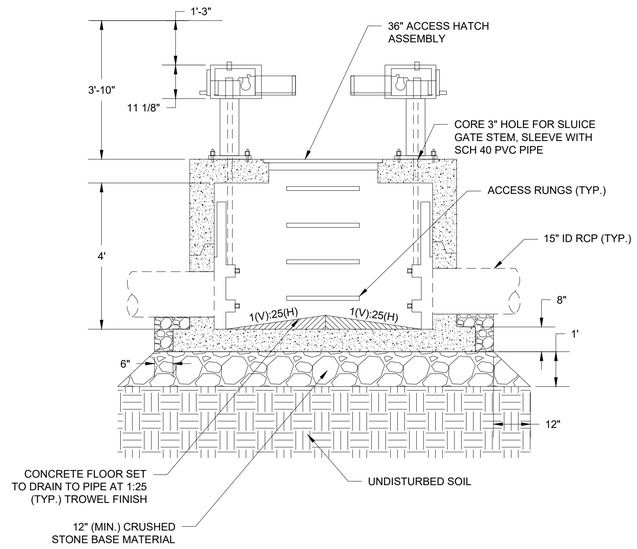


PLAN VIEW

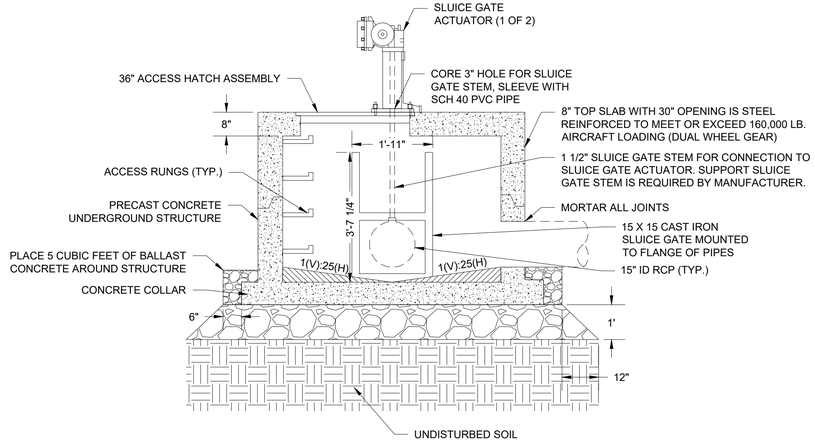
DIVERSION STRUCURE NOTE:

1. ALL LIFTING HOLES MUST BE PLUGGED WITH NON-SHRINK GROUT.
2. REINFORCING STEEL MUST CONFORM TO THE LATEST ASTM A-185 SPECIFICATIONS. 0.18 SQ.IN. PER LINEAR FEET.
3. CONCRETE COMPRESSIVE STRENGTH IS 4,000 PSI MINIMUM.
4. HAND CONCRETE FORM WORK MUST NOT INTERFERE WITH THE OPERATION OF THE SLUICE GATE.
5. PRECAST STRUCTURE MUST BE MADE USING TYPE V CEMENT.

NOTE:
IMMEDIATELY PRIOR TO THE END OF CONSTRUCTION OR ACCEPTANCE BY THE OWNER, THE CONTRACTOR MUST INSPECT ALL ON-SITE BASINS LOCATED WITHIN THE CONSTRUCTION AREA, AND CLEAN AND FLUSH AS NECESSARY.



SECTION A-A



SECTION B-B

1 C7.49 DIVERSION STRUCTURE DETAIL
SCALE: NTS

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UTILITY DETAILS 9

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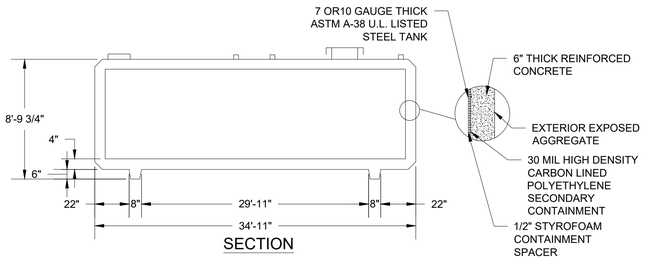
SHEET NUMBER
C7.49



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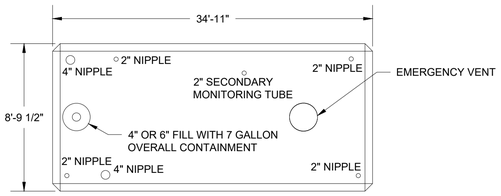
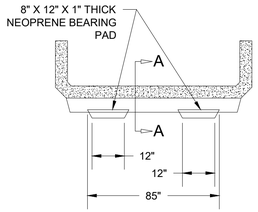
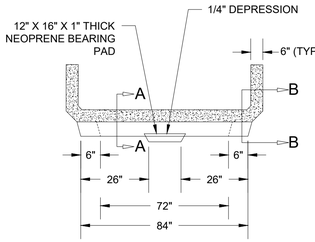


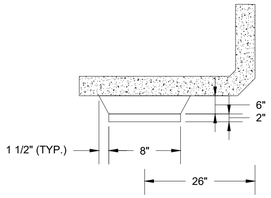
OUTLET PLAN



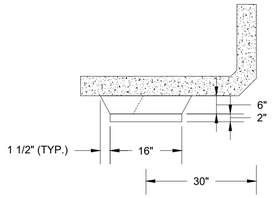
SUPPORT LEG WITH 2 PADS



SUPPORT LEG WITH 1 PAD



SECTION A-A



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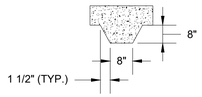


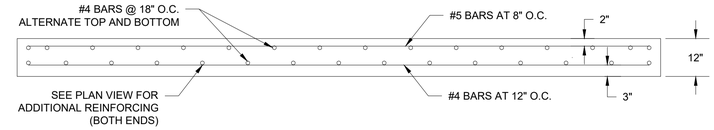
SECTION B-B

NOTE:

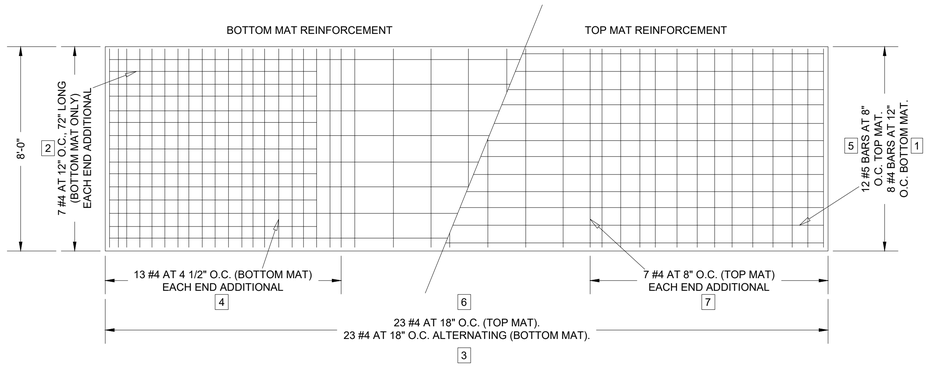
1. STEEL TANK MUST BE U.L. LISTED FOR ABOVE GROUND STORAGE OF FLAMMABLE LIQUIDS.
2. STEEL TANK SKIN MUST BE 7 OR 10 GAUGE THICK ASTM A-38 STEEL PLATE.
3. STEEL TANK AND SECONDARY CONTAINMENT MUST BE ENCASED IN 6" OF REINFORCED CONCRETE. CONCRETE COMPRESSIVE STRENGTH - 5,000 PSI @ 28 DAYS.
4. THE VAULT MUST BE OF A MONOLITHIC (SEAMLESS AND CONTINUOUS) CONCRETE POUR AND CONTAIN NO COLD JOINTS OR HEAT SINKS (HEAT TRANSFER POINTS) ON THE BOTTOM OR SIDES.
5. THE SECONDARY CONTAINMENT MUST CONSIST OF A 30 MIL HIGH-DENSITY CARBON LINED POLYETHYLENE GEO-MEMBRANE.

1 C7.50 CONVAULT SLAB DETAILS

SCALE: NTS



SECTION - SLAB REINFORCING



PLAN - SLAB REINFORCING NOTES:

1. CONCRETE COMPRESSIVE STRENGTH = 5,000 PSI @ 28 DAYS.
2. REINFORCING STEEL MUST COMPLY WITH ASTM A815 GRADE OR ASTM A806 GRADE. BAR BENCING AND PLACEMENT MUST COMPLY WITH LATEST ACI STANDARDS.
3. LIFTING INSERTS FOR HANDLING MUST BE INSTALLED PER MANUFACTURERS REQUIREMENTS.
4. APPROXIMATE SLAB WEIGHT: 41,000 LBS.
5. MIN. SOIL BEARING CAPACITY: 3,000 PSF.

[#] ORDER IN WHICH REBAR MUST BE PLACED

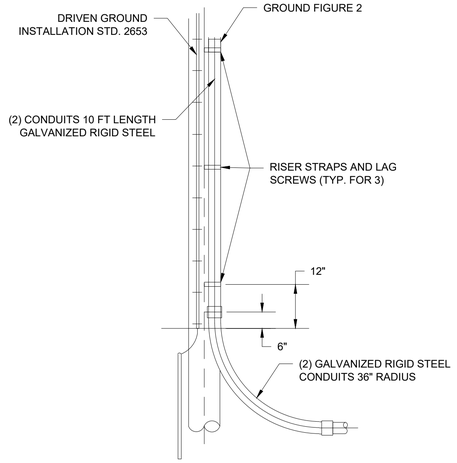


FIGURE 1 - GENERAL ARRANGEMENT:

1. RISER PIPES ARE LOCATED ON A STREET QUARTER OF POLE AND WHEN POSSIBLE ON THE QUARTER AWAY FROM APPROACHING TRAFFIC.
2. LEAVE 30FT OF CABLE SLACK AT POLE TOP FOR CONNECTION BY UTILITY CO.

2 C7.50 RISER POLE DETAIL

SCALE: NTS

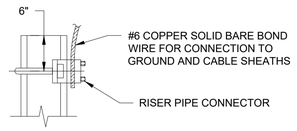
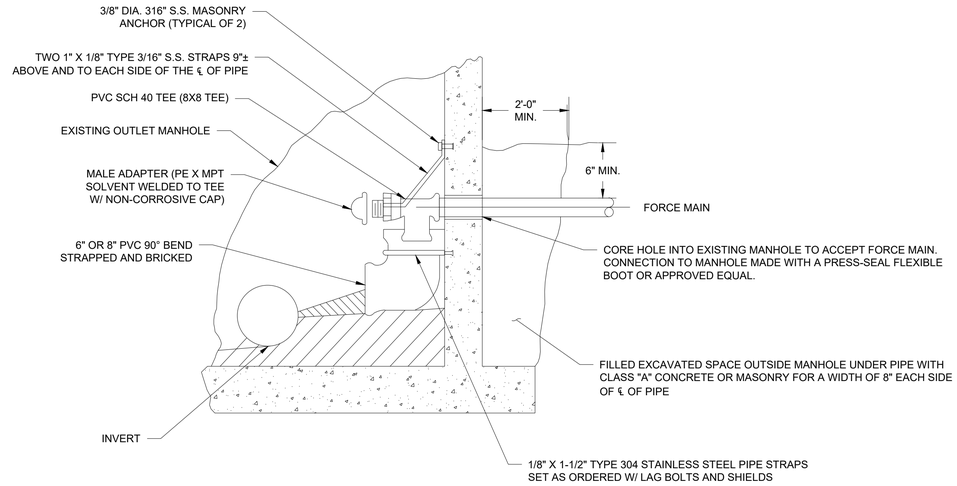


FIGURE 2 - GROUNDING OF METAL RISER PIPE:

GROUND METAL RISER PIPE TO ARRESTER GROUND LEAD IF AVAILABLE. OTHERWISE, INSTALL A DRIVEN GROUND WITH GROUND WIRE AND MOLDING EXTENDING TO TOP OF STEEL PIPE.



3 C7.50 OUTLET MANHOLE DETAIL FROM FORCE MAIN

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155 BURR STREET
EAST HAVEN, CT
06512

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US00025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

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UTILITY DETAILS 10

DATE	DRN BY	CHK BY	APP BY
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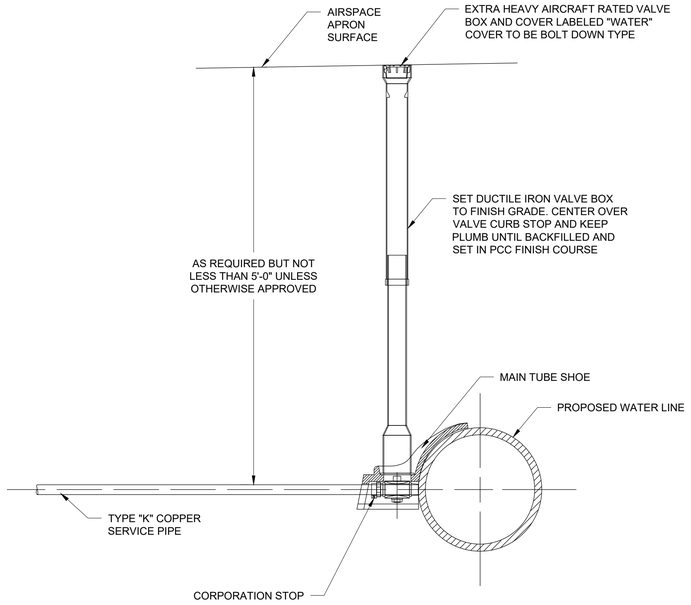
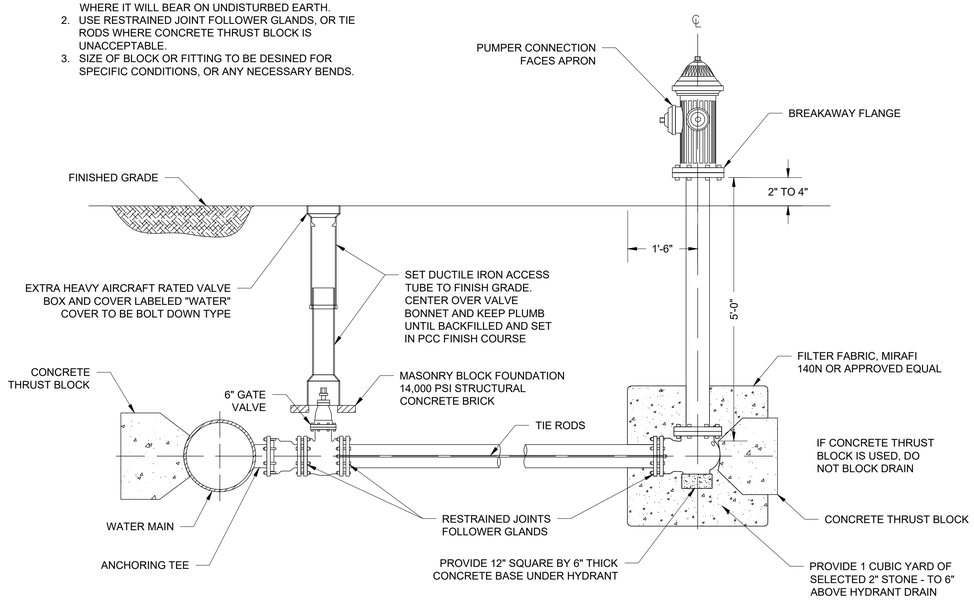


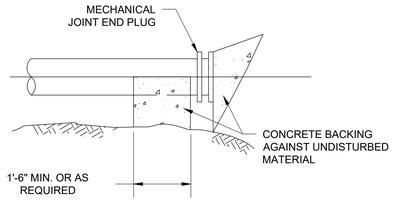
NOTE:
1. WATER SERVICE REQUIRES A CORPORATION STOP ONLY AT THE MAIN AND MUST BE PROVIDED WITH ROADWAY BOX TO SURFACE.
2. REFER TO WATER MAIN DETAIL FOR INSTALLATION.
3. SITE CONTRACTOR TO COORDINATE WATER SERVICE CONNECTION WITH PLUMBER, PROVIDING CAPPED COPPED SERVICE TO 3 FEET ABOVE GRADE AT SERVICE LOCATION.

1 C7.51 WATER SERVICE CONNECTION
SCALE: NTS

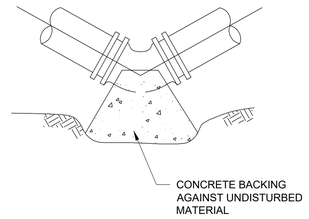
NOTE:
1. CONCRETE THRUST BLOCK TO BE USED ONLY WHERE IT WILL BEAR ON UNDISTURBED EARTH.
2. USE RESTRAINED JOINT FOLLOWER GLANDS, OR TIE RODS WHERE CONCRETE THRUST BLOCK IS UNACCEPTABLE.
3. SIZE OF BLOCK OR FITTING TO BE DESINED FOR SPECIFIC CONDITIONS, OR ANY NECESSARY BENDS.



2 C7.51 FIRE HYDRANT DETAIL
SCALE: NTS

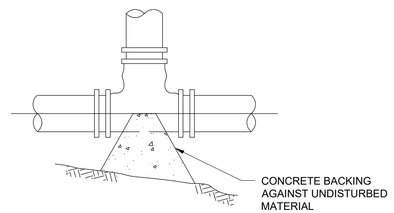


TYPICAL PLUG



TYPICAL BEND

TABLE OF BEARING AREAS IN SQUARE FEET AGAINST UNDISTURBED MATERIAL FOR WATER MAIN FITTINGS			
SZE OF MAIN (IN.)	45° BEND	TEES AND PLUGS	22 1/2° BEND
8" AND LESS	4	5	2
10"	6	8	3
12"	9	12	5
16"	12	16	7



TYPICAL TEE

3 C7.51 CONCRETE THRUST BLOCKS
SCALE: NTS

NOTE:
1. ALL FITTINGS, BENDS, TEES, DEAD ENDS, ETC. MUST BE DUALLY RESTRAINED PROVIDED WITH MECHANICAL JOINT RESTRAINTS IN ADDITION TO THRUST BLOCKS.

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C7.51

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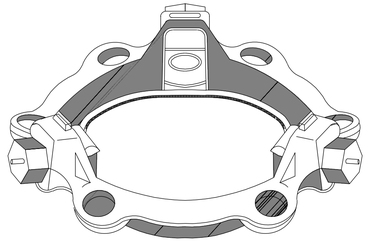
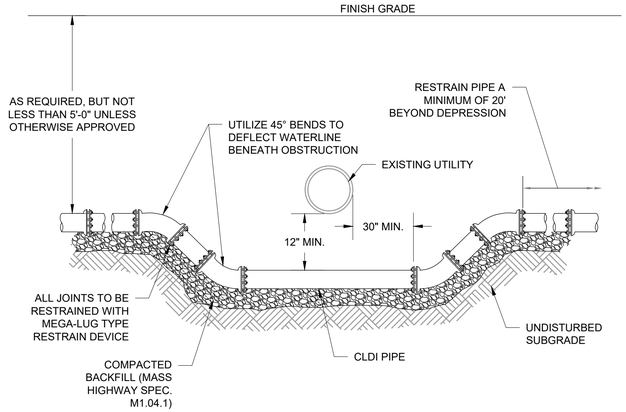
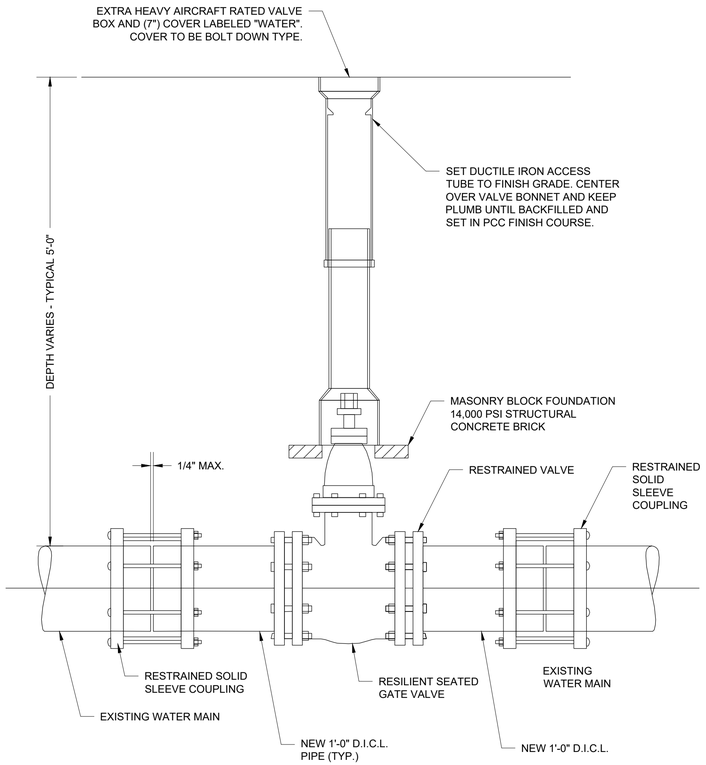


1 C7.50 TYPICAL MEGA-LUG TYPE RESTRAINT DEVICE
SCALE: NTS

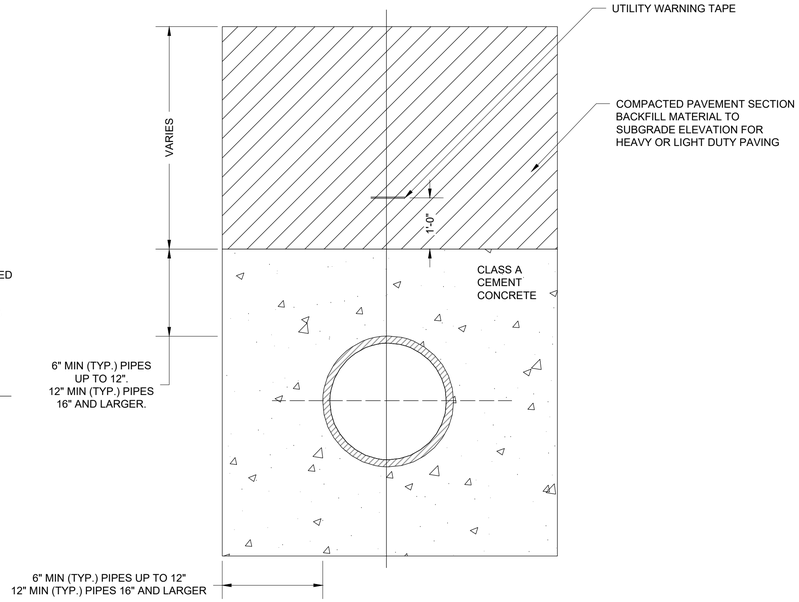


REFER TO THE ONSITE WATER MAIN TRENCH DETAIL FOR BACKFILL AND INSTALLATION.

2 C7.52 DEPRESS WATERLINE
SCALE: NTS



3 C7.52 TYPICAL GATE VALVE INSTALLATION UP TO 20" IN EXISTING WATER MAIN
SCALE: NTS



4 C7.52 WATER, SEWER OR DRAIN CONCRETE ENCASEMENT DETAIL
SCALE: NTS

NOTE:
1. BACKFILL REQUIREMENTS MUST CONFORM WATER MAIN TRENCH DETAIL.
2. ENCASEMENT MUST BE USED ON ALL WATER MAINS WHERE SEPARATION FROM FUELING OR SANITARY IS LASS THAN 10 FEET SIDEWALL TO SIDEWALL. CONCRETE ENCASEMENT TO CARRY 10 FEET LINEAR BEYOND POINT OF CONFLICT.

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT RICHARD L. PETRELLI No. 19478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 12

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.52

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\ARPHELPLOTSHEETS\240400769-C7.41-C7.76.dwg

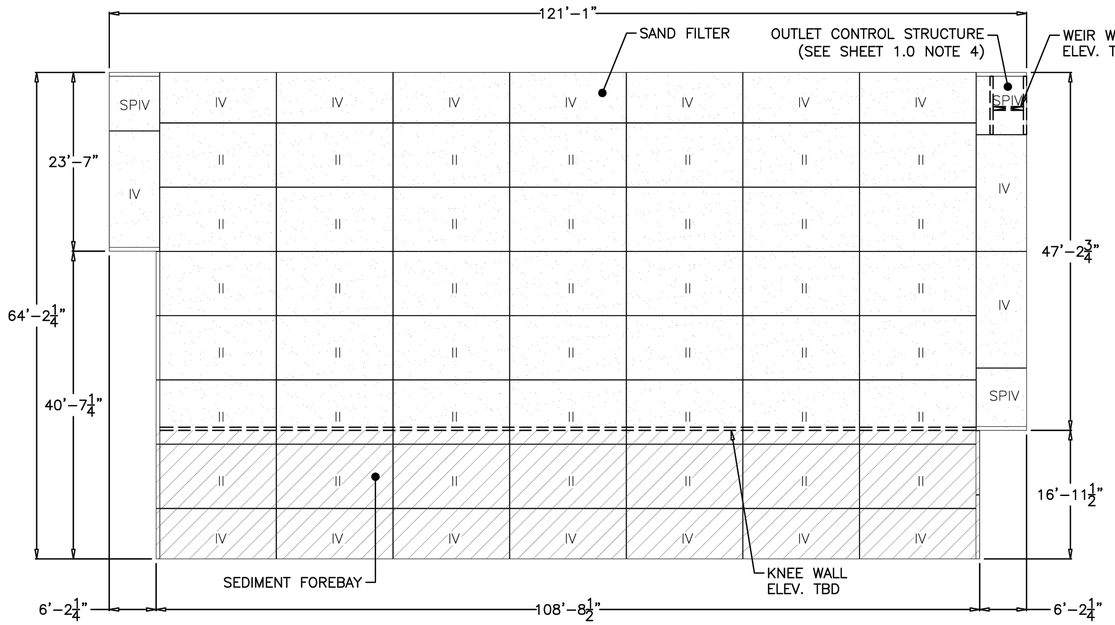
BILL OF MATERIALS

QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
42	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
17	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
3	SPIV	4'–0" SINGLETRAP	VARIES
6	T2 PANEL	6" THICK PANEL	2843
5	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
13	JOINTWRAP	150' PER ROLL	
32	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 62			
TOTAL PANELS = 11			
HEAVIEST PICK WEIGHT = 16,802			

N

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–A1

East Haven, CT

CURRENT ISSUE DATE:

02/18/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:

2.0

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

TWEED NEW HAVEN AIRPORT
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EAST HAVEN, CT 06512
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REGISTRATION



DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 13

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.53

H:\N - 2/26/2025 3:45:35 PM - C:\Users\USBF730207\DOCACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\8.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL
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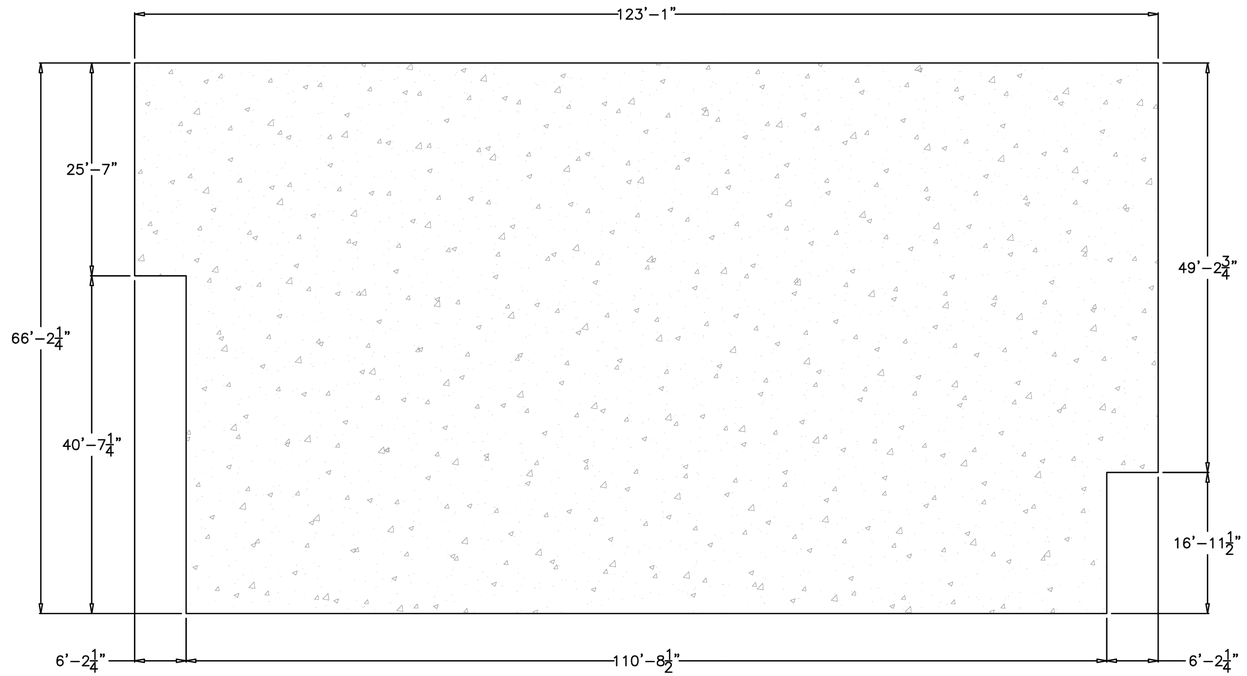
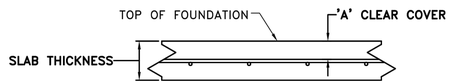


CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'–0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
7. DIMENSION OF STORMTRAP SYSTEM ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
8. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
9. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.



STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)

MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'–6" – 1'–0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'–1" – 2'–0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'–1" – 3'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'–1" – 4'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'–1" – 5'–0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'–1" – 6'–0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'–1" – 7'–0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'–1" – 8'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'–1" – 9'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'–1" – 10'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

StormTrap
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ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

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500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–A1

East Haven, CT

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1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 14

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.54

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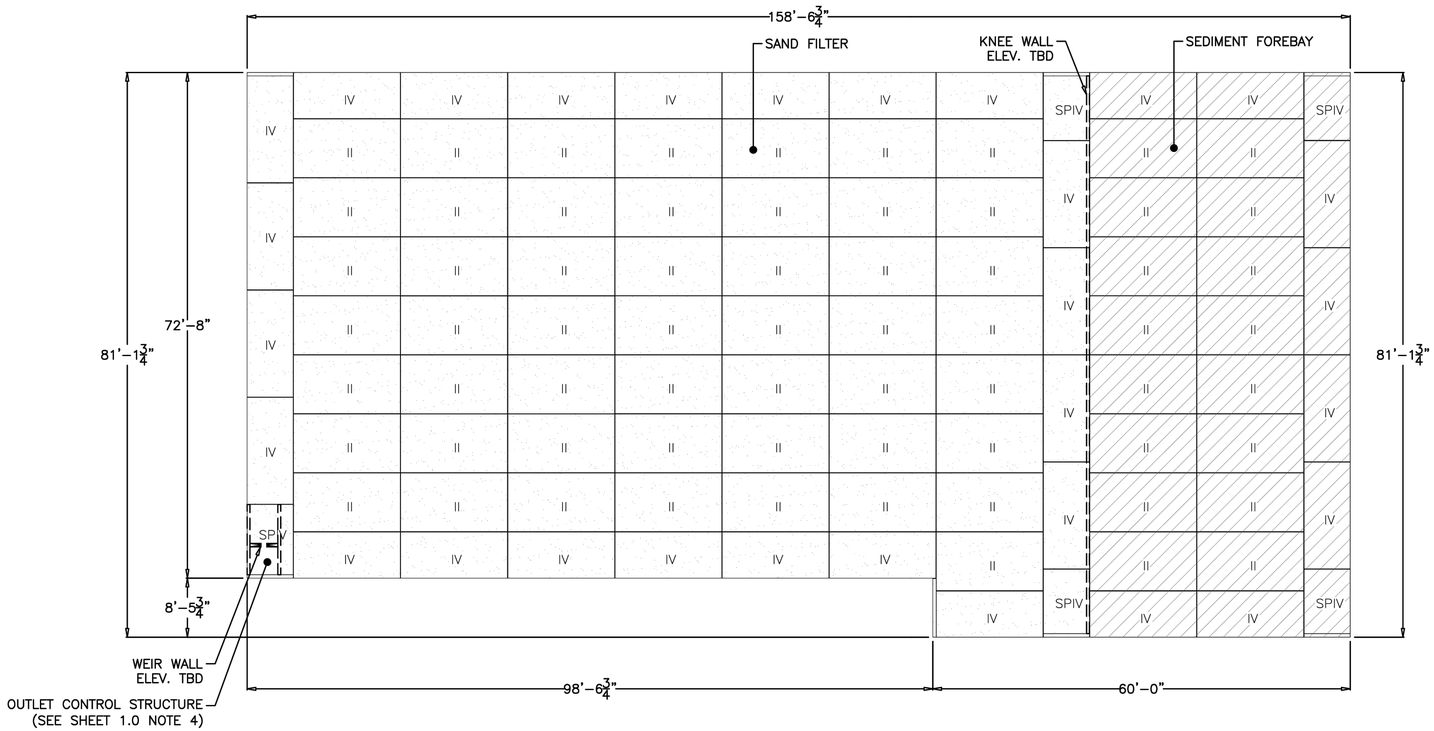
BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
66	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
30	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
5	SPIV	4'–0" SINGLETRAP	VARIES
1	T2 PANEL	6" THICK PANEL	2843
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
19	JOINTWRAP	150' PER ROLL	
48	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 101			
TOTAL PANELS = 7			
HEAVIEST PICK WEIGHT = 16,802			

N

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



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P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

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500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–A2

East Haven, CT

CURRENT ISSUE DATE:

02/18/2025

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REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:

2.0

CLIENT
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REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19475 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 15

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.55

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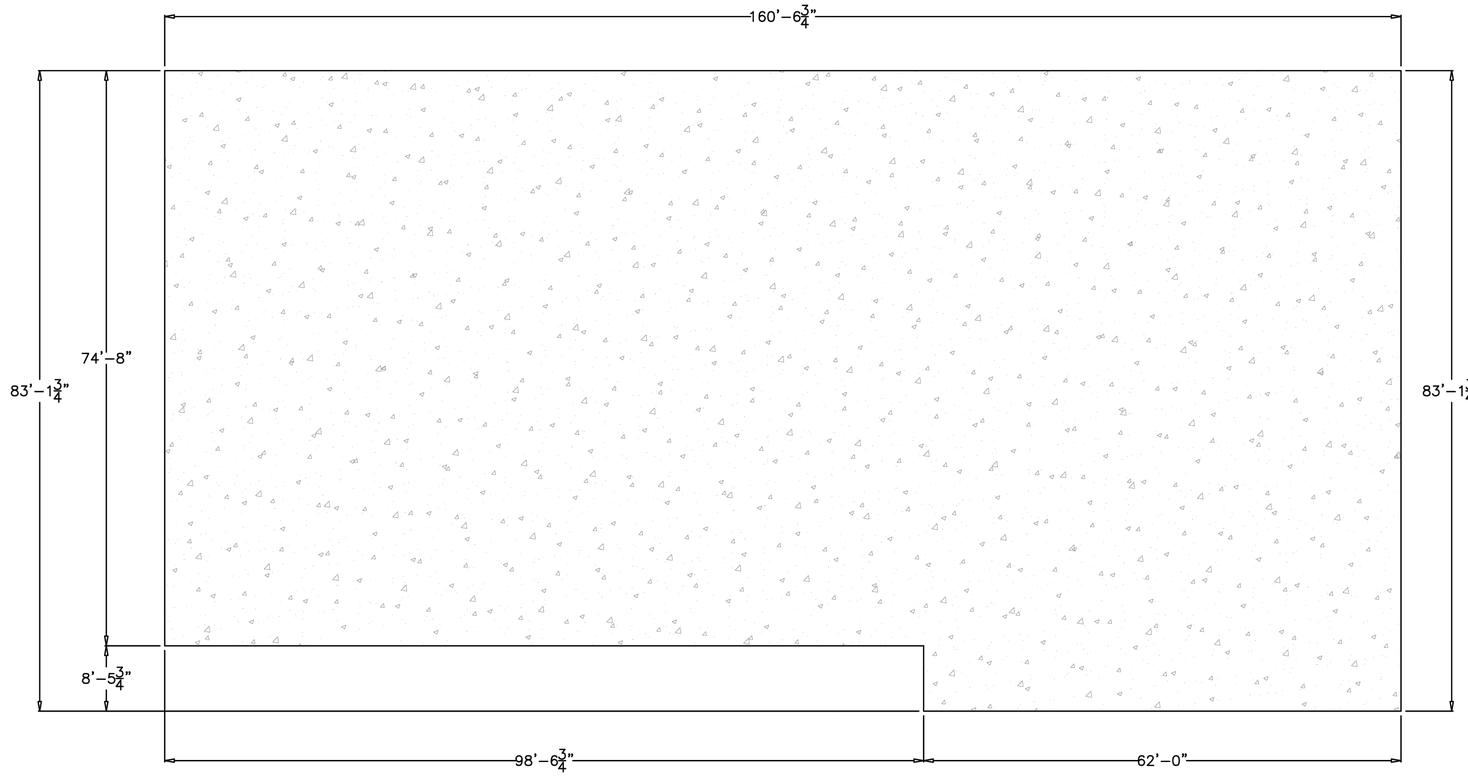
AIRFIELD\PLOTSHEETS\260240769-G7.41_C7.75.dwg



CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'–0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
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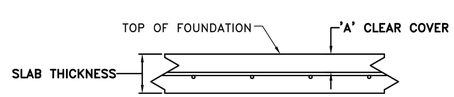

STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)

MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'–6" – 1'–0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'–1" – 2'–0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'–1" – 3'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'–1" – 4'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'–1" – 5'–0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'–1" – 6'–0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'–1" – 7'–0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'–1" – 8'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'–1" – 9'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'–1" – 10'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

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ENGINEER INFORMATION:

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1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS
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CONSULTANT

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REGISTRATION



DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 16

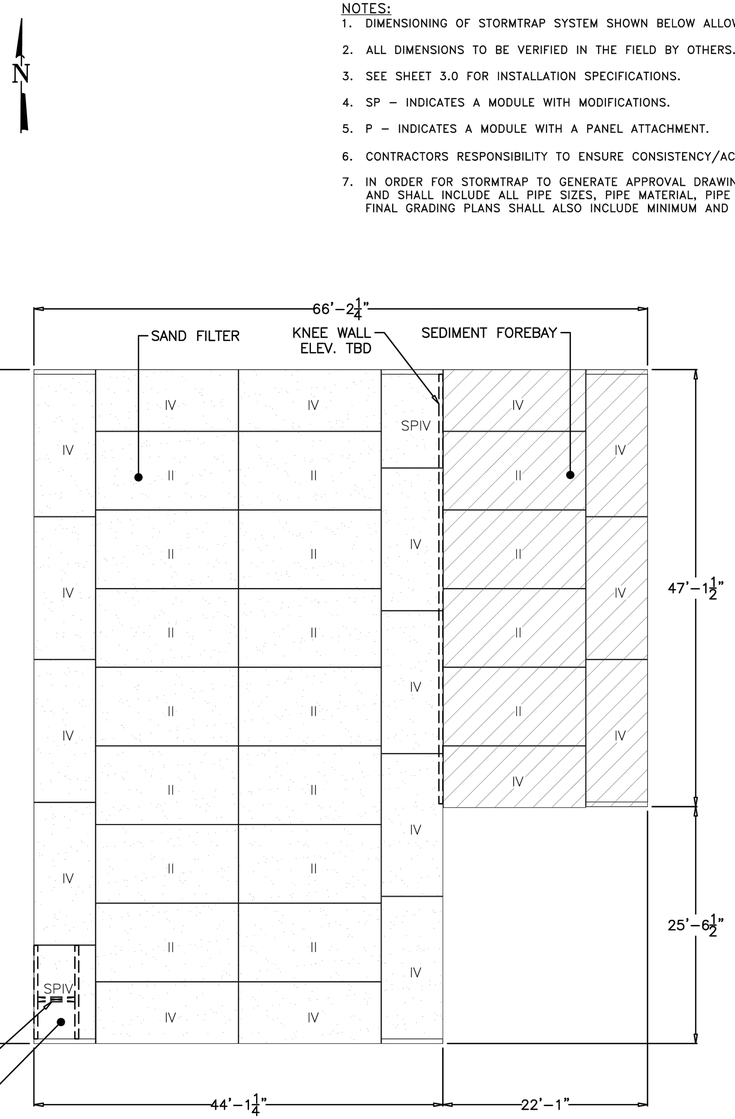
DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.56

HVN - 2/26/2025 3:45:35 PM - C:\Users\USBF73020\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C7.41_C7.76.dwg

BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
18	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
17	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
2	SPIV	4'–0" SINGLETRAP	VARIES
0	T2 PANEL	6" THICK PANEL	–
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
8	JOINTWRAP	150' PER ROLL	
32	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 37			
TOTAL PANELS = 6			
HEAVIEST PICK WEIGHT = 16,802			



DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–A3

East Haven, CT

CURRENT ISSUE DATE:

02/18/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:

2.0

CLIENT
HVN TWEED NEW HAVEN AIRPORT
AVPORTS
TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT
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WSP USA
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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 17

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.57

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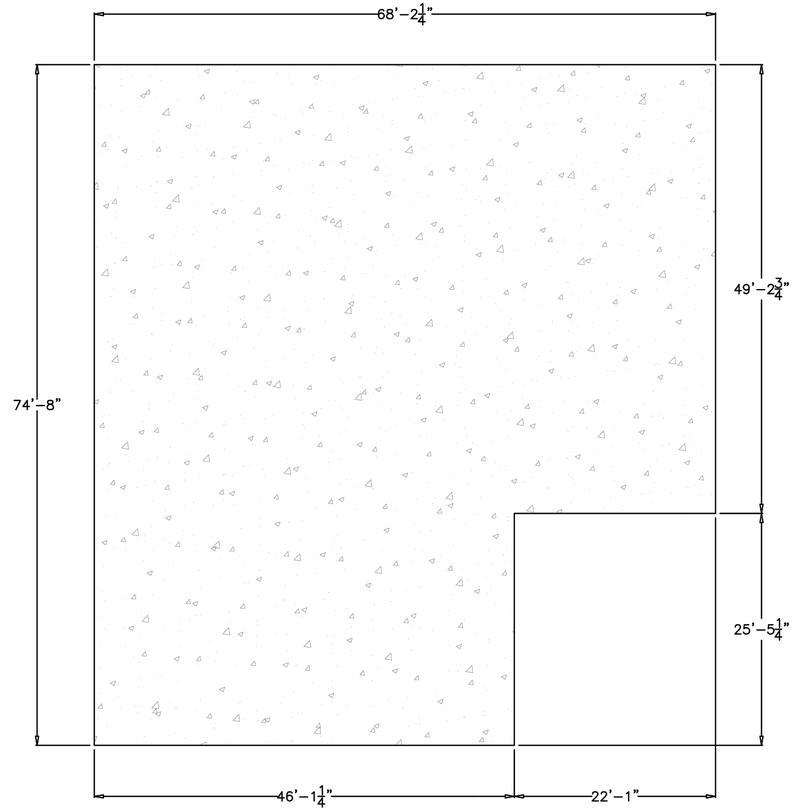
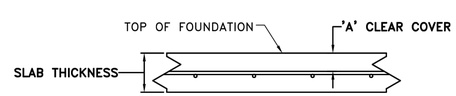


CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%-8% ENTRAINED AIR, 3"-5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'-0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
7. DIMENSION OF STORMTRAP SYSTEM ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
8. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
9. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.



STORMTRAP FOUNDATION DETAIL

HS-20 & HS-25 LOADING - (ACI 318, ST2)

MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'-6" - 1'-0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'-1" - 2'-0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'-1" - 3'-0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'-1" - 4'-0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'-1" - 5'-0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'-1" - 6'-0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'-1" - 7'-0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'-1" - 8'-0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'-1" - 9'-0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'-1" - 10'-0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860-659-0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF-A3

East Haven, CT

CURRENT ISSUE DATE:

02/18/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS
TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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ARCHITECT

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CONSULTANT

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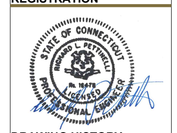
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION



DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 18

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.58

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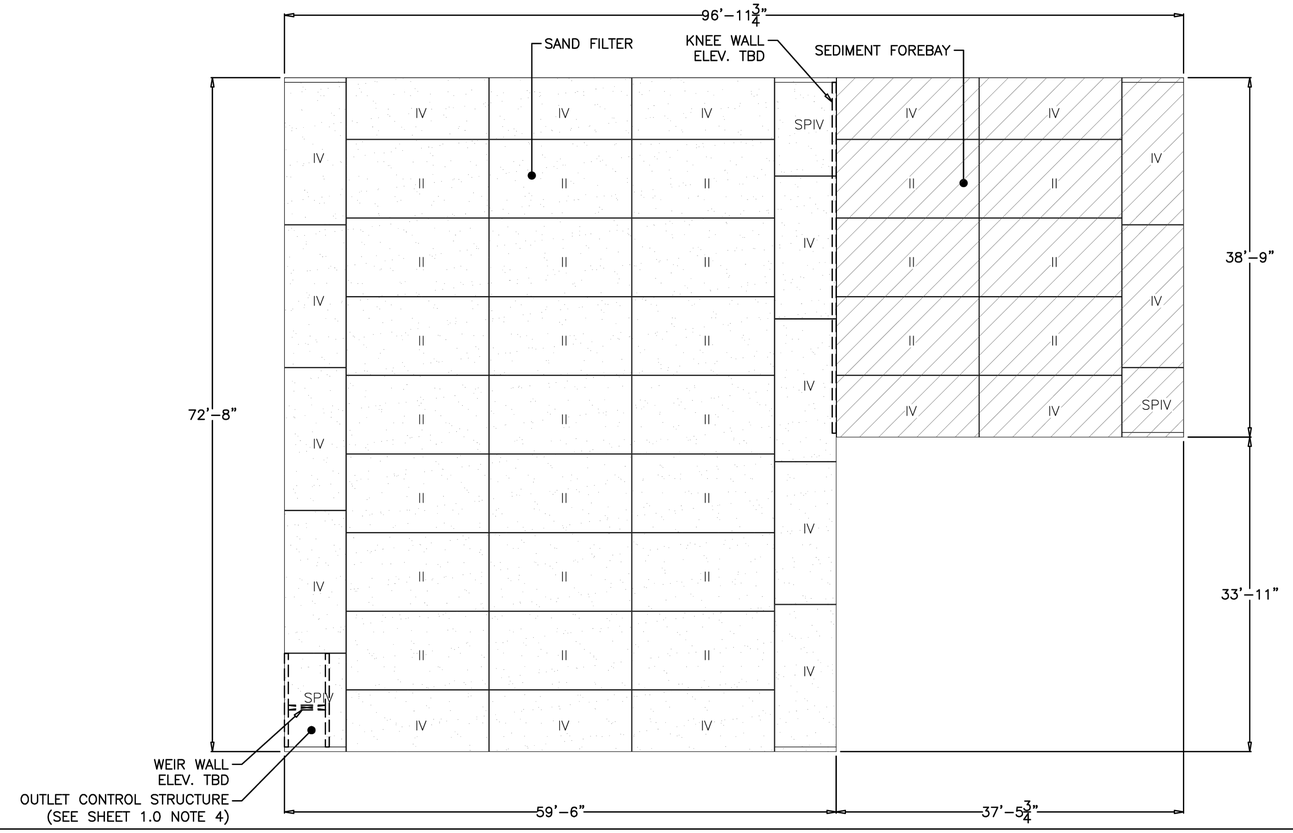
BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
27	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
20	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
3	SPIV	4'–0" SINGLETRAP	VARIES
0	T2 PANEL	6" THICK PANEL	–
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
10	JOINTWRAP	150' PER ROLL	
32	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 50			
TOTAL PANELS = 6			
HEAVIEST PICK WEIGHT = 16,802			

N

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–5
East Haven, CT

CURRENT ISSUE DATE:
02/21/2025

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:
NTS

SHEET TITLE:
SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:
2.0

CLIENT
TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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3131 Briarpark Dr.
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CONSULTANT
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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETRIELLO · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 19

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.59

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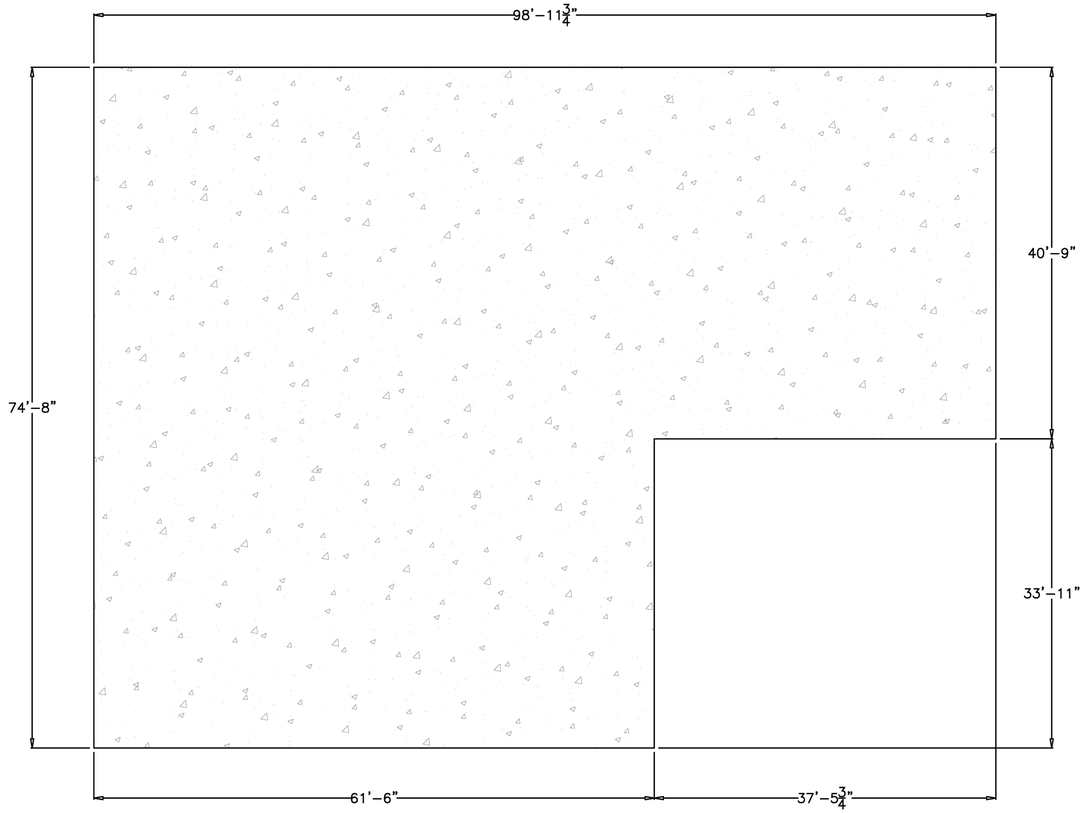


StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860-659-0444

PROJECT INFORMATION:

Tweed New Haven
Airport East Terminal
SF-5
East Haven, CT

CURRENT ISSUE DATE:

02/21/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

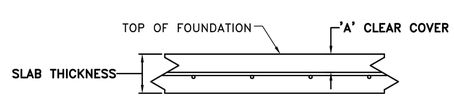
SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%-8% ENTRAINED AIR, 3"-5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'-0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
7. DIMENSION OF STORMTRAP SYSTEM ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
8. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
9. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.



STORMTRAP FOUNDATION DETAIL

HS-20 & HS-25 LOADING - (ACI 318, ST2)

MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'-6" - 1'-0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'-1" - 2'-0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'-1" - 3'-0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'-1" - 4'-0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'-1" - 5'-0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'-1" - 6'-0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'-1" - 7'-0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'-1" - 8'-0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'-1" - 9'-0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'-1" - 10'-0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

CLIENT

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AVPORTS
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION



DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 20

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.60

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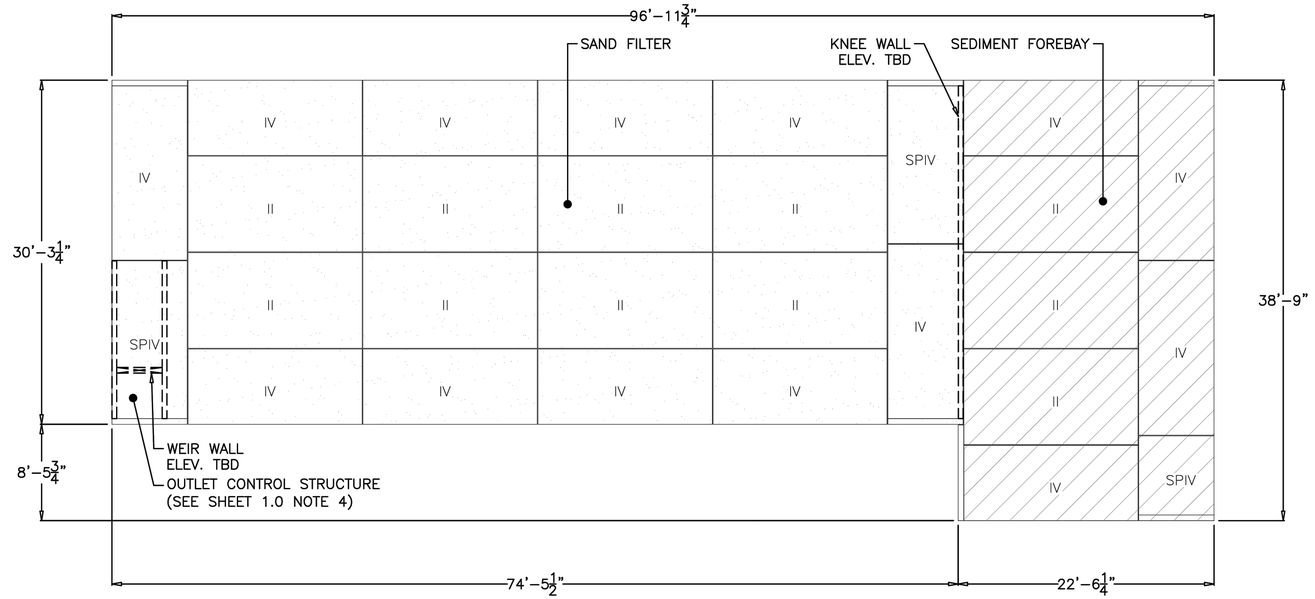
BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
11	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
14	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
3	SPIV	4'–0" SINGLETRAP	VARIES
1	T2 PANEL	6" THICK PANEL	2843
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
6	JOINTWRAP	150' PER ROLL	
24	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 28			
TOTAL PANELS = 7			
HEAVIEST PICK WEIGHT = 16,802			

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860-659-0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF-8

East Haven, CT

CURRENT ISSUE DATE:

02/21/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:

2.0

CLIENT

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AVPORTS

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · REGISTERED · PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 21

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.61

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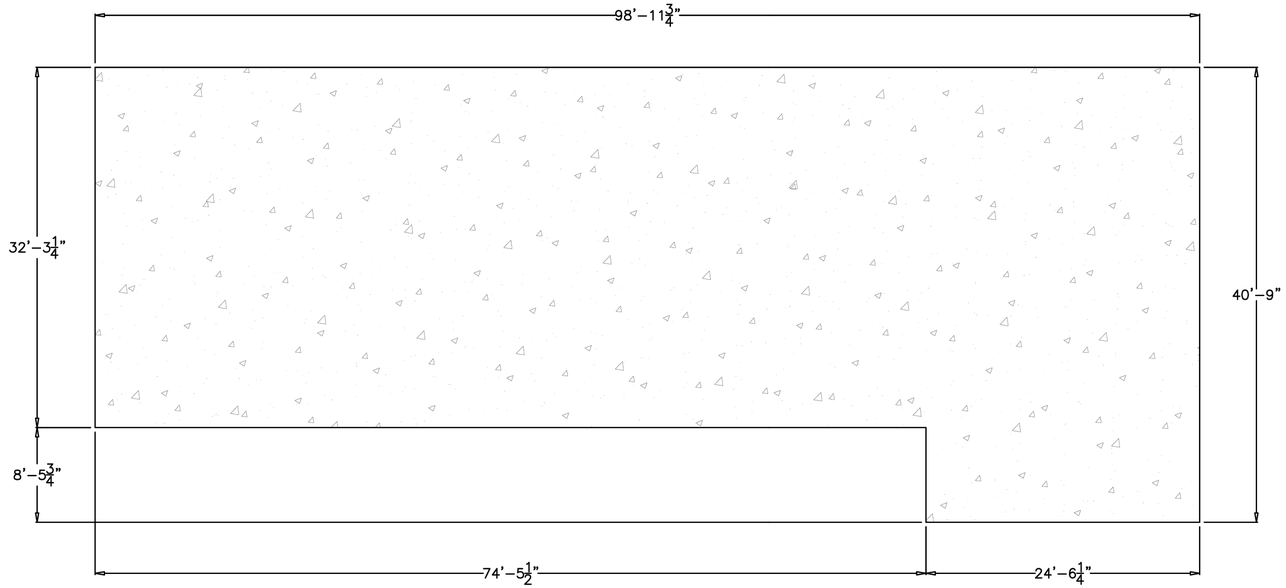

CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
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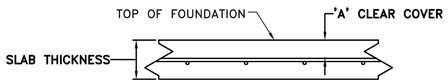

STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)				
MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'–6" – 1'–0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'–1" – 2'–0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'–1" – 3'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'–1" – 4'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'–1" – 5'–0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'–1" – 6'–0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'–1" – 7'–0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'–1" – 8'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'–1" – 9'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'–1" – 10'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–8

East Haven, CT

CURRENT ISSUE DATE:

02/21/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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3131 Briarpark Dr.
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F 713 622 1444
www.pgal.com

CONSULTANT

wsp

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 18478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 22

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.62

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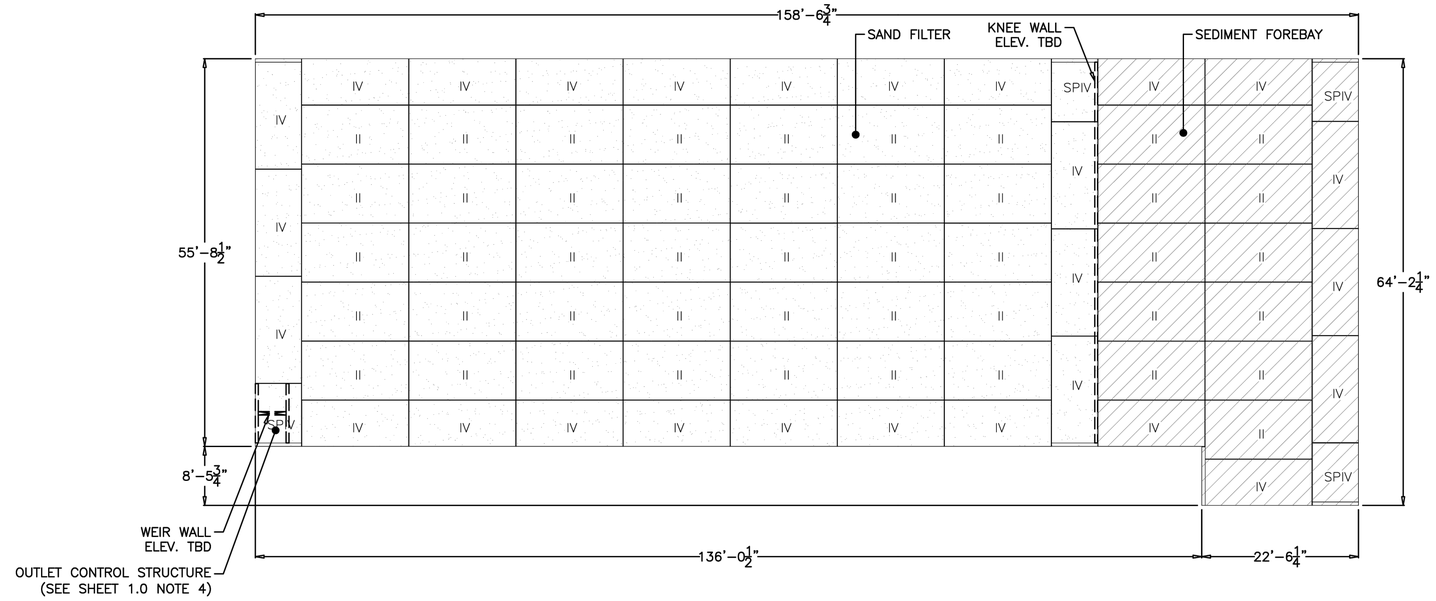
AIRFIELD\PLOTSHEETS\20240918-07:41-C7.75.dwg

BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
46	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
27	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
4	SPIV	4'–0" SINGLETRAP	VARIES
1	T2 PANEL	6" THICK PANEL	2843
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
15	JOINTWRAP	150' PER ROLL	
40	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 77			
TOTAL PANELS = 7			
HEAVIEST PICK WEIGHT = 16,802			

N

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



StormTrap
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1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:
WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:
Tweed New Haven Airport East Terminal SF–3
East Haven, CT

CURRENT ISSUE DATE:
02/21/2025

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:
NTS

SHEET TITLE:
SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:
2.0

CLIENT
HVN TWEED NEW HAVEN AIRPORT
AVPORTS
TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19473 · LICENSED · PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 23

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.63

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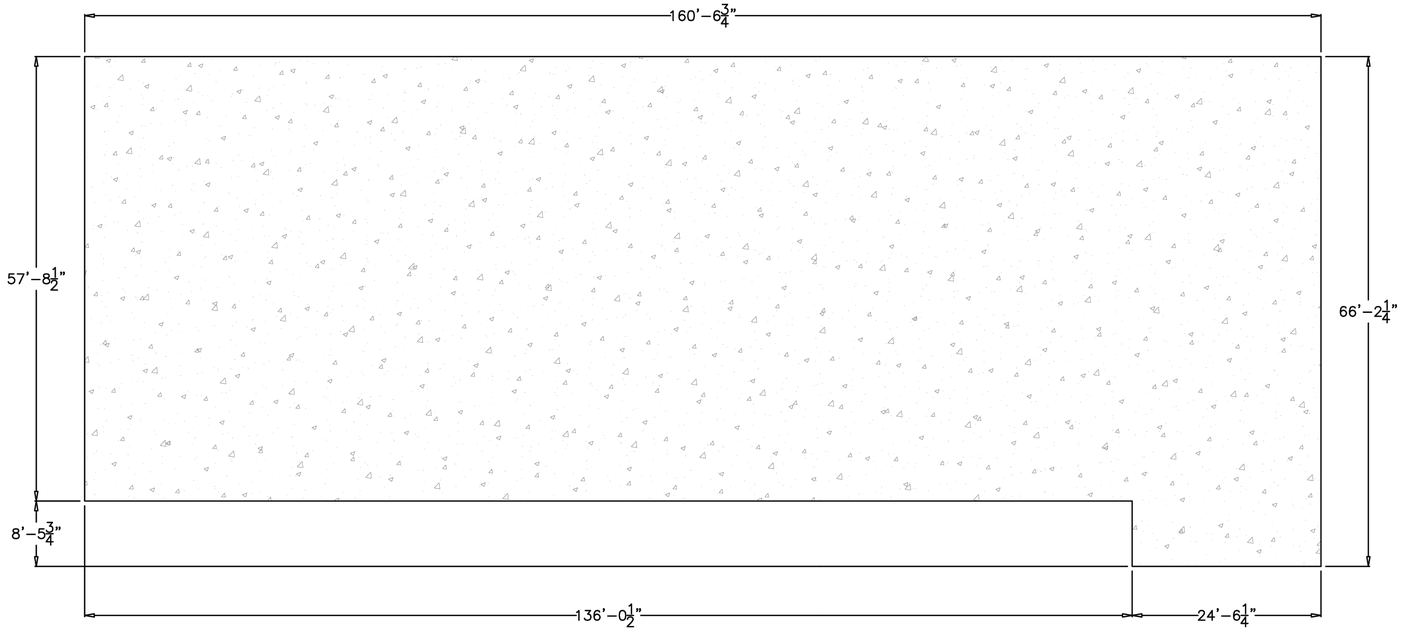
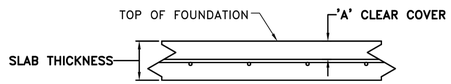


CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'–0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
7. DIMENSION OF STORMTRAP SYSTEM ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
8. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
9. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.



STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)				
MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'–6" – 1'–0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'–1" – 2'–0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'–1" – 3'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'–1" – 4'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'–1" – 5'–0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'–1" – 6'–0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'–1" – 7'–0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'–1" – 8'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'–1" – 9'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'–1" – 10'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860-659-0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–3

East Haven, CT

CURRENT ISSUE DATE:

02/21/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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CONSULTANT

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION



DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 24

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.64

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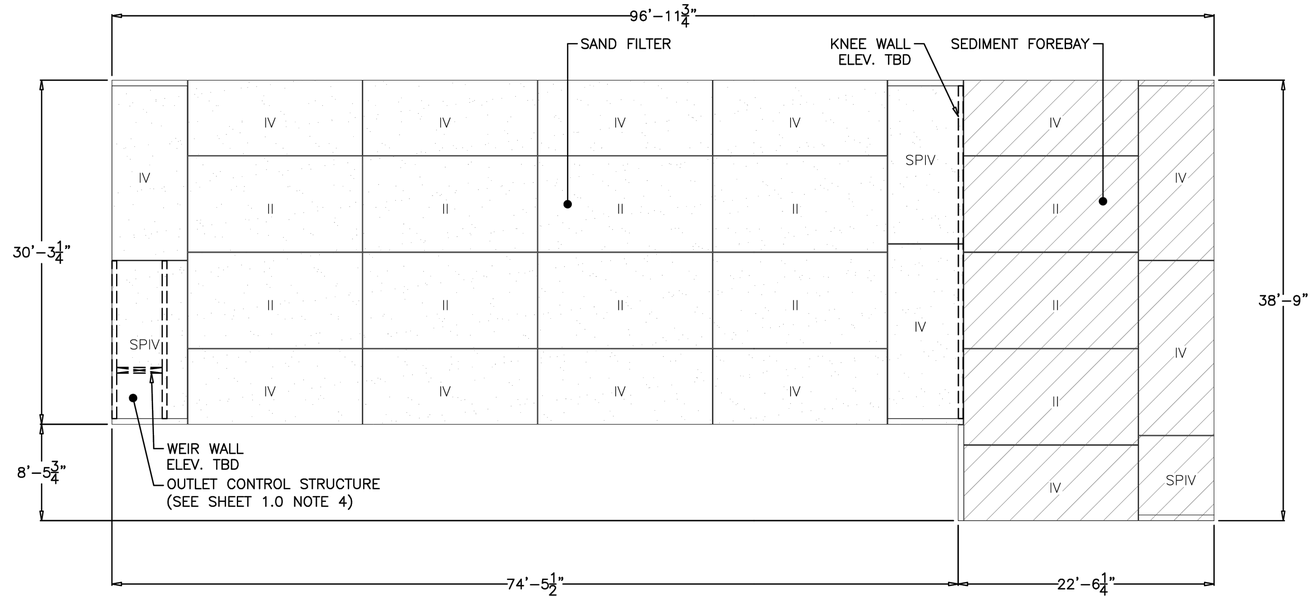
BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
11	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
14	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
3	SPIV	4'–0" SINGLETRAP	VARIES
1	T2 PANEL	6" THICK PANEL	2843
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
6	JOINTWRAP	150' PER ROLL	
24	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 28			
TOTAL PANELS = 7			
HEAVIEST PICK WEIGHT = 16,802			

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:
WSP
500 Winding Brook Drive
Glastonbury, CT
860-659-0444

PROJECT INFORMATION:
Tweed New Haven Airport East Terminal SF–7
East Haven, CT

CURRENT ISSUE DATE:
02/21/2025

ISSUED FOR:
PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:
NTS

SHEET TITLE:
SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:
2.0

CLIENT
HVN TWEED NEW HAVEN AIRPORT
AVPORTS
TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · REGISTERED · PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 25

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.65

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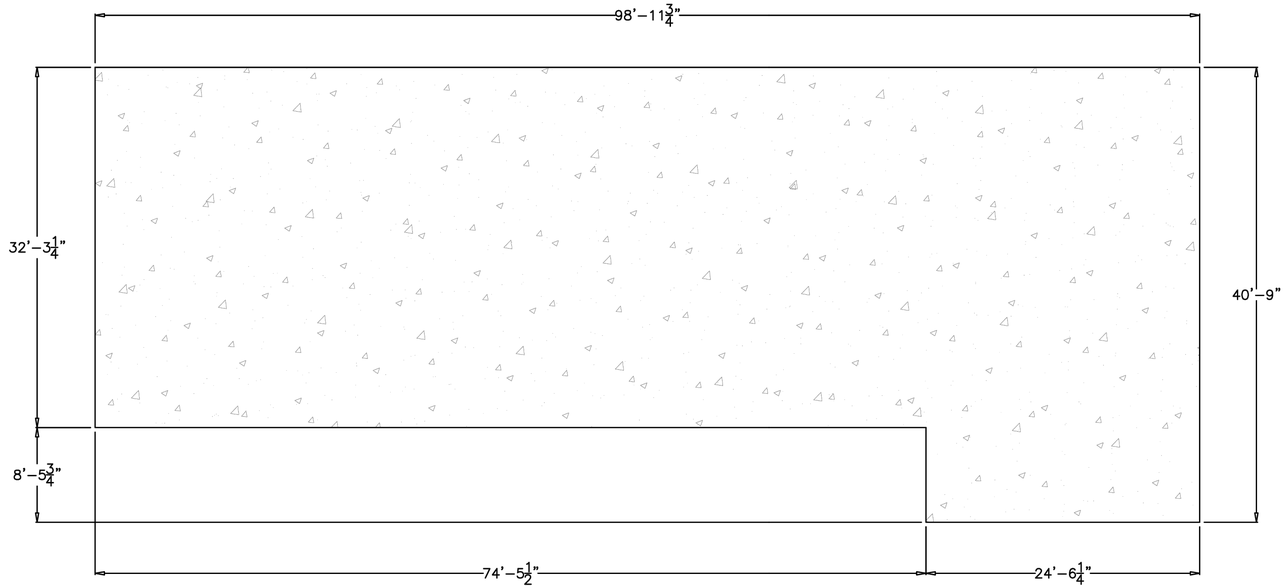

CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'–0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
7. DIMENSION OF STORMTRAP SYSTEM ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
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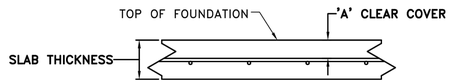

STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)

MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'–6" – 1'–0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'–1" – 2'–0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'–1" – 3'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'–1" – 4'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'–1" – 5'–0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'–1" – 6'–0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'–1" – 7'–0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'–1" – 8'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'–1" – 9'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'–1" – 10'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

StormTrap

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1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT

860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–7

East Haven, CT

CURRENT ISSUE DATE:

02/21/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
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EAST HAVEN, CT 06512
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 18478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
10052559.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 26

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.66

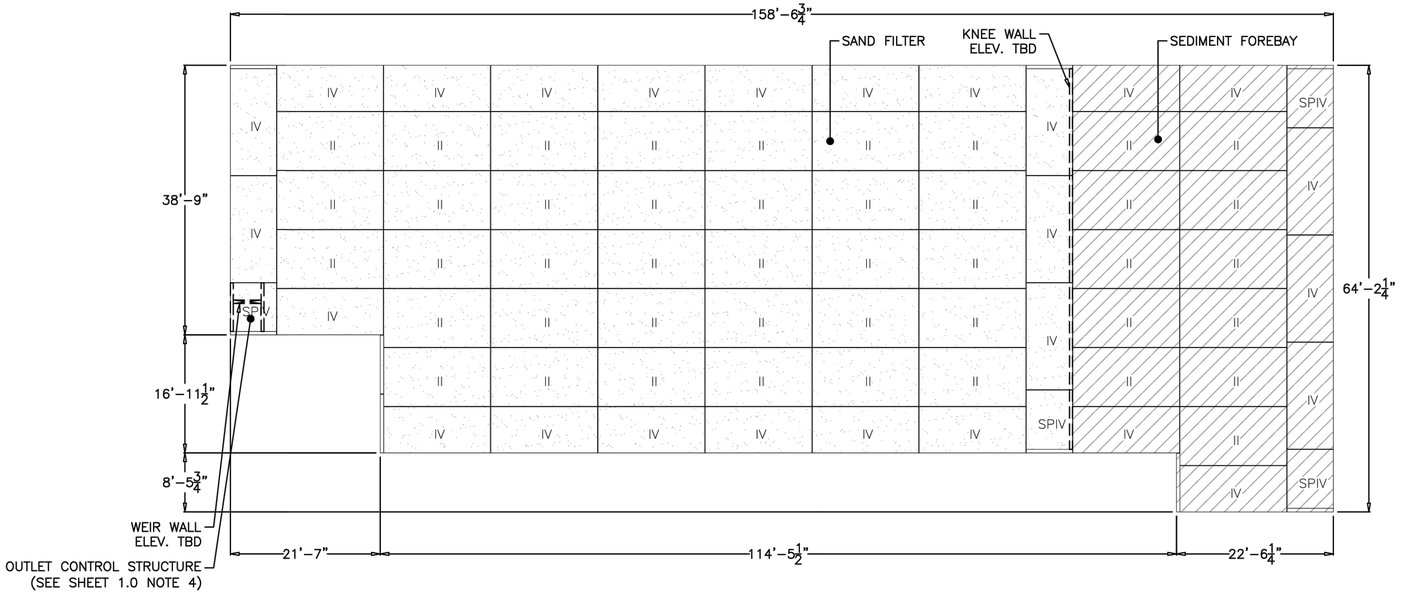
H:\N - 2/26/2025 3:45:35 PM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\20240918-07:41-C7.75.dwg

BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
44	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
26	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
4	SPIV	4'–0" SINGLETRAP	VARIES
3	T2 PANEL	6" THICK PANEL	2843
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
15	JOINTWRAP	150' PER ROLL	
40	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 74			
TOTAL PANELS = 9			
HEAVIEST PICK WEIGHT = 16,802			

N

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
4. SP – INDICATES A MODULE WITH MODIFICATIONS.
5. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
7. IN ORDER FOR STORMTRAP TO GENERATE APPROVAL DRAWINGS, CIVIL ENGINEERING DRAWINGS MUST BE PROVIDED TO STORMTRAP AND SHALL INCLUDE ALL PIPE SIZES, PIPE MATERIAL, PIPE INVERT ELEVATIONS, ACCESS OPENING SIZE AND SHAPE. IN ADDITION, FINAL GRADING PLANS SHALL ALSO INCLUDE MINIMUM AND MAXIMUM GRADES OVER THE TOP OF THE STORMTRAP SYSTEM.



StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–6

East Haven, CT

CURRENT ISSUE DATE:

02/21/2025

ISSUED FOR:

PRELIMINARY

REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:

2.0

CLIENT

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AVPORTS

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PESTINELLI · No. 19478 · REGISTERED · PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 27

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.67

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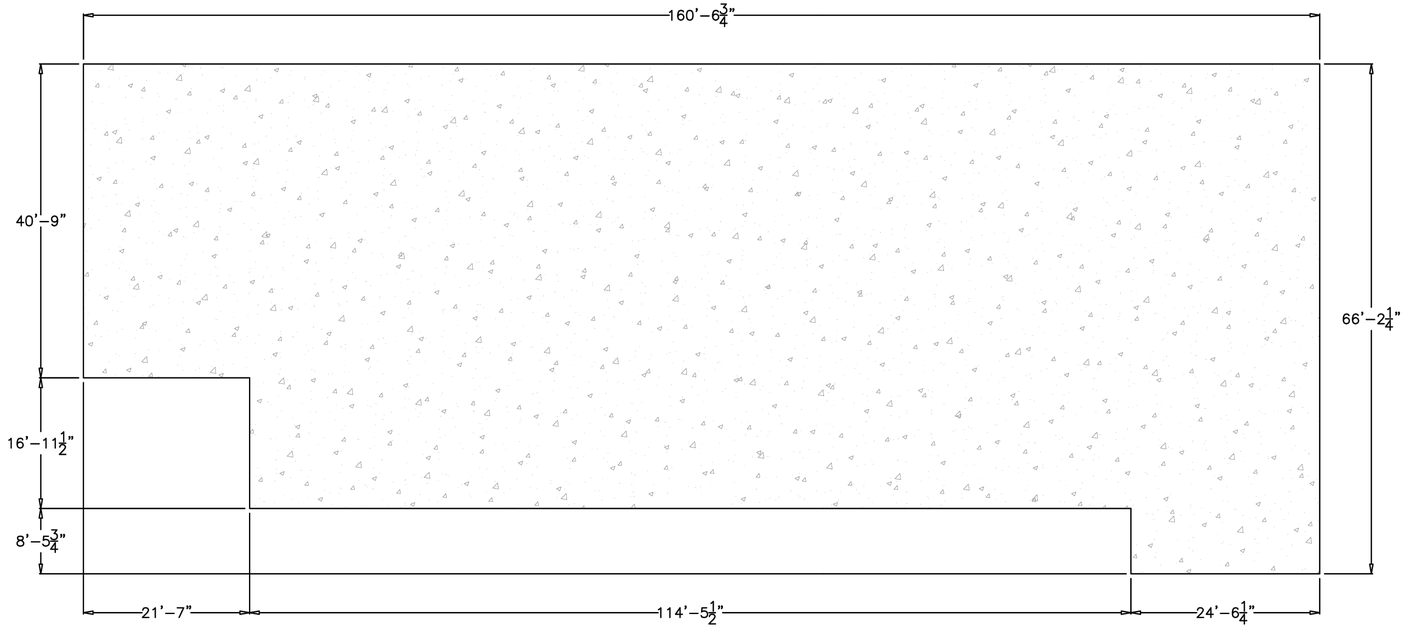

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1	02/21/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
3. NET ALLOWABLE SOIL PRESSURE AS INDICATED ON SHEET 1.1.
4. SOIL CONDITIONS TO BE VERIFIED ON SITE BY OTHERS.
5. REBAR: ASTM A615 GRADE 60, BLACK BAR.
6. DIMENSION OF FOUNDATION MUST HAVE 1'–0" OVERHANG BEYOND EXTERNAL FACE OF MODULE.
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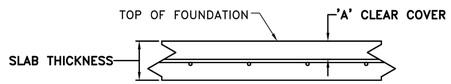

STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)

MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
0'–6" – 1'–0"	8"	4000 PSI	#4 @ 18" O.C.	3.5"
1'–1" – 2'–0"	8"	4000 PSI	#4 @ 16" O.C.	3.5"
2'–1" – 3'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
3'–1" – 4'–0"	8"	4000 PSI	#4 @ 12" O.C.	3.5"
4'–1" – 5'–0"	8"	4000 PSI	#5 @ 18" O.C.	3.375"
5'–1" – 6'–0"	8"	4000 PSI	#5 @ 16" O.C.	3.375"
6'–1" – 7'–0"	8"	4000 PSI	#5 @ 12" O.C.	3.375"
7'–1" – 8'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
8'–1" – 9'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"
9'–1" – 10'–0"	9"	4000 PSI	#5 @ 12" O.C.	3.875"

CLIENT

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REGISTRATION



DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 28

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.68

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BILL OF MATERIALS			
QTY.	UNIT TYPE	DESCRIPTION	WEIGHT
0	I	4'–0" SINGLETRAP	–
42	II	4'–0" SINGLETRAP	16802
0	III	4'–0" SINGLETRAP	–
16	IV	4'–0" SINGLETRAP	15104
0	VII	4'–0" SINGLETRAP	–
0	VII–1	4'–0" SINGLETRAP	–
0	VII–2	4'–0" SINGLETRAP	–
0	VII–3	4'–0" SINGLETRAP	–
0	VII–4	4'–0" SINGLETRAP	–
0	SPIII	4'–0" SINGLETRAP	VARIES
2	SPIV	4'–0" SINGLETRAP	VARIES
8	T2 PANEL	6" THICK PANEL	2843
6	T4 PANEL	6" THICK PANEL	2236
0	T7 PANEL	6" THICK PANEL	–
12	JOINTWRAP	150' PER ROLL	
32	JOINTTAPE	14.5' PER ROLL	
TOTAL PIECES = 60			
TOTAL PANELS = 14			
HEAVIEST PICK WEIGHT = 16,802			

N

DESIGN CRITERIA
ALLOWABLE MAX GRADE = 7.50'
ALLOWABLE MIN GRADE = 5.00'
INSIDE HEIGHT ELEVATION = 4.00'
SYSTEM INVERT = 0.00'

NOTES:
1. DIMENSIONING OF STORMTRAP SYSTEM SHOWN BELOW ALLOW FOR A 3/4" GAP BETWEEN EACH MODULE.
2. ALL DIMENSIONS TO BE VERIFIED IN THE FIELD BY OTHERS.
3. SEE SHEET 3.0 FOR INSTALLATION SPECIFICATIONS.
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6. CONTRACTORS RESPONSIBILITY TO ENSURE CONSISTENCY/ACCURACY TO FINAL ENGINEER OF RECORD PLAN SET.
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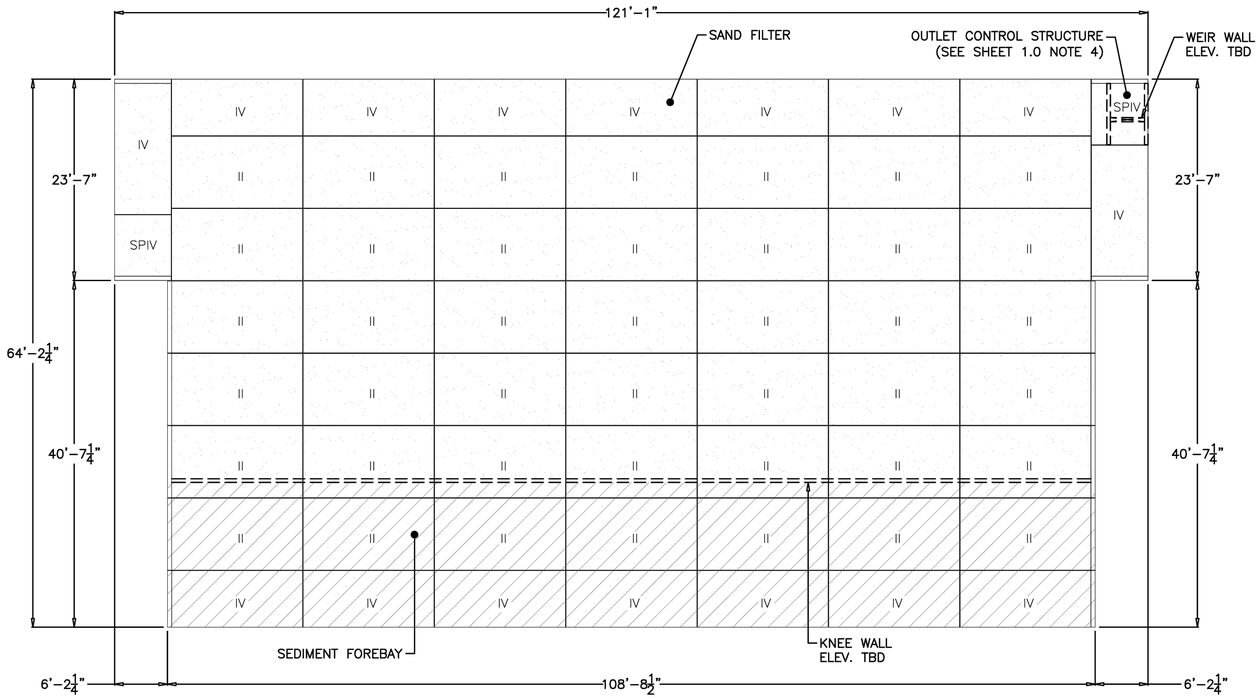

StormTrap
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1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–2

East Haven, CT

CURRENT ISSUE DATE:

02/19/2025

ISSUED FOR:

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REV.	DATE:	ISSUED FOR:	DWN BY:
1	02/19/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP SYSTEM LAYOUT

SHEET NUMBER:

2.0

CLIENT
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REGISTRATION
STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19475 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
UTILITY DETAILS 29

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER
C7.69

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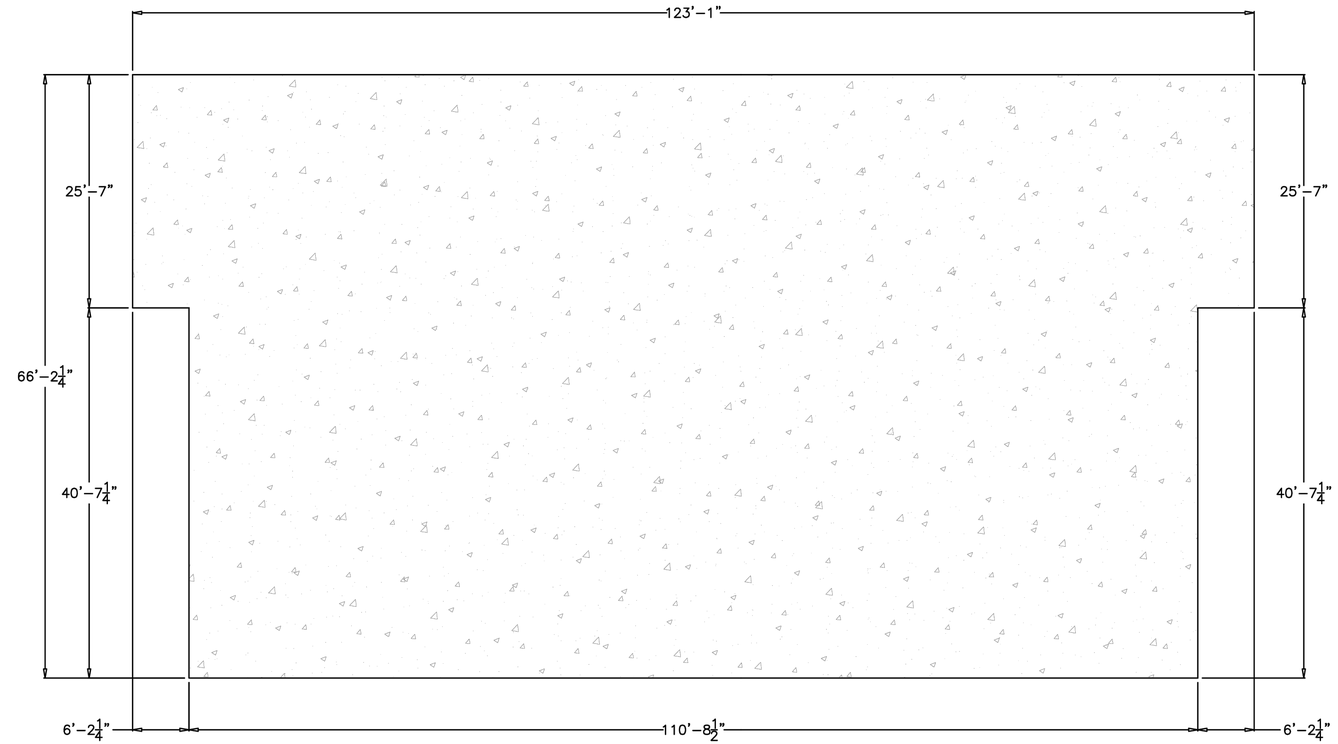
AIRFIELD\PLOTSHEETS\260240769-07.41_C7.75.dwg



CONCRETE FOUNDATION NOTES:

1. CONCRETE FOUNDATION TO BE SUPPLIED AND INSTALLED BY OTHERS.
2. CONCRETE STRENGTH @ 28 DAYS, 5%–8% ENTRAINED AIR, 3"–5" MAX SLUMP.
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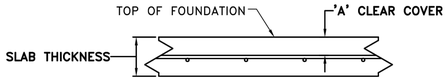

STORMTRAP FOUNDATION DETAIL

HS–20 & HS–25 LOADING – (ACI 318, ST2)				
MAXIMUM SYSTEM COVER	SLAB THICKNESS	CONCRETE STRENGTH	REINFORCEMENT (BOTH DIRECTIONS)	'A' CLEAR COVER
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StormTrap

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1287 WINDHAM PARKWAY
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P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

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500 Winding Brook Drive
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860-659-0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF-2

East Haven, CT

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SCALE:

NTS

SHEET TITLE:

SINGLETRAP FOUNDATION LAYOUT

SHEET NUMBER:

2.1

CLIENT

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AVPORTS

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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
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SHEET TITLE

UTILITY DETAILS 30

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.70

HVN - 2/26/2025 3:45:55 PM - C:\Users\USBF73207\DOCACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C2A\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\20240708-07:41_C7.70.dwg

STORMTRAP INSTALLATION SPECIFICATION

1. STORMTRAP SHALL BE INSTALLED IN ACCORDANCE WITH ASTM C891 (STANDARD PRACTICE FOR INSTALLATION OF UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES). THE FOLLOWING ADDITIONS AND/OR EXCEPTIONS ARE PROVIDED FOR EMPHASIS. THE MENTION OF THESE ITEMS DOES NOT PRECLUDE THE INSTALLING CONTRACTOR FROM FOLLOWING ASTM C891 IN ITS ENTIRETY AND IMPLEMENTING ALL APPROPRIATE MEASURES. THE INSTALLING CONTRACTOR OWNS AND IS RESPONSIBLE FOR THE STORMTRAP SYSTEM UPON REMOVAL OF THE MODULES FROM THE DELIVERY TRUCK THROUGH 'FINAL CONSTRUCTION'. FINAL CONSTRUCTION IS ACHIEVED WHEN ALL MODULES ARE SET, FULLY BACKFILLED, AND WHEN FINAL FINISHED GRADES ARE REACHED. THE CONTRACTOR IS RESPONSIBLE FOR ANY COUNTERMEASURES NECESSARY TO RESIST UPLIFT/BUOYANCY BEFORE 'FINAL CONSTRUCTION' IS ACHIEVED.

2. IT IS THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR TO ENSURE THAT PROPER/ADEQUATE EQUIPMENT IS USED TO SET/INSTALL THE MODULES.

3. STORMTRAP MODULES SHALL BE PLACED ON A LEVEL CONCRETE FOUNDATION (SEE SHEET 2.1) WITH A 1'–0" OVERHANG ON ALL SIDES THAT SHALL BE POURED IN PLACE BY INSTALLING CONTRACTOR. A QUALIFIED GEOTECHNICAL ENGINEER WILL BE EMPLOYED, BY OWNER, TO PROVIDE ASSISTANCE IN EVALUATING THE EXISTING SOIL CONDITIONS TO ENSURE THAT THE SOIL BEARING PRESSURE MEETS OR EXCEEDS THE STRUCTURAL DESIGN LOADING CRITERIA AS SPECIFIED ON SHEET 1.1.

4. THE STORMTRAP MODULES SHALL BE PLACED SUCH THAT THE MAXIMUM SPACE BETWEEN ADJACENT MODULES DOES NOT EXCEED ¾" (SEE DETAIL 2). IF THE SPACE EXCEEDS ¾", THE MODULES SHALL BE RESET WITH APPROPRIATE ADJUSTMENT MADE TO LINE AND GRADE TO BRING THE SPACE INTO SPECIFICATION.

5. THE PERIMETER HORIZONTAL JOINT BETWEEN THE STORMTRAP MODULES AND THE CONCRETE FOUNDATION SHALL BE SEALED TO THE FOUNDATION WITH PRE–FORMED MASTIC JOINT SEALER ACCORDING TO ASTM C891, 8.8 AND 8.12 (SEE DETAIL 1). THE MASTIC JOINT TAPE DOES NOT PROVIDE A WATERTIGHT SEAL.

6. ALL EXTERIOR ROOF AND EXTERIOR VERTICAL WALL JOINTS BETWEEN ADJACENT STORMTRAP MODULES SHALL BE SEALED WITH 8" WIDE PRE–FORMED, COLD–APPLIED, SELF–ADHERING ELASTOMERIC RESIN, BONDED TO A WOVEN , HIGHLY PUNCTURE RESISTANT POLYMER WRAP, CONFORMING TO ASTM C891 AND SHALL BE INTEGRATED WITH PRIMER SEALANT AS APPROVED BY STORMTRAP (SEE DETAILS 2, 3, & 4). THE JOINT WRAP DOES NOT PROVIDE A WATERTIGHT SEAL. THE SOLE PURPOSE OF THE JOINT WRAP IS TO PROVIDE A SILT AND SOIL TIGHT SYSTEM. THE ADHESIVE EXTERIOR JOINT WRAP SHALL BE INSTALLED ACCORDING TO THE FOLLOWING INSTALLATION INSTRUCTIONS:

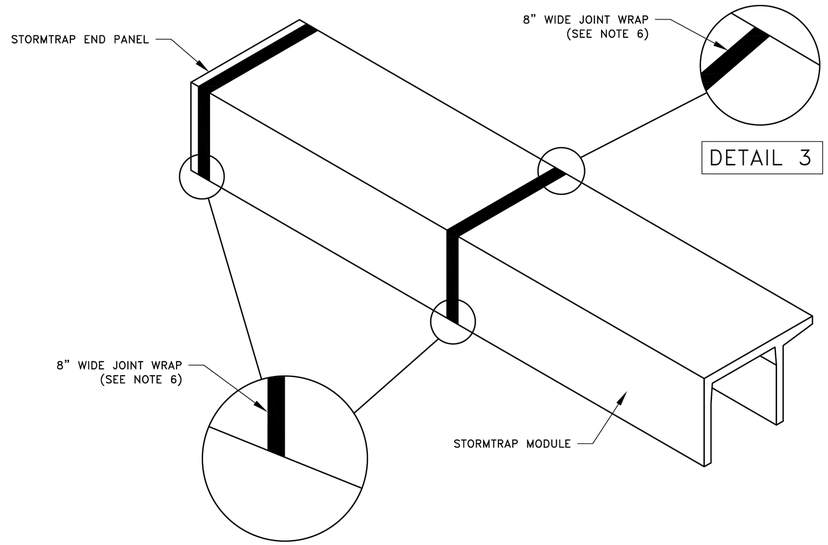
   6.1. USE A BRUSH OR WET CLOTH TO THOROUGHLY CLEAN THE OUTSIDE SURFACE AT THE POINT WHERE JOINT WRAP IS TO BE APPLIED.

   6.2. A RELEASE PAPER PROTECTS THE ADHESIVE SIDE OF THE JOINT WRAP. PLACE THE ADHESIVE TAPE (ADHESIVE SIDE DOWN) AROUND THE STRUCTURE, REMOVING THE RELEASE PAPER AS YOU GO. PRESS THE JOINT WRAP FIRMLY AGAINST THE STORMTRAP MODULE SURFACE WHEN APPLYING.

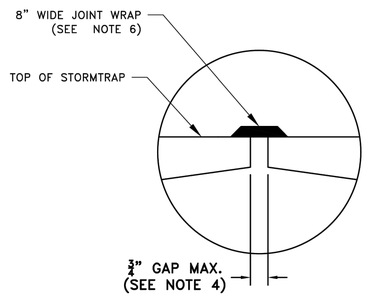
7. IF THE CONTRACTOR NEEDS TO CANCEL ANY SHIPMENTS, THEY MUST DO SO 48 HOURS PRIOR TO THEIR SCHEDULED ARRIVAL AT THE JOB SITE. IF CANCELED AFTER THAT TIME, PLEASE CONTACT THE PROJECT MANAGER.

8. IF THE STORMTRAP MODULE(S) IS DAMAGED IN ANY WAY PRIOR, DURING, OR AFTER INSTALL, STORMTRAP MUST BE CONTACTED IMMEDIATELY TO ASSESS THE DAMAGE AND DETERMINE WHETHER OR NOT THE MODULE(S) WILL NEED TO BE REPLACED. IF ANY MODULE ARRIVES AT THE JOBSITE DAMAGED DO NOT UNLOAD IT; CONTACT STORMTRAP IMMEDIATELY. ANY DAMAGE NOT REPORTED BEFORE THE TRUCK IS UNLOADED WILL BE THE CONTRACTOR'S RESPONSIBILITY.

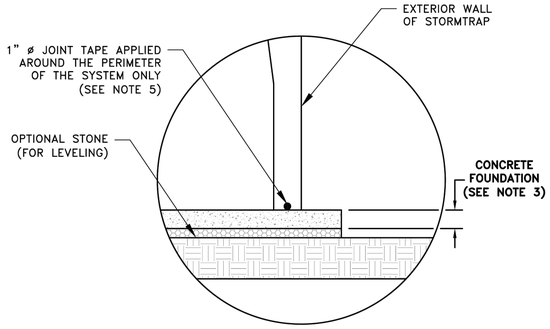
9. STORMTRAP MODULES CANNOT BE ALTERED IN ANY WAY AFTER MANUFACTURING WITHOUT WRITTEN CONSENT FROM STORMTRAP.



DETAIL 4



DETAIL 2



DETAIL 1

StormTrap
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ROMEOVILLE, IL 60446
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ENGINEER INFORMATION:

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500 Winding Brook Drive
Glastonbury, CT
860–659–0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF–A3

East Haven, CT

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SCALE:

NTS

SHEET TITLE:

SINGLETRAP INSTALLATION SPECIFICATION

SHEET NUMBER:

3.0

CLIENT
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500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
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REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 31

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.71

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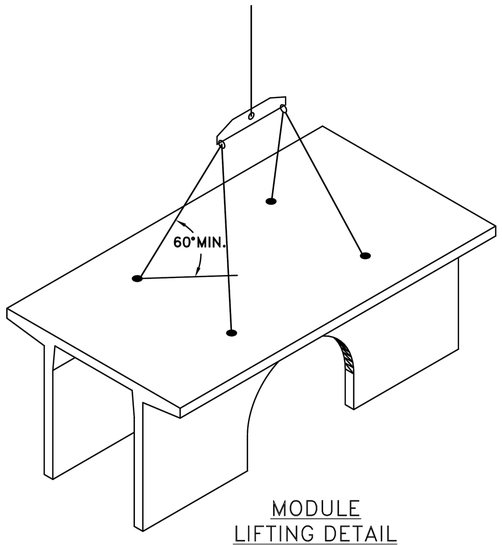
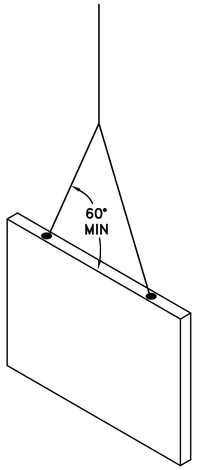
STORMTRAP MODULE LIFTING SPECIFICATION

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO ENSURE THAT ALL (4) CHAINS/CABLES ARE SECURED PROPERLY TO THE LIFTING ANCHORS AND IN EQUAL TENSION WHEN LIFTING THE STORMTRAP MODULE.
2. MINIMUM 7'-0" CHAIN/CABLE LENGTH TO BE USED TO LIFT STORMTRAP MODULES (SUPPLIED BY CONTRACTOR).
3. CONTRACTOR TO ENSURE MINIMUM LIFTING ANGLE IS 60° FROM TOP SURFACE OF STORMTRAP MODULE. SEE DETAIL.
4. IT IS UNDERSTOOD AND AGREED THAT AT ALL TIMES DURING WHICH HOISTING AND RIGGING EQUIPMENT IS BEING SUPPLIED TO THE PURCHASER, OPERATOR OF SUCH EQUIPMENT SHALL BE IN CHARGE OF HIS ENTIRE EQUIPMENT AND SHALL AT ALL TIMES BE THE JUDGE OF THE SAFETY AND PROPERTY OF ANY SUGGESTION TO HIM FROM THE SELLER, ITS AGENTS OR EMPLOYEES. PURCHASER AGREES TO SAVE, INDEMNIFY AND HOLD HARMLESS SELLER FROM ALL LOSS, CLAIMS, DEMANDS OR CAUSES OF ACTION, WHICH MAY ARISE FROM THE EXISTENCE OR OPERATION OF SAID EQUIPMENT.



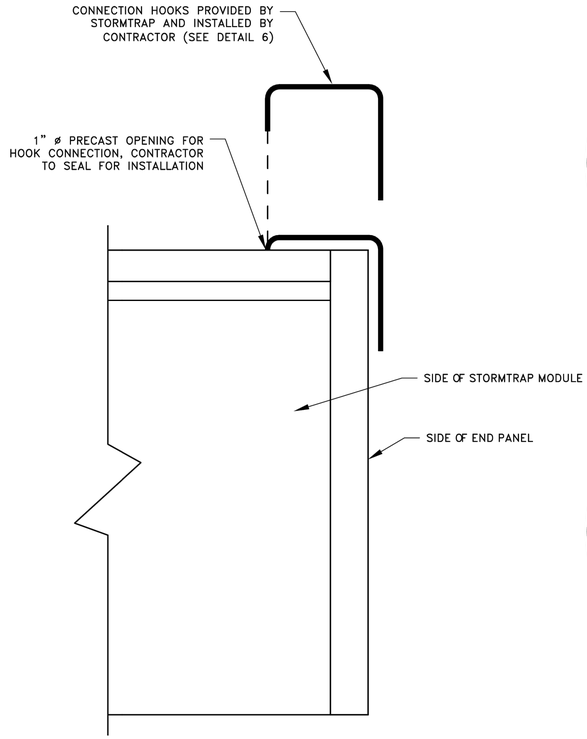
MODULE
LIFTING DETAIL



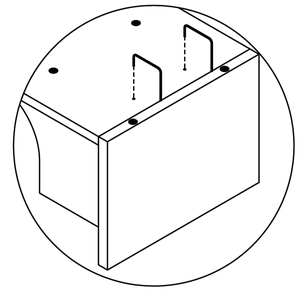
END PANEL
LIFTING DETAIL

END PANEL ERECTION/INSTALLATION SPECIFICATION

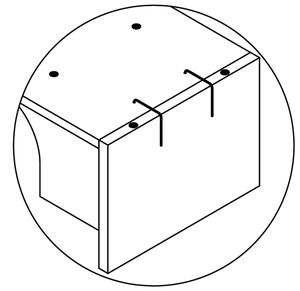
1. END PANELS WILL BE SUPPLIED TO CLOSE OFF OPEN ENDS OF ROWS.
2. PANELS SHALL BE INSTALLED IN A TILT UP FASHION DIRECTLY ADJACENT TO OPEN END OF MODULE (REFER TO SHEET 2.0 FOR END PANEL LOCATIONS).
3. CONNECTION HOOKS WILL BE SUPPLIED WITH END PANELS TO SECURELY CONNECT PANEL TO ADJACENT STORMTRAP MODULE (SEE PANEL CONNECTION ELEVATION VIEW).
4. ONCE CONNECTION HOOK IS ATTACHED, LIFTING CLUTCHES MAY BE REMOVED.
5. JOINT WRAP SHALL BE PLACED AROUND PERIMETER JOINT PANEL (SEE SHEET 3.0).



PANEL CONNECTION
ELEVATION VIEW



STEP 1



STEP 2

DETAIL 6

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]

1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

ENGINEER INFORMATION:

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500 Winding Brook Drive
Glastonbury, CT

860-659-0444

PROJECT INFORMATION:

Tweed New Haven
Airport East Terminal
SF-A2

East Haven, CT

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1	02/18/2025	PRELIMINARY	SG

SCALE:

NTS

SHEET TITLE:

SINGLETRAP
INSTALLATION
SPECIFICATION

SHEET NUMBER:

3.1

CLIENT

HVN TWEED NEW HAVEN AIRPORT
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SHEET TITLE

UTILITY DETAILS 32

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

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C7.72

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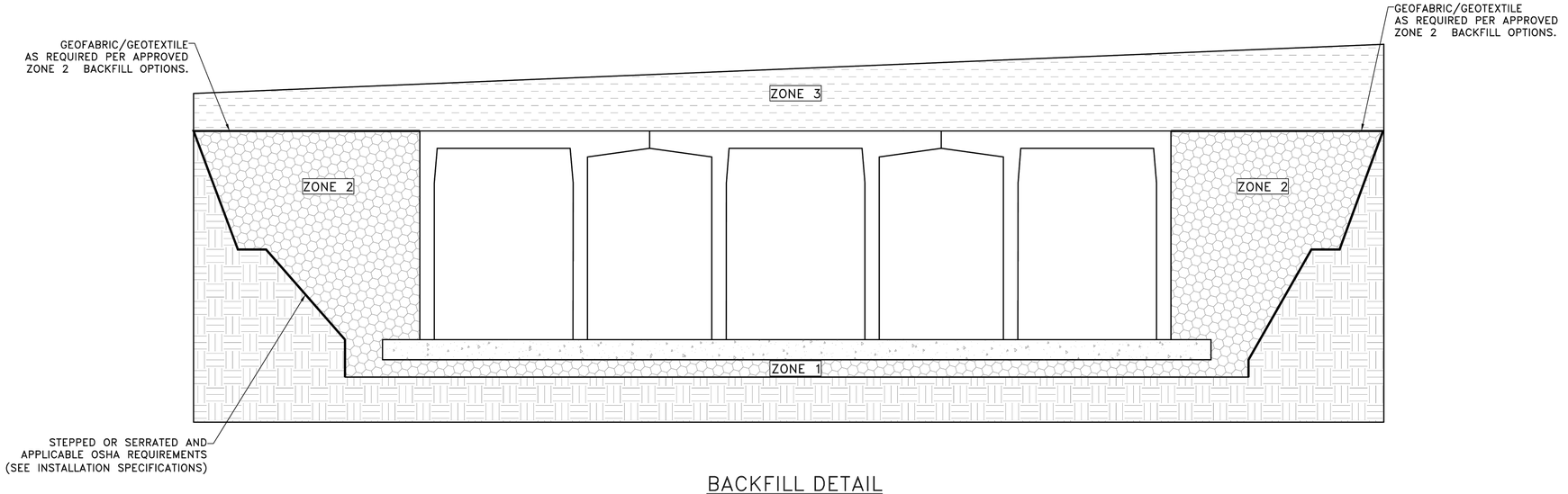
ZONE CHART		
ZONES	ZONE DESCRIPTIONS	REMARKS
ZONE 1	FOUNDATION AGGREGATE	#5 (¾") STONE ANGULAR AGGREGATE (SEE NOTE 4)
ZONE 2	BACKFILL	UNIFIED SOILS CLASSIFICATION (GW, GP, SW, SP) OR SEE BELOW FOR APPROVED BACKFILL OPTIONS
ZONE 3	FINAL COVER OVERTOP	MATERIALS NOT TO EXCEED 120 PCF

APPROVED ZONE 2 BACKFILL OPTIONS	
OPTION	REMARKS
¾" STONE AGGREGATE	THE STONE AGGREGATE SHALL CONSIST OF CLEAN AND FREE DRAINING ANGULAR MATERIAL. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL (ASTM SIZE #57) AS DETERMINED BY THE GEOTECHNICAL ENGINEER.
SAND	IMPORTED PURE SAND IS PERMITTED TO BE USED AS BACKFILL IF IT IS CLEAN AND FREE DRAINING. THE SAND USED FOR BACKFILLING SHALL HAVE LESS THAN 40% PASSING #40 SIEVE AND LESS THAN 5% PASSING #200 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE SAND BACKFILL.
CRUSHED CONCRETE AGGREGATE	CLEAN, FREE DRAINING CRUSHED CONCRETE AGGREGATE MATERIAL CAN BE USED AS BACKFILL FOR STORMTRAP'S MODULES. THE SIZE OF THIS MATERIAL SHALL HAVE 100% PASSING THE 1" SIEVE WITH 0% TO 5% PASSING THE #8 SIEVE. THIS MATERIAL SHALL BE SEPARATED FROM NATIVE MATERIAL USING GEOFABRIC AROUND THE PERIMETER OF THE BACKFILL.
ROAD PACK	STONE AGGREGATE 100% PASSING THE 1-1/2" SIEVE WITH LESS THAN 12% PASSING THE #200 SIEVE (ASTM SIZE #467). GEOFABRIC AS PER GEOTECHNICAL ENGINEER RECOMMENDATION.

STORMTRAP ZONE INSTALLATION SPECIFICATION/PROCEDURE

1. THE FILL PLACED AROUND THE STORMTRAP MODULES MUST BE DEPOSITED ON BOTH SIDES AT THE SAME TIME AND TO APPROXIMATELY THE SAME ELEVATION. AT NO TIME SHALL THE FILL BEHIND ONE SIDE WALL BE MORE THAN 2'-0" HIGHER THAN THE FILL ON THE OPPOSITE SIDE. BACKFILL SHALL EITHER BE COMPACTED AND/OR VIBRATED TO ENSURE THAT BACKFILL AGGREGATE/STONE MATERIAL IS WELL SEATED AND PROPERLY INTER LOCKED. CARE SHALL BE TAKEN TO PREVENT ANY WEDGING ACTION AGAINST THE STRUCTURE, AND ALL SLOPES WITHIN THE AREA TO BE BACKFILLED MUST BE STEPPED OR SERRATED TO PREVENT WEDGING ACTION. CARE SHALL ALSO BE TAKEN AS NOT TO DISRUPT THE JOINT WRAP FROM THE JOINT DURING THE BACKFILL PROCESS. BACKFILL MUST BE FREE-DRAINING MATERIAL. SEE ZONE 2 BACKFILL CHART ON THIS PAGE FOR APPROVED BACKFILL OPTIONS. IF NATIVE EARTH IS SUSCEPTIBLE TO MIGRATION, CONFIRM WITH GEOTECHNICAL ENGINEER AND PROVIDE PROTECTION AS REQUIRED (PROVIDED BY OTHERS). ALL MODULES MUST BE SET AND ALL SIDES MUST BE FULLY BACKFILLED BEFORE TRAVEL OVERTOP THE SYSTEM IS PERMITTED. SEE NOTE 2 FOR EXCEPTIONS AND LIMITATIONS.
2. THE FILL PLACED OVERTOP THE SYSTEM SHALL BE PLACED IN MINIMUM 6" LIFTS. AT NO TIME SHALL MACHINERY OR VEHICLES GREATER THAN THE DESIGN LIVE LOAD LISTED ON SHEET 1.0 TRAVEL OVERTOP THE SYSTEM. IF TRAVEL OVER THE SYSTEM OCCURS BEFORE THE MINIMUM DESIGN COVER IS ACHIEVED, IT MAY BE NECESSARY TO REDUCE THE ULTIMATE LOAD/BURDEN OF THE OPERATING MACHINERY SO AS TO NOT EXCEED THE DESIGN CAPACITY OF THE SYSTEM. VEHICLES AND MACHINERY USED TO PLACE FILL MATERIAL ON TOP OF THE SYSTEM SHALL TRAVEL PARALLEL TO THE LONGITUDINAL AXIS OF THE STORMTRAP MODULES WHENEVER POSSIBLE.
3. THE VIBRATORY FUNCTION OF ANY ROLLER, COMPACTOR, VEHICLE, ETC. SHALL NOT BE USED OVERTOP THE SYSTEM WITHOUT PRIOR APPROVAL FROM STORMTRAP. IN SOME CASES, HAND COMPACTION MAY BE NECESSARY TO ENSURE THAT THE ALLOWABLE DESIGN LOADING IS NOT EXCEEDED.
4. STONE AGGREGATE FOUNDATION IN ZONE 1 IS RECOMMENDED FOR LEVELING PURPOSES ONLY (OPTIONAL).



BACKFILL DETAIL

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815-941-4549 / F:331-318-5347

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500 Winding Brook Drive
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860-659-0444

PROJECT INFORMATION:

Tweed New Haven Airport East Terminal SF-A3

East Haven, CT

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SCALE:

NTS

SHEET TITLE:

SINGLETRAP BACKFILL SPECIFICATION

SHEET NUMBER:

4.0

CLIENT

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240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

UTILITY DETAILS 33

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.73

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ACCESS OPENING SPECIFICATION

1. A TYPICAL ACCESS OPENING FOR THE STORMTRAP SYSTEM ARE 2'–0" IN DIAMETER. ACCESS OPENINGS LARGER THAN 4'–0" IN DIAMETER NEED TO BE APPROVED BY STORMTRAP. ALL OPENINGS MUST RETAIN AT LEAST 2'–0" OF CLEARANCE FROM THE END OF THE STORMTRAP MODULE UNLESS NOTED OTHERWISE. ALL ACCESS OPENINGS TO BE LOCATED ON INSIDE LEG UNLESS OTHERWISE SPECIFIED. SEE SHEET 2.0 FOR SIZES AND LOCATIONS.

2. UNLESS OTHERWISE SPECIFIED, PLASTIC COATED STEEL STEPS PRODUCED BY M.A. INDUSTRIES PART #PS3–PFC OR APPROVED EQUAL (SEE STEP DETAIL) ARE PROVIDED INSIDE ANY MODULE WHERE DEEMED NECESSARY. THE HIGHEST STEP IN THE MODULE IS TO BE PLACED A DISTANCE OF 1'–0" FROM THE INSIDE EDGE OF THE STORMTRAP MODULES. ALL ENSUING STEPS SHALL BE PLACED AT A DISTANCE BETWEEN 10" MIN AND 14" MAX BETWEEN THEM. STEPS MAY BE MOVED OR ALTERED TO AVOID OPENINGS OR OTHER IRREGULARITIES IN THE MODULE.

3. STORMTRAP LIFTING INSERTS MAY BE RELOCATED TO AVOID INTERFERENCE WITH ACCESS OPENINGS OR THE CENTER OF GRAVITY OF THE MODULE AS NEEDED.

4. STORMTRAP ACCESS OPENINGS MAY BE RELOCATED TO AVOID INTERFERENCE WITH INLET AND/OR OUTLET PIPE OPENINGS SO PLACEMENT OF STEPS IS ATTAINABLE.

5. ACCESS OPENINGS SHOULD BE LOCATED IN ORDER TO MEET THE APPROPRIATE MUNICIPAL REQUIREMENTS. STORMTRAP RECOMMENDS AT LEAST TWO ACCESS OPENINGS PER SYSTEM FOR ACCESS AND INSPECTION.

6. USE PRECAST ADJUSTING RINGS AS NEEDED TO MEET GRADE. STORMTRAP RECOMMENDS FOR COVER OVER 2' TO USE PRECAST BARREL OR CONE SECTIONS. (PROVIDED BY OTHERS)

PIPE OPENING SPECIFICATION

1. MINIMUM EDGE DISTANCE FOR AN OPENING ON THE OUTSIDE WALL SHALL BE NO LESS THAN 1'–0".

2. CONNECTING PIPES MAY BE INSTALLED WITH A 1'–0" CONCRETE COLLAR AND AN AGGREGATE CRADLE (AS REQUIRED) FOR AT LEAST ONE PIPE LENGTH (SEE PIPE CONNECTION DETAIL). A STRUCTURAL GRADE CONCRETE OR HIGH STRENGTH, NON–SHRINK GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 PSI MAY BE USED.

3. THE ANNULAR SPACE BETWEEN THE PIPE AND THE HOLE SHALL BE FILLED WITH HIGH STRENGTH NON–SHRINK GROUT.

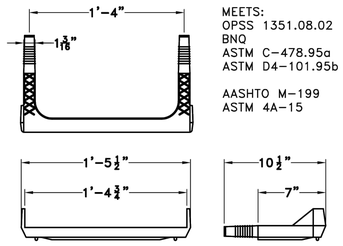
PIPE INSTALLATION INSTRUCTIONS

1. CLEAN AND LIGHTLY LUBRICATE ALL OF THE PIPE TO BE INSERTED INTO STORMTRAP.

2. IF PIPE IS CUT, CARE SHOULD BE TAKEN TO ALLOW NO SHARP EDGES. BEVEL AND LUBRICATE LEAD END OF PIPE.

3. ALIGN CENTER OF PIPE TO CORRECT ELEVATION AND INSERT INTO OPENING.

NOTE: ALL ANCILLARY PRODUCTS/SPECIFICATIONS RECOMMENDED AND SHOWN ON THIS SHEET INCLUDING BUT NOT LIMITED TO CONCRETE COLLARS, AGGREGATE CRADLES, GRADE RINGS, RISER SECTIONS, ETC., ARE RECOMMENDATIONS ONLY AND SUBJECT TO CHANGE PER THE INSTALLING CONTRACTOR AND/OR PER LOCAL MUNICIPAL CODE/REQUIREMENTS.



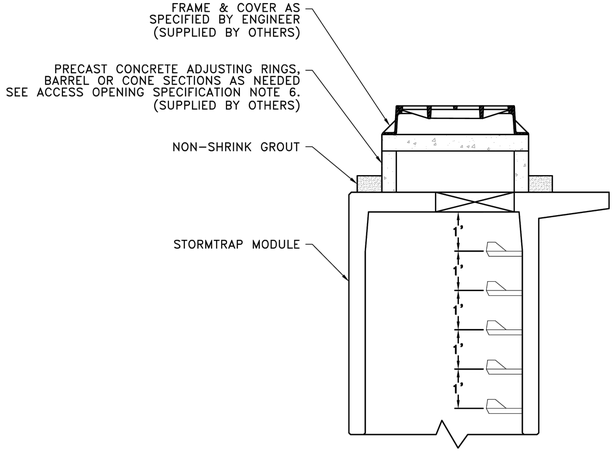
MEETS:
OPSS 1351.08.02
BNQ
ASTM C–478.95a
ASTM D4–101.95b

AASHTO M–199
ASTM 4A–15

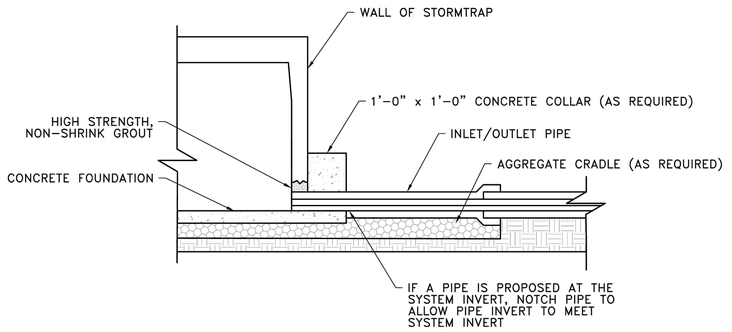
STEP DETAIL

*** NOTICE *** 03–25–2022

DUE TO CURRENT INCONSISTENCIES IN THE 16" STEP SUPPLY, STORMTRAP MAY SUBSTITUTE THE 16" STEP WITH THE CLOSEST ALTERNATIVE LENGTH STEP UNTIL THE SUPPLY CHAIN ISSUE IS RESOLVED.



RISER/STAIR DETAIL



NOTCHED PIPE CONNECTION DETAIL
WHEN PIPE INVERT IS AT
INVERT OF STORMTRAP SYSTEM

StormTrap
PATENTS LISTED AT: [HTTP://STORMTRAP.COM/PATENT]
1287 WINDHAM PARKWAY
ROMEOVILLE, IL 60446
P:815–941–4549 / F:331–318–5347

ENGINEER INFORMATION:

WSP
500 Winding Brook Drive
Glastonbury, CT

860–659–0444

PROJECT INFORMATION:

Tweed New Haven
Airport East Terminal
SF–A2

East Haven, CT

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SCALE:

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SHEET TITLE:

PIPE / ACCESS OPENING SPECIFICATION

SHEET NUMBER:

5.0

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SHEET TITLE
UTILITY DETAILS 34

DATE	DRN BY	CHK BY	APP BY
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C7.74

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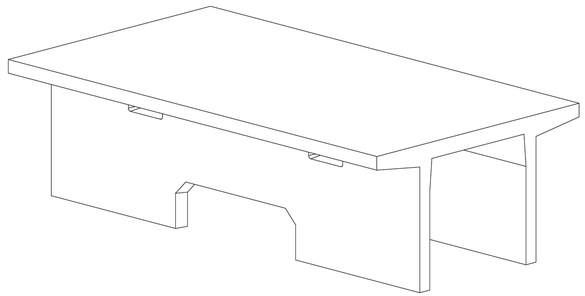
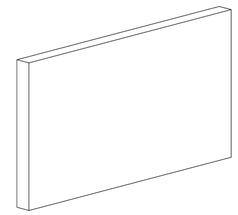
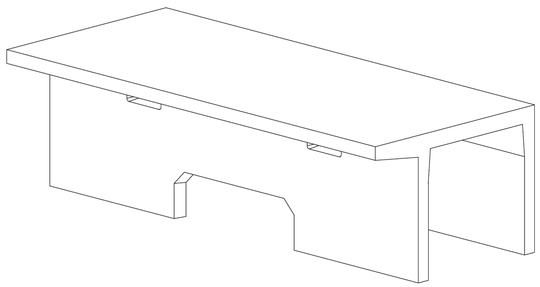


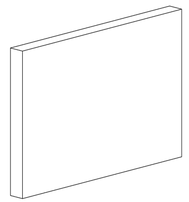
TYPE II



TYPE II END PANEL



TYPE IV



TYPE IV END PANEL

NOTES:
1. OPENING LOCATIONS AND SHAPES MAY VARY.
2. SP – INDICATES A MODULE WITH MODIFICATIONS.
3. P – INDICATES A MODULE WITH A PANEL ATTACHMENT.
4. POCKET WINDOW OPENINGS ARE OPTIONAL.

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SINGLETRAP
MODULE TYPES

SHEET NUMBER:

6.0

CLIENT

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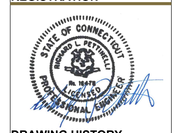
REGISTRATION



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SHEET TITLE

UTILITY DETAILS 35

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C7.75

HVN - 2/26/2025 3:45:35 PM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C7.41_C7.75.dwg

WETLANDS (TYP)

LIMIT OF MODERATE WAVE ACTION (TYP.)

COASTAL JURISDICTION LINE (TYP.)

LEASE LINE AND PROPERTY BOUNDARY (TYP.)

CROSS SECTION BASELINE START
STA 100+00.00
N: 656679.79
E: 962652.29

CROSS SECTION BASELINE END
STA 122+50.00
N: 655195.81
E: 964343.54

100+00 101+00 102+00 103+00 104+00 105+00 106+00 107+00 108+00 109+00 110+00 111+00 112+00 113+00 114+00 115+00 116+00 117+00 118+00 119+00 120+00 121+00 122+00 122+50

100-YEAR FLOOD LIMIT (TYP.)

LEASE LINE (TYP.)

WORK BY OTHERS

0 50' 100' 200'
HORIZONTAL SCALE 1"=100'

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AIRFIELDPLOTSHEETS\240878-C9.00.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT
AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

PGAL

PGAL, Inc.
3131 Briarpark Dr.
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F 713 622 1444
www.pgal.com

CONSULTANT

wsp

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

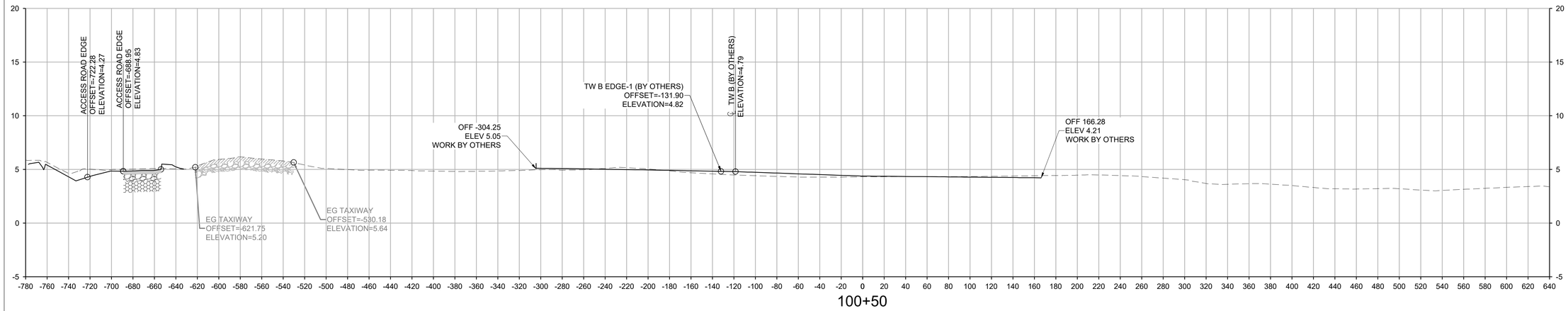
SHEET TITLE

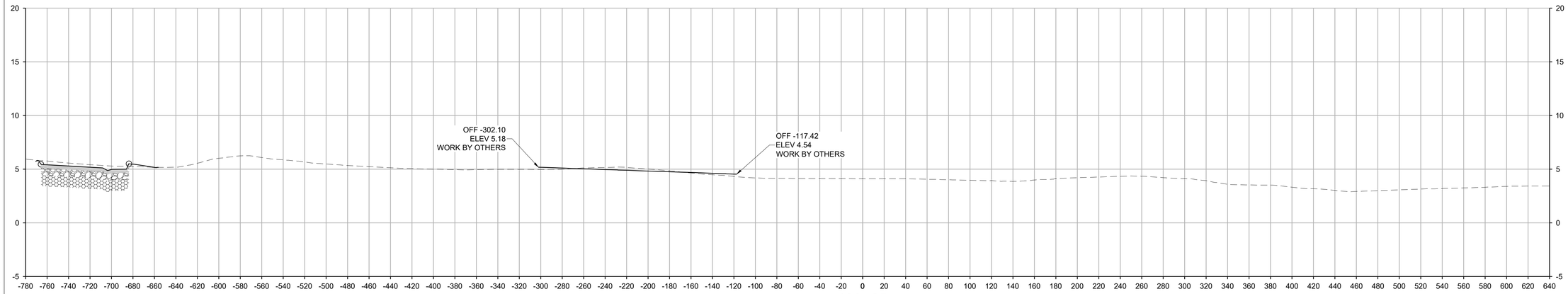
CROSS SECTION PLAN - OVERALL / LOCATION PLAN

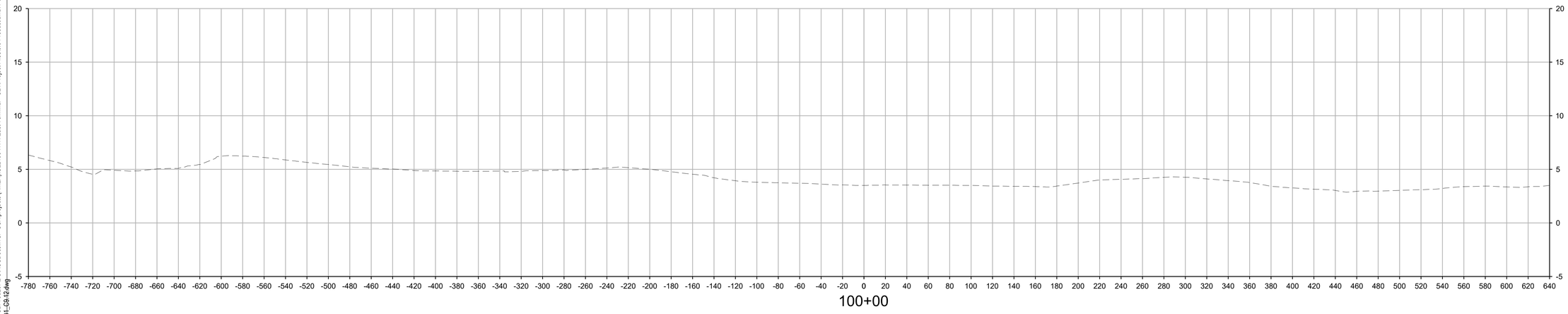
DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C9.00







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

H:\N1 - 2\27\2025 11:33:23 AM - C:\Users\USBF73\2007\DOCACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL \ARHELD\PLOTSHEETS\20240009\9-3-9-01_C9.12.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETRIELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

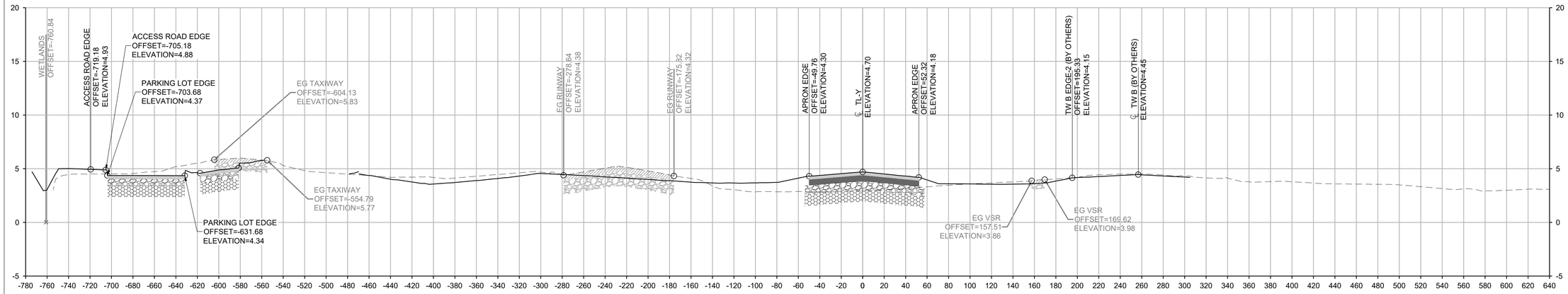
SHEET TITLE

CROSS SECTIONS - 1

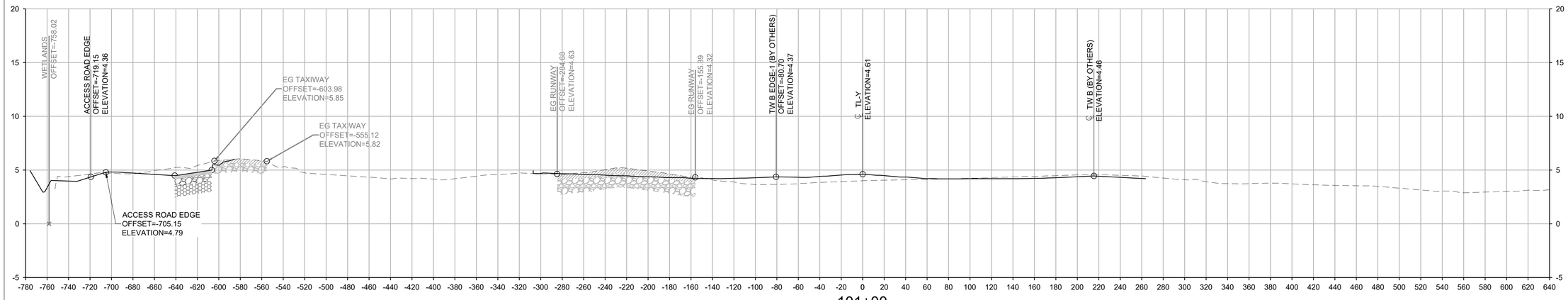
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.01



101+25



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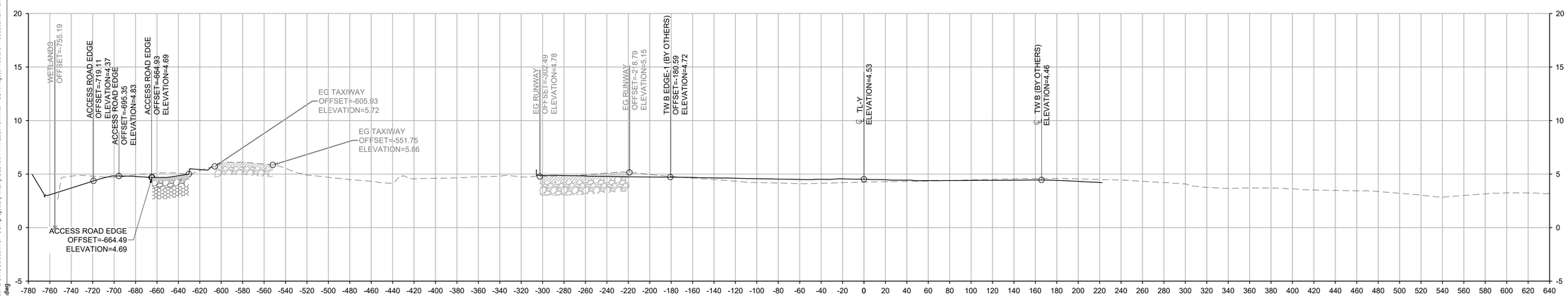

100+75

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
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CONSULTANT

wsp

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 2

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.02

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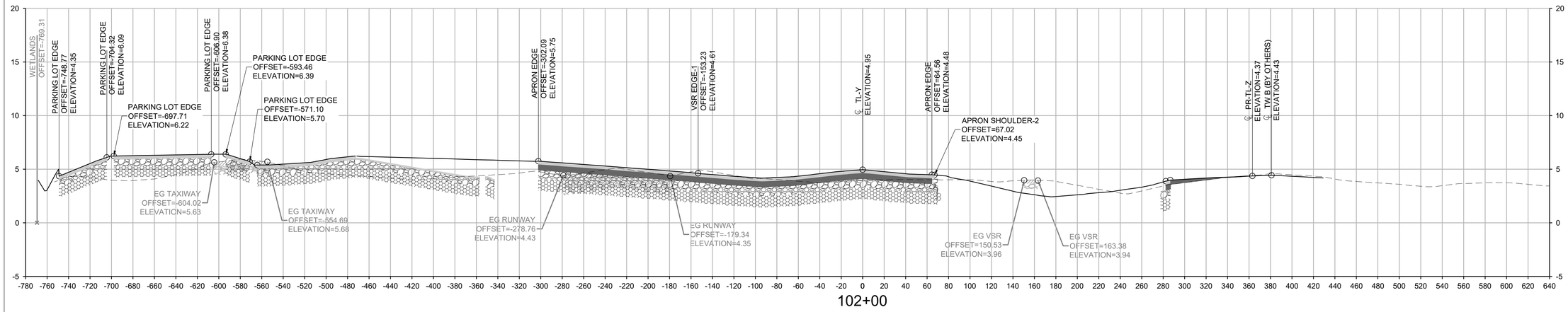

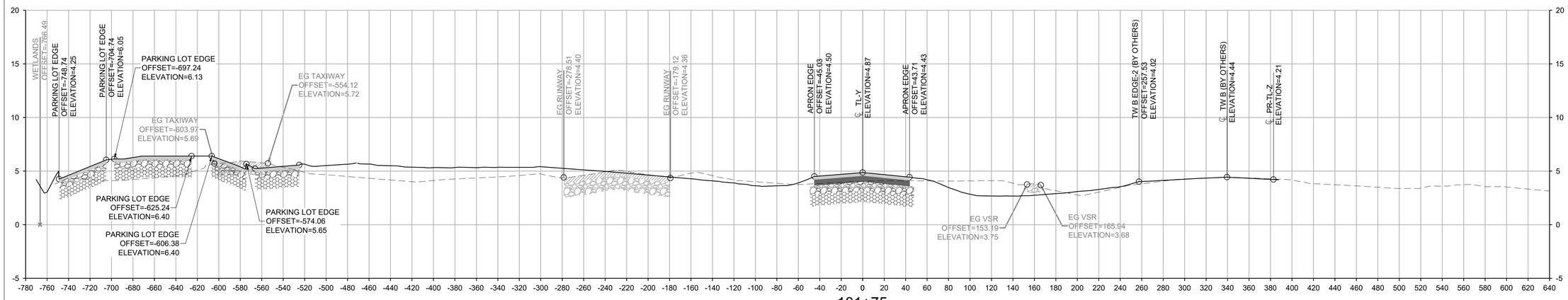

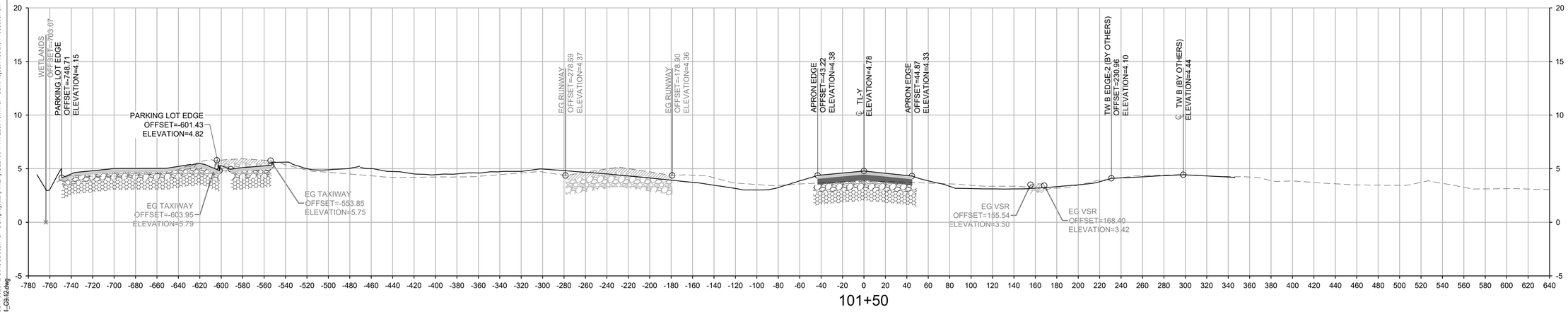

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

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AIRFIELD\PLOTSHEETS\240248\09-C9.01_C9.12.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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ARCHITECT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETTINELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

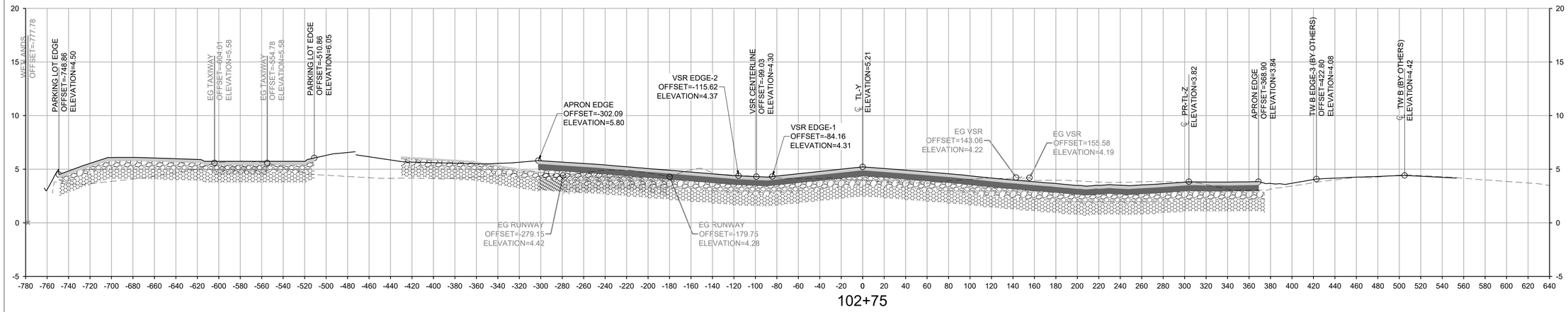
SHEET TITLE

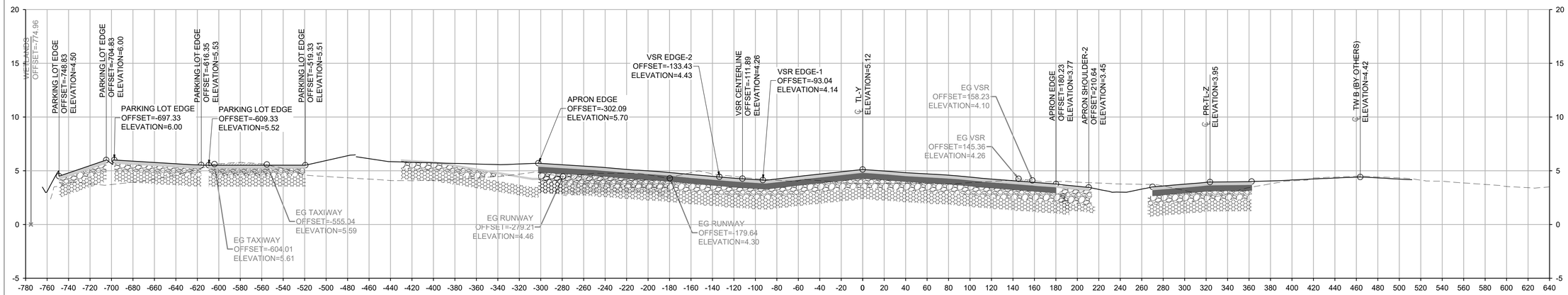
CROSS SECTIONS - 3

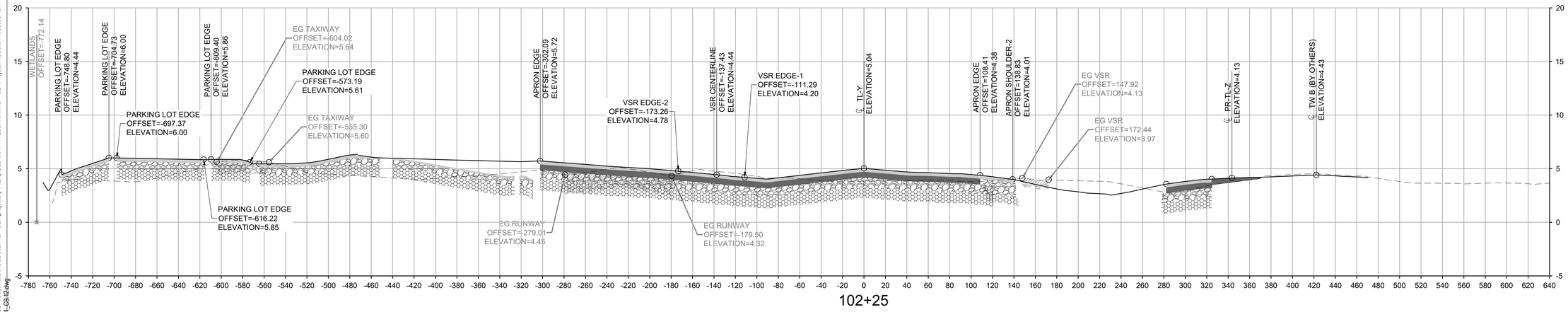
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.03







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

HVN - 2/27/2025 11:33:23 AM - C:\Users\SSF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\260240769-C9.01_C9.12.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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CONSULTANT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19475 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 4

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.04

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 16979 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 5

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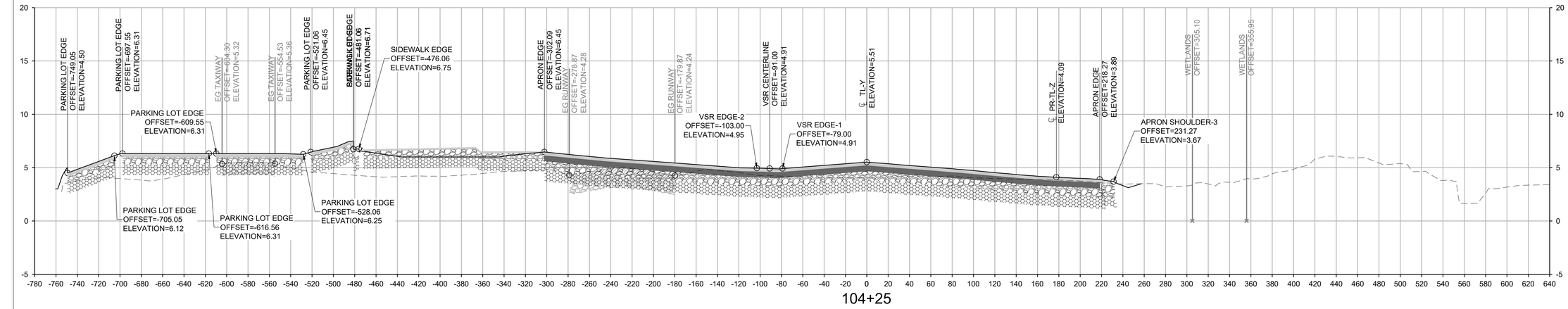
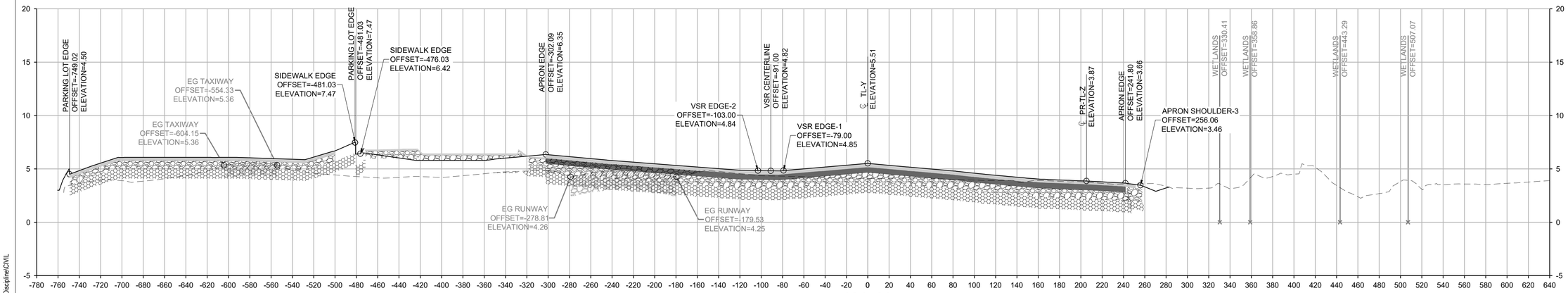
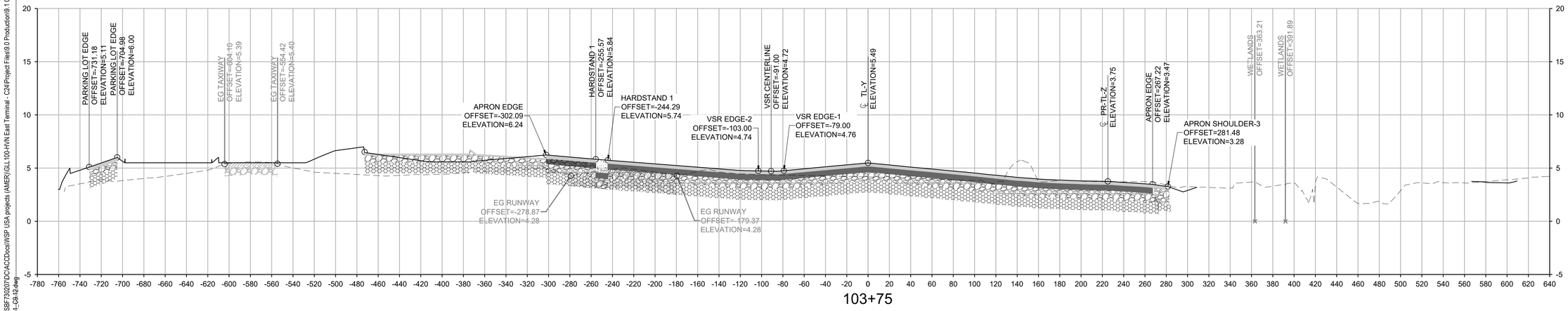
SHEET NUMBER

C9.05







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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CONSULTANT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

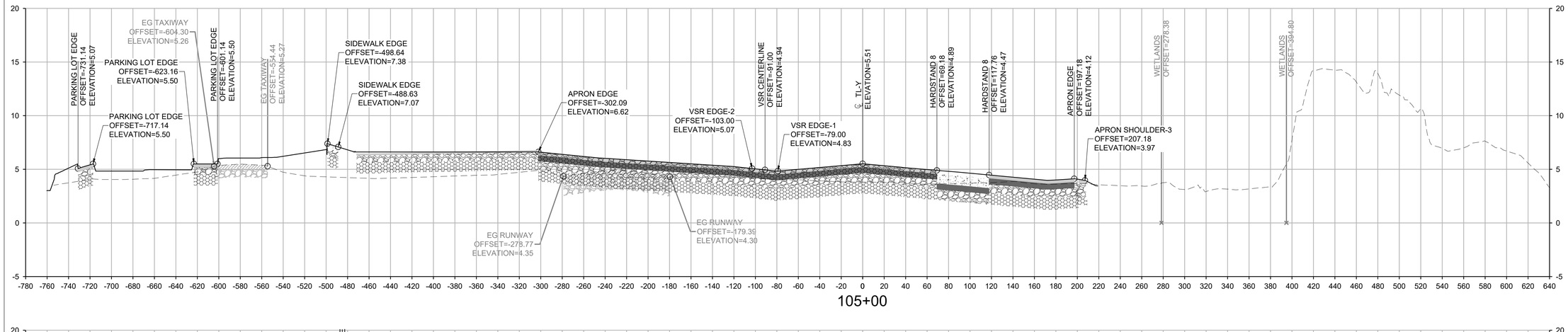
SHEET TITLE

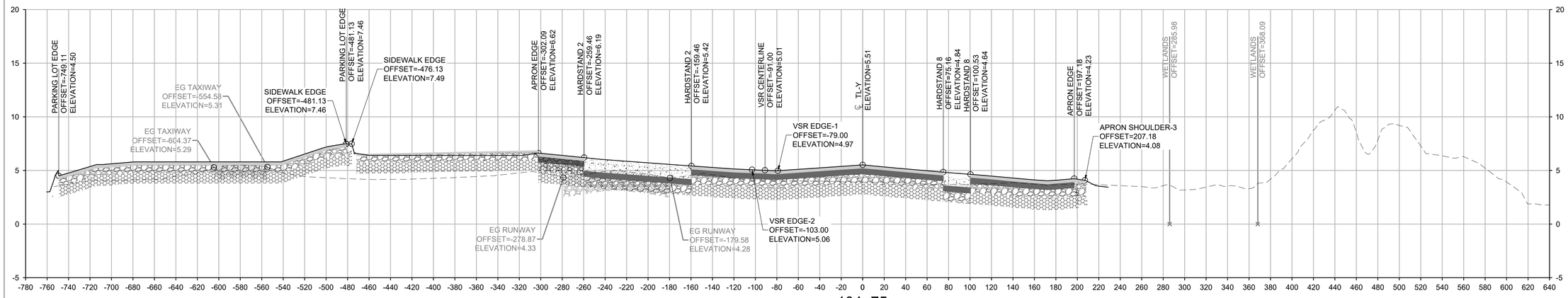
CROSS SECTIONS - 6

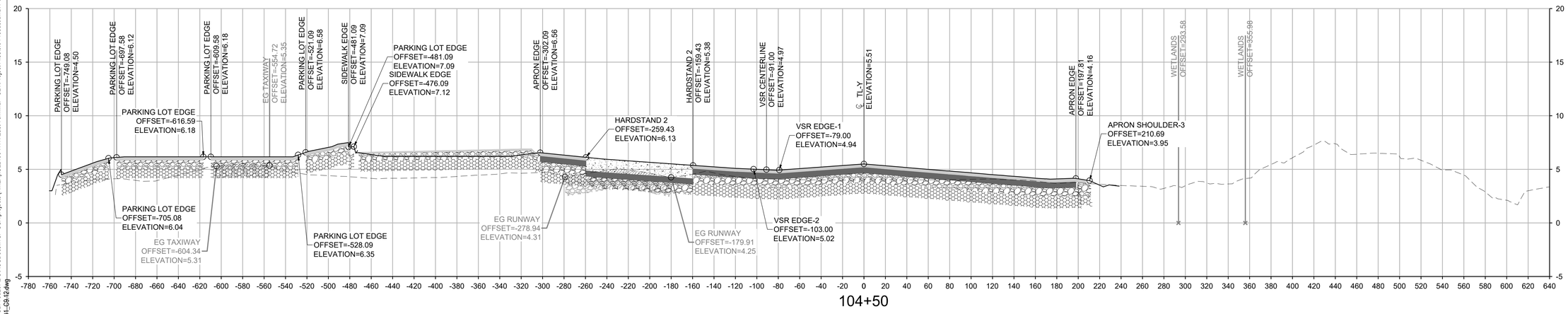
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.06







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19475 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

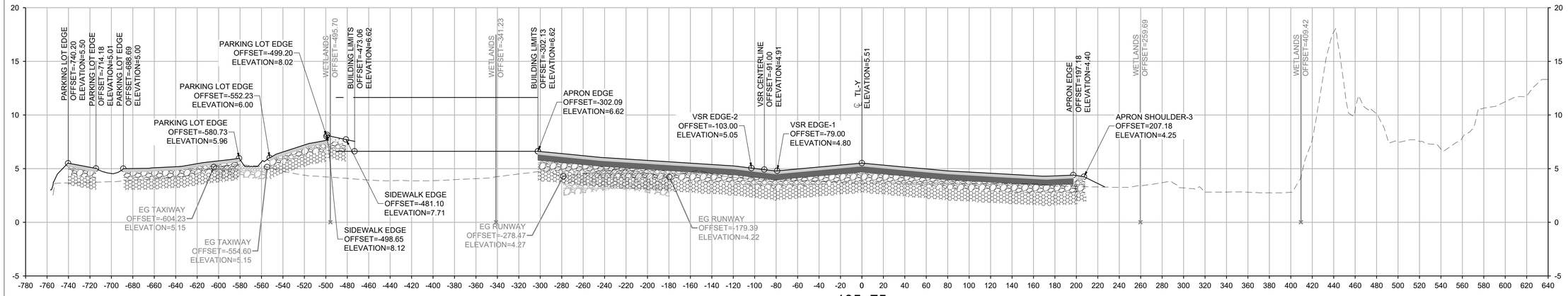
SHEET TITLE

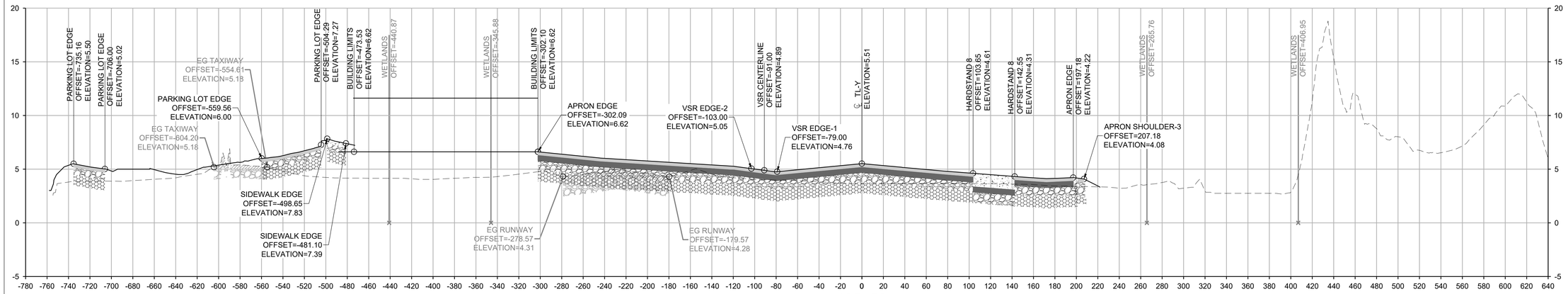
CROSS SECTIONS - 7

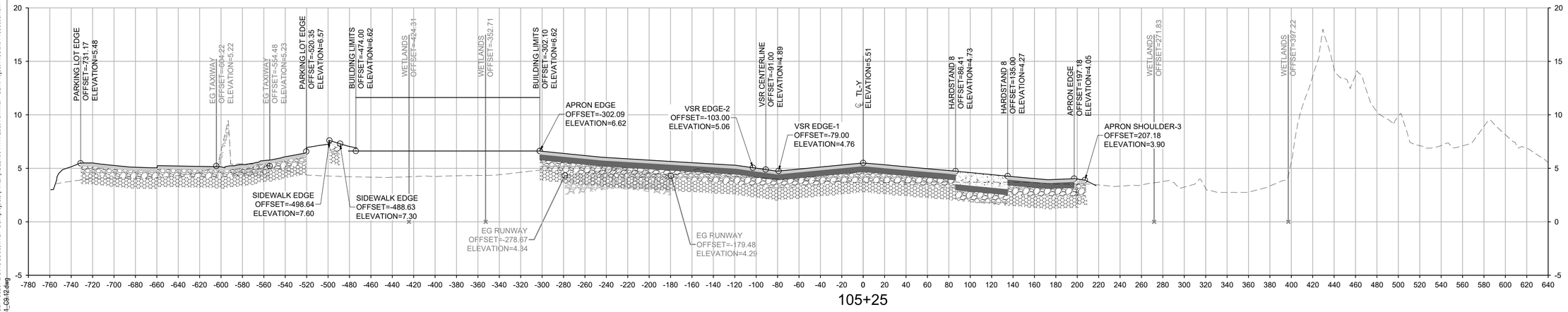
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.07







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

PGAL

PGAL, Inc.
3131 Briarpark Dr.
Suite 200
Houston, TX 77042
T 713 622 1444
F 713 622 1444
www.pgal.com

CONSULTANT

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

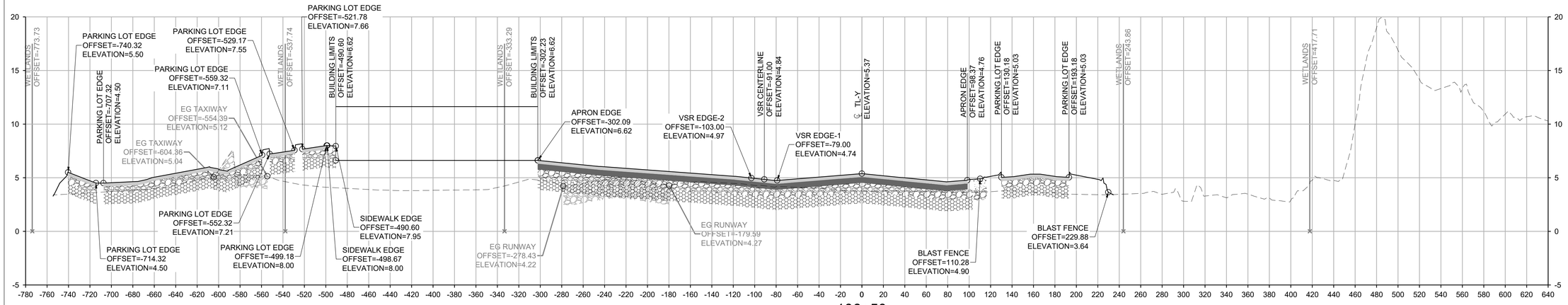
SHEET TITLE

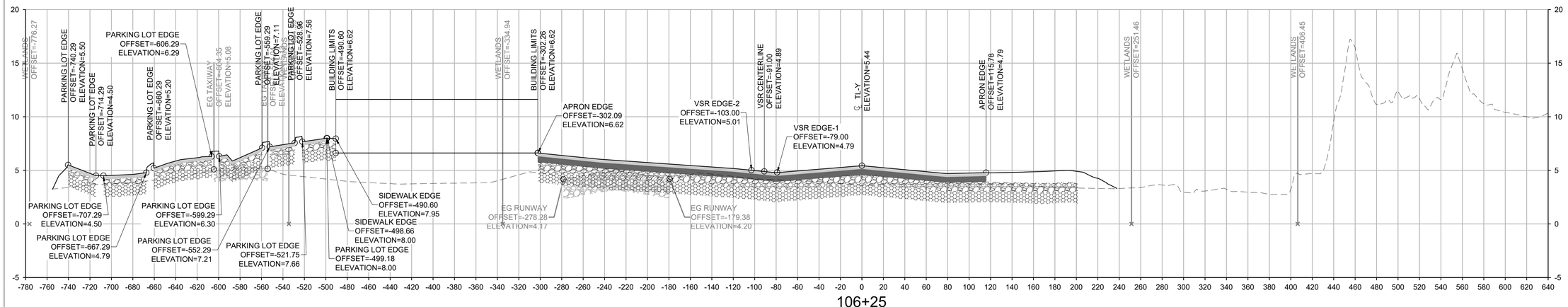
CROSS SECTIONS - 8

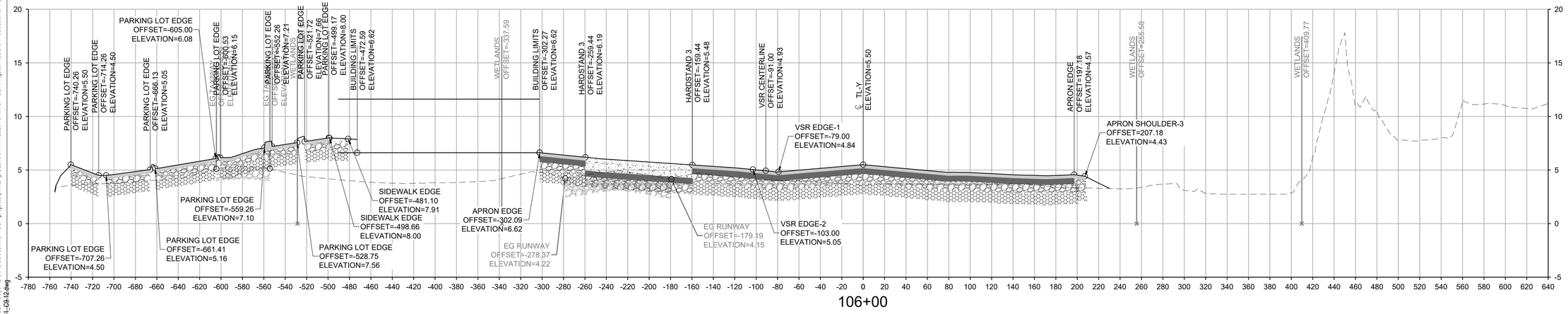
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.08







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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ARCHITECT

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CONSULTANT

wsp

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

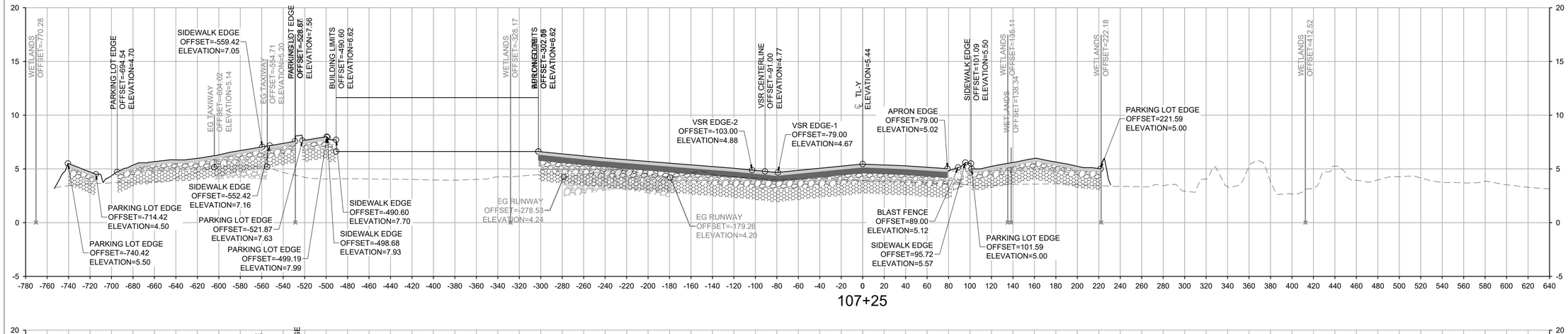
SHEET TITLE

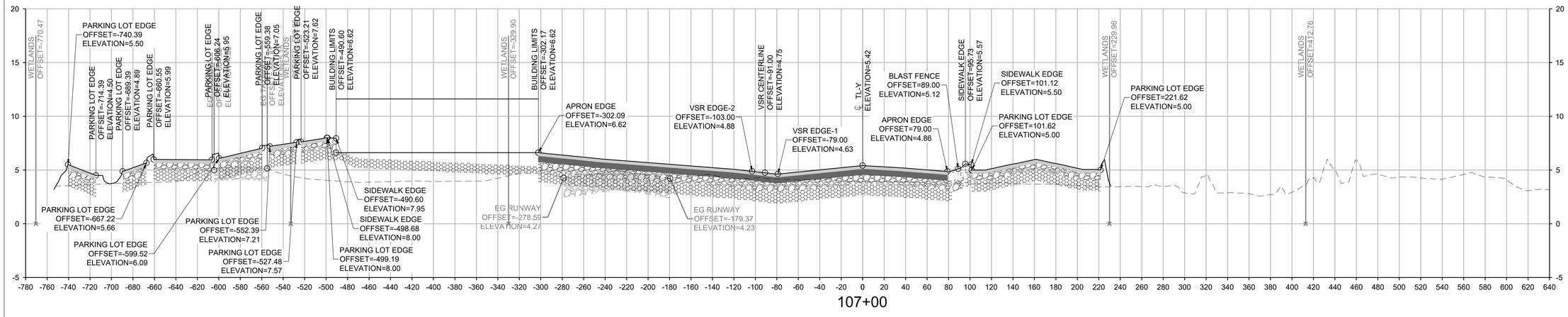
CROSS SECTIONS - 9

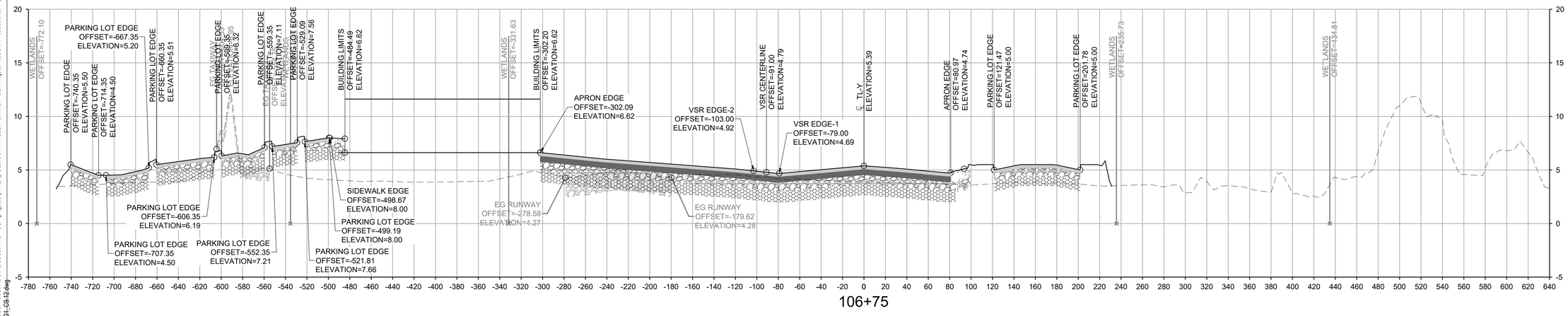
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.09







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

PGAL

PGAL, Inc.
3131 Briarpark Dr.
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CONSULTANT

WSP

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · MICHAEL L. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

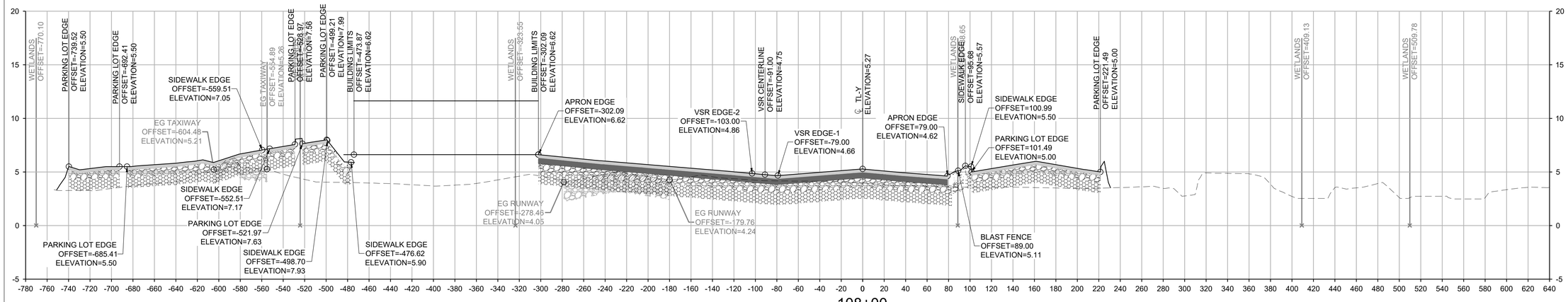
SHEET TITLE

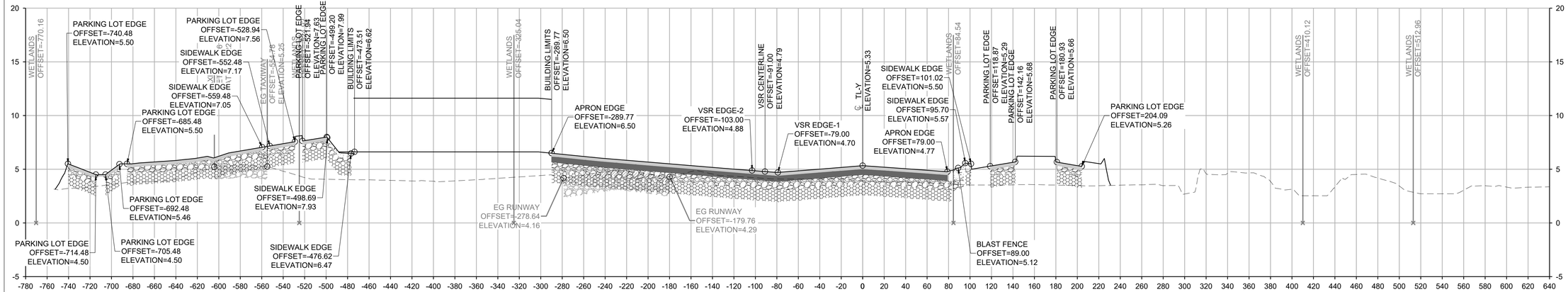
CROSS SECTIONS - 10

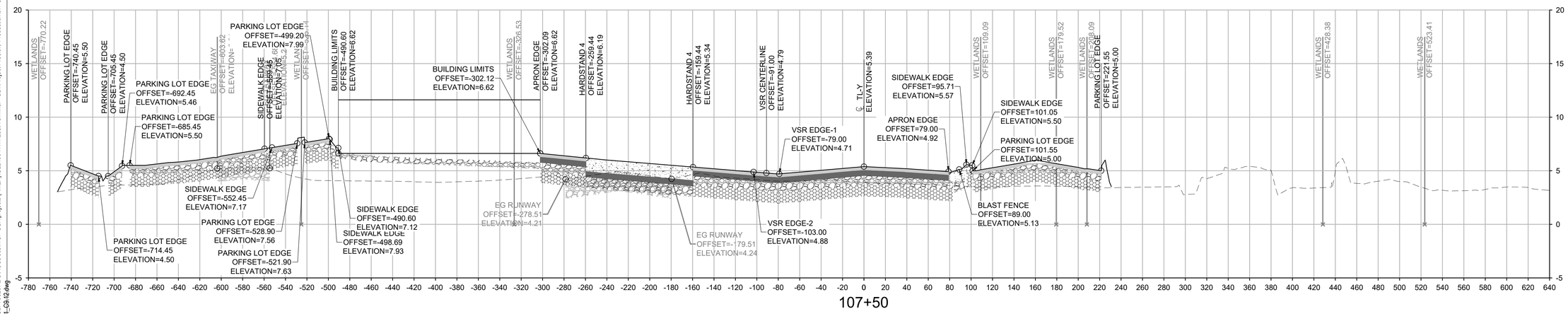
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.10







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

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500 WINDING BROOK DRIVE
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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

RICHARD L. PETTINELLI — No. 16979 — LICENSED PROFESSIONAL ENGINEER — STATE OF CONNECTICUT

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

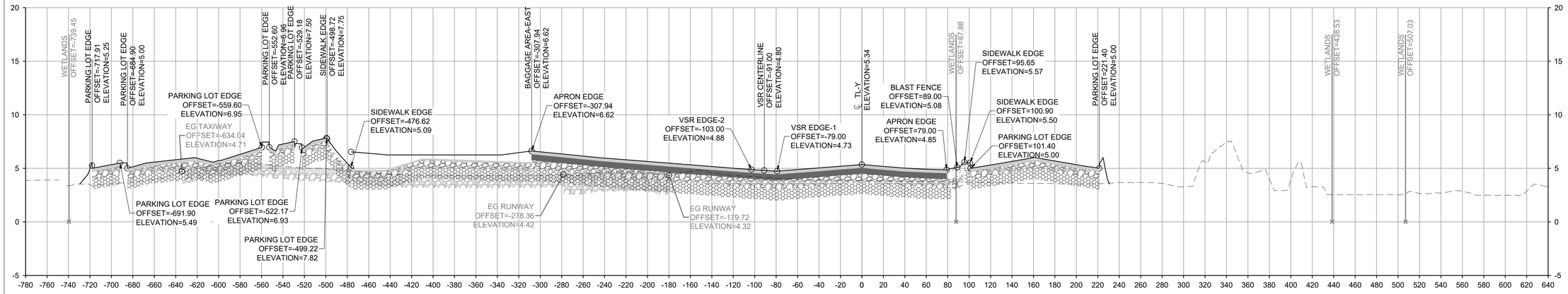
SHEET TITLE

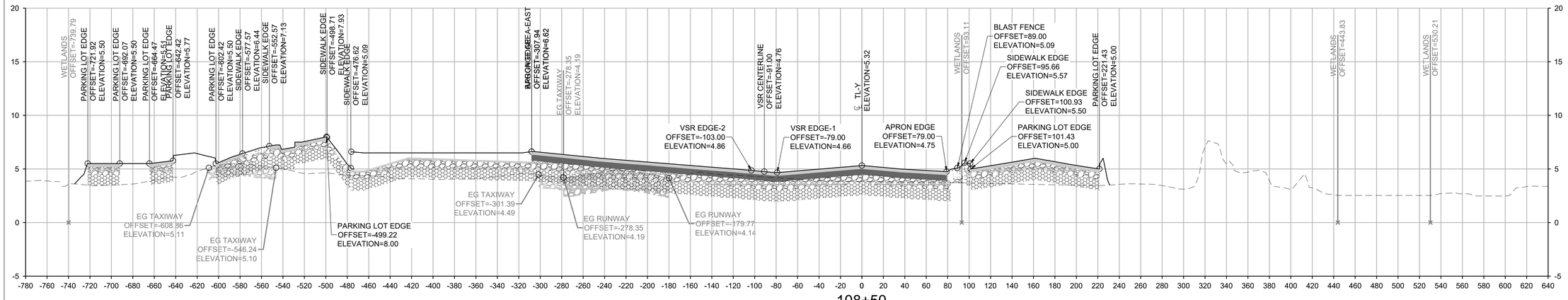
CROSS SECTIONS - 11

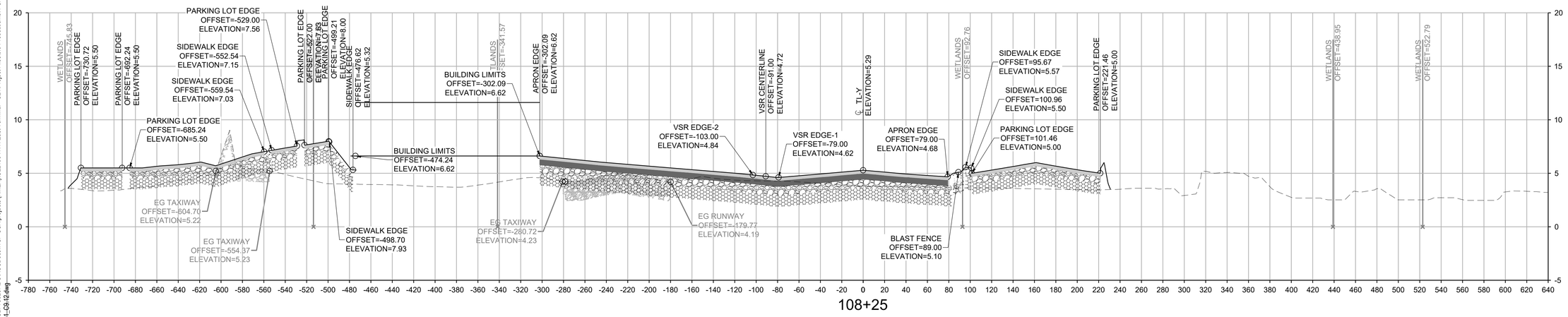
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.11







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16475 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

Nr.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 12

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.12

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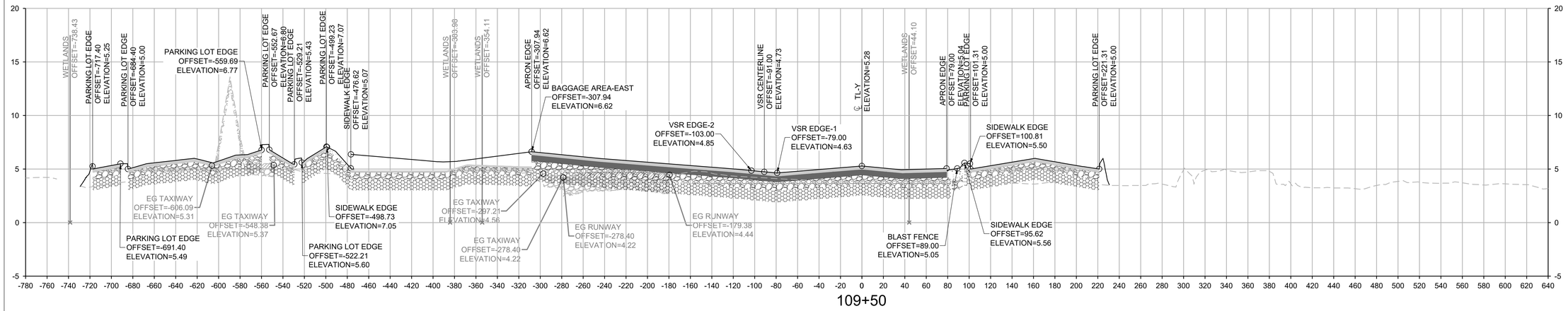

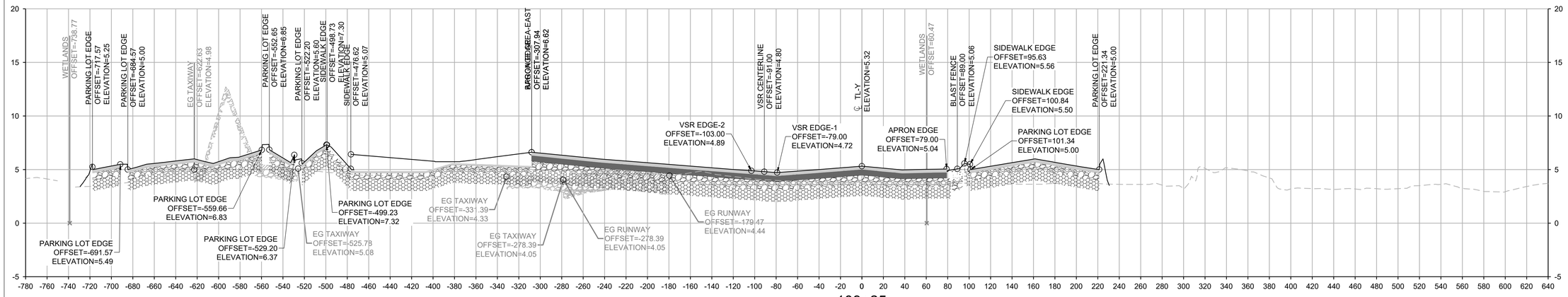

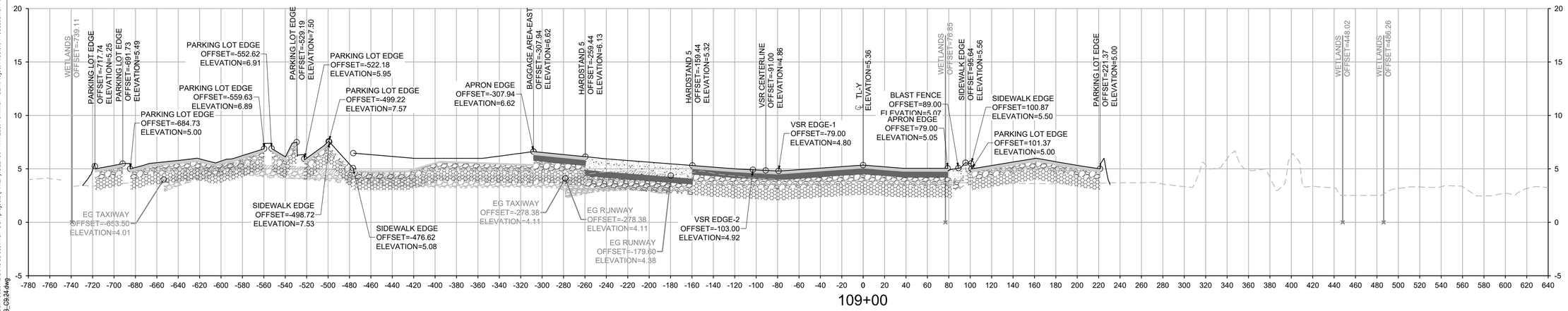

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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www.pgal.com

CONSULTANT

wsp

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500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PATTERSON — No. 19678 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

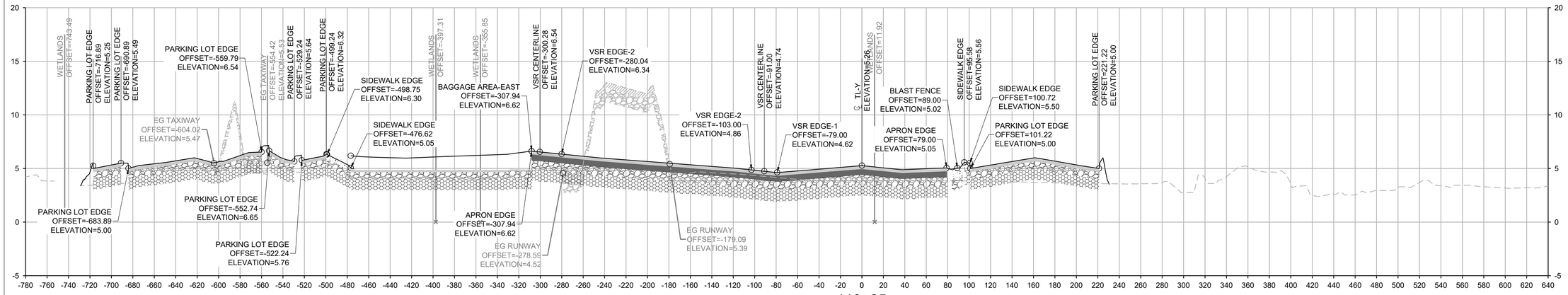
SHEET TITLE

CROSS SECTIONS - 13

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.13



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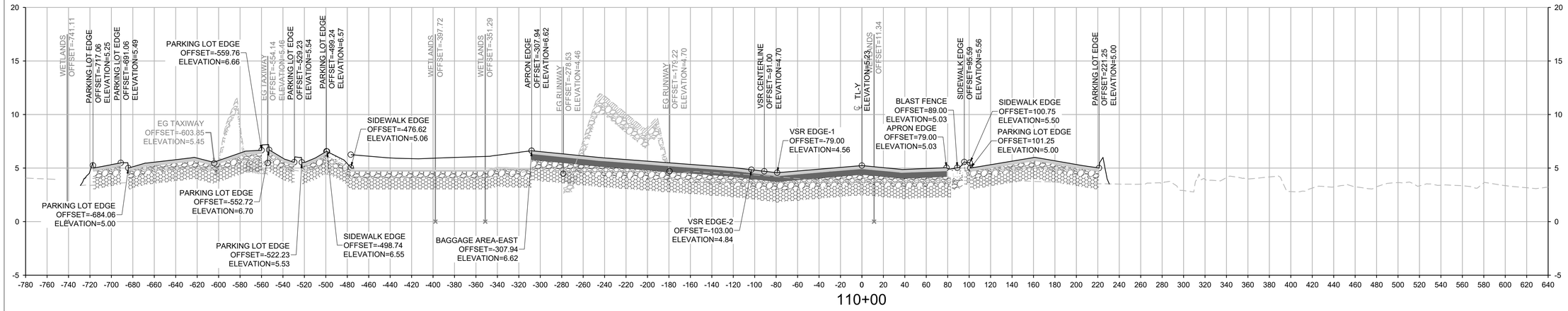

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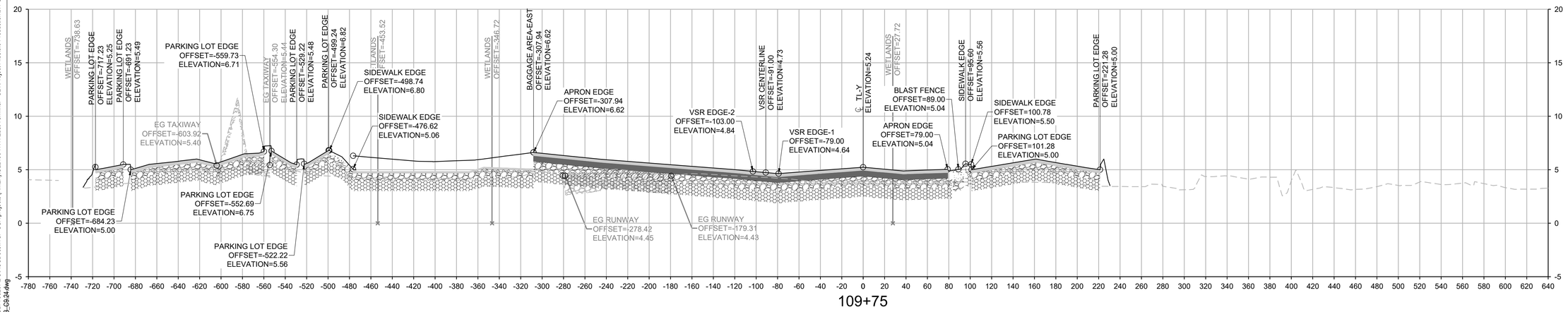

109+75

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

H:\N - 2/27/2025 11:22:47 AM - C:\Users\USBF73020\7DCVACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL\AIRFIELD\PLOTSHEETS\240409769-GR-13_C9.24.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

PGAL

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CONSULTANT

WSP

WSP USA
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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETTINELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240249.01	DESIMONE
23-006724	SYSKA

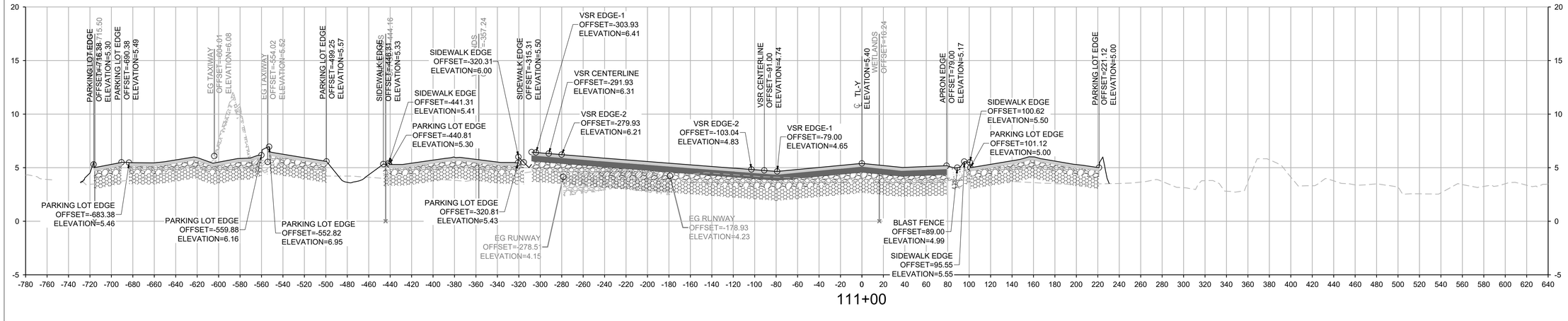
SHEET TITLE

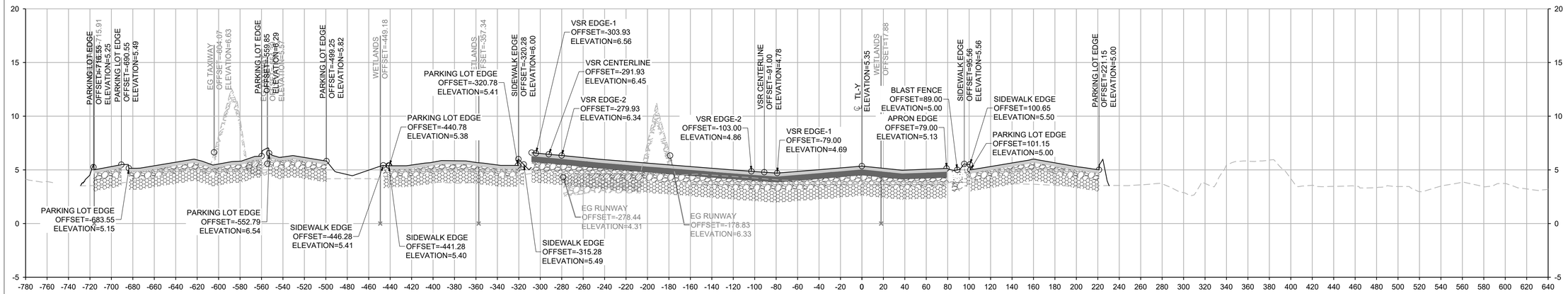
CROSS SECTIONS - 14

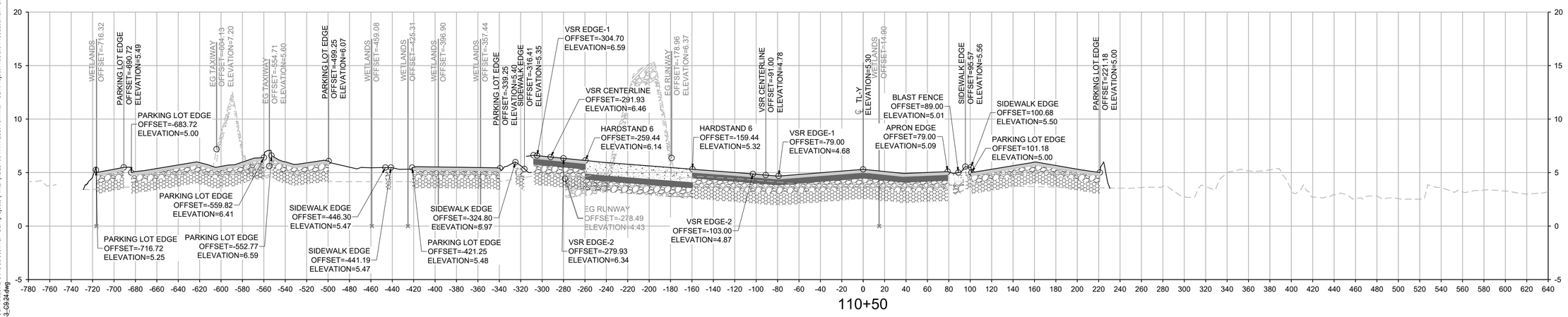
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.14







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

H:\N - 227\2025 11:22:47 AM - C:\Users\USSF73020\DOCS\ACCDocs\WSP USA projects (AMER)\GL1 100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.13 Discipline\CIVIL AIRFIELD\PLOTSHEETS\240480\89-03-13_09-24.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

WSP

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500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETTINELLI — No. 19478 — REGISTERED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00025063.0769	WSP
10052590.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

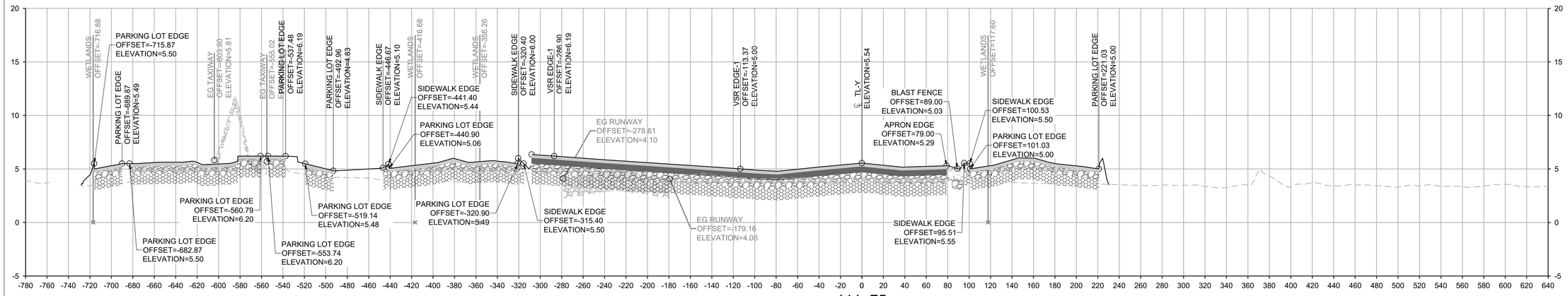
SHEET TITLE

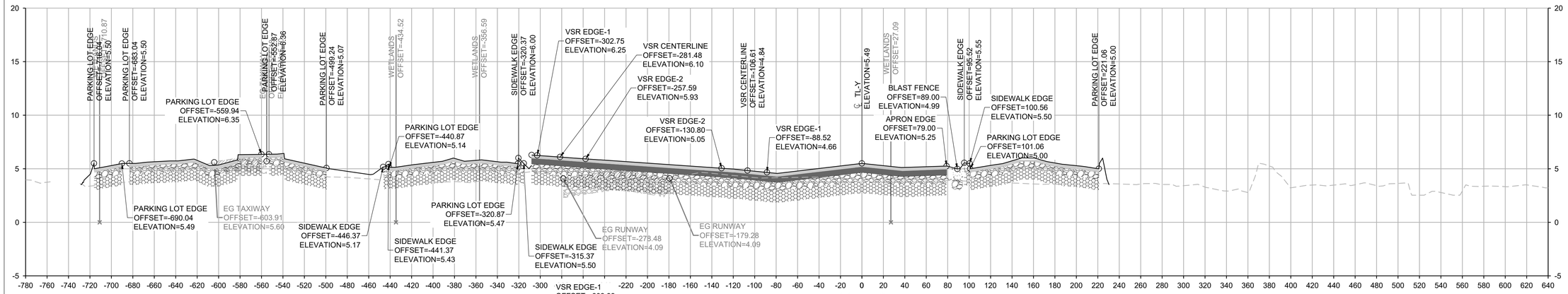
CROSS SECTIONS - 15

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.15





LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

5' VERTICAL SCALE 1"=5'

0 25' 50' 100' HORIZONTAL SCALE 1"=50'

H:\N - 227\2025 11:22:47 AM - C:\Users\USSF73020\7DOCACDocs\WSP USA projects (AMER)\GL\100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.13 Discipline\CIVIL AIRFIELD\PLOTSHEETS\240400\9-03-16_09:24.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

PGAL

PGAL, Inc.
3131 Briarpark Dr.
Suite 200
Houston, TX 77042
T 713 622 1444
F 713 622 1444
www.pgal.com

CONSULTANT

WSP

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L PETRUCELLI · No. 19478 · REGISTERED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00025063.0769	WSP
10052559.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

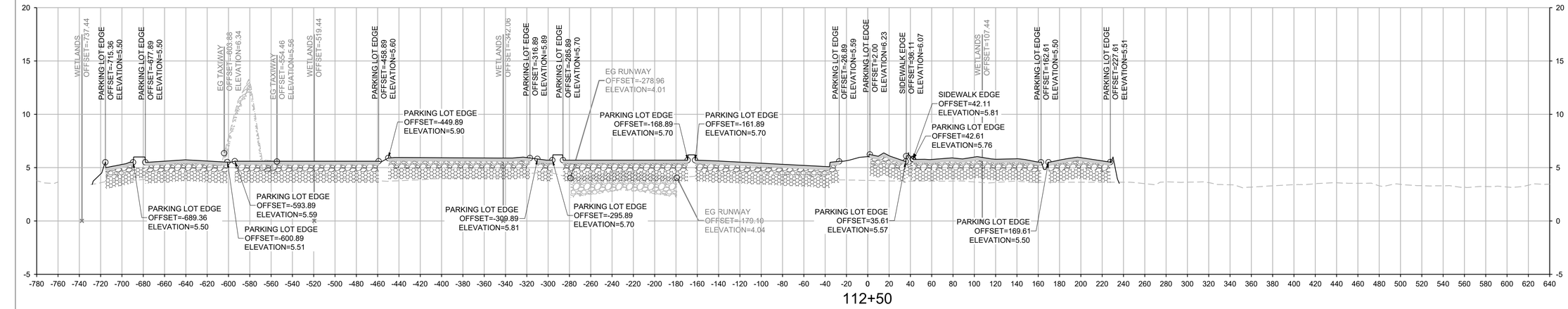
SHEET TITLE

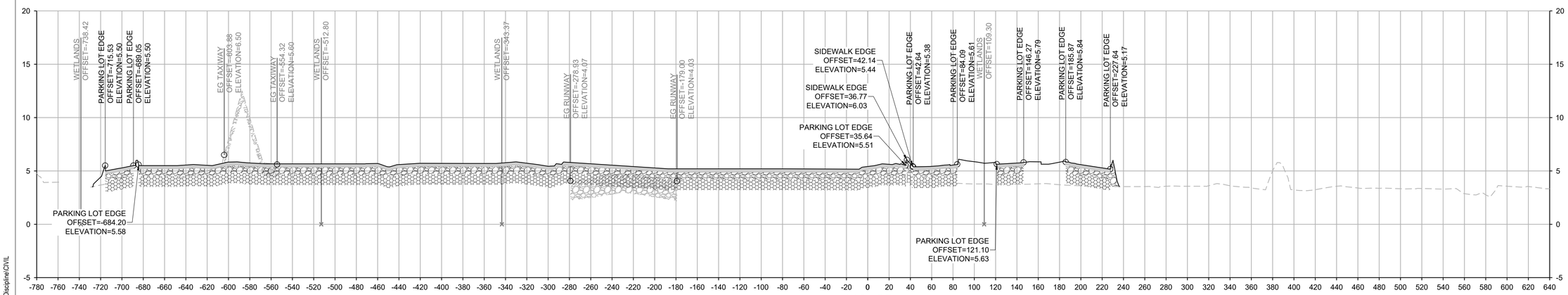
CROSS SECTIONS - 16

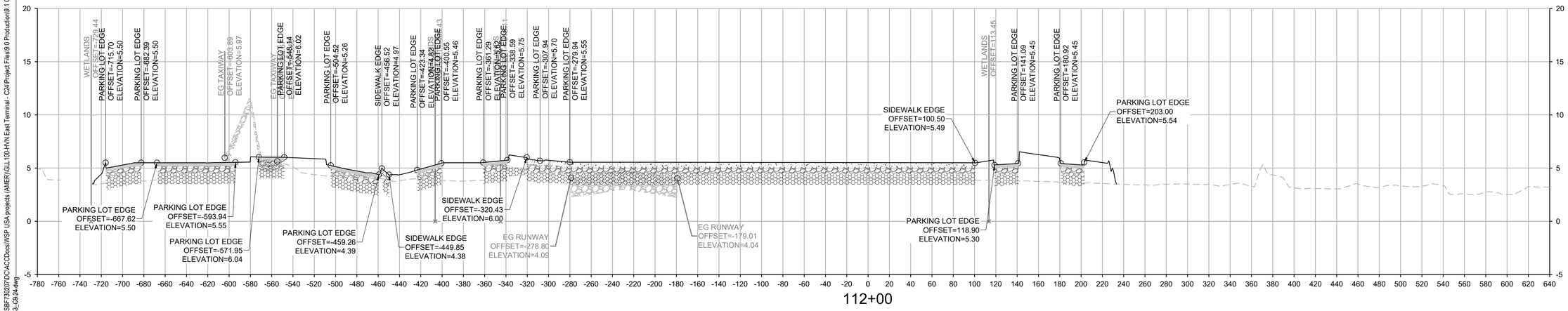
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.16







LEGEND

EXISTING GROUND

PROPOSED GRADE

UNCRUSHED AGG. BASE COURSE (P-154)

CRUSHED AGG. BASE COURSE (P-209)

BITUMINOUS BASE (P-403)

HMA (P-401)

PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

H:\N - 2/27/2025 11:22:47 AM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\Civil\AIRFIELD\PLOTSHEETS\9206240769-GI-13_C9.24.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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ARCHITECT

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CONSULTANT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 19478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 17

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.17

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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www.pgal.com

CONSULTANT

WSP

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETRELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 18

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.18

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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www.pgal.com

CONSULTANT

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETRIELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

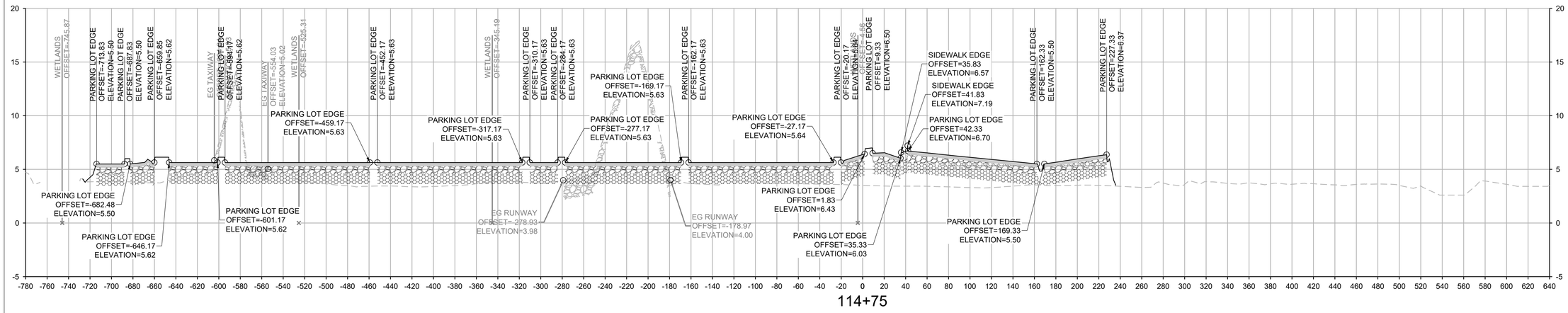
SHEET TITLE

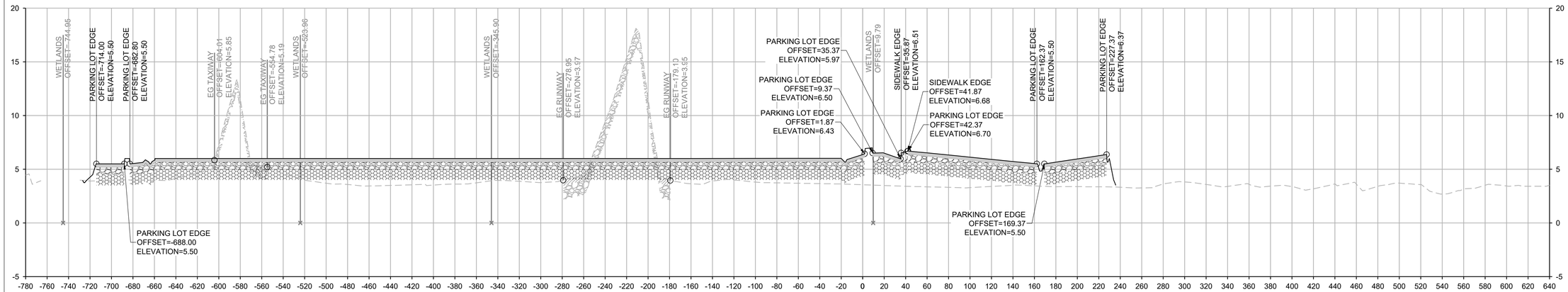
CROSS SECTIONS - 19

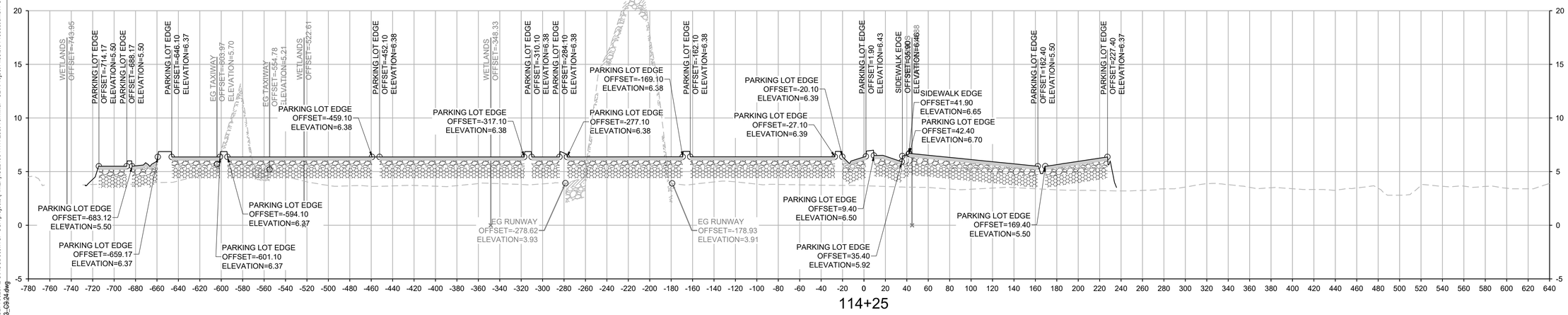
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.19







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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www.pgal.com

CONSULTANT

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 16979 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

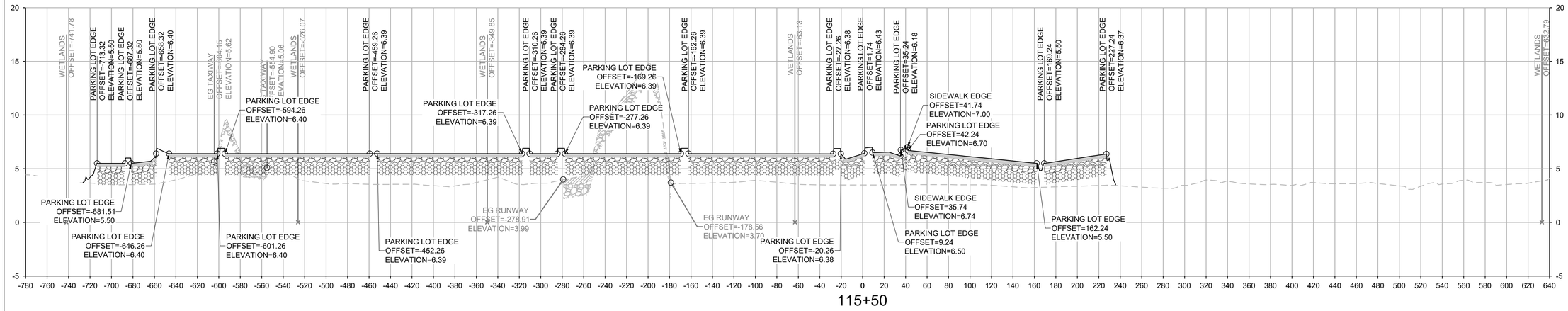
SHEET TITLE

CROSS SECTIONS - 20

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.20



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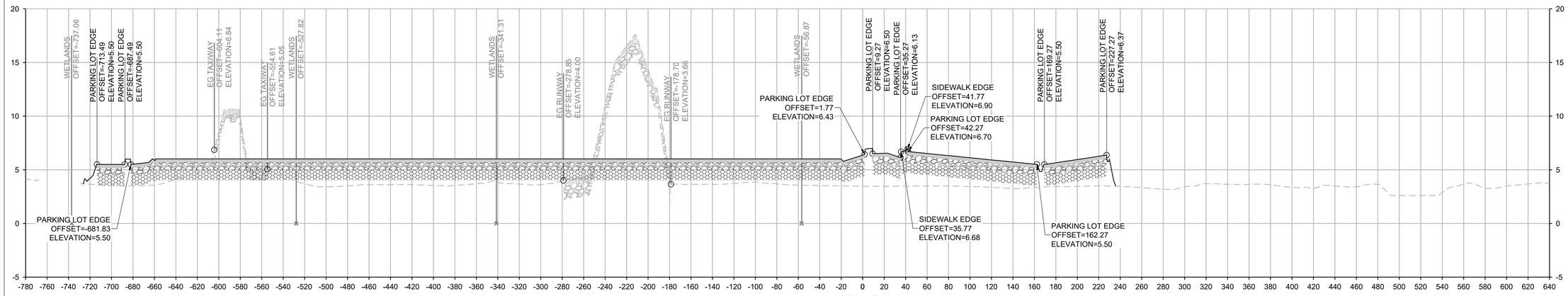

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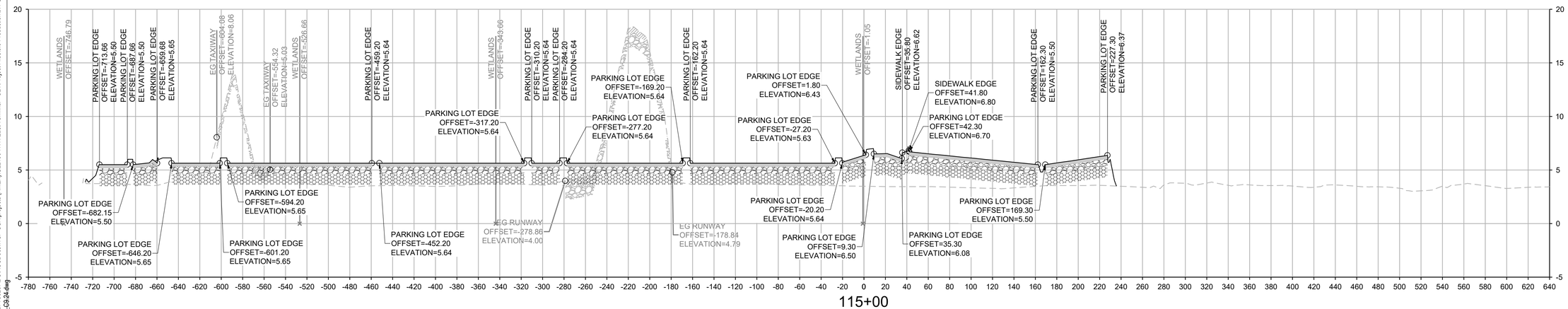

115+00

LEGEND

EXISTING GROUND

PROPOSED GRADE

UNCRUSHED AGG. BASE COURSE (P-154)

CRUSHED AGG. BASE COURSE (P-209)

BITUMINOUS BASE (P-403)

HMA (P-401)

PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

HVN - 2/7/2025 11:22:47 AM - C:\Users\USF73320\DC\ACCDocs\WSP USA projects (AMER)\GLL 100-HVN East Terminal - C2k\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL\AIRFIELD\PLOTSHEETS\260400769-09-13--C9.21.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

PGAL

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3131 Briarpark Dr.
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CONSULTANT

WSP

WSP USA
500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 19479
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

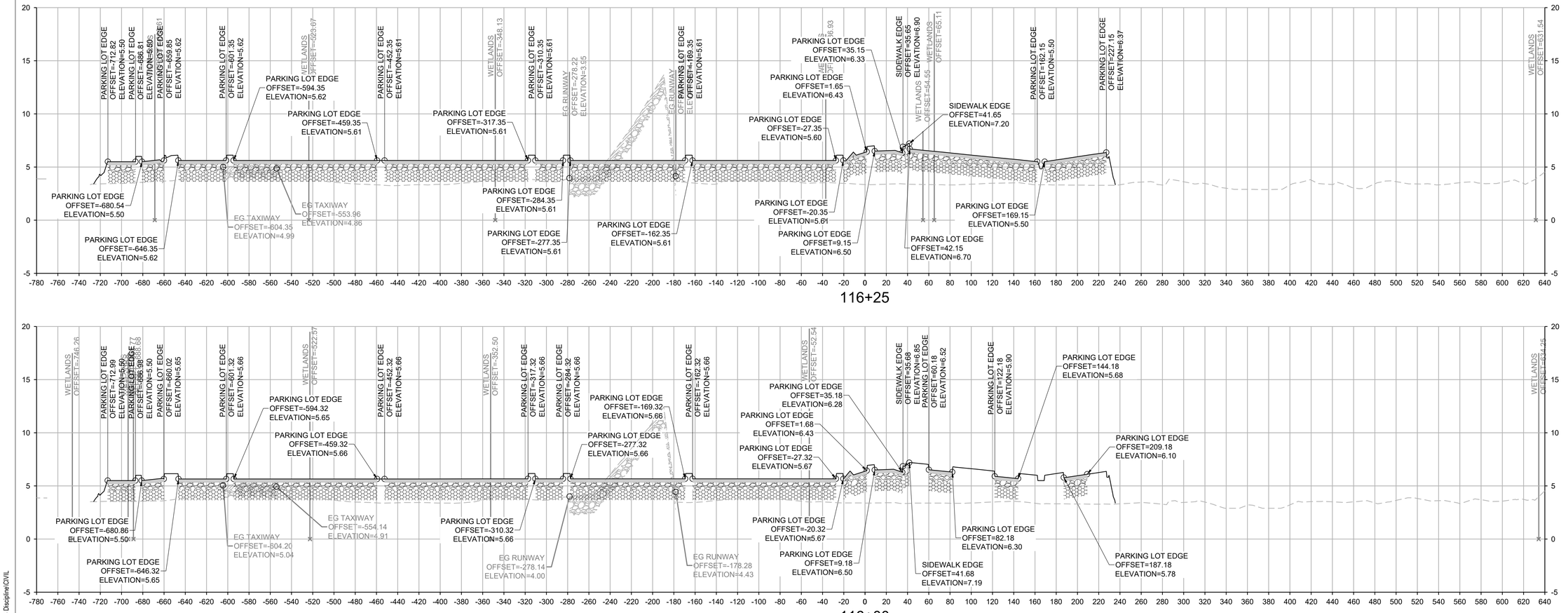
SHEET TITLE

CROSS SECTIONS - 21

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.21



LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

HVN - 2/27/2025 11:22:47 AM - C:\Users\USBF73020\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\10 Production\9.1 CAD\9.1.3 Discipline\CIVIL\AIRFIELD\PLOTSHEETS\0240069-C9.13-C9.44.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

wsp

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — RICHARD L. PETRELLI — No. 19478 — LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

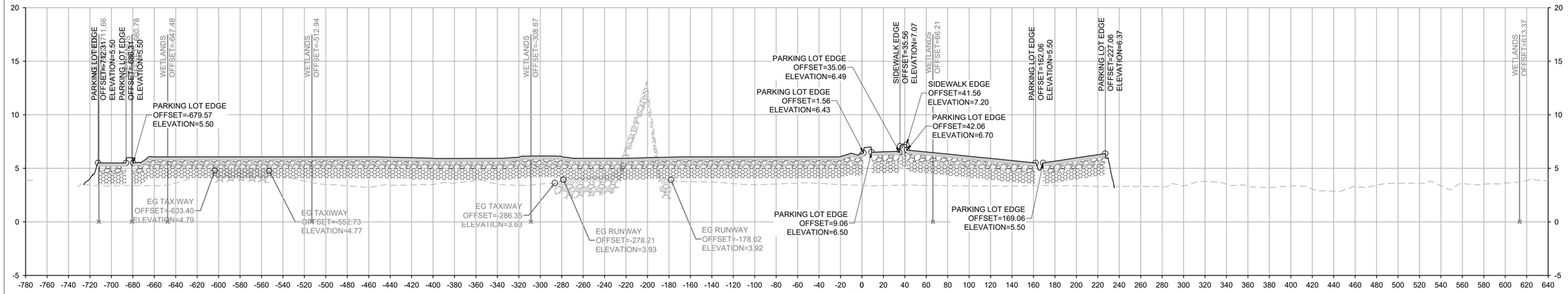
SHEET TITLE

CROSS SECTIONS - 22

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.22



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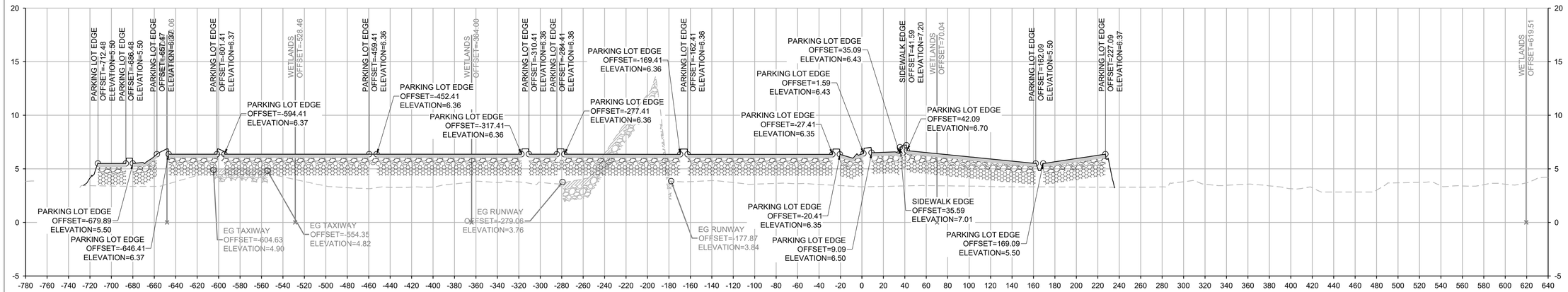

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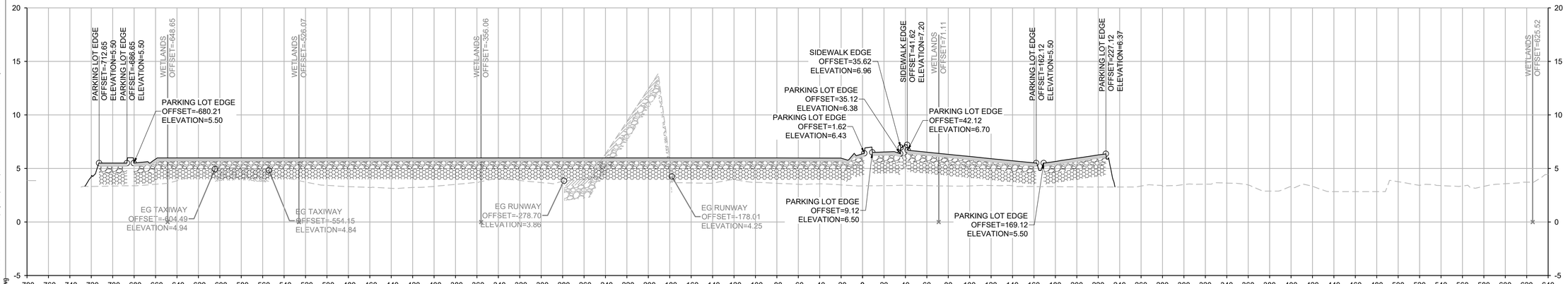

116+50

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5' (5', 2.5', 0)

HORIZONTAL SCALE 1"=50' (0, 25', 50', 100')

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CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 19475 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

Nr.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

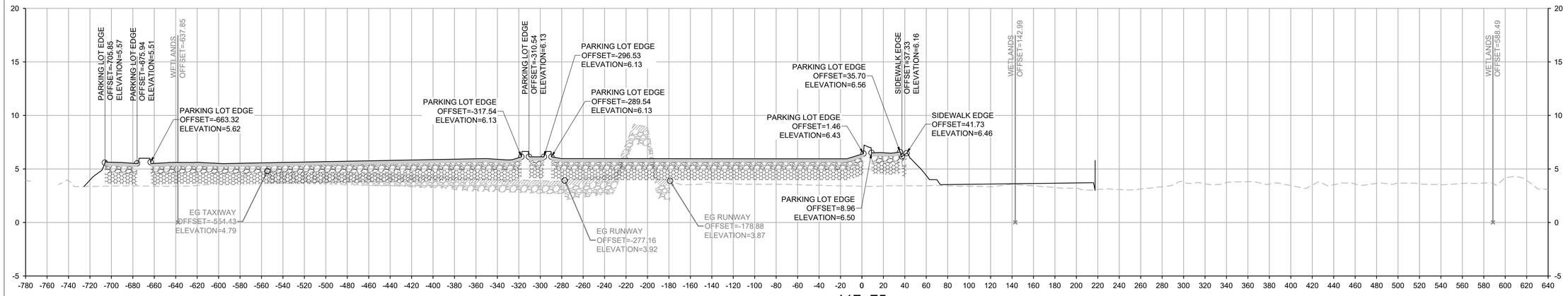
SHEET TITLE

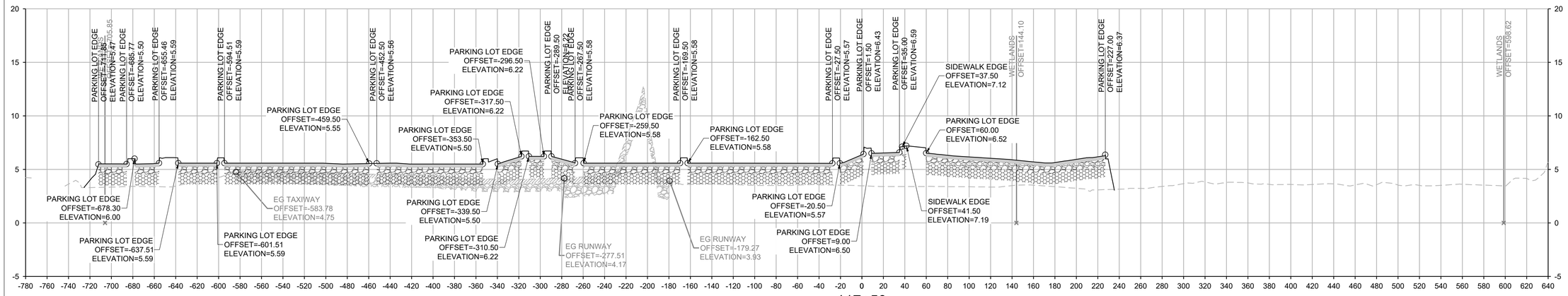
CROSS SECTIONS - 23

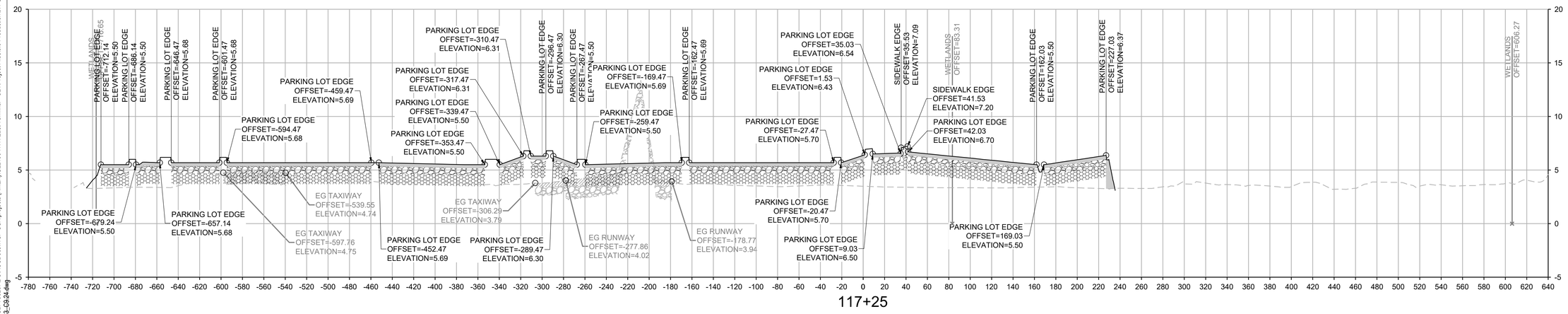
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.23







LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

H:\N - 2/27/2025 11:22:47 AM - C:\Users\USBF730207\DOCACDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\240248-09.19_09.24.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
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ARCHITECT

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CONSULTANT

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www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD L. PETTINELLI · No. 18478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US00250630.0769	WSP
10052590.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

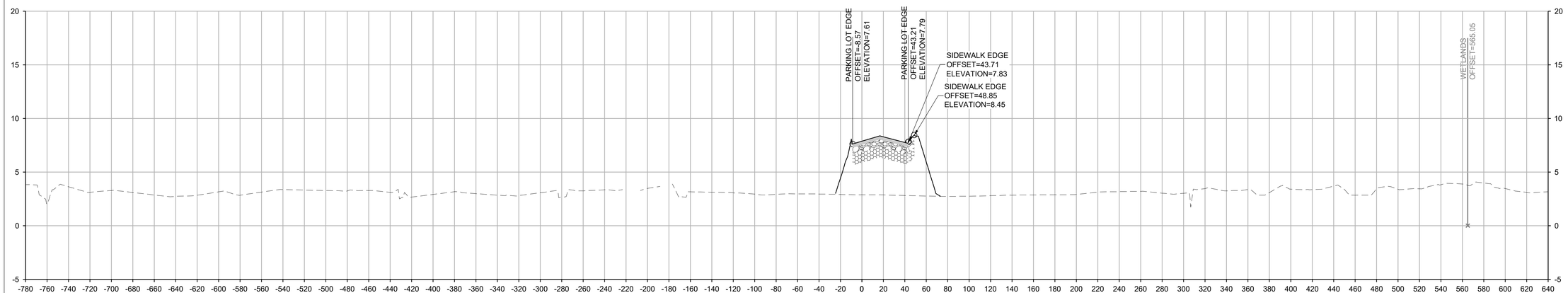
SHEET TITLE

CROSS SECTIONS - 24

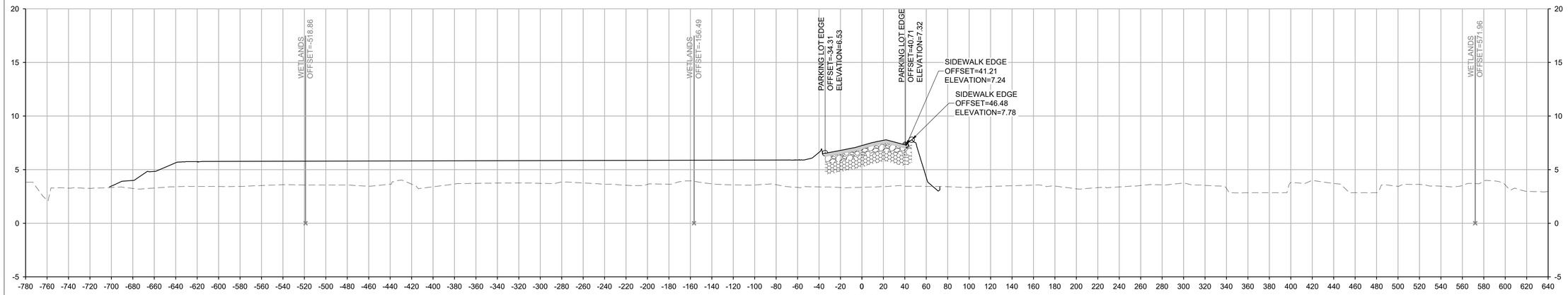
DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

SHEET NUMBER

C9.24



118+50



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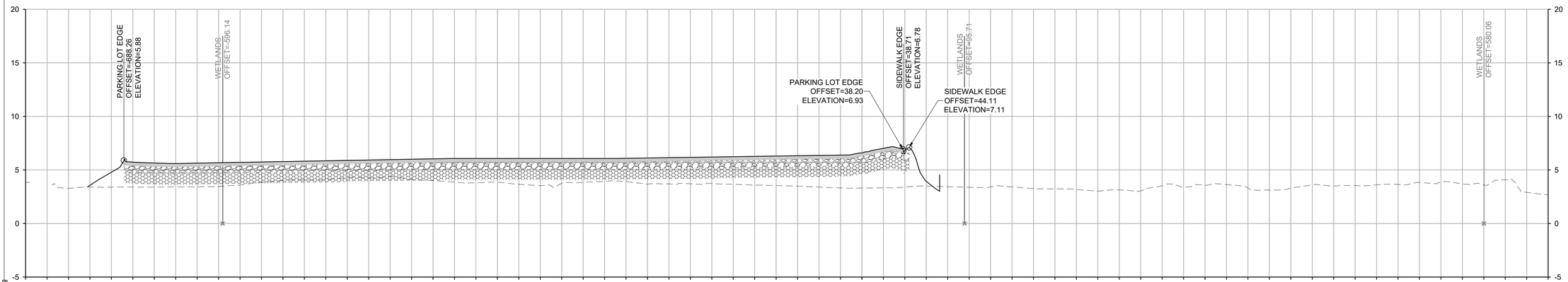

118+00

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

5' 2.5' 0 VERTICAL SCALE 1"=5'

0 25' 50' 100' HORIZONTAL SCALE 1"=50'

HVN - 2/27/2025 11:27:32 AM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C9.25_C9.30.dwg

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
155 BURR STREET
EAST HAVEN, CT 06512
T (203) 466-8888

ARCHITECT

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CONSULTANT

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500 WINDING BROOK DRIVE
GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

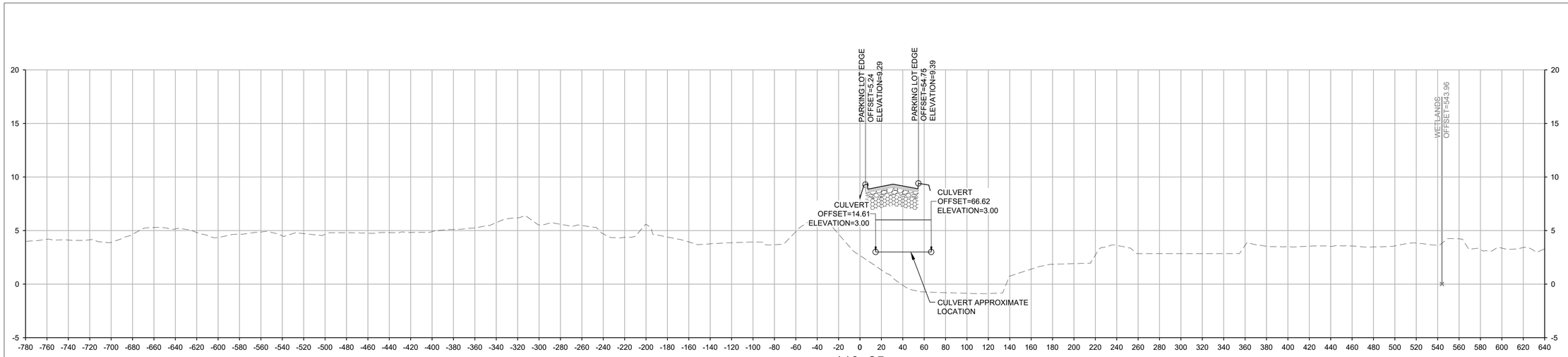
SHEET TITLE

CROSS SECTIONS - 25

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C9.25



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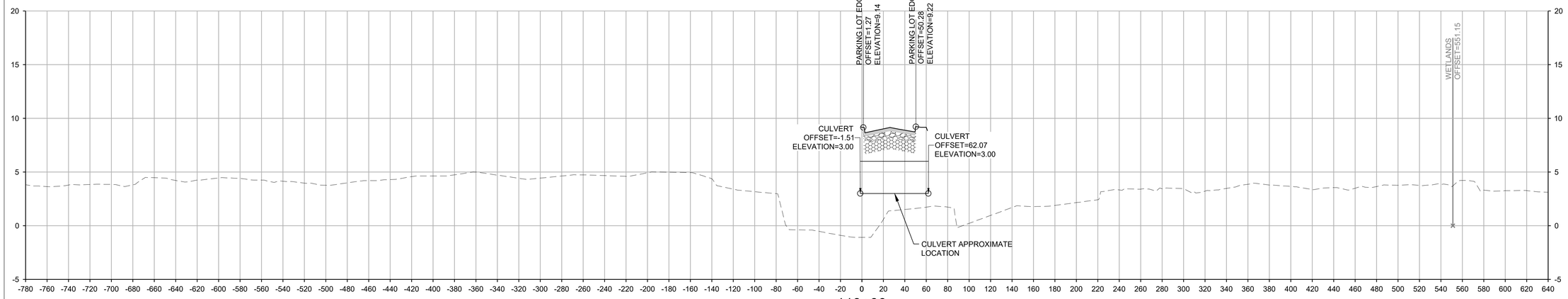

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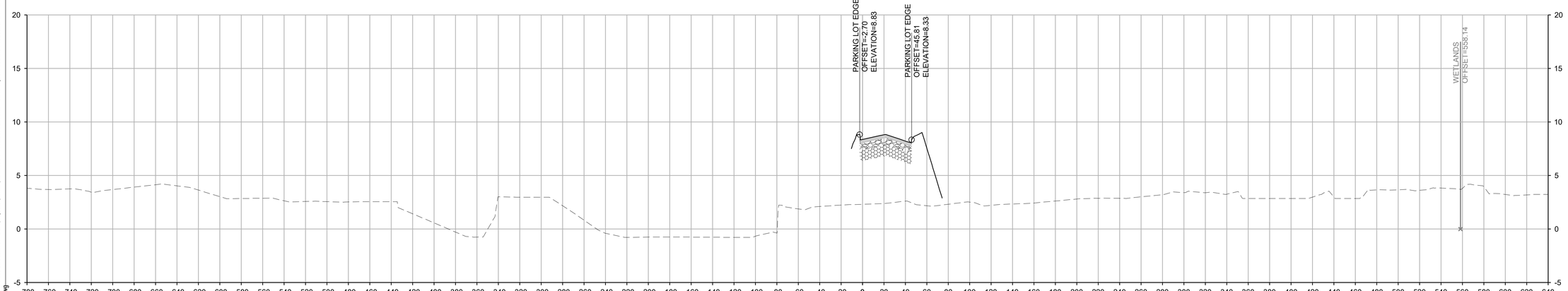

118+75

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
- BITUMINOUS BASE (P-403)
- HMA (P-401)
- PCC (P-501)

VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT · RICHARD E. PETTINELLI · No. 19478 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

№	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 26

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C9.26

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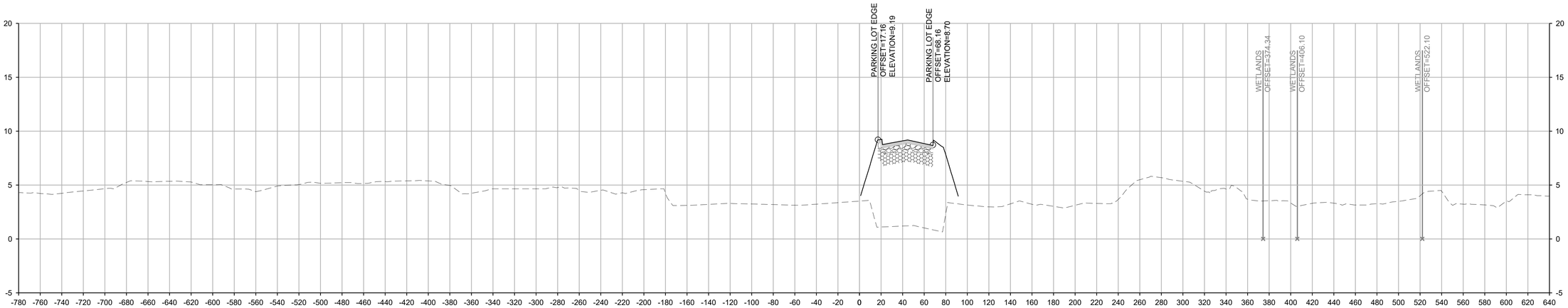

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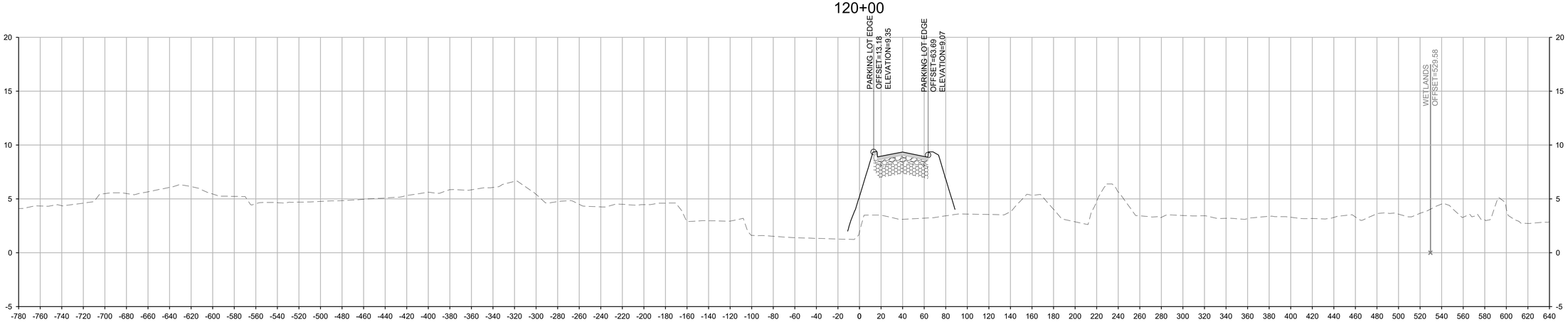

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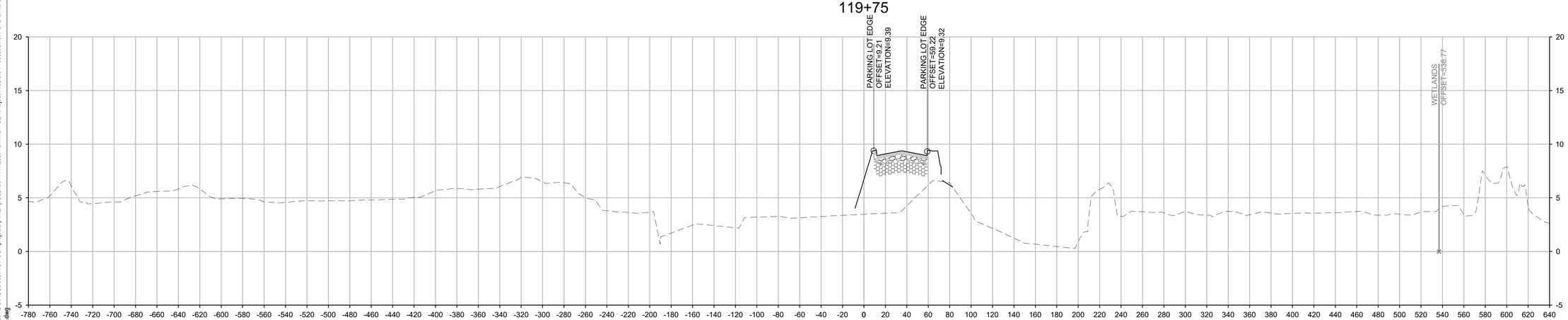

119+50

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
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5' 2.5' 0 VERTICAL SCALE 1"=5'

0 25' 50' 100' HORIZONTAL SCALE 1"=50'

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 18478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 27

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C9.27

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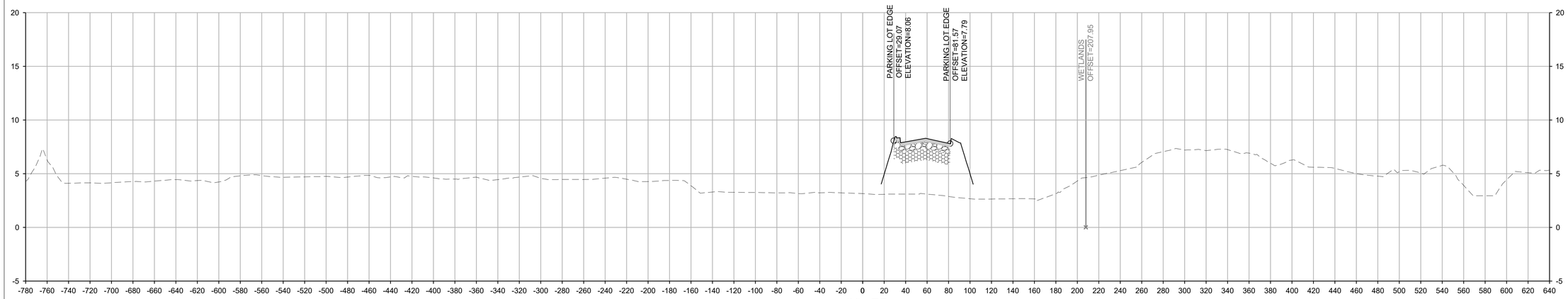

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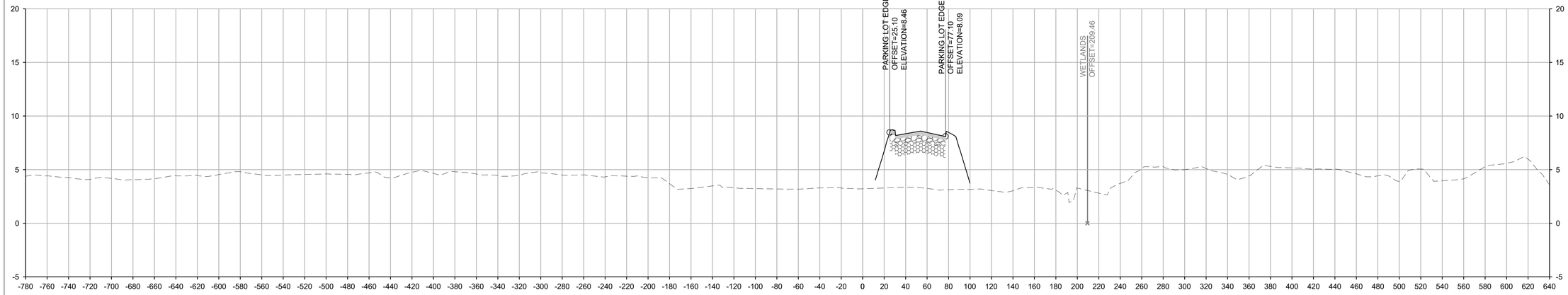

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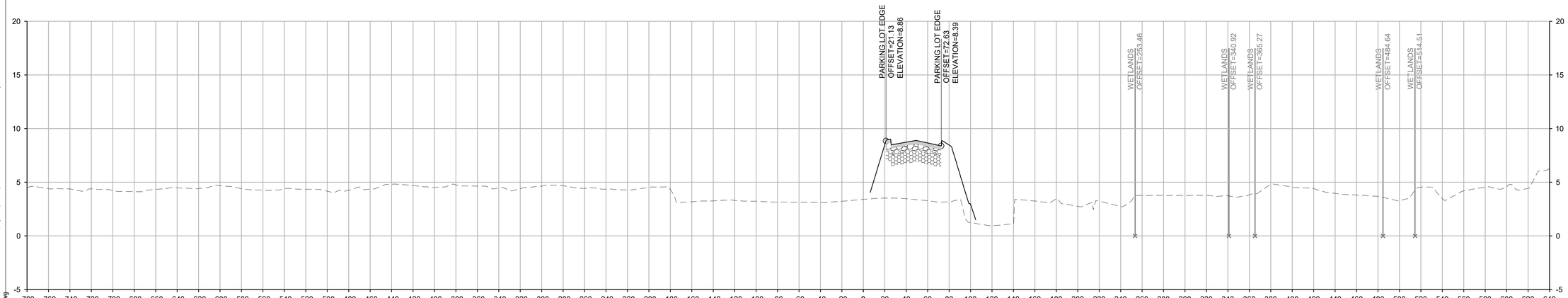

120+25

LEGEND

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- HMA (P-401)
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VERTICAL SCALE 1"=5'

HORIZONTAL SCALE 1"=50'

CLIENT

HVN TWEED NEW HAVEN AIRPORT

AVPORTS

TWEED NEW HAVEN AIRPORT
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CONSULTANT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16678
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

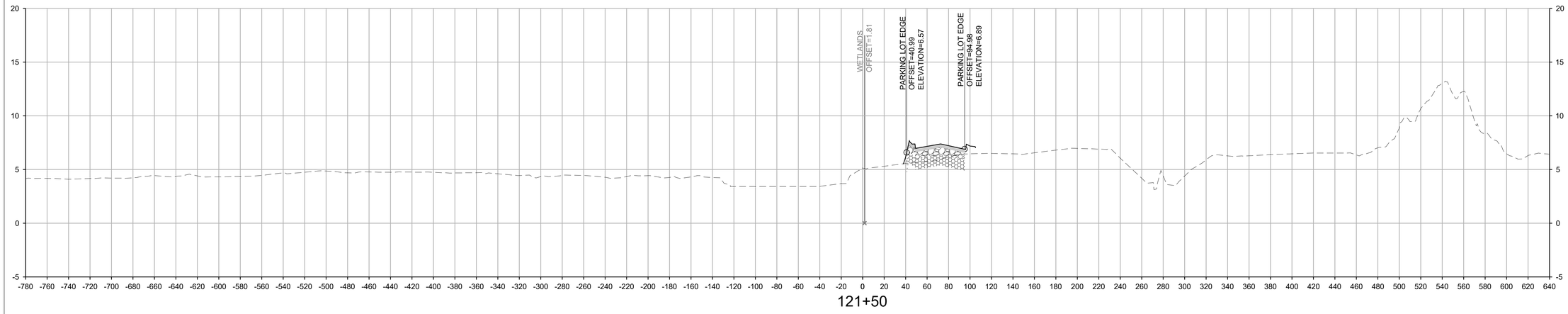
CROSS SECTIONS - 28

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C9.28

HVN - 2/27/2025 11:27:32 AM - C:\Users\USBF73020\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\20240076 9-C9.25_C9.30.dwg



LEGEND

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT
RICHARD L. PETTINELLI
No. 16478
LICENSED
PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

CROSS SECTIONS - 29

DATE	DRN BY	CHK BY	APP BY
02/20/2025	IAE	IAE	IAE

SHEET NUMBER

C9.29

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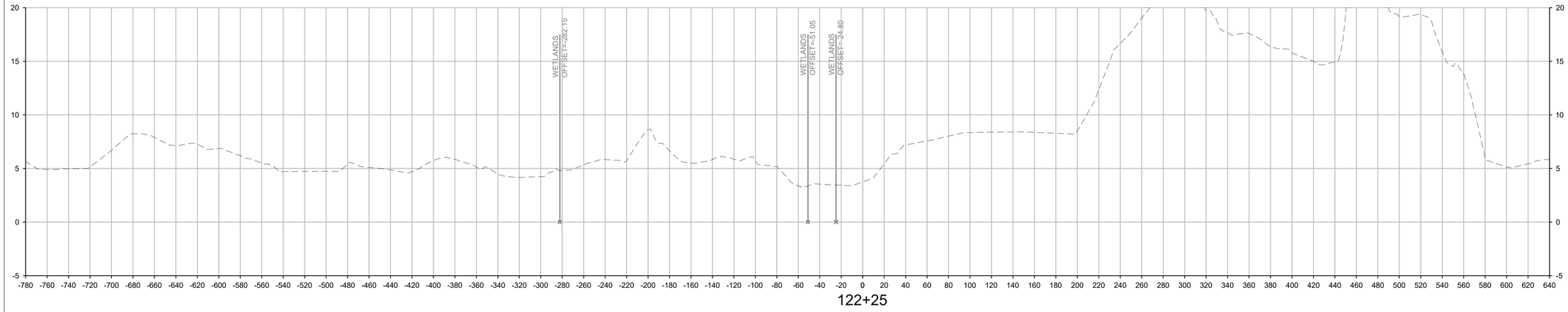

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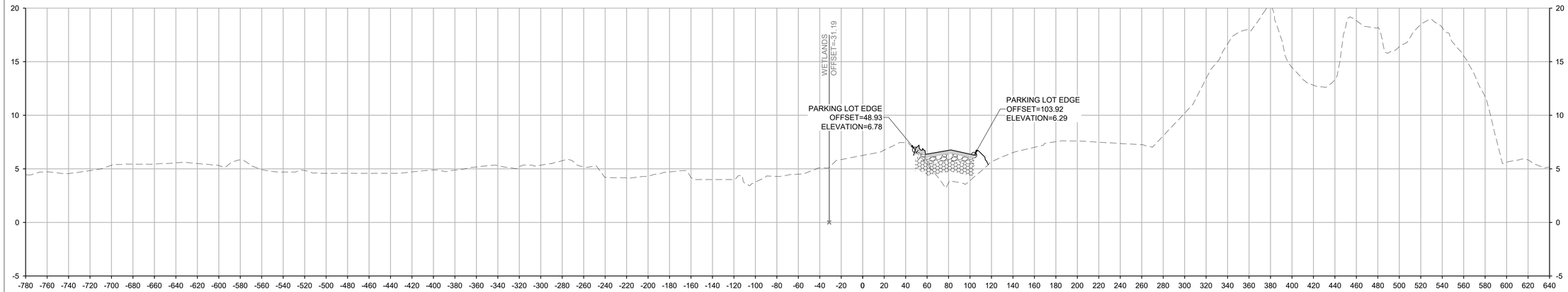

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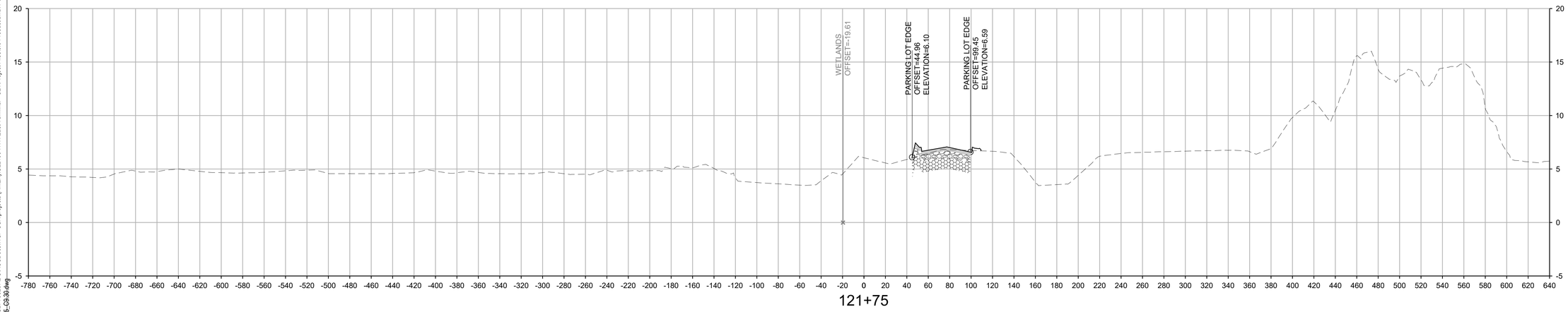

121+75

LEGEND

- EXISTING GROUND
- PROPOSED GRADE
- UNCRUSHED AGG. BASE COURSE (P-154)
- CRUSHED AGG. BASE COURSE (P-209)
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5' 2.5' 0 VERTICAL SCALE 1"=5'

0 25' 50' 100' HORIZONTAL SCALE 1"=50'

HVN - 2/27/2025 11:27:32 AM - C:\Users\USBF730207\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Discipline\CIVIL AIRFIELD\PLOTSHEETS\202400769-C9.25_C9.30.dwg

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT RICHARD L. PETTINELLI No. 16478 LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

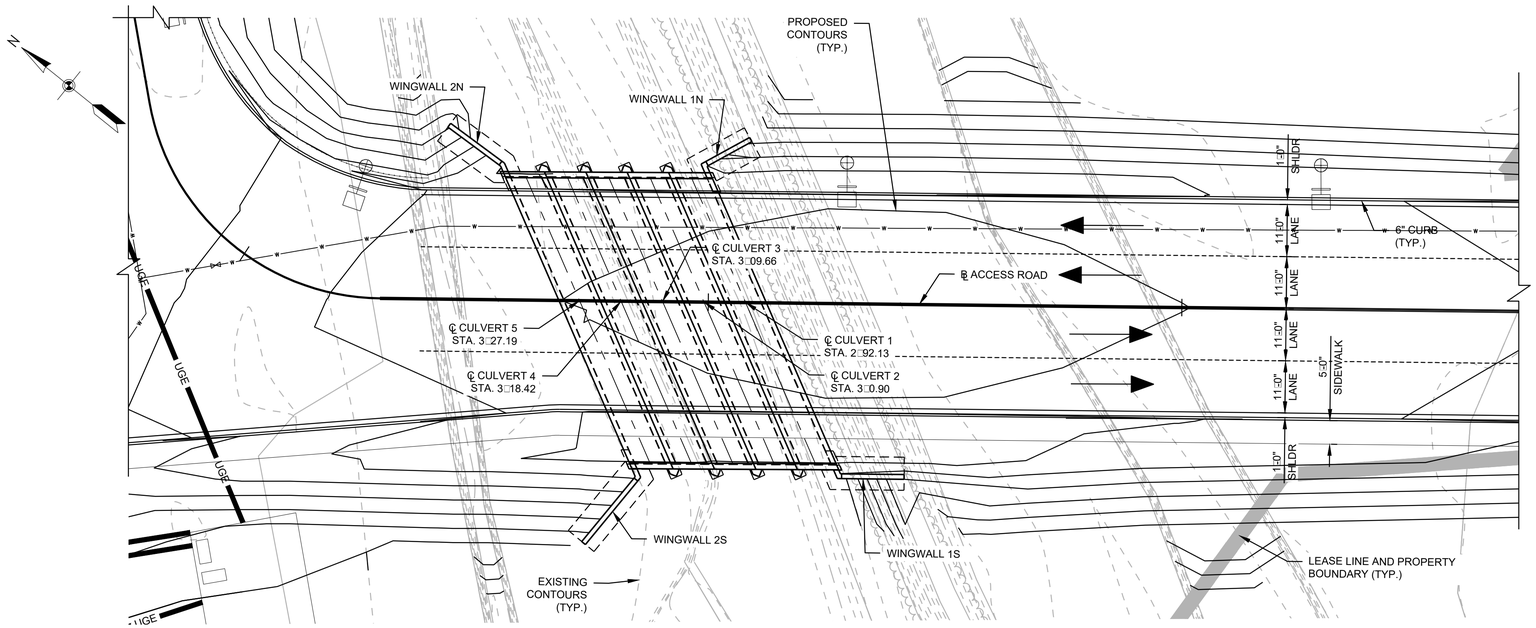
SHEET TITLE

CROSS SECTIONS - 30

DATE	DRN BY	CHK BY	APP BY
02/20/2025	SSD	GFR	CBC

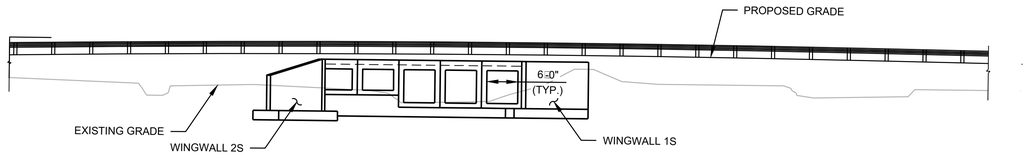
SHEET NUMBER

C9.30



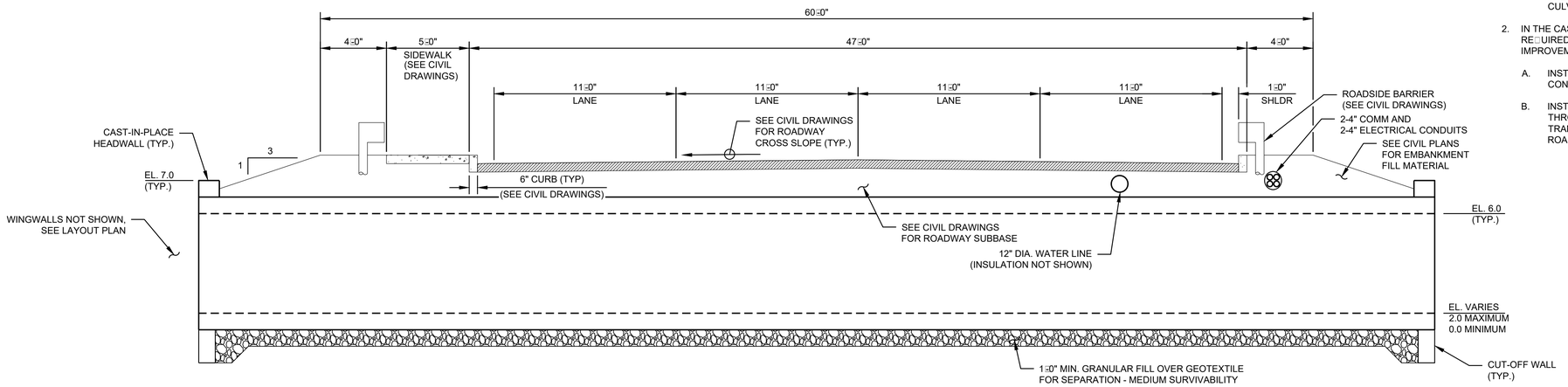
ACCESS ROAD DRAINAGE CULVERT LAYOUT PLAN

SCALE: 1/16"□1□0"



ACCESS ROAD DRAINAGE CULVERT LAYOUT ELEVATION

SCALE: 1/16"□1□0"



TYPICAL DRAINAGE CULVERT AND ACCESS ROAD SECTION

SCALE: 1/4"□1□0"

CULVERT GENERAL NOTES

1. SPECIFICATIONS: WORK UNDER THIS PROJECT SHALL BE PERFORMED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS.

2. DESIGN SPECIFICATIONS: *AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS* (9TH EDITION -2020), AS SUPPLEMENTED BY THE CONNECTICUT DEPARTMENT OF TRANSPORTATION *BRIDGE AND ROADWAY STRUCTURES DESIGN MANUAL* (2025).

3. MATERIAL STRENGTHS:

   CONCRETE:
   FOOTING CONCRETE.....F□ □3,000 PSI
   HEADWALL AND WINGWALL CONCRETE.....F□ □4,000 PSI
   CULVERT CONCRETE.....F□ □5,000 PSI

   REINFORCEMENT:
   (ASTM A615 GRADE 60).....F□□60,000 PSI

4. LIVE LOAD: HL-93, LEGAL AND PERMIT VEHICLES

5. FUTURE PAVING ALLOWANCE: NONE.

6. DIMENSIONS: WHEN DECIMAL DIMENSIONS ARE GIVEN TO LESS THAN THREE DECIMAL PLACES, THE OMITTED DIGITS SHALL BE ASSUMED TO BE □EROS.

7. EXISTING DIMENSIONS: DIMENSIONS OF THE EXISTING STRUCTURES SHOWN ON THESE PLANS ARE FOR GENERAL REFERENCE ONLY. THEY HAVE BEEN TAKEN FROM THE ORIGINAL DESIGN DRAWINGS AND ARE NOT GUARANTEED. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS NECESSARY TO ASSURE PROPER FIT OF THE FINISHED WORK AND SHALL ASSUME FULL RESPONSIBILITY FOR THEIR ACCURACY. WHEN SHOP DRAWINGS BASED ON FIELD MEASUREMENTS ARE SUBMITTED FOR REVIEW, THE FIELD MEASUREMENTS SHALL ALSO BE SUBMITTED FOR REFERENCE BY THE REVIEWER.

8. EXPOSED EDGES: EXPOSED EDGES OF CONCRETE SHALL BE BEVELED 1"X1" UNLESS DIMENSIONED OTHERWISE.

9. CONCRETE COVER: ALL REINFORCEMENT SHALL HAVE TWO INCHES COVER UNLESS DIMENSIONED OTHERWISE.

10. REINFORCEMENT: ALL PROPOSED REINFORCEMENT SHALL BE GALVANI□ED AFTER FABRICATION UNLESS NOTED OTHERWISE. REINFORCEMENT GALVANI□ING SHALL CONFORM TO THE RE□UIREMENTS OF ASTM A767, CLASS 1 INCLUDING SUPPLEMENTAL RE□UIREMENTS.

11. CONSTRUCTION JOINTS: CONSTRUCTION JOINTS, OTHER THAN THOSE SHOWN ON THE PLANS, WILL NOT BE PERMITTED WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

12. MASH TEST LEVEL: THE PROPOSED PARAPET MEETS THE TL-4 CRITERIA FOR MASH 2016.

CULVERT AND ACCESS ROAD CONSTRUCTION AND GROUND IMPROVEMENT NOTES:

1. DUE TO SOFT COMPRESSIBLE SOIL IN THE SUBSURFACE, TO MITIGATE POST-CONSTRUCTION CONSOLIDATION SETTLEMENT, THE FOLLOWING CONSTRUCTION SE□UENCE IS CURRENTLY PROPOSED.

   A. REMOVE SURFICIAL MARSH SOILS (ESTIMATED TO BE 5□0" THICK).

   B. BUILD THE ACCESS ROADWAY EMBANKMENT WITH TEMPORARY DRAINAGE AT INVERT EL. 3.0 (4 - 36" DIA. RCP OR 5 - 42" DIA. CMP).

   C. UTILI□E ACCESS ROADWAY FOR CONSTRUCTION ACCESS AND ALLOW SETTLEMENT FOR MINIMUM 18 MONTHS. SETTLEMENT SHALL BE MONITORED PERIODICALLY.

   D. AFTER COMPLETION OF SETTLEMENT PERIOD, SUBJECT TO VERIFICATION OF THE SETTLEMENT MONITORING DATA, COMPLETE FINAL GRADING, FINAL CULVERT CONSTRUCTION, AND FINAL ACCESS ROADWAY CONSTRUCTION.

2. IN THE CASE THAT THE CONSTRUCTION SCHEDULE DOES NOT ALLOW FOR THE RE□UIRED SETTLEMENT PERIOD, ONE OF THE FOLLOWING ALTERNATIVE GROUND IMPROVEMENT METHODS SHALL BE PERFORMED.

   A. INSTALL WICK DRAINS ACROSS THE ROADWAY FOOTPRINT TO ACCELERATE CONSOLIDATION SETTLEMENT.

   B. INSTALL RIGID INCLUSIONS SUCH AS TIMBER PILES OR AGGREGATE PIERS THROUGH THE BOTTOM OF THE COMPRESSIBLE SOILS, THEN INSTALL A LOAD TRANSFER PLATFORM OVER THE RIGID INCLUSIONS BEFORE FINISHING ROADWAY SURFACE.

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GLASTONBURY, CT 06033
www.WSP.com

PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION
STATE OF CONNECTICUT · JAMES R. LAMPOS · No 20890 · LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION
155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

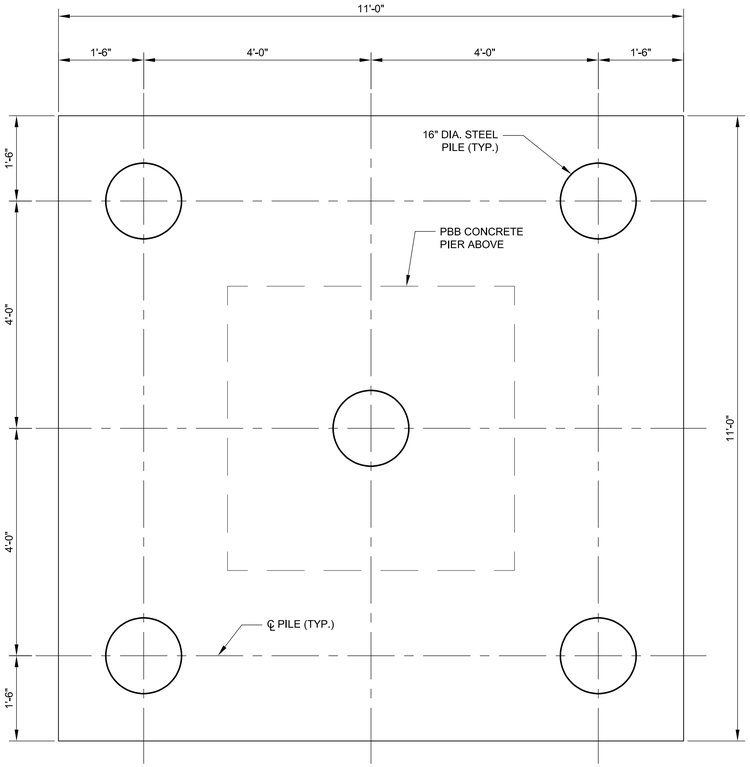
US0025063.0769	WSP
10052559.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE
ACCESS ROAD CULVERTS GENERAL PLAN

DATE	DRN BY	CHK BY	APP BY
02/20/2025	JMV	GTG	GTG

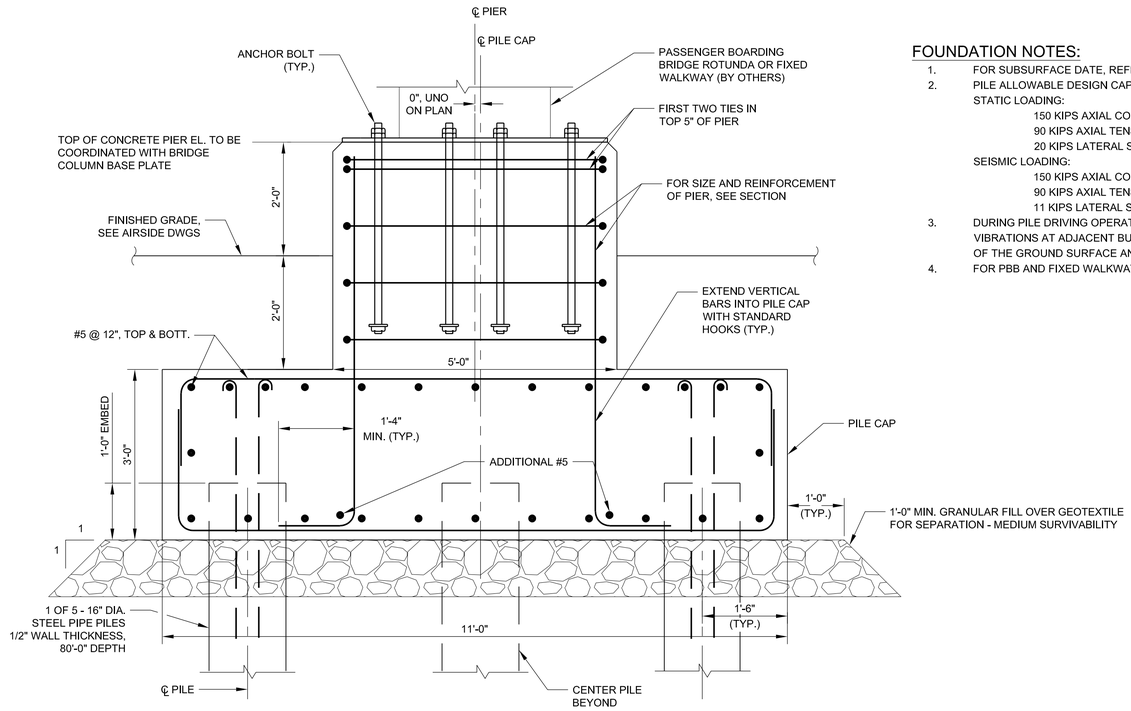
SHEET NUMBER
S2.01

H:\N - 2/27/2025 9:39:36 AM - C:\Users\USTGT32780\DC\ACCDocs\WSP USA projects (AMER)\GLL100-HVN East Terminal - C24\Project Files\9.0 Production\9.1 CAD\9.1.3 Disciplines\STRUCPLOTSHEETS\General Plan_24.dwg



PBB FOUNDATION PLAN

SCALE: ¾ "=1'-0"

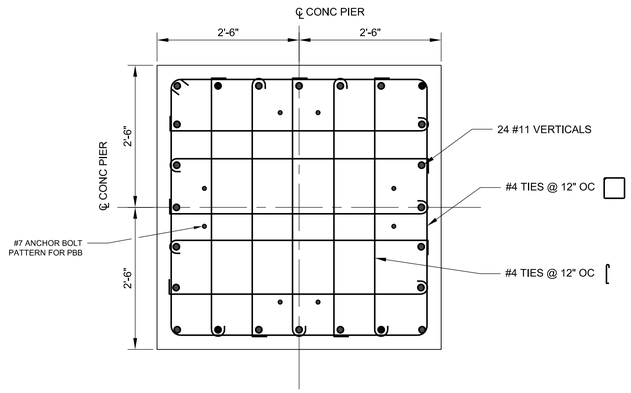


TYPICAL PASSENGER BOARDING BRIDGE (PBB) FOUNDATION AND REINFORCING DETAIL

SCALE: ¾"=1'-0"

FOUNDATION NOTES:

1. FOR SUBSURFACE DATE, REFER TO SHEET GT0.00.
2. PILE ALLOWABLE DESIGN CAPACITY (PER PILE):
   STATIC LOADING:
   150 KIPS AXIAL COMPRESSION, 375 KIPS ULTIMATE REQUIRED
   90 KIPS AXIAL TENSION
   20 KIPS LATERAL SHEAR
   SEISMIC LOADING:
   150 KIPS AXIAL COMPRESSION,
   90 KIPS AXIAL TENSION
   11 KIPS LATERAL SHEAR
3. DURING PILE DRIVING OPERATIONS, THE CONTRACTOR SHALL MONITOR GROUND VIBRATIONS AT ADJACENT BUILDINGS AND USING SURVEY MONITOR MOVEMENT OF THE GROUND SURFACE AND ADJACENT STRUCTURES/BUILDINGS.
4. FOR PBB AND FIXED WALKWAY FOUNDATION LAYOUT, SEE DWGS. C2.64 AND C2.65.



PBB CONCRETE PIER SECTION

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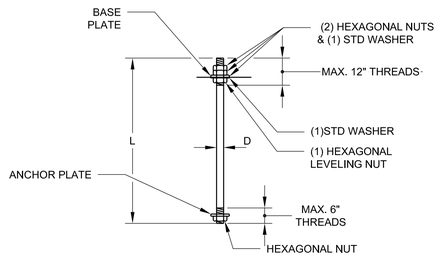

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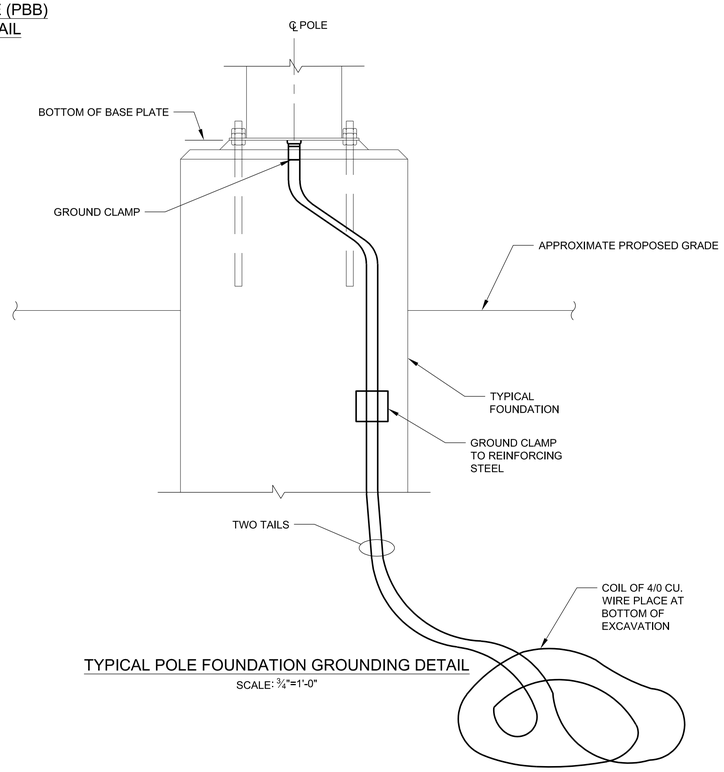

TYPICAL POLE FOUNDATION GROUNDING DETAIL

SCALE: ¾"=1'-0"

CLIENT

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PERMIT SET - NOT FOR CONSTRUCTION

REGISTRATION

STATE OF CONNECTICUT — REGISTERED — No. 20890 — LICENSEE — PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

TYPICAL FOUNDATION DETAILS - 1

DATE	DRN BY	CHK BY	APP BY
2/20/2025	TEG	GTG	GTG

SHEET NUMBER

S2.20

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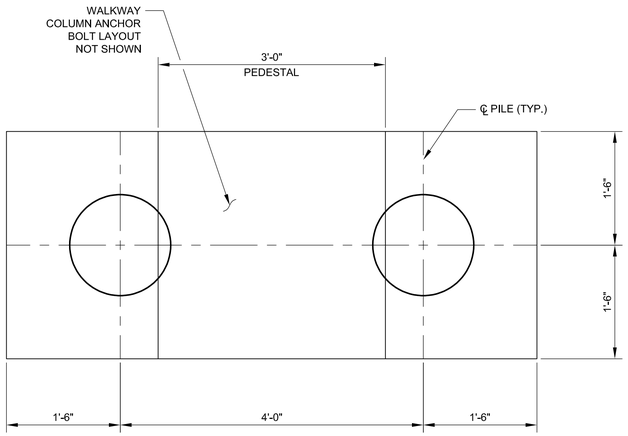

FIXED WALKWAY FOUNDATION PLAN
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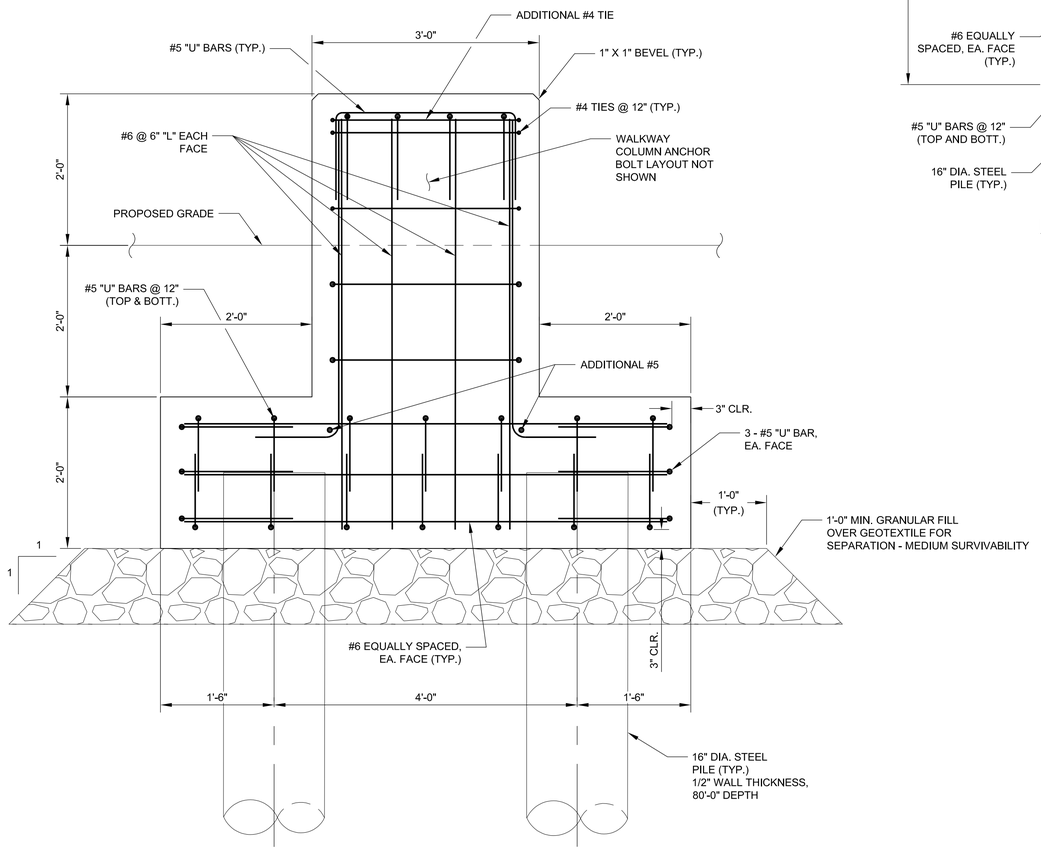

FIXED WALKWAY FOUNDATION
REINFORCING DETAIL
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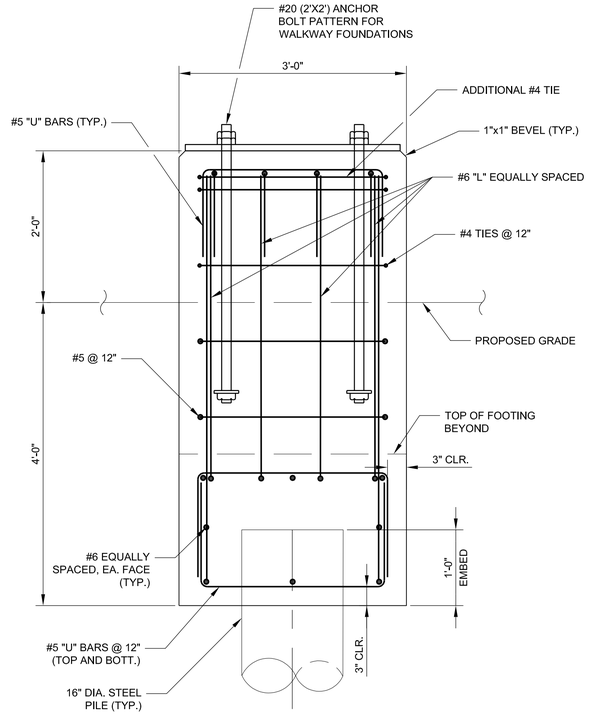

FIXED WALKWAY FOUNDATION
REINFORCING SECTION
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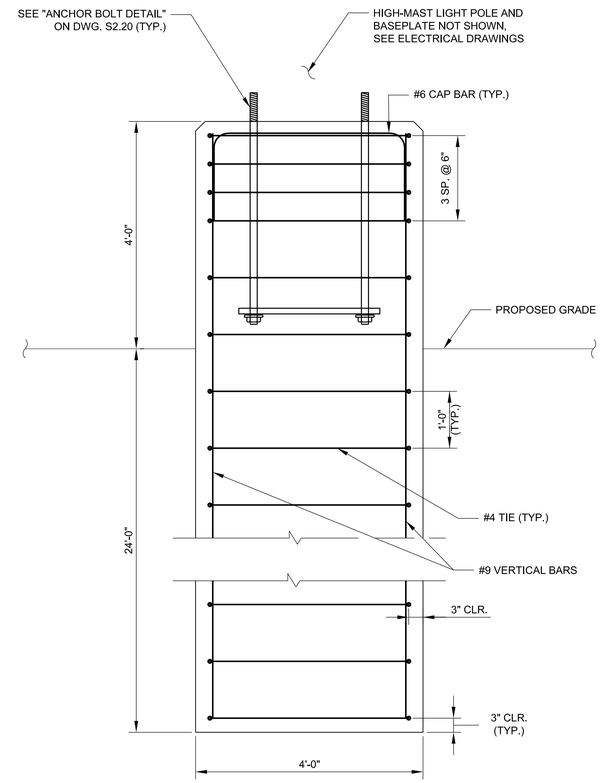

TYPICAL HIGH-MAST LIGHT POLE
FOUNDATION REINFORCING DETAIL
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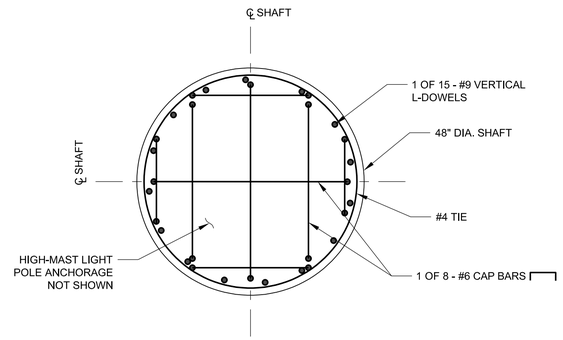

TYPICAL HIGH-MAST LIGHT POLE FOUNDATION
REINFORCING SECTION
SCALE: ¾"=1'-0"

NOTES:

1. FOR FOUNDATION NOTES, SEE DWG. NO. S2.20.
2. FOR FOUNDATION LAYOUT, SEE DWG. NO. C2.18.

CLIENT

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PERMIT SET -
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REGISTRATION

STATE OF CONNECTICUT
TIMOTHY J. SYSKA
No. 20880
LICENSED PROFESSIONAL ENGINEER

DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

TYPICAL FOUNDATION DETAILS - 2

DATE	DRN BY	CHK BY	APP BY
2/20/2025	TEG	GTG	GTG

SHEET NUMBER

S2.21

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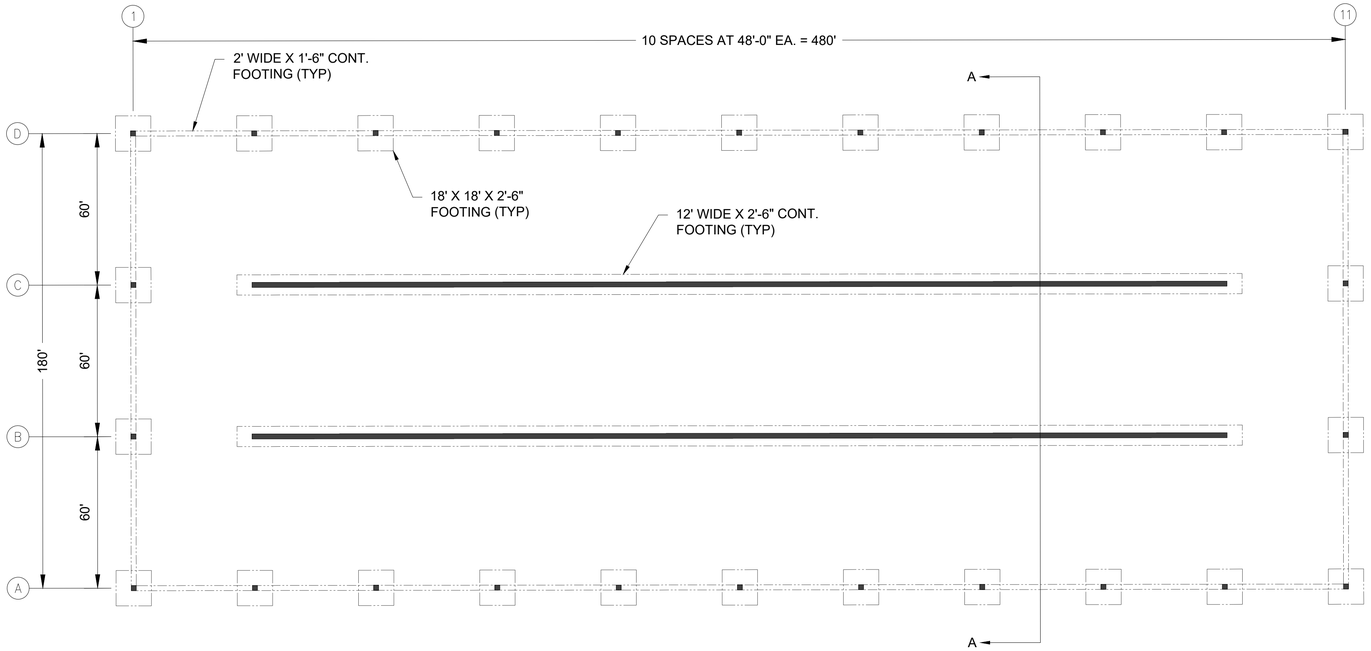
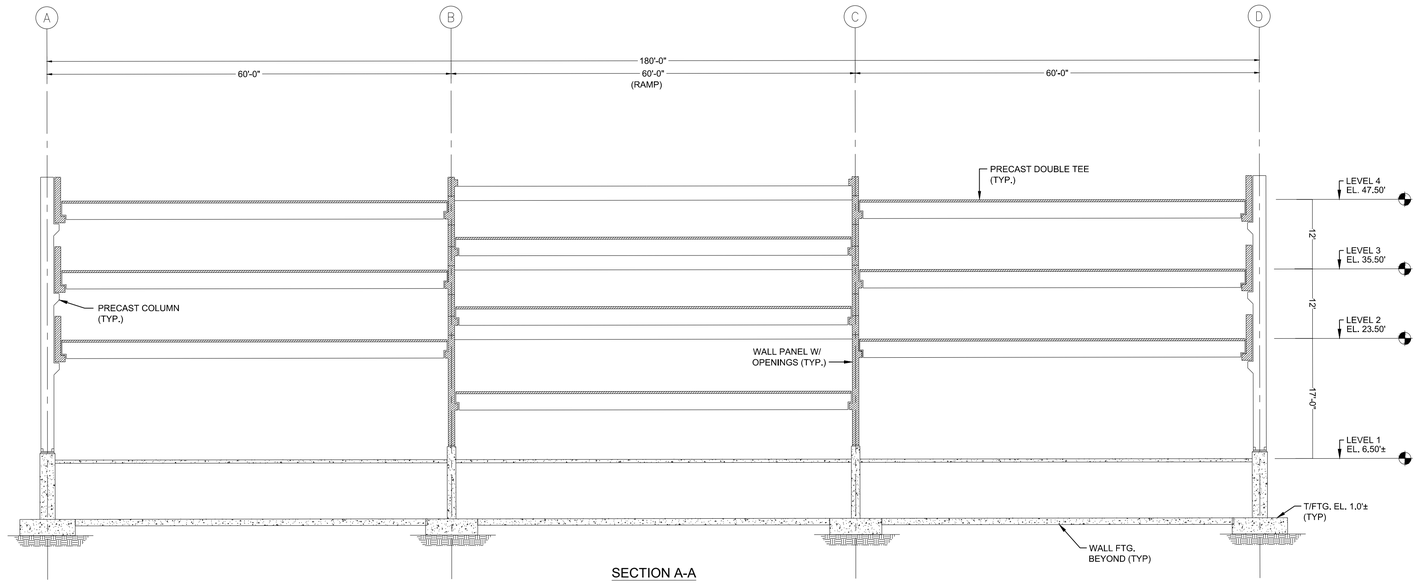


FOUNDATION PLAN



SECTION A-A

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DRAWING HISTORY

No.	DATE	DESCRIPTION

KEY PLAN

PROJECT NAME

RUNWAY EXTENSION AND TERMINAL EXPANSION

PROJECT LOCATION

155 BURR STREET
EAST HAVEN, CT
06512

PROJECT NUMBER

US0025063.0769	WSP
1005259.04	PGAL
240248.01	DESIMONE
23-006724	SYSKA

SHEET TITLE

PARKING GARAGE FOUNDATION PLAN AND SECTION

DATE	DRN BY	CHK BY	APP BY
02/20/2025	BJD	SJC	SJC

SHEET NUMBER

S8.01

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TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 15 – WETLAND REPORTS

The existing wetlands at the Project Site were delineated and characterized by FHI Studio in 2021 (FHI 2021), McCue Environmental (McCue 2024). Reports are attached.

McCUE ENVIRONMENTAL, LLC
LAFAYETTE MILL COMPLEX, 650 TEN ROD ROAD, NORTH KINGSTOWN, RI 02852
CONSULTING AND WETLAND PERMITTING SERVICES
(401) 595-4276

December 12, 2024

Robert Furey
Senior Vice President/Division Manager, Northeast Aviation Services
Hoyle Tanner
150 Dow Street
Manchester, NH 03101

Subject: Wetland Delineation Report for Tweed New Haven Regional Airport
Runway Extension and Terminal Expansion
New Haven and East Haven, Connecticut

I. INTRODUCTION

This letter presents my findings regarding wetlands investigation at the Tweed New Haven Regional Airport in New Haven and East Haven, Connecticut (Figures 1 & 2). The purpose of this work was to field delineate all wetland edges in those areas being assessed for mitigation, which are the eastern, western and southern portions of the property, and property owned by Town Fair Tire, south of Uriah Street. This report is submitted to Hoyle, Tanner & Associates, Inc. for the proposed new terminal and runway extension project to accommodate existing and growing aircraft operations and passenger volumes.

McCue Environmental, LLC (McCue) conducted the site reconnaissance for wetlands on April 24, April 25, May 2, June 10, June 20, November 1 and 18, 2024. At these times, McCue delineated several areas of wetlands within the subject areas. Web Soil Survey available online at http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, the Connecticut DEEP Geographic Information System (CTGIS) data and the National Wetlands Inventory (NWI) mapper (fws.gov/program/national-wetlands-inventory/wetlands-mapper) were consulted as a part of this effort. Figures 2A through 2F show the delineated wetlands at 1" = 300' and 1' = 400'scales, and mapped wetland types.

NWI mapping was used as a baseline by McCue Environmental with field observations editing, where needed. A combination of aerial photograph review and interpretation, and field observations were used in identifying habitat changes where lines were not laid. It should be noted that areas well interior of each delineated wetland were not accessed directly, therefore, smaller areas of differing subtypes may be present.

RELEVANT SITE HSTORY

The emergence of an airport in New Haven began in 1922 when mayor David E. Fitzgerald initiated the purchase of 220 acres of land situated on the New Haven-East Haven municipal boundary in a rural area of the community. In 1929, a ground-breaking ceremony occurred and on September 29, 1931, New Haven Municipal Airport celebrated its opening day. There has been intermittent scheduled commercial air service at HVN as early as 1934 when passenger and

mail flights were operated by American Airlines. The Airport is a non-hub, commercial service primary airport located in the both the City of New Haven and Town of East Haven, New Haven County, Connecticut approximately three miles southeast of the central business district of New Haven. The Airport has one paved asphalt runway: Runway 2-20, which is 5,600 feet long by 150 feet wide. Runway 14-32 is not eligible for federal funding as a crosswind runway and will remain closed permanently. Runway 2-20 has two partial parallel taxiways, one supporting each runway end. The Airport has an Airport Traffic Control Tower (ATCT) that provides guidance to the Airport and the Airport's airspace. HVN occupies approximately 437 acres of and. Presently, airlines operate out of the Airport terminal building. This building, originally constructed as a conventional hangar, was built in 1930 and then converted into the terminal building in 1995.

II. METHODOLOGY

These delineations were done in accordance with the Connecticut Department of Energy and Environmental Protection (DEEP) Inland Wetlands and Watercourses Act (Connecticut General Statutes Sections 22a-36 through 22a-45), and the US Army Corps of Engineers Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2), January 2012. A hand Dutch auger was used in observing soil profiles, and data collected included characteristics of soil horizons, soil color using a Munsell soil color chart, and documentation of site features such as topography, hydrology and vegetation types and density.

The wetland functional assessments were performed using the US Army Corps of Engineers Highway Methodology Workbook and associated Wetland Function-Value Evaluation Form.

III. RESULTS

PROJECT AREAS

(please note there is no WF-200 series flagging)

Tweed New Haven Regional Airport North Area Delineations (Figure 2A and P-1)

The identified wetland, represented by flag series WF100 – WF194, is a wooded swamp in the areas of the delineation; there are common reed (*Phragmites australis*, further referred to as *Phragmites*) dominated areas well interior of the flagged wetland edge. Vegetation observed in the delineated wetlands include red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*), multiflora rose, royal fern (*Osmunda regalis*), cinnamon fern (*Osmundastrum cinnamomeum*), skunk cabbage (*Symplocarpus foetidus*), sphagnum moss (*Sphagnum* sp.) and common greenbrier (*Smilax rotundifolia*).

The area of upland is forest habitat. Vegetation observed includes red maple, Norway maple (*Acer platanoides*), red oak (*Quercus rubra*), black cherry (*Prunus serotina*), sassafras trees and saplings (*Sassafras albidum*), Russian olive (*Elaeagnus angustifolia*), multiflora rose, privet (*Ligustrum vulgare*), eastern burning bush (*Euonymus atropurpureus*), Japanese honeysuckle

(*Lonicera japonica*), Canada mayflower (*Maianthemum canadense*), poison ivy (*Toxicodendron radicans*), garlic mustard (*Alliaria petiolate*) and Asiatic bittersweet (*Celastrus orbiculatus*).

The NWI mapper classifies the swamp as PFO1E: Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). As noted, there are areas of *Phragmites* dominated marsh habitat well interior of the wetland, which are mapped as PEM1/5F: Palustrine (P), Emergent persistent (EM1), Phragmites australis (5), Semi permanently Flooded (F). These map classifications would be consistent with the McCue site investigations, however, based on the detailed delineation, the PFO1E extent is broader than what is shown on the NWI Mapper as it coincides with the actual field delineation.

Tweed New Haven Regional Airport Central Area Delineations (Figure 2B and P-2)

North of Pig Farm Road

The identified wetland north of Pig Farm Road is represented by flag series WF300 – WF384. This wetland consists of several classifications, including a very dense *Phragmites* community. The delineated edge is mostly adjacent to areas of prior disturbances, including a former storage ground and Pig Farm Road. Vegetation observed in the delineated wetland includes red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), white birch (*Betula papyrifera*), arrowwood (*Viburnum dentatum*), pussy willow (*Salix discolor*), swamp azalea (*Rhododendron viscosum*), multiflora rose, *Phragmites*, common greenbrier and fox grape (*Vitis labrusca*).

As noted, the area of upland generally consists of disturbed areas associated with former and current airport operations. Vegetation in the upland areas include big-tooth aspen (*Populus grandidentata*), black locust (*Robinia pseudoacacia*), privet, multiflora rose, glossy buckthorn (*Frangula alnus*), staghorn sumac (*Rhus typhina*), poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier and garlic mustard.

The NWI mapper classifies the portion of the wetland along flags WF300 to Pig Farm Road as PSS1E: Palustrine (P), Scrub-Shrub (SS), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). The common reed dominated area of the wetland north of Pig Farm Road is classified as PEM1/5F: Palustrine (P), Emergent persistent (EM1), Phragmites australis (5), Semi permanently Flooded (F). These classifications would be consistent with the McCue site investigations; however, it should be noted that the NWI mapper erroneously includes the upland area west of flags WF300 to Pig Farm Road as the scrub-shrub classification.

Additionally, there are areas I have mapped separately from what the NWI mapper depicts. These are the areas of open water within the *Phragmites* dominated area, and the portion of the wetland that occurs in the maintained area south of the east terminal runway. The open water areas are classified as PUBH: Palustrine (P), Unconsolidated Bottom (UB), Permanently Flooded (H), and the maintained wetland area as PEM1E: Palustrine (P), Emergent (EM), persistent (1), Seasonally Flooded/Saturated (E).

South of Pig Farm Road

The identified wetland south of Pig Farm Road is represented by flag series WF400 – WF459. This wetland also consists of several classifications, including a very dense *Phragmites* community. Again, the delineated edge is entirely adjacent to areas of prior disturbances,

including a former storage ground and Pig Farm Road. Vegetation observed in the delineated wetland includes black gum, arrowwood, highbush blueberry, multiflora rose, *Phragmites*, common greenbrier and fox grape.

Vegetation in the upland areas include blackberry (*Rubus allegheniensis*), black locust, multiflora rose, arrowwood, sassafras, staghorn sumac, poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier, fox grape, goldenrod species and a dense stand of Japanese knotweed (*Reynoutria japonica*).

The NWI mapper primarily only maps the wetland area south of Pig Farm Road as E2EM1Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Irregularly Flooded (P), Partially Drained/Ditched (d). In performing the field delineations, McCue observed two additional classifications that are depicted on Figure 2B: narrow bands of PFO1E: Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E), and areas of PSS1E: Palustrine (P), Scrub-Shrub (SS), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). It is also noted that the mapped E2EM1Pd should also have the *Phragmites* qualifier (5) as much of this area is dominated by *Phragmites.*

In addition, in interior portions of the E2EM1Pd area, there are created channels that have been classified here as E1UBLx: Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x). It is noted that these water areas were mapped based on the CAD data from the prior restoration project and that these channels (e.g. Ordinary High Water (OHW) or Mean High Water (MHW)) were not field delineated.

Tweed New Haven Regional Airport: Uriah Street Area and Town Fair Tire Delineations (Figure 2C and P-3)

The identified wetland in this area has been represented by flag series WF800 – WF941. This wetland consists of several classifications, including a very dense *Phragmites* community. The beginning of the WF-800 series is the southern portion of the WF-400 series wetland complex. Vegetation observed in the delineated wetlands include red maple, gray birch (*Betula populifolia*), black gum, pussy willow, arrowwood, elderberry (*Sambucus canadensis*), black raspberry, multiflora rose, *Phragmites*, water purslane (*Ludwigia palustris*), lurid sedge (*Carex lurida*), Canada rush (*Juncus canadensis*), swamp milkweed (*Asclepias incarnata*), soft rush (*Juncus effusus*), several goldenrod species, common greenbrier and fox grape (*Vitis labrusca*).

The upland area consists primarily of previously disturbed areas and a large upland forested area. Vegetation in the upland areas include big-tooth aspen, trembling aspen (*Populus tremuloides*), black locust, red oak, privet, multiflora rose, glossy buckthorn, staghorn sumac, ragweed (*Ambrosia artemisiifolia*), poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier and garlic mustard.

The NWI mapper classifies the entire flagged wetland series as E2EM1/5Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d). Based on my observations in the field, I further mapped additional and separate classifications from what the NWI mapper depicts, including areas of PFO, PSS, and PEM (freshwater). It is also the opinion of McCue that the dense Phragmites area on the

Town Fair Tire property is likely not affected by tidal water regimes; therefore, this area of Phragmites is mapped as PEM.

Tweed New Haven Regional Airport South Area Delineations (Figure 2D and P-4)

The identified wetland in this area has been represented by flag series WF500 – WF530, WF600 – WF648 and WF700 – WF714. This wetland consists of several classifications: see the NWI mapper section below and Figure 2D. Vegetation observed in each corresponding classification is very consistent with the vegetation listed in this report. The more dominant species observed in each classification includes *Phragmites* in the E2EM and PEM Phrag type; pussy willow, alder (*Alnus incana*) and red maple in the PSS type; and various freshwater emergent species in the PEM type, including soft rush, goldenrod species, jewelweed (*Impatiens capensis*) and sensitive fern (*Onoclea sensibilis*).

The upland areas consist primarily of dense scrub-shrub habitat. The upland area in the vicinity of the WF-600 series consists of a former stone and mortar structure on an area that includes exposed ledge. Vegetation in the upland areas include trembling aspen, black locust, red oak, privet, multiflora rose, glossy buckthorn, staghorn sumac, Russian olive, black raspberry, ragweed, poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier and garlic mustard.

The NWI mapper classifies some of this area as both E2EM1/5Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d) and E2EM5/1P: Estuarine (E), Intertidal (2), Emergent (EM), Phragmites australis (5), Persistent (1), Irregularly Flooded (P).

Based on the McCue observations in the field, areas of PSS and PEM (freshwater) are further mapped. It is the opinion of McCue that these PSS and PEM areas are not likely not affected by tidal water regimes, in addition to the PEM Phrag area that is mapped south of the airport fence. Further salinity testing results may affect the opined mapped areas.

In addition, the tidal channel classified here as E1UBLx: Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x), again based on the CAD data from the prior restoration project and field observations. However, the OHM and/or MHW were not specifically field delineated.

Tweed Airport West Area Delineations (Figures 2E & 2F, and P-5 & P-6)

The identified wetland in this location is represented by flag series WF1000 – WF1020, WF1100 – WF1114, WF1200 – WF1284 and WF1300 – WF1347. This wetland area consists of several classifications, including a very dense *Phragmites* community. The delineated edge is entirely adjacent to areas of prior disturbances, including maintained airport grounds and steep, previously excavated banks or fill slopes. Vegetation observed in the WF1000, 1200 and 1300 series delineated wetlands include black gum, arrowwood, highbush blueberry, multiflora rose, *Phragmites*, common greenbrier, seaside goldenrod (*Solidago sempervirens*), Asiatic bittersweet and fox grape. The WF-1100 series wetland and the areas along the WF1200-series that are mapped as E2EM contain hightide bush (*Iva frutescens*), saltmeadow cordgrass (*Spartina*

patens), saltwater cordgrass (*Spartina alterniflora*) (at the channel banks), panic grass (*Panicum* sp.) and seaside goldenrod.

Vegetation in the upland areas include black oak (*Quercus velutina*), gray birch, barberry (*Berberis thunbergii*), blackberry, black locust, multiflora rose, tree-of-heaven, staghorn sumac, poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier, fox grape, goldenrod species, Japanese knotweed and mugwort.

The NWI mapper classifies the following wetland classifications in this delineated area: E2EM1/5Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d), and PFO1E: Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). In addition, the main channel east of Dean Street is classified as Riverine (R), Unknown Perennial (5), Unconsolidated Bottom (UB), Semipermanently Flooded (F), Excavated (x). Field observations during the delineation effort confirmed tidal influence north of the classified E1UBLx: Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x) that is mapped west of the terminus of runway 2. The channels north of this classified area have therefore been classified as E1UBLx and mapped based on the CAD data from the prior restoration project; the channels (e.g. Ordinary High Water (OHW) or Mean High Water (MHW)) were not field delineated.

Additionally, one additional type has been mapped than what the NWI mapper depicts. This area is consistent with the areas delineated with the WF-1100 series and the area of approximate flag numbers WF1200 through WF1220 and is classified as E2EM1P: Estuarine (E), Intertidal (2), Emergent (EM), Persistent (1), Irregularly flooded (P); more saltwater species were present in these areas.

SOILS (Figure 3)

Multiple, detailed soil profiles were not investigated throughout the entire project area extent; however, random plots were examined throughout the wetland delineation process and wetland delineation data forms are provided. The Web Soil Survey (State of Connecticut, Western Part (CT601)) was reviewed; it is my opinion that the Web Soil Survey is generally consistent with the wetland delineations, however, some observations are noted below. The following is a list of the delineated wetland flag series and soils mapped within each area; the full Web Soil Survey map and descriptions are found in Appendix E:

WF100 – WF194:
Hydric soils: Walpole sandy loam (13) and Westbrook mucky peat (99)

Adjacent upland soils: Deerfield loamy fine sand (24A) and Udorthents-Urban Land Complex (306)

WF300 – WF384:
Hydric soils: Westbrook mucky peat (99)

Adjacent upland soils: Udorthents-Urban Land Complex (306); this soil series is mapped too broadly into the delineated wetland in the area east of flags WF300 – WF340 and south of the runway

WF400 – WF459:
Hydric soils: Westbrook mucky peat (99) (tidally influenced in interior sections)

Adjacent upland soils: Udorthents-Urban Land Complex (306) and Udorthents, smoothed (308)

WF500 – WF530, WF600 – WF648, WF700 – WF714:
Hydric soils: Sulfaquents (947); the majority of these delineations are mapped as non-hydric soils (see below). In the opinion of McCue, soils underlying the delineated wetlands most closely resemble the Westbrook mucky peat (99)

Adjacent upland soils: Deerfield loamy fine sand (24A), Penwood loamy sand (35B), Cheshire-Holyoke complex (77C), Penwood-Urban Land Complex (235B) and Udorthents, smoothed (308)

WF800/WF900:
Hydric soils: Sulfaquents (947); in the opinion of McCue, the Sulfaquents should be mapped to the delineated wetlands edge

Adjacent upland soils: Holyoke rock-outcrop complex (78E) and Udorthents, smoothed (308)

WF1000, WF1100, WF1200 and WF1300 series:
Hydric soils: Westbrook mucky peat (99) and Gales Ferry silt loam, intertidal (917)

Adjacent upland soils: Udorthents-Urban Land Complex (306)

The delineations were performed by Joseph P. McCue, PWS, whose qualifications include over 28 years' experience in the practice of wetland science, is a Professional Soil Scientist with the Society of Soil Scientists of Southern New England (SSSSNE), and a Professional Wetland Scientist (#2010) certified by the Society of Wetland Scientists (SWS).

Please note that the information provided herein represents the best professional judgment of McCue Environmental, LLC, and should not be construed to represent the finding of any regulatory agency.

Thank you for the opportunity to work with you on this project. Please contact me at (401) 595-4276 if you have any questions regarding this work, or if you require additional information.

Sincerely yours,
MCCUE ENVIRONMENTAL, LLC



Joseph P. McCue, PWS
President
Principal Environmental Scientist

Appendix A:

Figure 1:	Site Location (USGS Topographic Map)
Figure 2:	Overall Site Location (Aerial Photograph)
Figures 2A – 2F:	Delineation Areas (1" = 300' or 1" = 400' scale)
Figure 3:	Soils

Appendix B:
ACOE Wetland Edge Delineation Data Forms

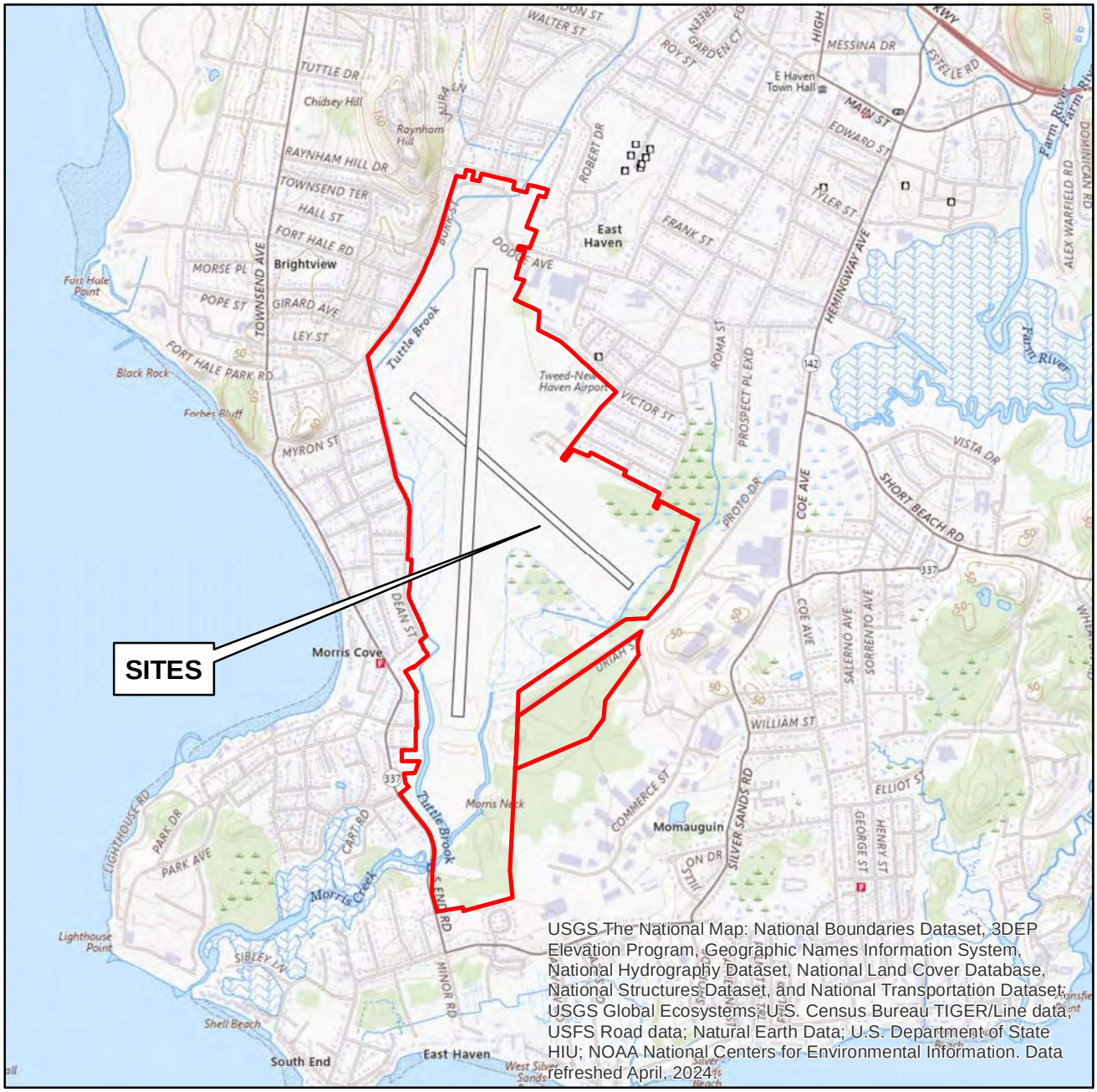
Appendix C:
Photo Sheets: Figures P1 – P6

Appendix D:
ACOE Wetland Function-Value Evaluation Forms

Appendix E:
Web Soil Survey Map and Soil Descriptions

APPENDIX A

Figure 1:	Site Location (USGS Topographic Map)
Figure 2:	Overall Site Location (Aerial Photograph)
Figures 2A – 2F:	Delineation Areas (1” = 300’ & 1” = 400’ scales)
Figure 3:	Soils



Source: 2024 USGS Topographic Map

Approximate Location of:

Property Boundaries

N
W E
S

0 1,000 2,000 Feet

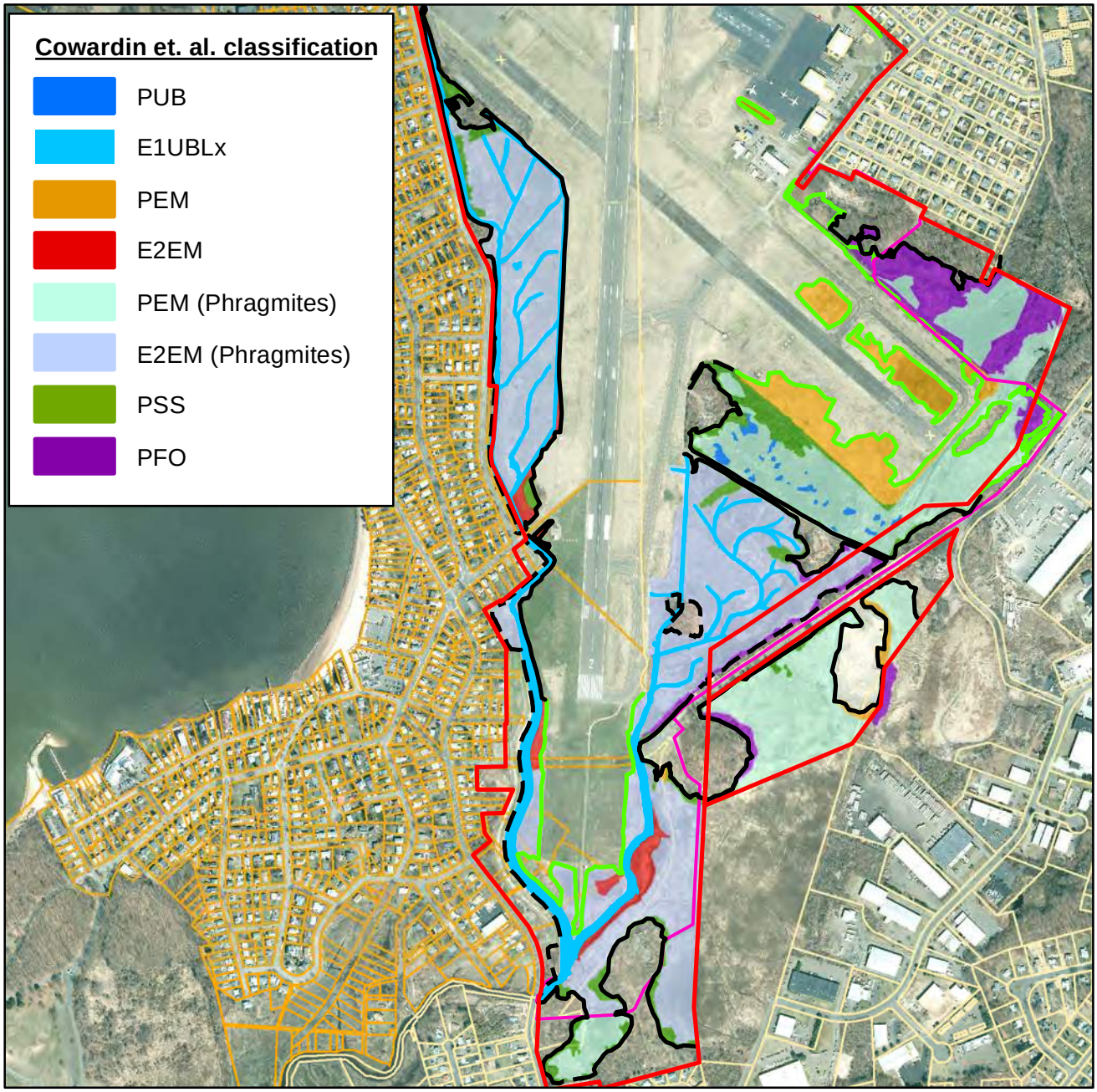
Tweed New Haven Regional Airport
New Haven & East Haven, CT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SITE LOCATION

Project No. 240308

Figure 1



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 500 1,000 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

OVERALL DELINEATIONS and WETLAND CLASSIFICATIONS

McCue Environmental, LLC
Consulting & Wetland Permitting Services
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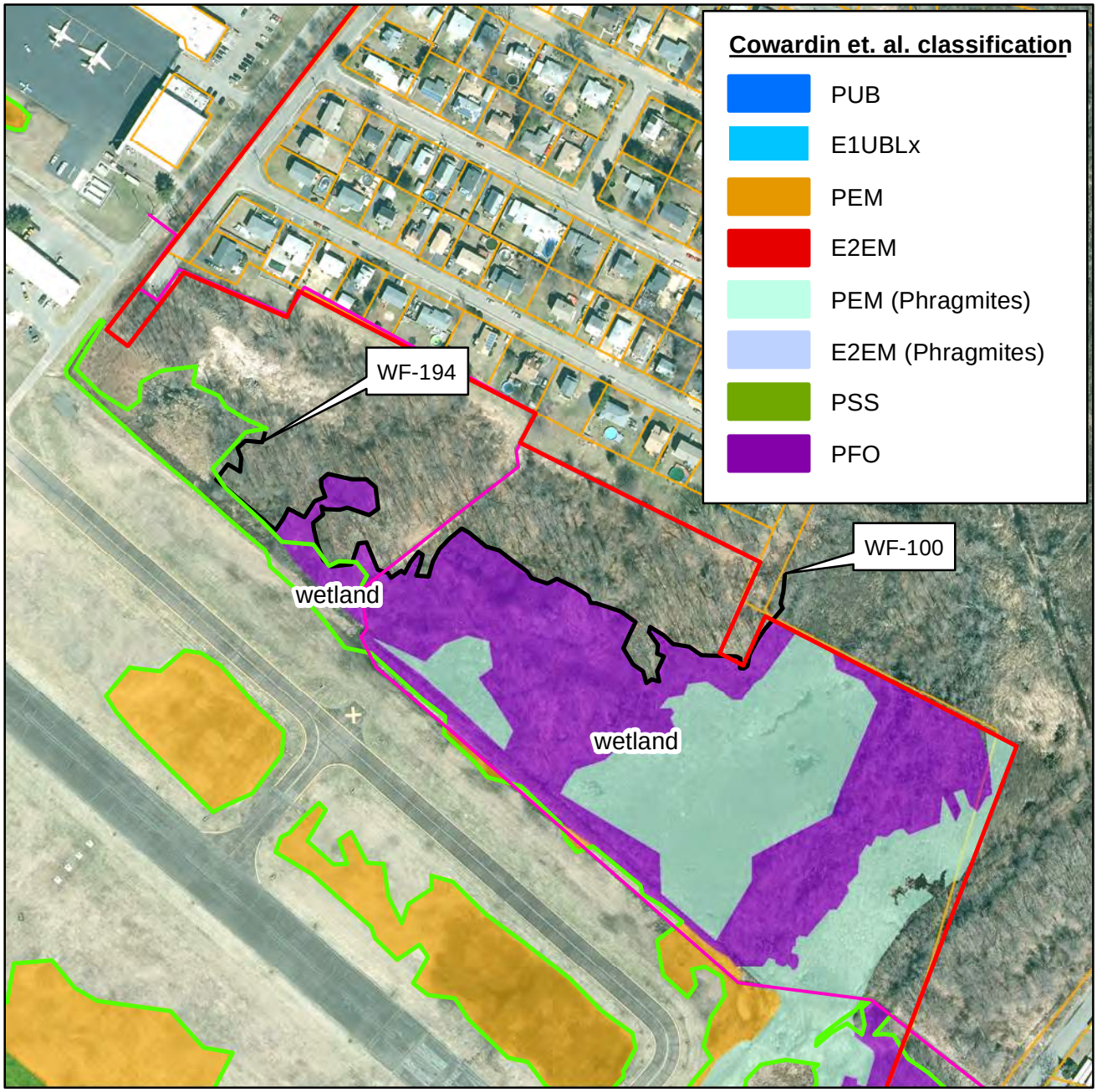
Project No. 240308

Figure 2



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

McCUE ENVIRONMENTAL, LLC
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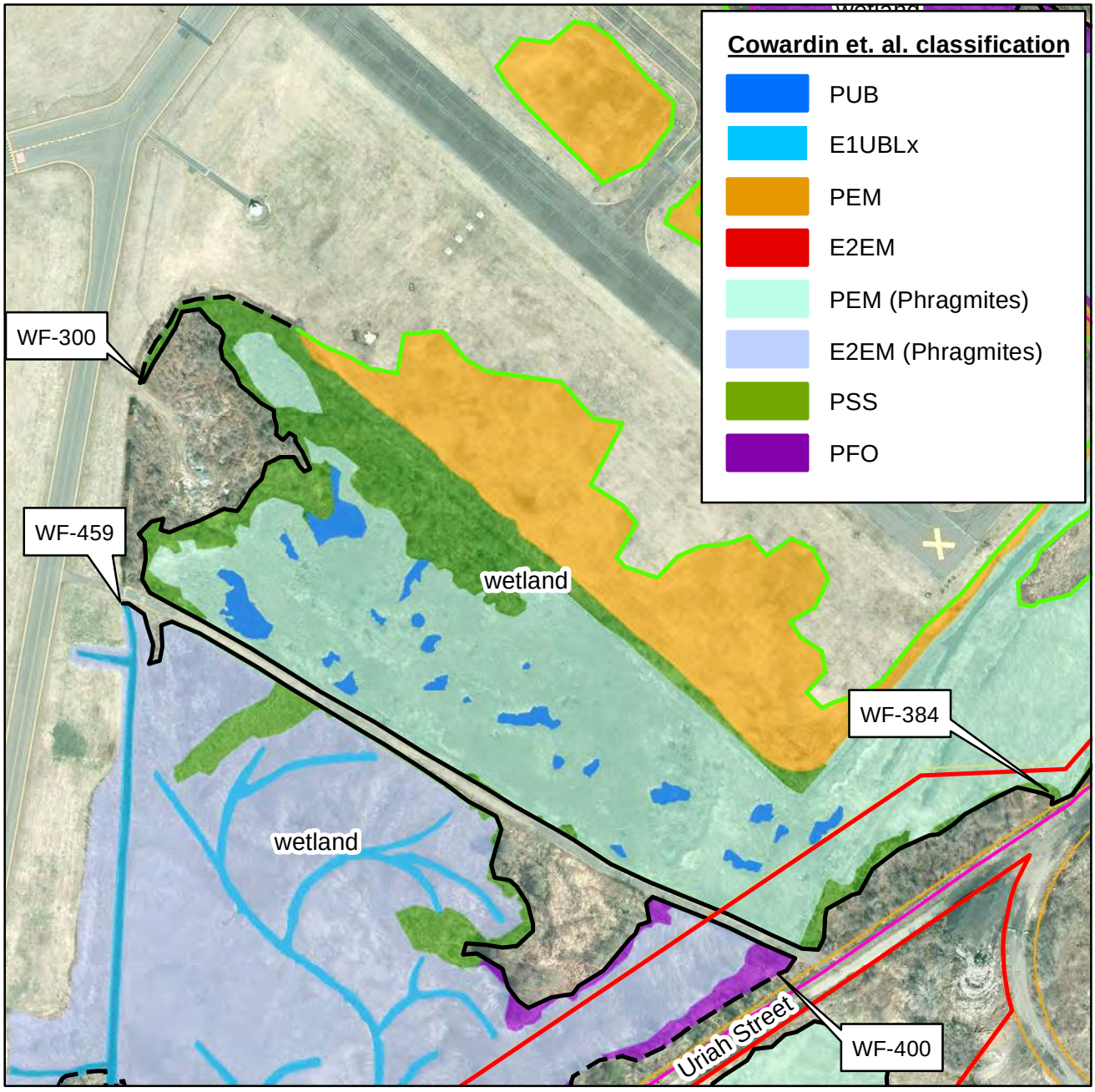
(401) 595-4276

NORTH AREA DELINEATIONS

Project No. 240308

Figure 2A



Source: CT Eco 2019 Imagery

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

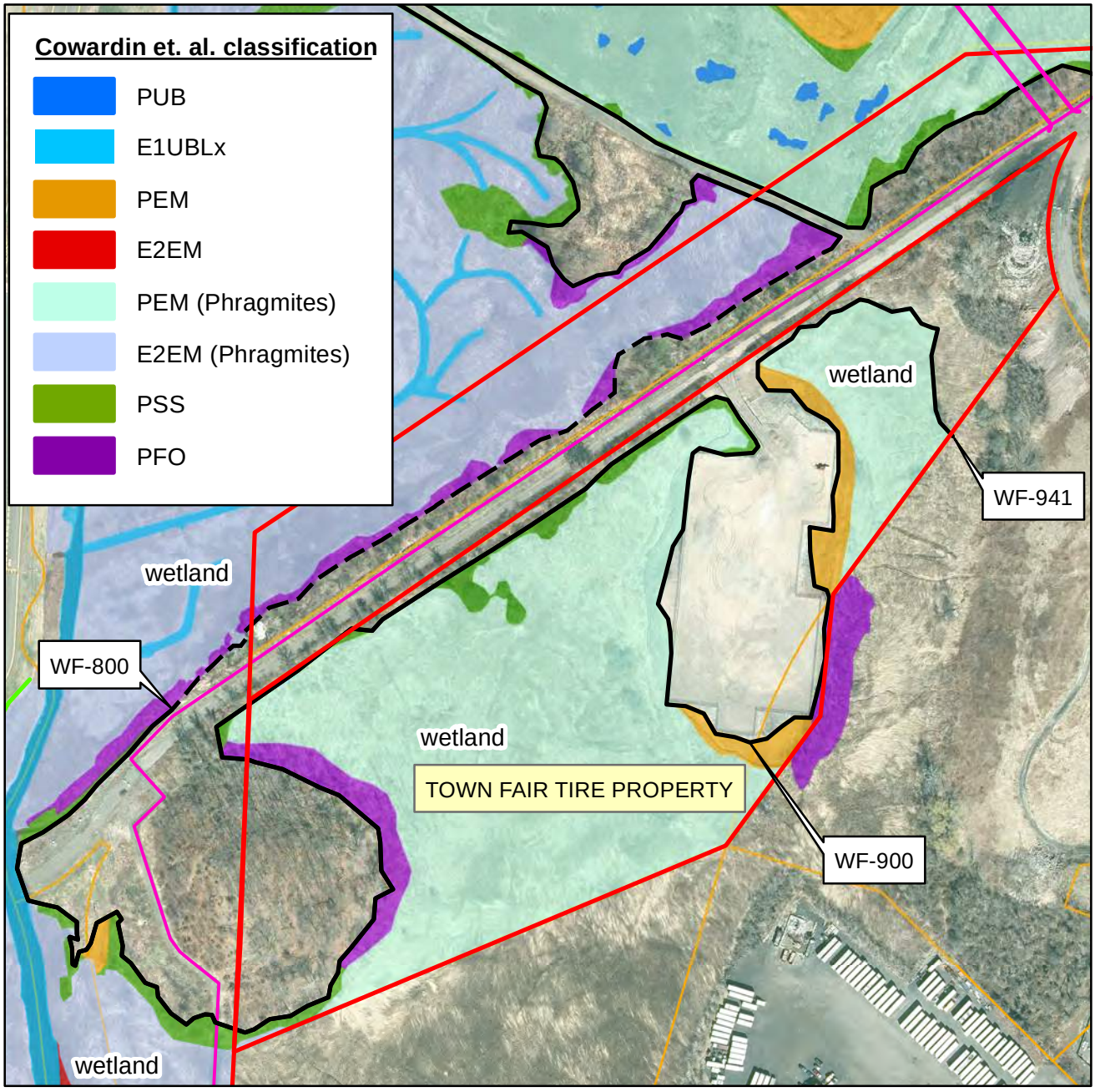
Tweed New Haven Regional Airport
New Haven & East Haven, CT

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

CENTRAL AREA DELINEATIONS

Project No. 240308

Figure 2B



Source: CT Eco 2019 Imagery

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

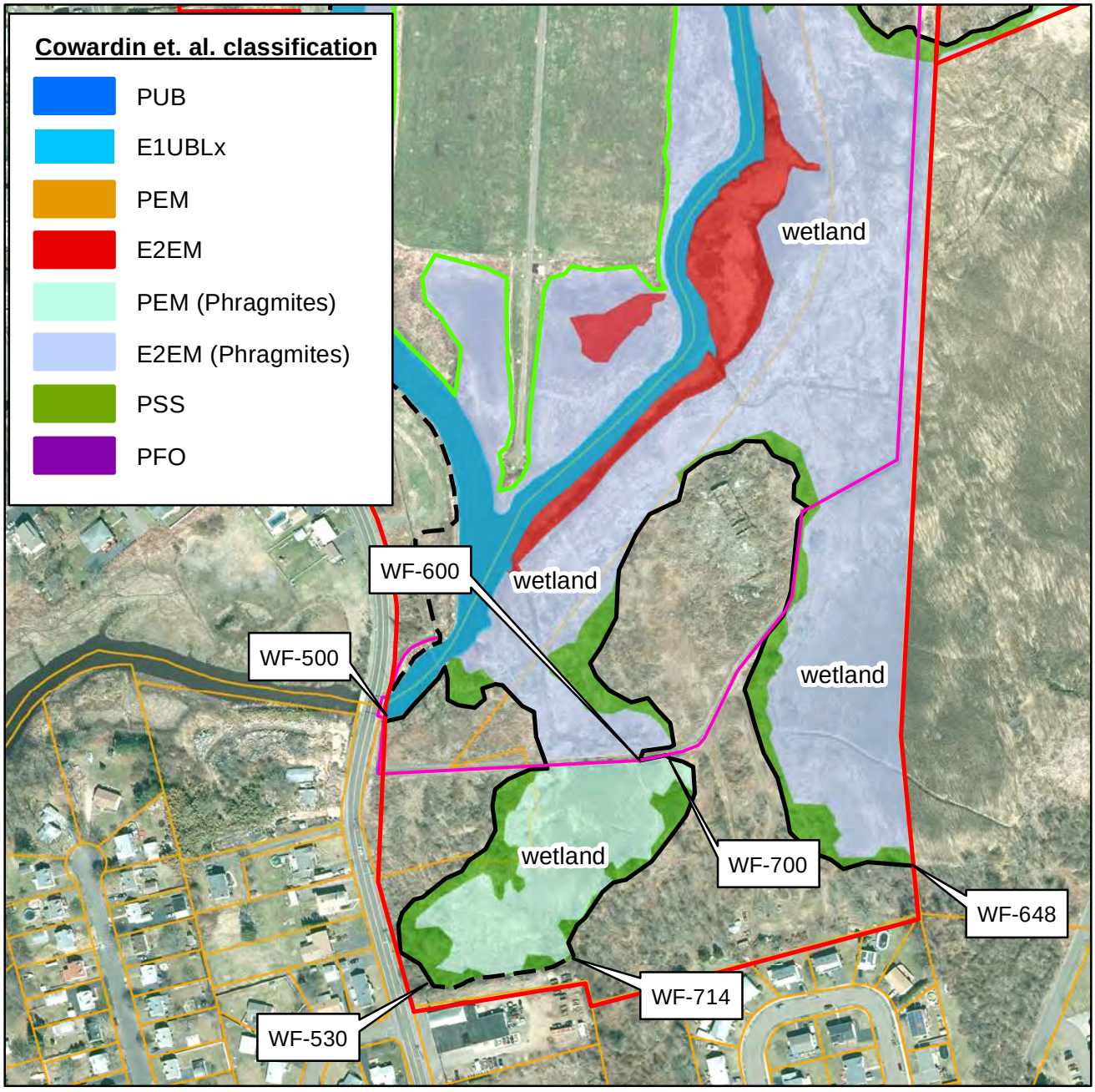
Tweed New Haven Regional Airport
New Haven & East Haven, CT

URIAH STREET AREA AND TOWN FAIR TIRE DELINEATIONS

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

Project No. 240308

Figure 2C



Source: CT Eco 2019 Imagery

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

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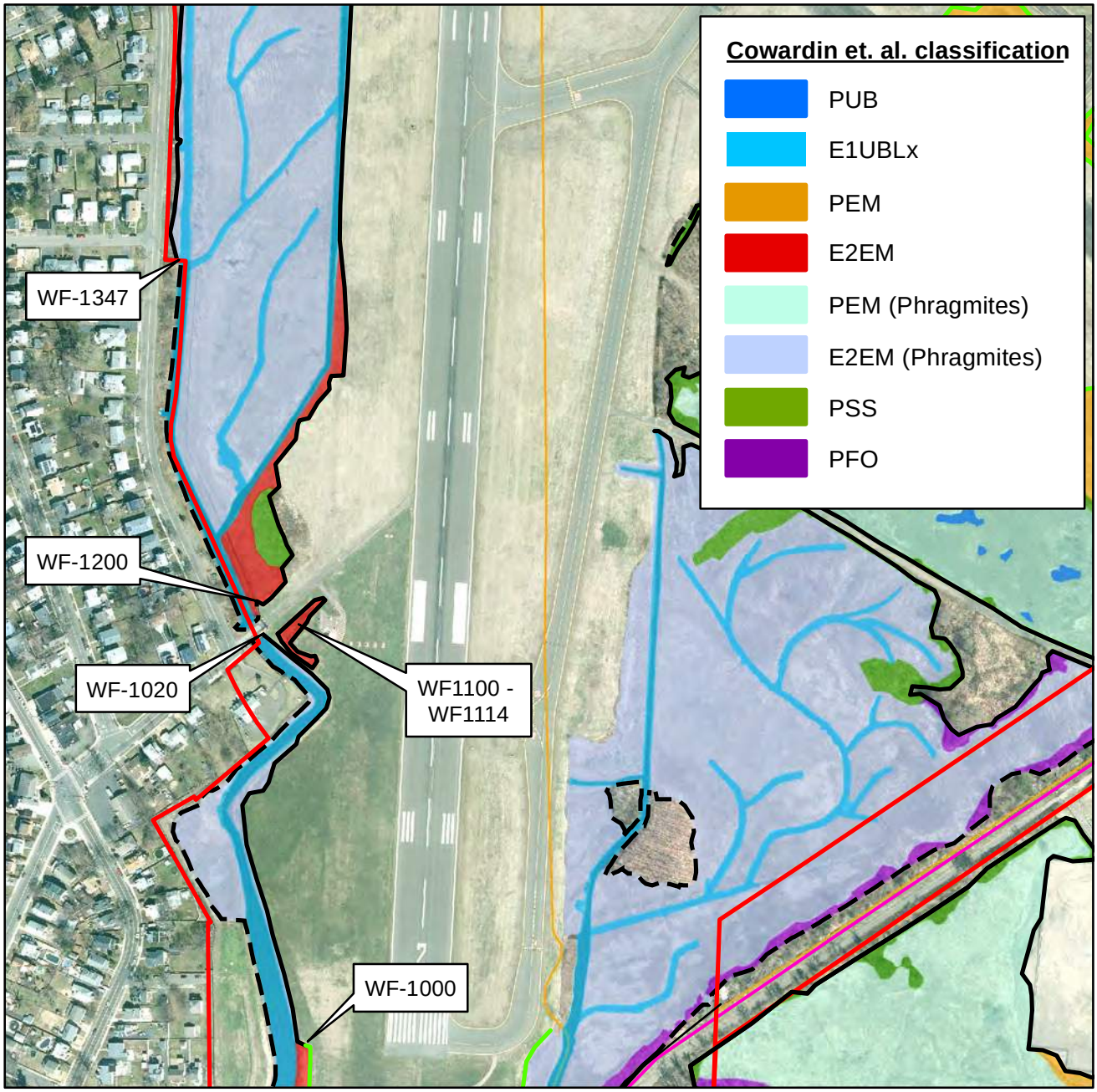
SOUTH AREA DELINEATIONS

Project No. 240308

Figure 2D



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 200 400 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

WEST AREA DELINEATIONS (SOUTH)

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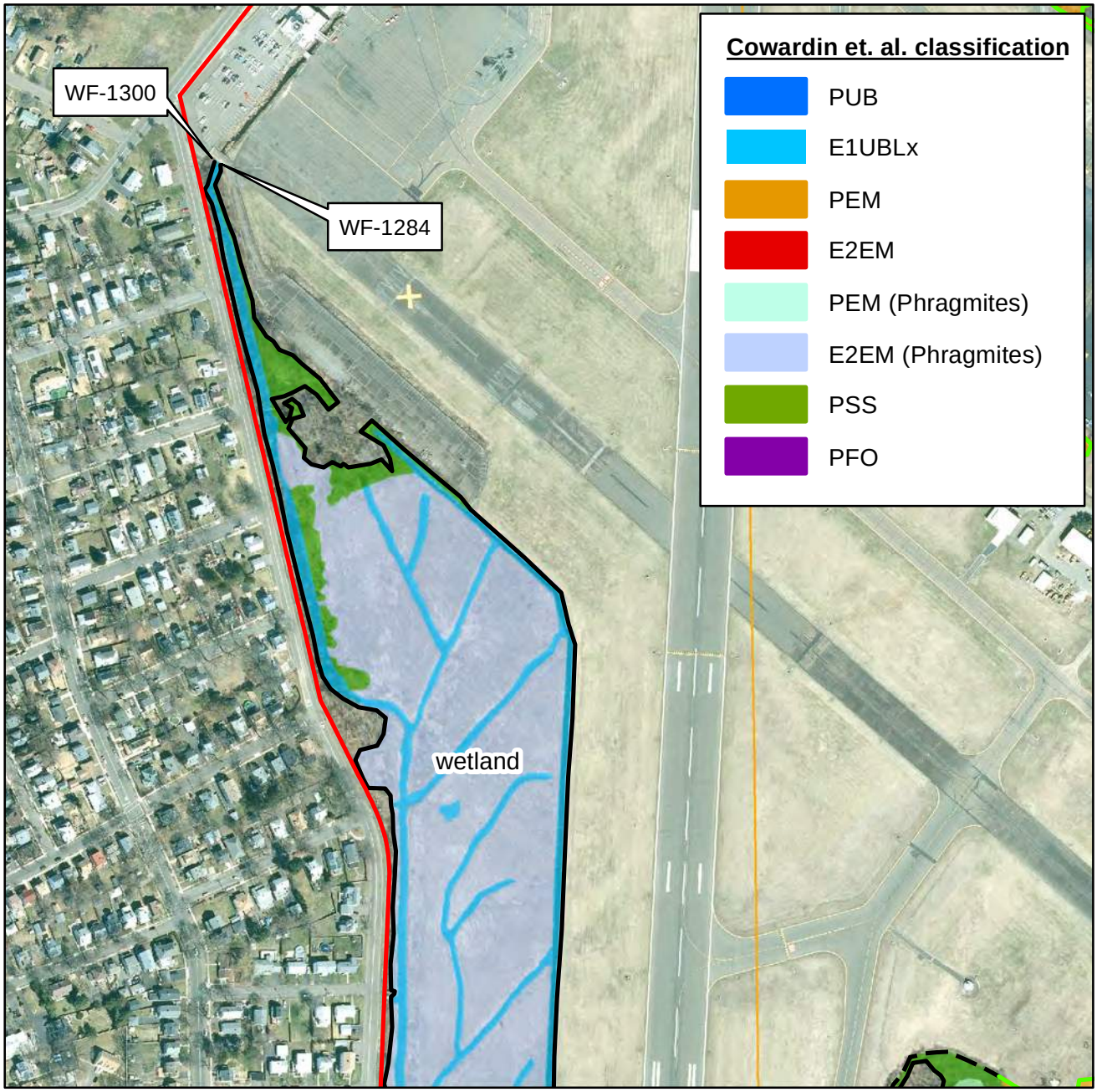
Project No. 240308

Figure 2E



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 200 400 Feet

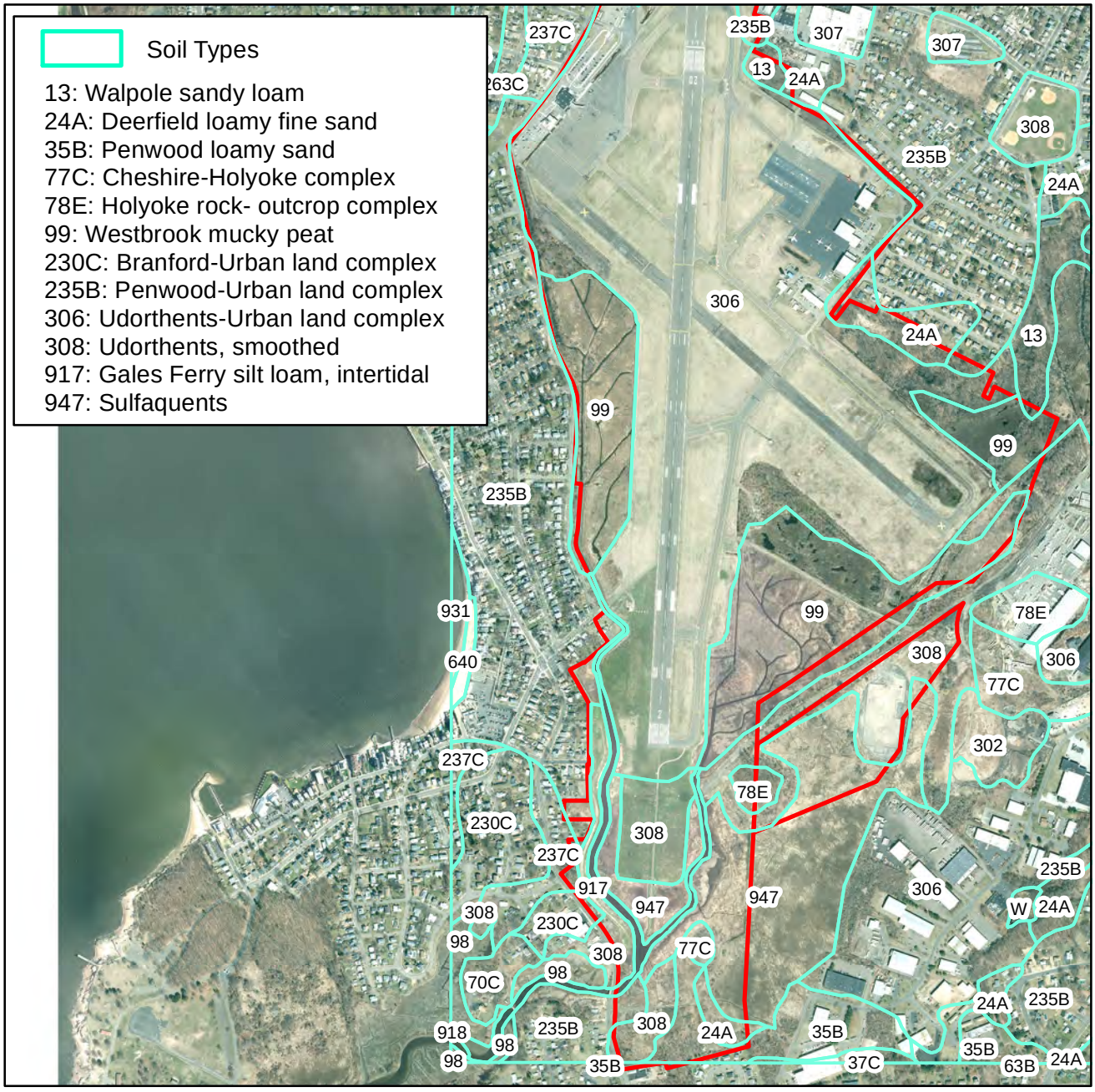
Tweed New Haven Regional Airport
New Haven & East Haven, CT

WEST AREA DELINEATIONS (NORTH)

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

Project No. 240308

Figure 2F



Source: CT Eco 2019 Imagery

Approximate Location of:

Property Boundaries

N
W E
S

0 600 1,200 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SOILS

Project No. 240308

Figure 3

APPENDIX B

ACOE Wetland Edge Delineation Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF175wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Forested area shallow slope Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2641 Long: -72.8818 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: Not mapped, but PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

See Remarks in the Soil section

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches):	to 6" deep
Water Table Present?	Yes ✓	No _____	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches):	_____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF175wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	98	Y	FAC
2. *Populus grandidentata*	10.5	N	FACU
3.			
4.			
5.			
6.			
7.			
	108.5	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. *Acer rubrum*	98	Y	FAC
2. *Vaccinium corymbosum*	3	N	FACW
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5')			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	5
FAC species	196	x 3 =	588
FACU species	10.5	x 4 =	42
UPL species	0	x 5 =	0
Column Totals:	209.5 (A)		635 (B)

Prevalence Index = B/A = 3.03

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF175wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	7.5YR 2/1	100					SL	
3 - 20	7.5YR 4/6	90	7.5YR 5/3	10			LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

This is a shallow depression that drains southward to the primary wetland area. Soils in this specific location may not make hydric soil criteria, however, it is this biologists' opinion that this area should be considered wetland because up to 6" of standing water was present, Acer rubrum dominates the wetland, buttressed tree roots are present with other water marks, and green frogs were observed in the wetland.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF175upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Forested area shallow slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2641 Long: -72.8817 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF175upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus velutina*	38	Y	UPL
2. *Populus grandidentata*	38	Y	FACU
3. *Betula lenta*	20.5	Y	FACU
4. *Sassafras albidum*	3	N	FACU
5.			
6.			
7.			
	99.5	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. *Prunus serotina*	85.5	Y	FACU
2. *Viburnum dentatum*	10.5	N	FAC
3. *Euonymus atropurpureus*	3	N	FACU
4. *Elaeagnus angustifolia*	3	N	FACU
5.			
6.			
7.			
	102	= Total Cover	

Herb Stratum (Plot size: 5')			
1. *Maianthemum canadense*	20.5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20.5	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. *Smilax rotundifolia*	3	Y	FAC
2. *Lonicera japonica*	3	Y	FACU
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 14.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	13.5	x 3 =	40.5
FACU species	176.5	x 4 =	706
UPL species	38	x 5 =	190
Column Totals:	228 (A)		936.5 (B)

Prevalence Index = B/A = 4.11

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF175upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	100					SL	
3 - 8	10YR 3/2	100					SL	
8 - 19	7.5YR 4/6	100					SL	
19 -22+	7.5YR 5/6	100					GSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF336wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Forested area shallow slope Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2607 Long: -72.8855 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: Not mapped, but PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches): _____	
Water Table Present?	Yes ✓	No _____	Depth (inches): 10"	
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"	**Wetland Hydrology Present?** Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF336wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Nyssa sylvatica*	38	Y	FAC
2. *Betula papyrifera*	38	Y	FACU
3.			
4.			
5.			
6.			
7.			
	76	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Viburnum dentatum*	38	Y	FAC
2. *Rhododendron viscosum*	10.5	Y	FACW
3.			
4.			
5.			
6.			
7.			
	48.5	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	20.5	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20.5	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. *Vitis labrusca*	3	Y	FACU
2.			
3.			
4.			
	3	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	31	x 2 =	62
FAC species	76	x 3 =	228
FACU species	41	x 4 =	164
UPL species	0	x 5 =	0
Column Totals:	148 (A)		454 (B)

Prevalence Index = B/A = 3.08

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF336wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 9	7.5YR 2.5/1	100					SL	
9 - 20	7.5YR 3/3	80	7.5YR 4/2	10	D	M	LS	
			7.5YR 3/1	10	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ✓ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF336upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Base of fill slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2607 Long: -72.8856 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances; soil plot is near the base of a fill slope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF336upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus grandidentata*	38	Y	FACU
2. *Robinia pseudoacacia*	10.5	Y	FACU
3.			
4.			
5.			
6.			
7.			
	48.5	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rosa multiflora*	20.5	Y	FACU
2. *Ligustrum vulgare*	20.5	Y	FACU
3.			
4.			
5.			
6.			
7.			
	41	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Alliara petiolata*	3	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	3	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	3	Y	FACU
2.			
3.			
4.			
	3	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95.5	x 4 =	382
UPL species	0	x 5 =	0
Column Totals:	95.5 (A)		382 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF336upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 6	7.5YR 3/2	100					SL	
6 - 18	7.5YR 3/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/25/2024

Applicant/Owner: _____ State: CT Sampling Point: WF435wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.259 Long: -72.8836 Datum: CT State Plane

Soil Map Unit Name: mapped as Udorthents-Urban Land Complex (306), but Westbrook (98) NWI classification: E2EM1Pd

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

The specific location of this data plot is mapped as Udorthents-Urban Land Complex, but the soil was observed to be characteristic of the Westbrook mucky peat (98) of which the remainder of this marsh complex is mapped as.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF435wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	98	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	98	x 2 =	196
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	98 (A)		196 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF435wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 3/1	100					hemic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

The specific location of this data plot is mapped as Udorthents-Urban Land Complex, but the soil was observed to be characteristic of the Westbrook mucky peat (98) of which the remainder of this marsh complex is mapped as.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/25/2024

Applicant/Owner: _____ State: CT Sampling Point: WF435upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): small terrace, shrub dom. Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.259 Long: -72.8835 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and tree species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF435upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rosa multiflora*	38	Y	FACU
2. *Rubus allegheniensis*	20.5	Y	FACU
3. *Viburnum dentatum*	3	N	FAC
4. *Sassafras albidum*	1	N	FACU
5.			
6.			
7.			
	62.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago/Euthamia sp. (goldenrod species)*	10.5	Y	var.
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	98	Y	FACU
2. *Vitis labrusca*	3	N	FACU
3.			
4.			
	101 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	160.5	x 4 =	642
UPL species	0	x 5 =	0
Column Totals:	163.5 (A)		642 (B)

Prevalence Index = B/A = 3.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF435upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 8	7.5YR 3/2	100					SL	
8 - 18	7.5YR 3/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: State: CT Sampling Point: WF605wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range:

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2509 Long: -72.8875 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

This flag series is also associated with the WF-500 and WF-700 series edges.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): _____
Water Table Present?	Yes ✓	No _____	Depth (inches): 8"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 12"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Standing water observed in interior sections.

VEGETATION – Use scientific names of plants.

Sampling Point: WF605wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Viburnum dentatum*	38	Y	FAC
2. *Rosa multiflora*	3	N	FACU
3. *Rubus allegheniensis*	3	N	FACU
4.			
5.			
6.			
7.			
	44 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago/Euthamia sp. (goldenrod sp.)*	98	Y	var.
2. *Phragmites australis*	20.5	N	FACW
3. *Juncus effusus*	3	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	121.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	20.5	x 2 =	41
FAC species	38	x 3 =	114
FACU species	6	x 4 =	24
UPL species	0	x 5 =	0
Column Totals:	67.5 (A)		182 (B)

Prevalence Index = B/A = 2.69

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF605wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 3	2.5Y 3/1	100					VFSL	
3 - 20	gley2 5/10B	80	10YR 5/8	10	C	M	VFSL	
			7.5YR 4/6	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: _____ State: CT Sampling Point: WF605upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): scrub-shrub, slight slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2509 Long: -72.8874 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and tree species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF605upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rosa multiflora*	38	Y	FACU
2. *Rubus allegheniensis*	20.5	Y	FACU
3. *Viburnum dentatum*	3	N	FAC
4. *Sassafras albidum*	1	N	FACU
5.			
6.			
7.			
	62.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago/Euthamia sp. (goldenrod species)*	10.5	Y	var.
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	98	Y	FACU
2. *Vitis labrusca*	3	N	FACU
3.			
4.			
	101 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	160.5	x 4 =	642
UPL species	0	x 5 =	0
Column Totals:	163.5 (A)		642 (B)

Prevalence Index = B/A = 3.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF605upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 4	7.5YR 2.5/3	100					SL	
4 - 9	7.5YR 3/3	100					SL	
9 - 20	7.5YR 3/4	97	7.5YR 4/3	3	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: State: CT Sampling Point: WF706wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range:

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2502 Long: -72.8876 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

This flag series is also associated with the WF-500 and WF-700 series edges.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF706wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Salix discolor*	38	Y	FACW
2. *Rosa multiflora*	3	N	FACU
3.			
4.			
5.			
6.			
7.			
	41 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	98	Y	FACW
2. *Onoclea sensibilis*	3	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	101 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	63	Y	FACU
2.			
3.			
4.			
	63 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	139	x 2 =	278
FAC species	0	x 3 =	0
FACU species	66	x 4 =	264
UPL species	0	x 5 =	0
Column Totals:	205 (A)		542 (B)

Prevalence Index = B/A = 2.64

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF706wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	7.5YR 2/2	100					SL	root rhizospheres
12 - 20	7.5YR 3/1	90	7.5YR 3/2	10	C	M	LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: _____ State: CT Sampling Point: WF706upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): scrub-shrub, slight slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2502 Long: -72.8875 Datum: CT State Plane

Soil Map Unit Name: Penwood loamy sand, 3 - 8% slopes (35B) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and tree species.
This flag series is also associated with the WF-500 and WF-700 series edges.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF706upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Salix discolor*	20.5	Y	FACU
2. *Ligustrum vulgare*	20.5	Y	FACU
3. *Rhus typhina*	10.5	Y	UPL
4.			
5.			
6.			
7.			
	51.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Ambrosia artimisiifolia*	98	Y	FACU
2. *Alliaria petiolata*	3	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	101 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Vitis labrusca*	38	Y	FACU
2.			
3.			
4.			
	38 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	180	x 4 =	720
UPL species	10.5	x 5 =	52.5
Column Totals:	190.5 (A)		772.5 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF706upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	7.5YR 2.5/3	100					SL	
4 - 9	7.5YR 3/3	100					SL	
9 - 20	7.5YR 3/4	97	7.5YR 4/3	3	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/10/2024

Applicant/Owner: _____ State: CT Sampling Point: WF814wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2549 Long: -72.8868 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF814wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	98	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	98	x 2 =	196
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	98 (A)		196 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF814wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	7.5YR 2/2	100					SL	root rhizospheres
12 - 18	7.5YR 3/2	90	7.5YR 5/1	10	C	M	LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/10/2024

Applicant/Owner: _____ State: CT Sampling Point: WF814upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): scrub-shrub, slight slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.255 Long: -72.8867 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and sapling species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF814upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rhus typhina*	98	Y	UPL
2. *Rubus allegheniensis*	3	Y	FACU
3.			
4.			
5.			
6.			
7.			
	101 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Pteridium aquilinum*	85.5	Y	FACU
2. *Euthamia graminifolia*	85.5	Y	FAC
3. *Solidago sp*	85.5	Y	var.
4. *Phragmites australis*	3	N	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	259.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	6
FAC species	85.5	x 3 =	256.5
FACU species	88.5	x 4 =	354
UPL species	98	x 5 =	490
Column Totals:	275 (A)		1106.5 (B)

Prevalence Index = B/A = 4.02

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF814upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 10	7.5YR 2.5/3	100					SL	
10 - 14	7.5YR 3/4	100					SL	
14 - 20	7.5YR 3/3	90	7.5YR 5/2	3	D	M	SL	
			7.5YR 5/3	3	D	M		
			7.5YR 3/4	4	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/20/2024

Applicant/Owner: _____ State: CT Sampling Point: WF888wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2568 Long: -72.8828 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1/5Pd

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 14"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 14"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF888wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	63	Y	FACW
2. *Solidago rugosa*	63	Y	FAC
3. *Euthamia graminifolia*	38	Y	FAC
4. *Impatiens capensis*	20.5	N	FACW
5. *Eutrochium purpureum*	3	N	FAC
6. *Scirpus cyperinus*	3	N	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	190.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	83.5	x 2 =	167
FAC species	104	x 3 =	312
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	187.5 (A)		479 (B)

Prevalence Index = B/A = 2.55

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF888wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 11	2.5Y 2.5/1	90	2.5Y 5/2	3	D	M	SL	
			2.5Y 4/2	3	D	M		
			2.5Y 5/6	4	C	M		
11 - 18	2.5Y 6/2	90	2.5Y 5/2	3	D	M	SL	
			2.5Y 4/2	3	D	M		
			2.5Y 4/3	2	D	M		
			2.5Y 5/6	2	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/20/2024

Applicant/Owner: _____ State: CT Sampling Point: WF888upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): fill slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2567 Long: -72.8827 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and sapling species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF888upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rubus allegheniensis*	85.5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	85.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago rugosa*	85.5	Y	FAC
2. *Ambrosia artemisiifolia*	63	Y	FACU
3. *Reynoutria japonica*	3	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	151.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	85.5	x 3 =	256.5
FACU species	151.5	x 4 =	606
UPL species	0	x 5 =	0
Column Totals:	237 (A)		862.5 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF888upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
see below								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Unable to obtain soil data due to fill edge.

APPENDIX C

Photo Sheets: Figures P1 – P6



Southeast view of wetland at Flag WF-114. Note the PFO and PEM (phragmites) classifications (Photo taken 4/24/2024)



Southwest view of wetland at flag WF-176 (Photo taken 4/24/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | FIGURE P-1



EAST VIEW OF WETLAND AT FLAG WF-316. NOTE THE PFO AND PEM (PHRAGMITES) CLASSIFICATIONS (PHOTO TAKEN 4/25/2024)



SOUTH VIEW OF WETLAND AT FLAG WF-419 (PHOTO TAKEN 4/25/2024)

TWEED NEW HAVEN AIRPORT, NEW HAVEN & EAST HAVEN, CONNECTICUT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SITE PHOTOGRAPHS

PROJECT # 240308 | FIGURE P-2



EAST VIEW OF WETLAND AT FLAG WF-316. NOTE THE PEM AND PEM (PHRAGMITES) CLASSIFICATIONS (PHOTO TAKEN 6/10/2024)



SOUTHWEST VIEW OF WETLAND AT FLAG WF-888, AT ACOE DATA FORM PLOT LOCATION (PHOTO TAKEN 6/20/2024)

TWEED NEW HAVEN AIRPORT, NEW HAVEN & EAST HAVEN, CONNECTICUT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SITE PHOTOGRAPHS

PROJECT # 240308 | FIGURE P-3



Northwest view of wetland at Flag WF-709
(Photo taken 5/2/2024)



North view of wetland Airport and Town Fair Tire area from top of the stone structure at the WF-600 series, showing dense Phragmites (Photo taken 5/2/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | FIGURE P-4



Southwest view of WF-1100 series wetland
(Photo taken 11/1/2024)



East view of WF-1100 wetland
(Photo taken 11/1/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | Figure P-5



North view of WF-1200 series wetland near flag WF-1221
(Photo taken 11/1/2024)



South view of Watersourse at flag WF-1317, Photo shows woody vegetated banks, but dominant Phragmites beyond
(Photo taken 11/18/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | Figure P-6

APPENDIX D

ACOE Wetland Function-Value Evaluation Forms

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *270 ft. North*

Dominant wetland systems present *PFO1E* Contiguous undeveloped buffer zone present *Yes*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF100 - WF194*

Latitude *41.2633* Longitude *-72.8804*

Prepared by: *McCue* Date *4/24/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	✓		*1 (very few), 2, 4, 5, 7, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 15, 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*2, 4, 8, 14, 15, 16*		*(Freshwater)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13*	✓	*Rationale cont.: 14, 16*
Nutrient Removal	✓		*1, 3, 5, 6, 7, 8, 9, 10, 11, 12*	✓	*Rationale cont.: 13, 14*
Production Export		✓	*1, 2, 4, 5, 7*		
Sediment/Shoreline Stabilization	✓		*7, 9, 12, 13, 14, 15*		
Wildlife Habitat	✓		*1, 3, 4, 6, 7, 8, 11, 13, 14*	✓	*Rationale cont.: 15, 16, 17, 19, 20, 21*
Recreation		✓	*5, 12*		*(6 unknown); Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 4, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 5, 7, 10, 16, 19, 27*		
Visual Quality/Aesthetics		✓	*7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *120' Southeast*

Dominant wetland systems present *PEM1/5F* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF300 - WF384*

Latitude *41.26* Longitude *-72.8836*

Prepared by: *McCue* Date *4/24/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	✓		*1 (very few), 2, 4, 5, 7, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 15, 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*2, 4, 5, 8, 14, 15, 16*		*(Freshwater)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13*	✓	*Rationale cont.: 14, 16*
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12*	✓	*Rationale cont.: 13, 14*
Production Export		✓	*1, 2, 4, 5, 7*		
Sediment/Shoreline Stabilization	✓		*7, 9, 12, 13, 14, 15*		
Wildlife Habitat	✓		*1, 3, 6, 7, 8, 11, 13*	✓	*Rationale cont.: 16, 17, 18, 19, 20, 21*
Recreation		✓	*5, 12*		*(6 unknown) ;Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 4, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 4, 5, 7, 16, 19, 27*		
Visual Quality/Aesthetics		✓	*7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *21 ac.* Human made? *part.* Is wetland part of a wildlife corridor? *yes* or a "habitat island"? _____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *70' Southeast*

Dominant wetland systems present *E2EM1Pd* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF400 - 459/WF800 - 809*

Latitude *41.2583* Longitude *-72.885*

Prepared by: *McCue* Date *6/10/24*

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N _____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 14, 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*1, 2, 4*		*(Marine)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8,*	✓	
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 6, 7, 13*		
Sediment/Shoreline Stabilization	✓		*7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 11, 12, 13, 16, 17*	✓	*Rationale cont.: 18, 19, 20, 21*
Recreation		✓	*5, 9, 12*		*(6 unknown); Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 4, 5, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 4, 5, 16, 27*		
Visual Quality/Aesthetics		✓	*7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *340' west*

Dominant wetland systems present *E2EM1Pd, EM1/5F & PSS* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland?_____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF500-515 & WF600 - 648*

Latitude *41.2512* Longitude *-72.8882*

Prepared by: *McCue* Date *4/25/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*Freshwater: no qualifiers*		*Marine: 1, 2, 4*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8*	✓	
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 7, 13*		
Sediment/Shoreline Stabilization	✓		*3, 7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 9, 10, 11, 12, 13, 14*	✓	*Rationale cont.: 15, 16, 17, 18, 19, 20, 21*
Recreation		✓	*5, 9, 10, 12*		*(6 unknown); Not suitable: Airport restricted or private property*
Educational/Scientific Value		✓	*2, 3, 4, 5, 8, 9, 14*		*Not suitable: Airport restricted property or private property*
Uniqueness/Heritage		✓	*1, 4, 5, 8, 19, 27*		
Visual Quality/Aesthetics		✓	*2, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *3 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *15 - 340' west*

Dominant wetland systems present *PEM1/5F & PSS* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland?_____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF516 -530 & WF700 - 714*

Latitude *41.2503* Longitude *-72.8881*

Prepared by: *McCue* Date *4/25/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat		✓	*Freshwater: no qualifiers*		*(Freshwater)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8*	✓	
Nutrient Removal	✓		*1, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 7*		
Sediment/Shoreline Stabilization		✓	*3, 9, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 10, 11, 13, 14*	✓	*Rationale cont.: 15, 16, 17, 18, 19, 20, 21*
Recreation		✓	*5, 9, 10, 12*		*(6 unknown); Not suitable: Airport restricted or private property*
Educational/Scientific Value		✓	*2, 3, 4, 5, 8, 9, 14*		*Not suitable: Airport restricted property or private property*
Uniqueness/Heritage		✓	*1, 5, 8, 19, 27*		
Visual Quality/Aesthetics		✓	*2, 7, 8, 9, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *70' Northwest*

Dominant wetland systems present *E2EM1Pd & PEM1/5F* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland?_____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF810 - WF941*

Latitude *41.2559* Longitude *-72.884*

Prepared by: *McCue* Date *6/20/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*Freshwater: non qualifiers*		*Marine: 1, 2, 4,*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8*	✓	
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 6, 7, 13*		
Sediment/Shoreline Stabilization	✓		*3, 7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 11, 12, 13, 16, 17*	✓	*Rationale cont.: 18, 19, 20, 21*
Recreation		✓	*5, 10, 12*		*(6 unknown); Not suitable: Airport restricted or private property*
Educational/Scientific Value		✓	*2, 4, 5, 8, 9, 14*		*Not suitable: Airport restricted property or private property*
Uniqueness/Heritage		✓	*1, 3, 4, 5, 8, 27*		
Visual Quality/Aesthetics		✓	*2, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *0.14 ac.* Human made? *part.* Is wetland part of a wildlife corridor? *no* or a "habitat island"?_____

Adjacent land use *Airport* Distance to nearest roadway or other development *80' NW*

Dominant wetland systems present *E2EM1P* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *Yes* If not, where does the wetland lie in the drainage basin?_____

How many tributaries contribute to the wetland? *0* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF1100 - 1114*

Latitude *41.259* Longitude *-72.8893*

Prepared by: *McCue* Date *11/18/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5*		*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓	✓	*4, 5, 6, 7, 9, 11, 13, 15*	✓	*Small wetland area, provides limited floodflow alteration*
Fish and Shellfish Habitat		✓	*1*		
Sediment/Toxicant Retention		✓	*1, 2*		
Nutrient Removal	✓		*3, 4, 9, 10*		
Production Export		✓			
Sediment/Shoreline Stabilization		✓	*3, 5*		
Wildlife Habitat		✓	*7*		
Recreation		✓			*Not suitable: Airport restricted property*
Educational/Scientific Value		✓			*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1*		
Visual Quality/Aesthetics		✓			
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes: *This wetand noted as a separet system, however, a culvert dors provide a hydraulic connectivity to the WF1000 series.*

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *~28 ac.* Human made? *part.* Is wetland part of a wildlife corridor? *yes* or a "habitat island"? _____

Adjacent land use *Dense residential, airport, commercial* Distance to nearest roadway or other development *30' west*

Dominant wetland systems present *E2EM1/5Pd* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF1000, 1200 & 1300*

Latitude *41.2626* Longitude *-72.8896*

Prepared by: *McCue* Date *11/18/24*

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N _____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 5, 7, 15*		*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*1 (very few), 2, 4*		*(Marine) (5 unknown)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8, 10, 14, 16*	✓	
Nutrient Removal	✓		*1, 3, 5, 6, 7, 8, 9, 10, 11, 12*	✓	*Rationale cont.:14*
Production Export		✓	*1, 2, 4, 5, 6, 7, 10, 13*		
Sediment/Shoreline Stabilization	✓		*4, 6, 7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*6, 7, 8, 11, 12, 13, 16, 17*	✓	*Rationale cont.: 18, 19, 20, 21*
Recreation		✓	*5, 9, 12*		*(6 unknown); Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 5, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 3, 5, 7, 12, 16, 19, 22, 27*		
Visual Quality/Aesthetics		✓	*1, 2, 7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes: *This wetland system is subject to tidal inundation*

* Refer to backup list of numbered considerations.

File Name

APPENDIX E

Web Soil Survey Map and Soil Descriptionss

Soil Map—State of Connecticut, Western Part
(Tweed New Haven Regional Airport)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut, Western Part
Survey Area Data: Version 2, Aug 30, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	2.0	0.2%
13	Walpole sandy loam, 0 to 3 percent slopes	22.2	1.9%
24A	Deerfield loamy fine sand, 0 to 3 percent slopes	61.5	5.2%
35B	Penwood loamy sand, 3 to 8 percent slopes	27.1	2.3%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	9.0	0.8%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	0.5	0.0%
63B	Cheshire fine sandy loam, 3 to 8 percent slopes	0.1	0.0%
70C	Branford-Holyoke complex, 3 to 15 percent slopes, very rocky	5.0	0.4%
77C	Cheshire-Holyoke complex, 3 to 15 percent slopes, very rocky	19.1	1.6%
78C	Holyoke-Rock outcrop complex, 3 to 15 percent slopes	3.4	0.3%
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes	16.6	1.4%
87C	Wethersfield loam, 8 to 15 percent slopes	1.6	0.1%
87D	Wethersfield loam, 15 to 25 percent slopes	0.0	0.0%
98	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	7.5	0.6%
99	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded, low halinity	95.2	8.0%
224A	Deerfield-Urban land complex, 0 to 3 percent slopes	30.6	2.6%
230C	Branford-Urban land complex, 8 to 15 percent slopes	18.4	1.5%
235B	Penwood-Urban land complex, 0 to 8 percent slopes	276.9	23.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
237C	Manchester-Urban land complex, 3 to 15 percent slopes	26.7	2.2%
255B	Watchaug-Urban land complex, 0 to 8 percent slopes	4.5	0.4%
263B	Cheshire-Urban land complex, 3 to 8 percent slopes	18.4	1.5%
263C	Cheshire-Urban land complex, 8 to 15 percent slopes	17.9	1.5%
269C	Yalesville-Urban land complex, 8 to 15 percent slopes	5.5	0.5%
302	Dumps	7.8	0.7%
306	Udorthents-Urban land complex	326.8	27.4%
307	Urban land	36.9	3.1%
308	Udorthents, smoothed	79.4	6.7%
640	Beaches, sand-Hooksan complex, 0 to 8 percent slopes	1.5	0.1%
917	Gales Ferry silt loam, intertidal	8.0	0.7%
918	Gales Ferry silt loam, subtidal	0.3	0.0%
931	Anguilla sand, subtidal	2.3	0.2%
947	Sulfaquents, 0 to 2 percent slopes, very frequently flooded	57.0	4.8%
W	Water	1.1	0.1%
Totals for Area of Interest		**1,191.0**	**100.0%**



Appendix: F

Wetland Report

McFarland Johnson



HVN

TWEED
NEW HAVEN
AIRPORT

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Wetland Delineation Report

Master Plan Implementation Projects

Tweed New Haven Airport
New Haven/East Haven, Connecticut

January 2022

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INTRODUCTION

Tweed New Haven Regional Airport (the "Airport") is a public airport located in the City of New Haven and Town of East Haven, CT, owned and operated by the City of New Haven (see **Figure 1, Overview Map** and **Figure 2, USGS Map** in **Appendix A**). The property is located along the New Haven-East Haven town-line with Long Island Sound approximately ¾-mile to the south, New Haven Harbor ¼ mile to the west, and Morris Cove approximately ¼-mile to the southwest. The Airport has two asphalt runways, Runway 2-20 which is approximately 5,200 feet long by approximately 150 feet wide oriented north-south, and Runway 14-32 (currently not in use) which is approximately 3,600 feet long by 100 feet wide with a northwest – southeast orientation.

According to field observations and a review of recent aerial photographs of the area, the Airport is set within a mixed residential, commercial, and industrial area. To the west of the Airport (between Dean Street and Townsend Avenue), land use is mostly residential whereas to the east (along Proto Drive and Commerce Street), it is mostly industrial. There is undeveloped land (wetlands) to the south of Runway 2-20 and to the southeast of the HVN property boundary.

Taxiways, aprons, parking lots and access driveways comprise the other paved areas on the airport property. Buildings include a terminal building and hangars housing planes and offices for private air carriers and other airport related businesses along with airport maintenance and operations structures including a fire and rescue building. Areas interior to and surrounding the runways and taxiways are comprised of mowed/maintained grasslands. Along the southwestern, southern, and southeastern perimeter of the airport are extensive vegetated tidal wetland systems with constructed channels and areas of open water. Inland wetlands occur at the northwestern, northern, northeastern, and eastern edges of the runway and taxiway areas. Some of the inland wetland areas appear to have been constructed as drainage features as they do not appear on United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) or CT Department of Energy and Environmental Protection (CTDEEP) wetland mapping. Previous wetland delineations by others did not identity wetland resources within these infield areas (ie where Wetlands 4 and 5 and a portion of Wetland 6 were delineated under this field survey). Wetlands 4 and 5 may be viewed by the USACE as isolated and thus may not be subject to USACE jurisdiction. A request for a jurisdictional determination is recommended for these wetlands.

HVN proposes multiple projects to continue advancing the Airport Master Plan Update, including the development of a new terminal area and a runway extension. The Tweed New Haven Airport Authority is preparing an Environmental Assessment for the project in accordance with the National Environmental Policy Act (NEPA) to implement elements of its Airport Master Plan. The wetland and watercourse delineation will be used to inform the NEPA process and permitting requirements.

METHODOLOGY

Historically impacted inland wetlands (some presumably man-made and offering limited functions and values) and one tidal wetland were delineated by FHI Studio soil scientists within the project areas in accordance with State and federal definitions and guidelines.

Tidal wetland limits were delineated in accordance with the State of Connecticut General Statutes (CGS) Section 22a-29 (Tidal Wetlands). Tidal wetlands are "…those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marsh, swamps, meadows, flats, or other lowlands subject to tidal action, including those areas now or formerly connected to tidal waters, and whose surface is at or below an elevation of one foot above local extreme high water; and upon which may grow or be capable of growing…" tidal vegetation.

In 2012, the Connecticut General Assembly passed Public Act No. 12-101, which included a revision to the State's regulatory jurisdiction under CGS Section 22a-359. This revision changed the regulatory jurisdiction limit from the "high tide line" to the area up to and including the elevation of the "coastal jurisdiction line" (CJL) as determined for the State's major tidal waterbodies. The CJL is not delineated in the field, but is a set elevation for each municipality. It also states under CGS Section 22a-359, "For any tidal, coastal or navigable waters of the state located upstream of a tide gate, weir, or other device that modifies the flow of tidal waters, the coastal jurisdiction line for such tidal, coastal or navigable waters shall be the elevation of mean high water as found at the downstream location of such device".

Under CGS Section 22a-39 the identification of Connecticut-regulated inland wetlands is determined by the limit of any of the soil types designated as poorly drained, very poorly drained, alluvial, or floodplain by the National Cooperative Soils Survey, of the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA) (§22a-38-15) that are not subject to CGS Section 22a-29 as defined above. NRCS soil surveys were consulted to compare observed soil types to those mapped in the project area. The *Field Indicators for Identifying Hydric Soils in New England Version 4* (2018) and *Field Indicators of Hydric Soils in the United States, Version 8.2* (2018) were used to identify hydric soils, which include both poorly and very poorly drained soils.

Identification of watercourses, as regulated by Connecticut, was based upon the definitions contained in Section 22a-38 of Chapter 440 of the Connecticut General Statutes of Connecticut; including the following hydrological systems under the term "watercourse": rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, vernal or intermittent, public or private.

The Ordinary High Water (OHW) mark as defined by the USACE for the purposes of the Clean Water Act (CWA) lateral jurisdiction at 33 CFR 328.3€ is the "line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial

vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas". The OHW mark was flagged with sequentially labeled blue flagging and is considered the lateral extent of Federal jurisdiction over non-tidal Waters of the United States (US) in the absence of adjacent wetlands.

Federal wetlands, both tidal and inland, were delineated based on the United States Army Corps of Engineers (USACE) 1987 *Wetland Delineation Manual* and the USACE 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region – Version 2.0*. Federal wetland boundaries were determined by the presence of dominant hydrophytic vegetation, presence of hydric soils, and evidence of wetland hydrology. In tidally influenced areas, the USACE regulates up to the high tide line (HTL) elevation. USACE Wetland Determination Data Forms were not completed for tidal resource delineations, since the wetlands are tidal, and jurisdiction is defined by the HTL elevation. USACE Field Documentation Forms for the delineated inland wetlands are provided in **Appendix C**.

The limit of the wetland delineation fieldwork was confined to distinct project areas where activities are likely to be proposed at the Airport (see Figures 1 and 2). Field work was conducted over several site visits conducted between August and October 2021. The wetland/upland boundary was marked in the field using consecutively numbered flags, and the locations of the flags were recorded by FHI Studio using a GPS unit capable of achieving sub-meter accuracy (note that FHI Studio is not a licensed surveyor) and subsequently located and documented by a licensed land surveyor. Wetland functions and values were documented in accordance with the USACE *Highway Methodology Supplement* (1999) guidelines (see **Appendix B**). Photographs were taken at representative locations in the wetlands and are included in **Appendix D**.

RESULTS

Seven wetland systems were delineated in the field, numbered 1 to 7 from north to south, within the areas of investigation (see **Figure 3, Wetland Map** in **Appendix A**). Wetlands 1 – 6 are inland wetlands. Wetland 7 is a tidal wetland - a good portion of which, within the project area, has been subject to past alterations and disturbance related to the relocation of Morris Creek sometime prior to 2010. A tide gate is located southwest of Wetland 7, which likely regulates the amount of tidal flow to wetlands upstream of the tide gate.

All wetlands lie within the Southcentral Coast Major Basin No. 5, regional basin 50 and subregional basin 5000 and drain ultimately to Long Island Sound via Morris Creek. Wetland System No. 1 drains west to Tuttle Creek (a tributary of Morris Creek) in Local Basin Number 5000-45 (CT Environmental Conditions Online, Advanced Viewer, 2021). Wetland 7 and a portion of the southwestern limits of Wetland 6 drains to this same basin series. Wetlands 2-5 and a majority of Wetland 6 drain to the east and southeast to Morris Creek in Local Basin Number 5000-46 (CT Environmental Conditions Online, Advanced Viewer, 2021). The confluence of these two drainages lies immediately south of the Airport. The CJL elevation for New Haven is 4.6 feet

NAVD88, while that of East Haven is 4.5 feet NAVD88. According to information provided in an Environmental Assessment for the Taxiway and Drainage Improvement Project, "the CJL for the wetland within the Tweed Airport boundary above the tide gate on Morris Creek is 3.5' NGVD. All wetlands below this elevation for the purpose of the project are considered tidal, and they are therefore under the jurisdiction of CTDEEP.

General descriptions of these seven wetlands are provided below, with additional detailed information for each wetland in **Table 1**.

Wetland 1 is located at the northwestern limit of the airport. It contains a reach of Tuttle Brook and associated bordering vegetated wetlands. The reach of Tuttle Brook originates at a double box culvert (through which Tuttle Brook is conveyed underneath Dodge Avenue) and extends approximately 1,200 linear feet southerly downstream before entering another double box culvert underneath a service road to the airport that is accessed off Dodge Avenue in New Haven. The reach of Tuttle Brook within the project area is best classified as a Riverine Lower Perennial Watercourse characterized by an unconsolidated bottom dominated by sand and organic matter substrate(R2UB2/4). Only the northern-most reach of Tuttle Brook was delineated within the airport boundary. OHW flags were hung in the field to demarcate the limits of Tuttle Brook. The bordering vegetated wetlands along Tuttle Brook consists largely of stands of palustrine emergent persistent vegetation (e.g., Broad-leaved Cattail and Common Reed *Phragmites australis*-dominated stands - PEM1/5. Woody shrubs consisting primarily of American Black Elderberry and an alder sp., occur sporadically.

Wetland 2 is located at the northeastern limit of the airport in the area between the General Aviation Parking and the East Ramp. It consists of a palustrine forested, broad-leaved deciduous, seasonally flooded/saturated, and ditched wetland system (PFO1Ed) with a small palustrine emergent *Phragmites australis*-dominated inclusion that appears to be permanently flooded (PEM5H). Characteristic vegetation includes Red Maple, Black Gum, and Pin Oak in the tree layer, Northern Spicebush and Sweet Pepperbush in the shrub layer. *Phragmites* flanks most of the ditched portion of the wetland in the herbaceous layer.

Wetland 3 is located adjacent to the mowed areas between the Air Traffic Control Tower and the East Ramp's tarmac. It consists of a palustrine emergent, nonpersistent, intermittently flooded/saturated (PEM2J) wetland that collects sheet flow runoff and direct precipitation. It is characterized by Soft Rush, Water Purslane, Broom Sedge, a spike rush sp., and various other rushes, sedges, and hydrophytic grasses (incl. the state-threatened *Paspalum laeve*).

Wetland 4 is a shallow drainage area located north of Runway 32 which forms its southwestern boundary. It is bounded by Taxiway C on the northeast side, and Taxiway H on the southwest side. Wetland 4 consists of a palustrine emergent, nonpersistent, intermittently flooded/saturated (PEM2J) wetland. It is dominated by various species of hydrophytic plant species such as Soft Rush, Straw-colored Sedge, Curly Dock, Calico Aster, and the state-threatened Field Beadgrass. This wetland receives sheet flow runoff from the surrounding

impervious runways and tarmacs. A catch basin serves as the outlet that regulates the surface water level of the wetland when it receives collected stormflows. Based upon its morphology and drainage structures, it appears that this wetland has formed within a drainage area that was constructed with the adjacent Runway 14/32 and Taxiways Band C were built. While it is a routinely mowed lawn, since Runway 14/32 has not been used for years, routine maintenance of the basin has waned which may have allowed for the development of hydrophytic plant community. A suspected high groundwater table in this area may support these hydrophytes. Functions and values are low for this wetland.

Wetland 5 is a similar shallow drainage area bounded by Taxiway C on the northeast and southeast sides, Taxiway H on the northwest side and former Runway 32 on the southwest side. It consists of a palustrine emergent, nonpersistent, intermittently flooded (PEM2J) wetland that also collects sheet flow runoff and direct precipitation. Hydrophytic vegetation observed within this wetland included the following: Soft Rush, Strawcolored Flatsedge, Field Beadgrass, Long-leaved Redtop Panicgrass, Rough Barnyardgrass, Spike Rush, Sharp-fruit Rush, Marsh Seedbox, Swamp Smartweed, Common Threesquare, Yellow Bristlegrass, and Calico aster. A catch basin serves as the outlet that regulates the surface water level of the wetland when it receives stormflows. Based upon its morphology and drainage structures, it appears that this wetland may have also formed within a drainage area that was constructed with the adjacent Runway 14/32 and Taxiways Band C were built, similar to Wetland 4. Similarly, while it is a routinely mowed lawn, since Runway 14/32 has not been used for years, routine maintenance of the basin has waned which may have allowed for the development of a hydrophytic plant community. During field work, high levels of standing water were observed in this catch basin, which may indicate high groundwater levels in this area. Functions and values are low for this wetland.

Although a contiguous wetland system, Wetland 6 is characterized by two different wetland types. Wetland 6A consists of palustrine emergent wetlands within a mowed lawn airfield. Wetland 6B consists of a palustrine forested broad-leaved deciduous, seasonally saturated, wetland (PFO1E), and bordering palustrine emergent wetlands (PEM2) containing non-persistent, persistent and Phragmites-dominated subclasses. An upper reach of Morris Creek bisects the PFO portion of this wetland east of Taxiway C and Runway 32. Sheet flow runoff from the adjacent runways and taxiways and direct precipitation contribute to the hydrology of this wetland, however portions of the wetland are transected by permanently flooded / excavated channels lending evidence of a suspected high groundwater elevation. Seasonal flooding along Morris Creek also likely contributes to the sustaining hydrology of the wetland. Red Maple dominates the PFO portion, while *Phragmites* has significant cover in the PEM portion. Other hydrophytes noted included the following: Northern Spicebush, Highbush Blueberry, Winterberry, Northern Arrowwood, Sweet Pepperbush, Common Reed, Purple Loosestrife, Steeplebush, Spotted Joe Pye-weed, Flat-top Goldenrod, Boneset, and Spike Rush east of Taxiway C (Wetland 6B). To the west of the former runway 14/32 within the mowed portion of the RSA (Wetland 6A), the wetland is dominated by Field Beadgrass, Spike Rush, Brownish Beakrush, and

Yellow Bristlegrass. Functions and values are low for the 6A portion of the wetland due to its maintained nature. Functions and values are slightly higher for the 6B portion of the wetland.

Wetland 7 consists of an estuarine intertidal emergent persistent / *Phragmites*-dominated system (E2EM1/5) bordering estuarine subtidal creeks (Morris Creek and Tuttle Brook) with unconsolidated bottoms and irregularly flooded tidal regimes E1UBL. The tidally influenced dominant vegetation of this wetland includes *Phragmites australis* (an invasive plant species) and several halophytic grasses (e.g., *Spartina alterniflora, Spartina patens, Distichlis spicata,* etc.). The wetland is bordered by a zone of *Baccharis halimifolia* shrubs.

The wetland ID/flagging sequence, wetland type, soil type and characteristic vegetation of each of the seven delineated wetlands is summarized in **Table 1**. Additionally, the United States Fish and Wildlife Service (USFWS), National Wetland Inventory (NWI) map is provided as **Figure 4 in Appendix A**, and the United States Department of Agriculture's Natural Resource Conservation Service (NRCS) Soils Map is provided as **Figure 5 in Appendix A.** Most of the project area is located within the 100-year floodplain limits. The Federal Emergency Management Agency (FEMA) floodplain map is provided as **Figure 6** in **Appendix A**.

NRCS MAPPED AND OBSERVED SOILS

The mapped NRCS soils and observed soils on, and in the vicinity of, the study area are depicted by their soil number on **Figure 5** in **Appendix A**. The mapped NRCS soils and observed soils within the study area are listed in **Table 2** along with their drainage class and NRCS official soil series description.

CONCLUSION

Six of the seven wetlands (Wetland Nos. 1 through 6) delineated among the various project areas on the site are considered inland wetlands and watercourses and were delineated accordingly. The state and federal jurisdictional limits of these six wetlands are coincident. One wetland system (Wetland No. 7) is subject to tidal influence and contains one or more species of tidal wetland vegetation. Thus, Wetland No. 7 is considered a tidal wetland in accordance with the State of Connecticut definition and, as such, is regulated under CGS Section 22a-29 (Tidal Wetlands). These tidal wetlands are also regulated by the USACE. Wetland 1, Wetland 7, and a portion of Wetland 6 drain to the south to Tuttle Brook, a tributary to Morris Creek, which in turn drains to Long Island Sound south of Morris Cove in New Haven, CT. Wetland 3 appears to be an isolated wetland with no apparent direct hydrologic connection to other site wetlands unless it connects through a submerged culvert that was not readily observable at the time of our delineation. Wetlands 4, 5 and a portion of Wetland 6 drain to the southeast – either directly (i.e., via excavated channel) or indirectly (via groundwater discharge) – to an extensive interspersed wetland transected by Morris Creek. In regards to Wetlands 3, 4, and 5, which are

presumed to be constructed drainage areas, one or more of these wetlands may be viewed by the USACE as isolated and thus may not be subject to USACE jurisdiction. A request for a jurisdictional determination is recommended for these wetlands.

Table 1: Wetlands Within the Limit of Wetland Delineation Fieldwork

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
Wetland 1 (OHWA1-A33; OHWB1-B11; E1-E48)	R2UB2/4 and PEM1/5	A relocated reach of Tuttle Brook flanked by bordering vegetated wetland dominated by emergent persistent vegetation.	Walpole (Poorly Drained) and Scarboro (Very Poorly Drained)	Sediment/Toxicant Retention Nutrient Removal Production Export	*Sambucus nigra* (FACW) *Alnus sp.* *Phragmites australis* (FACW) *Typha latifolia* (OBL) *Onoclea sensibilis* (FACW)
Wetland 2 (H1-H32)	PFO1Ed and PEM5H	Red Maple swamp adjacent to an excavated channel that drains easterly and is flanked by stands of Phragmites	Walpole (Poorly drained) and Aquents (poorly drained fill materials)	Sediment/Toxicant Retention Nutrient Removal	*Acer rubrum* (FAC) *Nyssa sylvatica* (FAC) *Quercus palustris* (FACW) *Clethra alnifolia* (FAC) *Lindera benzoin* (FACW) *Vaccinium corymbosum* (FACW) *Phragmites australis* (FACW)
Wetland 3 (B1-B14)	PEM2J	Shallow basin dominated by gramminoids	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Juncus effusus* (OBL) *Juncus tenuis* (FAC) ***Paspalum laeve* (FAC)** *Symphyotrichum lateriflorum* (FAC) *Ludwigia palustris* (OBL)
Wetland 4 (F1-F20)	PEM2J	Routinely mowed lawn area bounded by Taxiway C on the northeast side, and Taxiway H on the southeast side. Low depression with	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Juncus effusus* (OBL) *Cyperus strigosus* (FACW) *Rumex crispus* (FAC) ***Paspalum laeve* (FAC)** *Symphyotrichum lateriflorum*

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
		suspected high groundwater table.			(FAC)
Wetland 5 (G1-G48)	PEM2J	Routinely mowed lawn area bounded by Taxiway C on the northeast and southeast sides, Taxiway H on the northwest side and former Runway 32 on the southwest side. Low depression with high groundwater table.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention Production Export	*Juncus effusus* (OBL) *Cyperus strigosus* (FACW) ***Paspalum laeve* (FAC)** *Coleataenia longifolia* ssp. *longifolia* (FACW) *Echinochloa muricata* (OBL) *Eleocharis obtusa* (OBL) *Juncus acuminatus* (OBL) *Ludwigia palustris* (OBL) *Persicaria hydropiperoides* (OBL) *Schoenoplectus pungens var. pungens* (OBL) *Setaria pumila* ssp. *pumila* (FAC) *Symphyotrichum lateriflorum* (FAC)
Wetland 6 (A1-A121; D1-D50; D51-D62 & D63 to D-88)	PFO1E PEM2	Forested and scrub-shrub wetland (6B portion) and bordering mowed lawn area (6A portion) transected by permanently flooded excavated channel. Low depressions with apparent high groundwater table in mowed areas.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Acer rubrum* (FAC) *Lindera benzoin* (FACW) *Vaccinium corymbosum* (FACW) *Ilex verticillata* (FACW) *Viburnum dentatum* (FAC) *Clethra alnifolia* (FAC) *Phragmites australis* (FACW)

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
					Lythrum salicaria (OBL) *Spiraea tomentosa* (FACW) *Euthrochium maculatum* (OBL) *Juncus effusus* (OBL) ***Paspalum laeve* (FAC)** *Euthamia caroliniana* (FAC) *Eupatorium perfoliatum* (FACW) *Rhynchospora capitellata* (OBL) *Setaria pumila* ssp. *pumila* (FAC) *Cyperus strigosus* (FACW)
Wetland 7 (C1-C104)	E2EM1/5 P and E1UBL	The majority of this wetland system consists of a *Phragmites australis*-dominated tidal wetland bordered by a zone of *Baccharis halimifolia* landward.	Aquents (poorly drained fill materials)	Floodflow Alteration Fish and Shellfish Habitat Wildlife Habitat Uniqueness/Heritage	*Phragmites australis* (FACW) *Spartina alterniflora* (OBL) *Spartina patens* (FACW) *Distichlis spicata* (FACW) *Juncus gerardii* (OBL) *Baccharis halimifolia* (FACW) *Iva frutescens* (FACW)

Notes:

(a) Wetland Type (Cowardin, et. al., 1979 and Federal Geographic Data Committee, 2013)
R3UB2/4 – Riverine lower perennial unconsolidated bottom (sand/mud) watercourse
PFO1E – Palustrine Forested Broad-leaved Deciduous seasonally flooded/saturated wetland
PEM5H – Palustrine Emergent *Phragmites australis*-dominated permanently flooded wetland
PEM2 – Palustrine Emergent, non-persistent wetland
PEM2J – Palustrine Emergent, non-persistent intermittently-flooded wetland
E2EM1/5P – Estuarine intertidal emergent, persistent/*Phragmites australis*, irregularly flooded wetland

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
		E1UBL – Estuarine subtidal, unconsolidated bottom, subtidal deepwater habitat (b) Wetland Indicator Status: OBL (Obligate): Almost always occur in wetland FACW (Facultative Wetland): Usually occur in wetland, but may occur in non-wetland FAC (Facultative): Occur in wetland or non-wetland **Bold text** = State listed plant species			

Table 2: NRCS Mapped Soils in the Vicinity of the Project Area

Soil ID	Soil Name	Drainage Class	Official NRCS Soil Series Description
24	Deerfield Loamy Sand	Moderately well-drained	Soils belonging to the Deerfield series consists of loamy sands of glaciofluvial deposits. They are derived from acidic crystalline rocks such as granite, gneiss, and schist. They are recognized as farmland soils of statewide importance.
37	Manchester gravelly sandy loam	Excessively-drained	The soils of the Manchester series consists of gravelly sandy loam that originated from glaciofluvial deposits. They are derived from acidic red sandstone, shale, and conglomerate bedrocks. They are recognized as farmland soils of statewide importance.
98	Westbrook mucky peat	Very poorly drained	The Westbrook series consists of very deep soils formed in organic deposits over loamy mineral material. They are in tidal marshes subject to inundation by salt water twice daily.
306	Udorthents-Urban Land complex	Well drained	This complex consists of soils that have been disturbed by cutting or filling, and areas that are covered by buildings and pavement.
308	Udorthents, smoothed	Moderately well drained	Udorthents, smoothed, consists of areas from which soil material has been excavated, and nearby areas in which this material has been deposited. The original soil material is generally excessively drained to moderately well drained, and ranges from nearly level to very steep.
	Aquents (un-mapped)	Poorly to very poorly drained	Aquents are soils formed in human transported material or on excavated (cut) landscapes. They typically exist as smaller units within Udorthent soil materials.

The larger wetland complexes that are not within the maintained areas around the runways form important habitat systems and wildlife corridors that provide resources for various fish and wildlife species known to occur in tidal marshes and tidal creeks. The tidal wetlands within the maintained areas around the runways provide limited habitat for various wildlife species of conservation concern. *Paspalum laeve*, a characteristic wetland plant of the herbaceous layer in multiple PEM wetlands on the site, is listed in the State of Connecticut Endangered Species Act as Threatened. A "Threatened" designation is given to plants that have been documented by research and scientific inventory to occur at only six to nine locations in the state. Field Beadgrass is primarily restricted to sites within CT's coastal zone such as Old Lyme, East Haddam, Groton

(W. Moorhead, personal communication), in undisclosed sites in New Haven County (Magee and Ahles, 1999); and in a similar biogeographic zone in NY (e.g., on Fisher's Island and in various municipalities of Long Island, based upon FHI's review of New York State Museum specimen labels). The density and distribution of this species on the Airport has not yet been determined. It is recommended that these metrics be completed during the permitting stage of the project.

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Appendix A - Figures





Legend

- Areas of Wetland Investigation
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

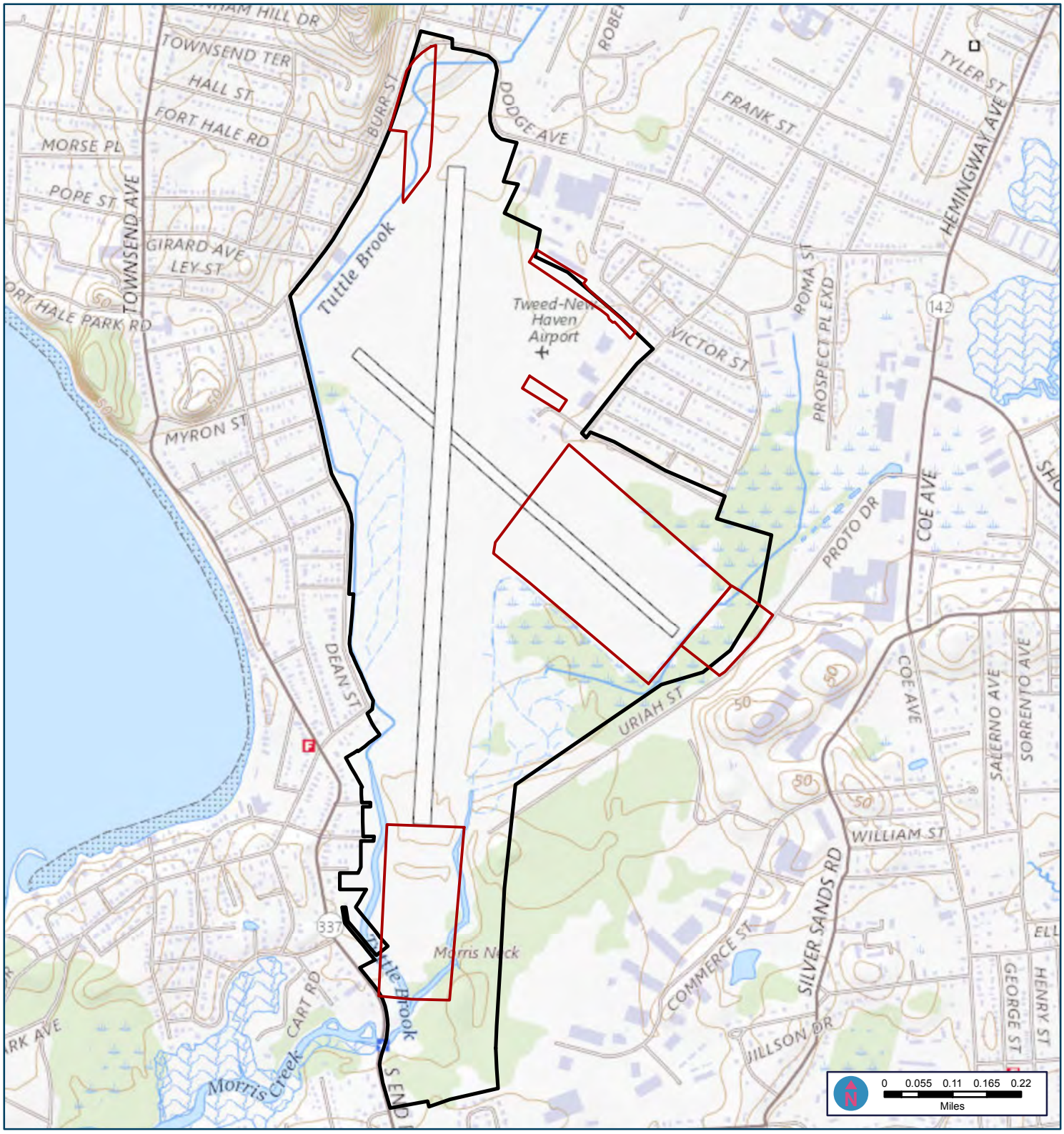
Figure 1

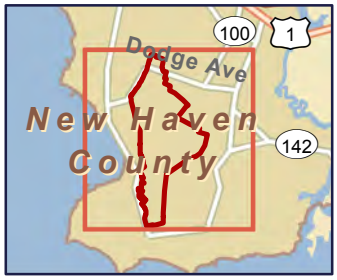
Overview Map

Map Produced 11/29/2021

Data Source: USGS The National Map 2021

FHI studio





Legend

- Areas of Wetland Investigation
- Tweed Airport Property

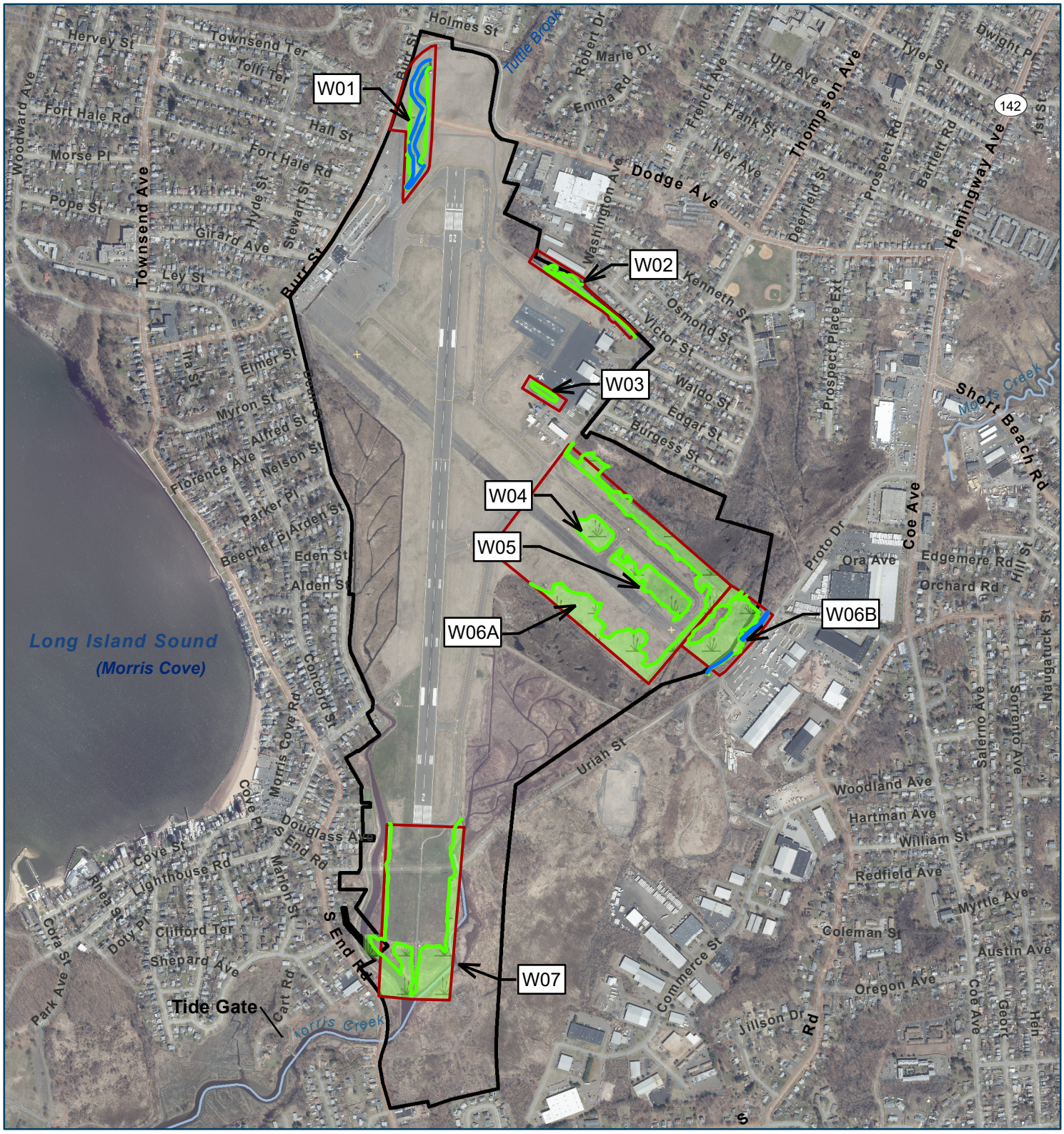
Tweed New Haven Airport

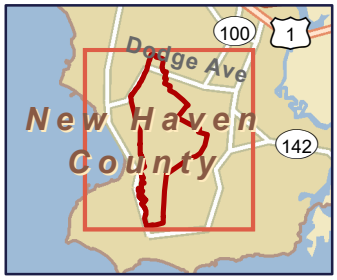
Wetland and Watercourse Delineation

Figure 2

Map Produced 11/29/2021
Data Source: USGS The National Map 2021

USGS Map





Legend

- Delineated Wetland
- Delineated Ordinary High Water (OHW)
- Areas of Wetland Investigation
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

Figure 3A

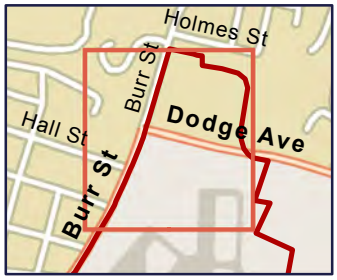
Map Produced 11/30/2021

Data Source: CTECO 2019 Aerial, ESRI, FHI Studio 2021

Wetland Field Delineation Sketch Map

FHI studio





Map Produced 12/8/2021

Data Source: CTECO 2019 Aerial, FHI Studio 2021

Legend

- Wetland Transect Plot Location
- Ordinary High Water (OHW) Field Flag Location
- Wetland Field Flag Location
- Delineated Ordinary High Water (OHW) Line
- Limits of Wetland Investigation Area
- Field Delineated Wetland 2021
- Tweed Airport Property

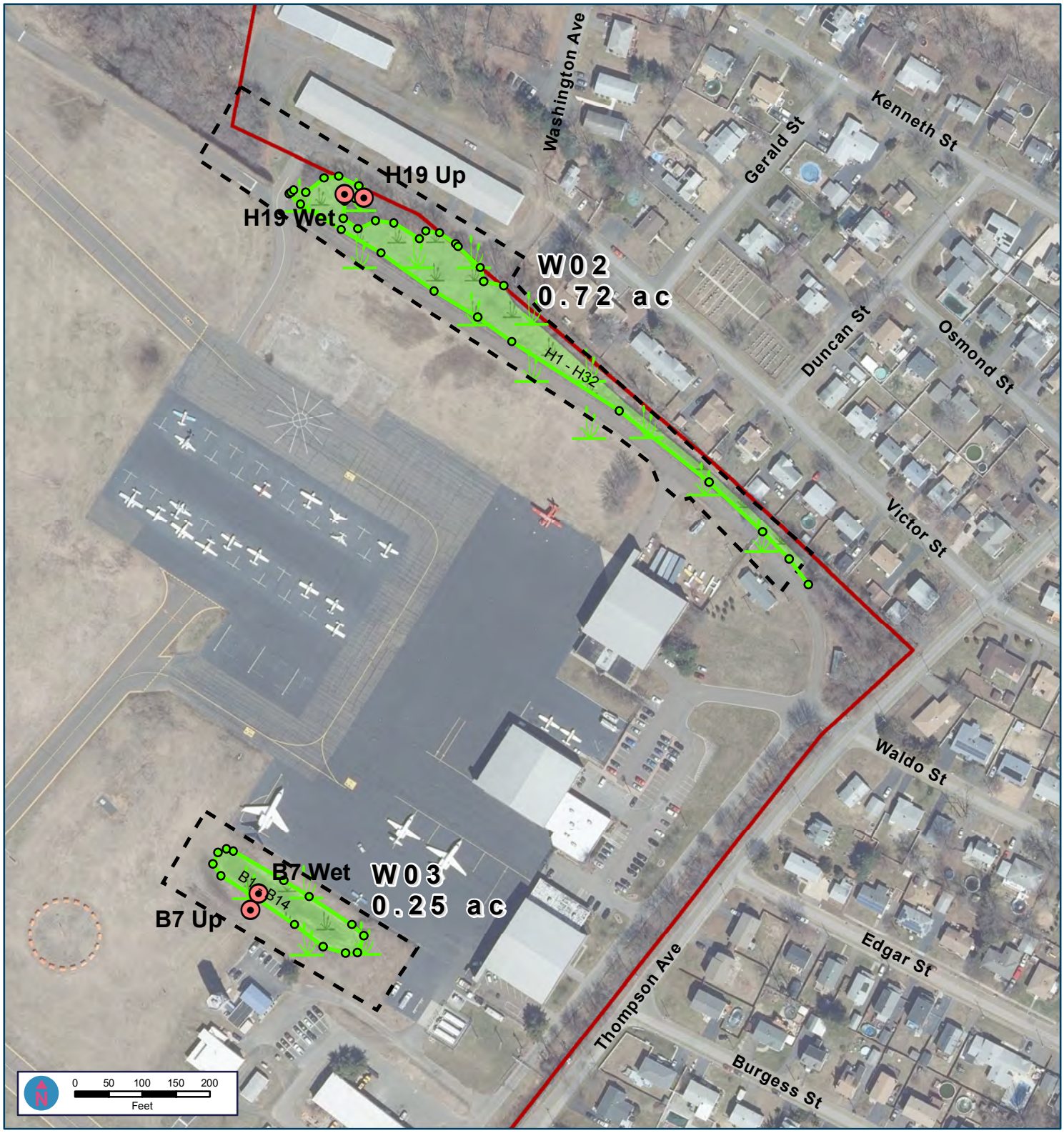
Tweed New Haven Airport

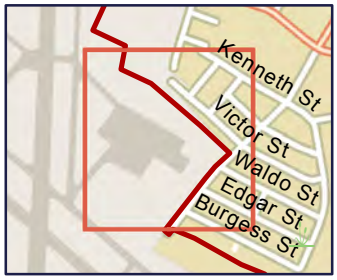
Wetland and Watercourse Delineation

Figure 3b

Detailed Field Delineated Wetland Sketch Map

FHI studio





Legend

- Wetland Transect Plot Location
- Ordinary High Water (OHW) Field Flag Location
- Wetland Field Flag Location
- Delineated Ordinary High Water (OHW) Line
- Limits of Wetland Investigation Area
- Field Delineated Wetland 2021
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

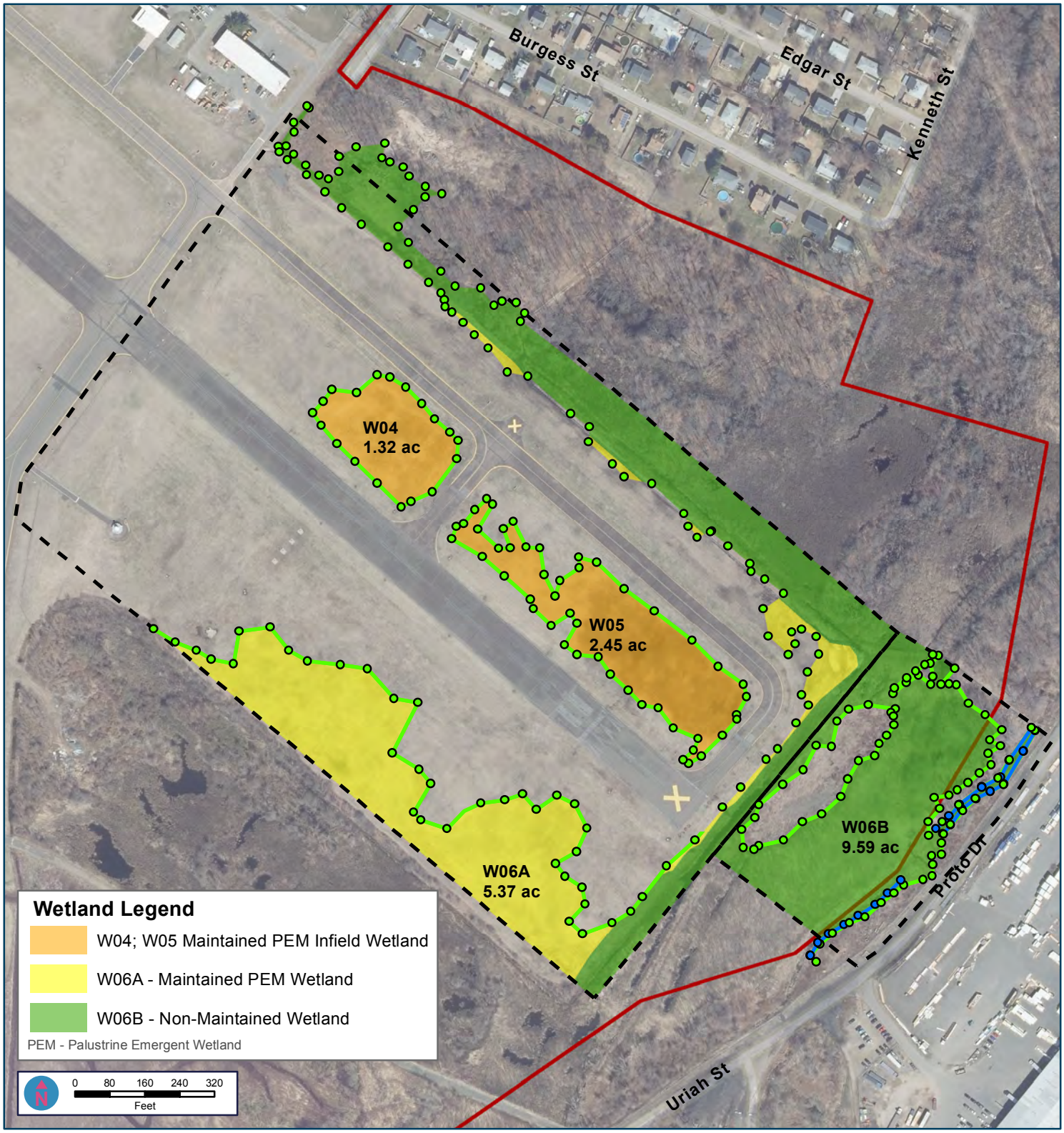
Figure 3c

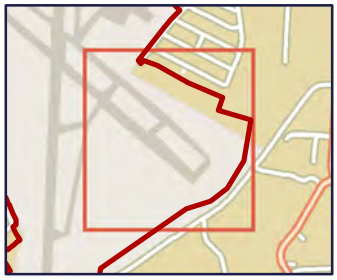
Detailed Field Delineated Wetland Sketch Map

Map Produced 12/8/2021

Data Source: CTECO 2019 Aerial, FHI Studio 2021

FHI studio





Legend

- Tweed Airport Property
- Limits of Wetland Investigation Area
- Wetland Field Flag Location
- Ordinary High Water (OHW) Field Flag Location
- Delineated Wetland Line
- Delineated Ordinary High Water (OHW) Line

Tweed New Haven Airport

Wetland and Watercourse Delineation

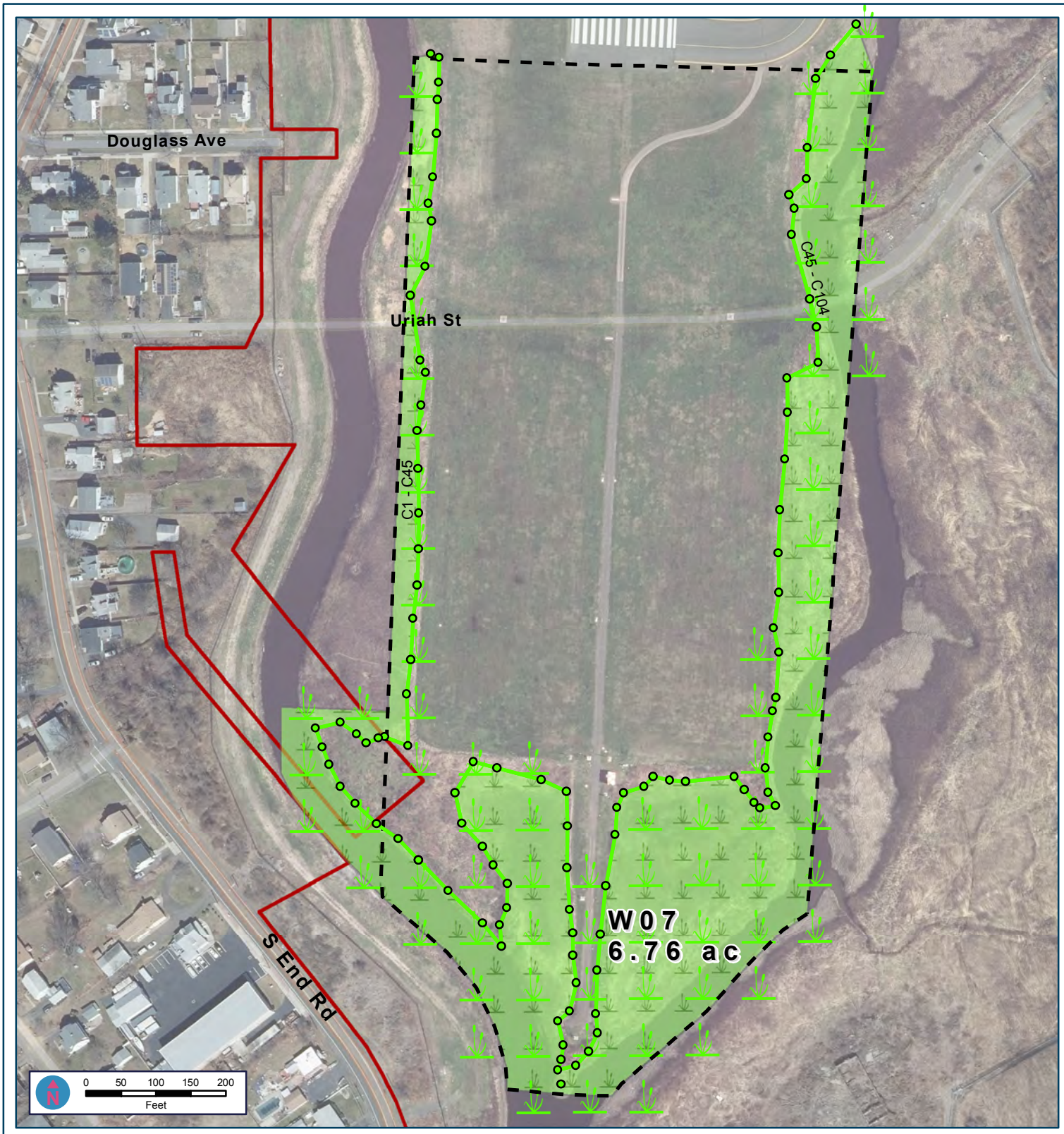
Figure 3d

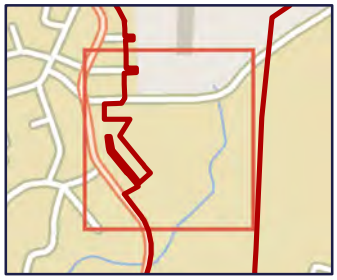
Detailed Field Delineated Wetland Sketch Map

Map Produced 1/5/2022

Data Source: CTECO 2019 Aerial, FHI Studio 2021

FHI studio





Legend

- Wetland Transect Plot Location
- Ordinary High Water (OHW) Field Flag Location
- Wetland Field Flag Location
- Delineated Ordinary High Water (OHW) Line
- Limits of Wetland Investigation Area
- Field Delineated Wetland 2021
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

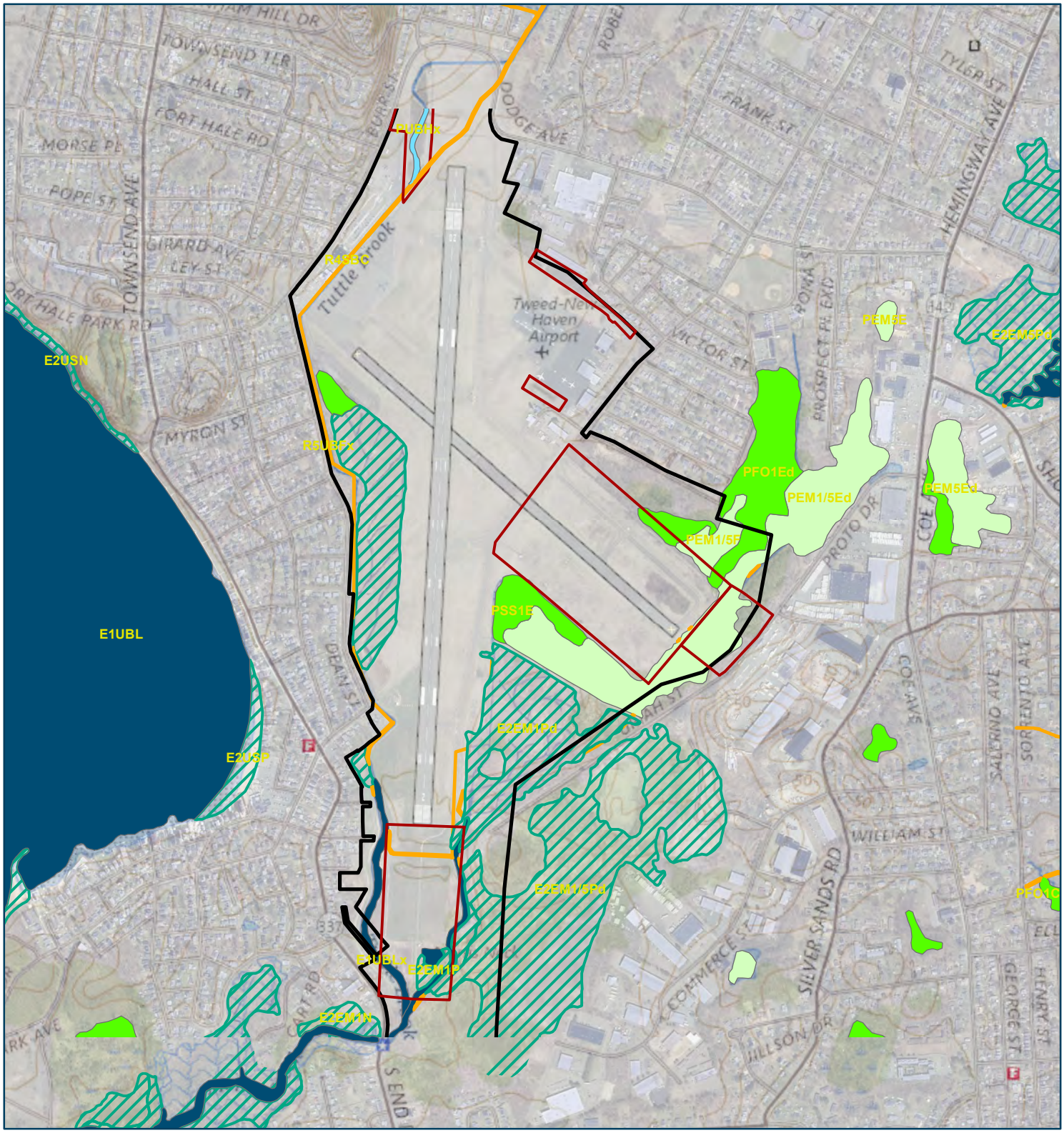
Figure 3e

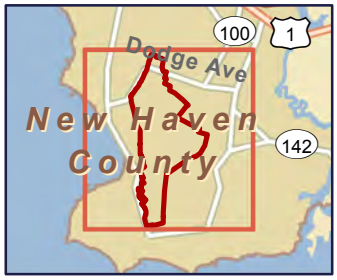
Detailed Field Delineated Wetland Sketch Map

Map Produced 12/8/2021

Data Source: CTECO 2019 Aerial, FHI Studio 2021

FHI studio





Map Produced 12/1/2021
Data Source: USFWS NWI

Legend

- Tweed Airport Property
- Areas of Wetland Investigation
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Tweed New Haven Airport

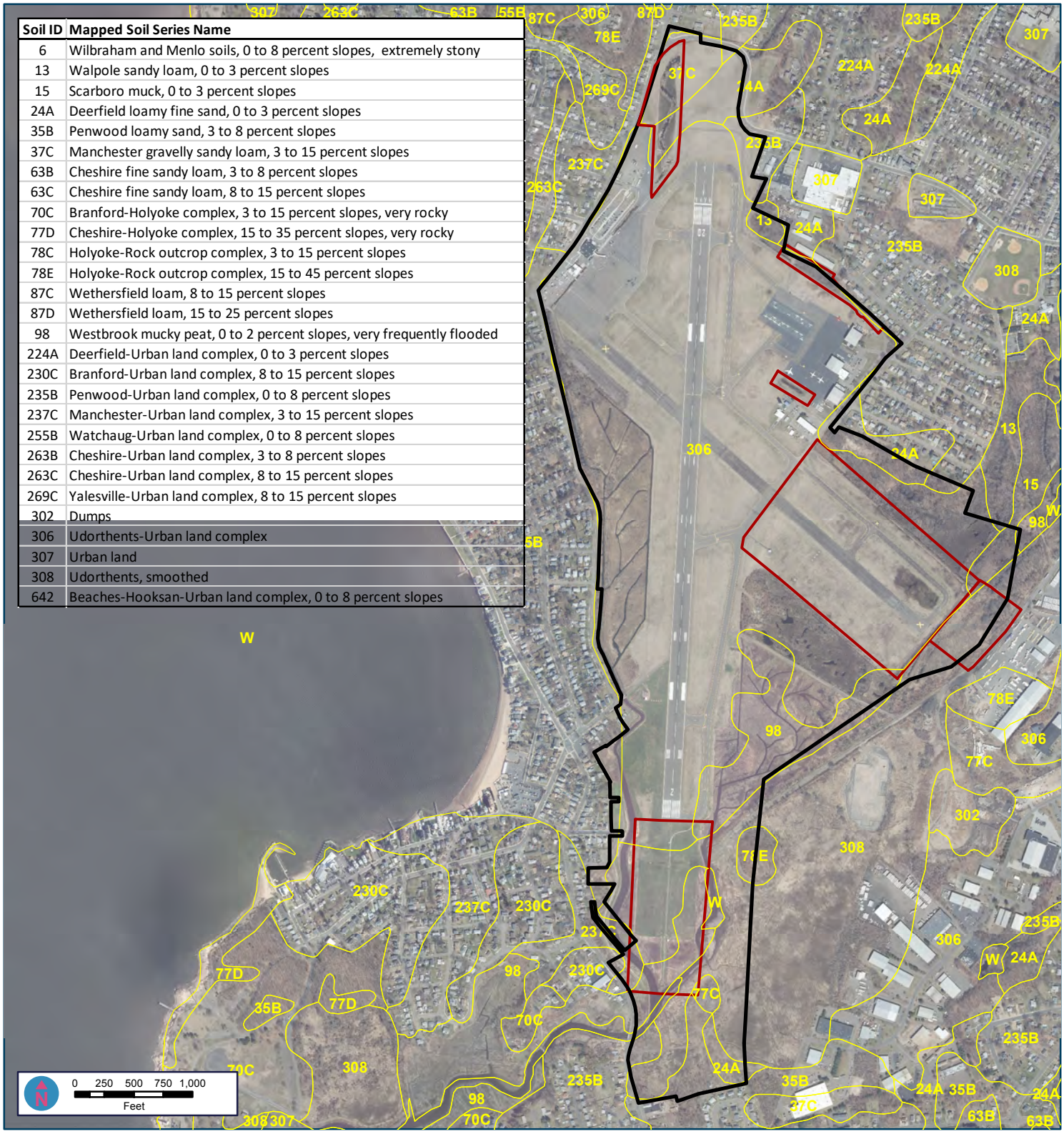
Wetland and Watercourse Delineation

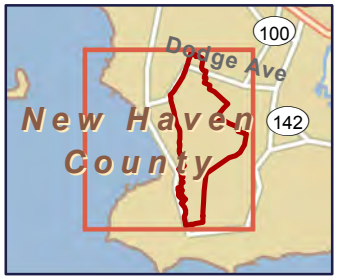
Figure 4

USFWS NWI Map

FHI studio

Soil ID	Mapped Soil Series Name
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony
13	Walpole sandy loam, 0 to 3 percent slopes
15	Scarboro muck, 0 to 3 percent slopes
24A	Deerfield loamy fine sand, 0 to 3 percent slopes
35B	Penwood loamy sand, 3 to 8 percent slopes
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes
63B	Cheshire fine sandy loam, 3 to 8 percent slopes
63C	Cheshire fine sandy loam, 8 to 15 percent slopes
70C	Branford-Holyoke complex, 3 to 15 percent slopes, very rocky
77D	Cheshire-Holyoke complex, 15 to 35 percent slopes, very rocky
78C	Holyoke-Rock outcrop complex, 3 to 15 percent slopes
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes
87C	Wethersfield loam, 8 to 15 percent slopes
87D	Wethersfield loam, 15 to 25 percent slopes
98	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded
224A	Deerfield-Urban land complex, 0 to 3 percent slopes
230C	Branford-Urban land complex, 8 to 15 percent slopes
235B	Penwood-Urban land complex, 0 to 8 percent slopes
237C	Manchester-Urban land complex, 3 to 15 percent slopes
255B	Watchaug-Urban land complex, 0 to 8 percent slopes
263B	Cheshire-Urban land complex, 3 to 8 percent slopes
263C	Cheshire-Urban land complex, 8 to 15 percent slopes
269C	Yalesville-Urban land complex, 8 to 15 percent slopes
302	Dumps
306	Udorthents-Urban land complex
307	Urban land
308	Udorthents, smoothed
642	Beaches-Hooksan-Urban land complex, 0 to 8 percent slopes





Legend

- Areas of Wetland Investigation
- Tweed Airport Property
- NRCS Mapped Soil Unit

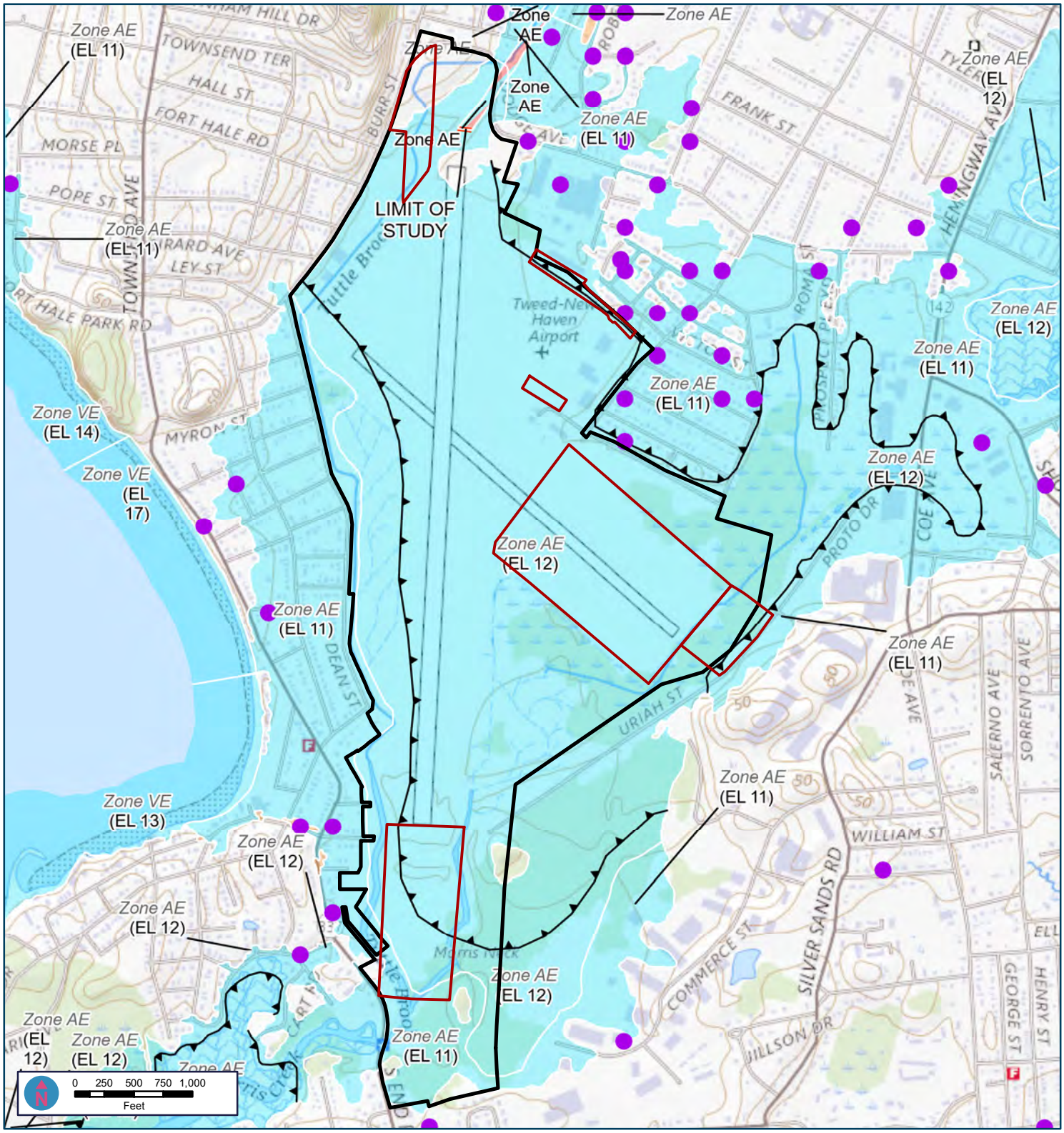
Tweed New Haven Airport

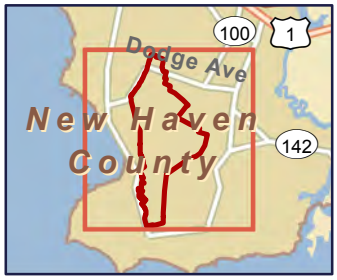
Wetland and Watercourse Delineation

Figure 5

Map Produced 12/1/2021
Data Source: USDA NRCS Soils Mapping 2021

NRCS Soils Series





Map Produced 12/1/2021
Data Source: FEMA

Legend

- Tweed Airport Property
- Areas of Wetland Investigation

Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Effective
- LOMAs
- Limit of Moderate Wave Action

Tweed New Haven Airport

Wetland and Watercourse Delineation

Figure 6

FEMA Flood Zones

FHI studio

Appendix B - USACE Wetland Functions and Values Assessment Forms

Wetland Function-Value Evaluation Form

Total area of wetland 3.04ac Human made? Modified Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use Airport Runway Safety Area (Lawn) Distance to nearest roadway or other development 80'

Dominant wetland systems present R3UB2/3 Contiguous undeveloped buffer zone present no

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? Middle

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. W01

Latitude 41.27177811 Longitude -72.88867746

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,7,15		watercourse shows clear evidence of OHW; GW Q sustains base flow
Floodflow Alteration	○	◉	4,5,7,9,10,11,13,16,18		
Fish and Shellfish Habitat	○	◉	4,10,14,16,17		
Sediment/Toxicant Retention	◉	○	1,2,3,4,10,15,16	X	1= road sands; 10=Tuttle Brook (a perennial watercourse)
Nutrient Removal	○	◉	3,4,5,6,7,8,9,10,11	X	4=lawn fertilizer from upstream residences
Production Export	○	◉	1,2,4,7,9,10,11,12,13	X	
Sediment/Shoreline Stabilization	○	◉	1,,2,3,4,5,7,9,12,13,15		1=sedimentation from lateral culvert outlets
Wildlife Habitat	○	◉	7,8,11,13,15,16,17,18		19,20
Recreation	○	◉	12		
Educational/Scientific Value	○	◉	8,9,14		
Uniqueness/Heritage	○	◉	1,7,8,9,11,12,13,17,19		22,24,28 (Paspalum laeve - CT Threatened)
Visual Quality/Aesthetics	○	◉	2,6,9		
ES Endangered Species Habitat	○	◉	1		1 = Paspalum laeve - CT Threatened
Other	◉	○			carbon sequestration

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.72ac Human made? Modified Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use residential, commercial (Hangars), access rd Distance to nearest roadway or other development adjacent

Dominant wetland systems present PFO1E & PEM 1/5 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? middle

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. W02

Latitude 41.26904653 Longitude -72.88417179

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,7,15		
Floodflow Alteration	◉	○	3,4,5,6,7,8,9,10,11		
Fish and Shellfish Habitat	○	◉	4,10,14,16?,17		
Sediment/Toxicant Retention	◉	○	1,2,3,4,8,10,12	X	
Nutrient Removal	◉	○	2,3,4,5,6,7,8,9,10,11	X	13 , 14
Production Export	◉	○	1,2,4,7,9,10,11,12,13		
Sediment/Shoreline Stabilization	◉	○	1,2,3,4,5,6,7,9,12,13		15
Wildlife Habitat	○	◉	7,8,11,13,16,18,19,20		
Recreation	○	◉			wetland is not accessible to the public
Educational/Scientific Value	○	◉	1,8,14		
Uniqueness/Heritage	○	◉	1,5,7,8,9,13,14,17,22		
Visual Quality/Aesthetics	○	◉	2		
ES Endangered Species Habitat	○	◉	1		
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.25ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use East Ramp, ATC, OPS, parking Distance to nearest roadway or other development 30'

Dominant wetland systems present PEM2 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. W03

Latitude 41.26619678 Longitude -72.88465694

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	○	◉	4,5,8		
Floodflow Alteration	◉	○	3,4,6,7,8?,9,11		4=East Ramp, 7=ponded water
Fish and Shellfish Habitat	○	◉			wetland not associated with a watercourse
Sediment/Toxicant Retention	◉	○	1,2,3,5,7,9	X	
Nutrient Removal	◉	○	2,3,4?,5,7,9,10,11		
Production Export	○	◉	2,7,9		
Sediment/Shoreline Stabilization	○	◉	2,3,5,10,12,13,15		
Wildlife Habitat	◉	○	7,11,16,19		limited suitability for most vertebrate taxon
Recreation	○	◉			no public access available
Educational/Scientific Value	○	◉	1,14		no public access available
Uniqueness/Heritage	◉	○	1,5,15,24,28		Paspalum laeve
Visual Quality/Aesthetics	○	◉	2,6,9,12		
ES Endangered Species Habitat	○	◉	1		1= Paspalum laeve
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 1.3ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use Taxiway & Runway Distance to nearest roadway or other development adjacent

Dominant wetland systems present PEM2 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 4

Latitude 41.26247437 Longitude -72.88275629

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,9,10,15		10=drop inlet catchbasin regulates the maximum heightof impounded water
Floodflow Alteration	◉	○	3,4,5,6,7,8,9,10,12,15		15=drop inlet catchbasin regulates the maximum heightof impounded water
Fish and Shellfish Habitat	○	◉			wetland not directly associated with a Watercourse
Sediment/Toxicant Retention	◉	○	2,3,4,5,7,9	X	
Nutrient Removal	◉	○	2,3,5,7,9,10,11		
Production Export	◉	○	1,2,4,9,10,12,13		
Sediment/Shoreline Stabilization	○	◉	2,5,15		
Wildlife Habitat	◉	○	7,8,9,10,11,12,13,16		18,19,20,21; 8=smartweeds, 11=shallow marsh
Recreation	○	◉			wetland is not accessible or visible to the public
Educational/Scientific Value	○	◉	1,14		
Uniqueness/Heritage	○	◉	1,5,8,12,13,17,19,24		28; 24=Paspalum laeve (CT-Threatened)
Visual Quality/Aesthetics	○	◉	2,4,6		
ES Endangered Species Habitat	◉	○	1		1=Paspalum laeve (CT-Threatened)
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 2.45ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use Taxiway, Runway Distance to nearest roadway or other development adjacent

Dominant wetland systems present PEM2 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 5

Latitude 41.26108729 Longitude -72.88005655

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,8,9,10,15		9=drop inlet catchbasin recharge
Floodflow Alteration	◉	○	3,4,5,6,7,8,9,10,15,18		4=runways, taxiways,tarmac,parking; 7=ponded water; 15=drop inlet catchbasin
Fish and Shellfish Habitat	○	◉			wetland not directly associated with a watercourse
Sediment/Toxicant Retention	◉	○	1,2,3,4,5,7,9	X	4=organic soils
Nutrient Removal	◉	○	2,3,4,5,7,8,9,10,11		2=openwater habitat; 7=organic soils; 9=emergent covert type
Production Export	◉	○	1,2,4,7,9,10,12,13	X	1=e.g.,smartweeds, woolgrass; 4=waterfowl & shorebirds; 10=drop inlet catchbasin
Sediment/Shoreline Stabilization	○	◉	2,5,15		
Wildlife Habitat	◉	○	7,8,11,13,16,18,19,20		8=smartweed, 16=obligate hydrophytes, 19=abundant odonata and mosquito larvae
Recreation	○	◉			area not accessible to the public
Educational/Scientific Value	○	◉	1,14		1=Paspalum laeve
Uniqueness/Heritage	◉	○	1,5,8,12,13,17,19,24		24 & 28=Paspalum laeve
Visual Quality/Aesthetics	○	◉	2,4,6		
ES Endangered Species Habitat	◉	○	1		1=Paspalum laeve
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 14.95ac Human made? N Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use Taxiway C, closed RW32 Distance to nearest roadway or other development adjacent

Dominant wetland systems present PFO1E/ PEM 1/5 Contiguous undeveloped buffer zone present

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? Lower Middle

How many tributaries contribute to the wetland? unknown Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 6

Latitude 41.26058504 Longitude -72.88216529

Prepared by: AJZ Date 11-9-2021

Wetland Impact:
Type YBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,8,10,15		
Floodflow Alteration	○	◉	4,6,7,9,10		
Fish and Shellfish Habitat	○	◉			wetland not directly associated with a watercourse
Sediment/Toxicant Retention	◉	○	2,4,7,9	X	
Nutrient Removal	◉	○	11,3,5,7,8,9,10,11		9=emergent cover type
Production Export	◉	○	1,4,9,12		
Sediment/Shoreline Stabilization	○	◉	2,5,15		
Wildlife Habitat	◉	○	7,11,16,18,20,21,22		11=wet meadow
Recreation	○	◉			
Educational/Scientific Value	○	◉	1,14		1=Paspalum laeve
Uniqueness/Heritage	◉	○	1,5,8,12,13,17,19,24		24&28=Paspalum laeve
Visual Quality/Aesthetics	○	◉	2,4,6		
ES Endangered Species Habitat	◉	○			1=Paspalum laeve
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 8.4ac Human made? N Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use Runway Distance to nearest roadway or other development 250'

Dominant wetland systems present PEM 1/5d Contiguous undeveloped buffer zone present

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? lower

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 7

Latitude 41.252328 Longitude -72.888514

Prepared by: AJZ Date 11-11-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	○	◉	4,7		7=Morris and Tuttle Creeks
Floodflow Alteration	◉	○	4,5,9,10,11,12,13,18	X	13=Morris and Tuttle Creeks
Fish and Shellfish Habitat	◉	○	1,2,3,4	X	
Sediment/Toxicant Retention	◉	○	1,2,3,4,5,8,10,15,16		1=road sands; 2=vehicle fluids, 10=Morris and Tuttle Creeks
Nutrient Removal	◉	○	2,3,4,5,6,7,8,9,10,11		14; 4=residential lawns
Production Export	◉	○	1,2,4,5,6,7,9,10,11,12		13; 5=e.g. Osprey; 9=abundance
Sediment/Shoreline Stabilization	◉	○	1,2,3,4,6,7,9,12,13,15		3&4=road sands; 12=vegetation borders watercourse; 15=Phragmites stands
Wildlife Habitat	◉	○	6,7,8,11,13,16,18,19,	X	21,22,23; 8=e.g., Vitis, Toxicodendron, Paspalum, etc.; 16=waterbirds, hydrophytes; 23=wetland subject to a mitigation project implemented to enhance biodiversity
Recreation	○	◉	7		
Educational/Scientific Value	○	◉	1,5,14		
Uniqueness/Heritage	◉	○	1,4,5,7,12,13,15,24,27	X	28
Visual Quality/Aesthetics	◉	○	2,4,6,8		
ES Endangered Species Habitat	◉	○	1		1= Great Egret, Paspalum laeve (both CT-Threatened)
Other	◉	○			coastal resiliency; Carbon sequestration

Notes:

* Refer to backup list of numbered considerations.

Appendix C - USACE Wetland Documentation Dataforms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: New Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: E36U

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR or MLRA): LRR R Lat: -41.27178354 Long: -72.88871735 Datum:

Soil Map Unit Name: Deerfield Loamy fine sand NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	**Yes**	**No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Much of the upland vegetation was mowed;.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: E36U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Plantago lanceolata*	38	Yes	FACU
2. *Hypochaeris radicata*	20	Yes	FACU
3. *Andropogon gerardii*	5	No	FACU
4. *Schizachyrium scoparium*	5	No	FACU
5. *Lotus corniculatus*	5	No	FACU
6. *Trifolium pratense*	3	No	FACU
7. *Artemisia vulgaris*	3	No	UPL
8. *Paspalum setaceum*	3	No	FACU
9.			
10.			
11.			
12.			
	82 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	79	x 4 =	316
UPL species	3	x 5 =	15
Column Totals:	82 (A)		331 (B)
Prevalence Index = B/A =			4.04

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: E36U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 2.5/1						Sandy	
8-12	5YR 4/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: New Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: E36W

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): river terrace Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.27177811 Long: -72.88867746 Datum:

Soil Map Unit Name: Deerfield Loamy fine sand NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil N, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: E36W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Symphyotrichum lateriflorum*	50	Yes	FAC
2. *Juncus effusus*	12	Yes	OBL
3. *Carex stricta*	12	Yes	OBL
4. *Typha latifolia*	10	No	OBL
5. *Thalictrum thalictroides*	10	No	FACU
6. *Rumex crispus*	8	No	FAC
7. *Rubus hispidus*	5	No	FACW
8. *Dichanthelium clandestinum*	3	No	FACW
9. *Lythrum salicaria*	3	No	OBL
10.			
11.			
12.			
	113 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	37	x 1 =	37
FACW species	8	x 2 =	16
FAC species	58	x 3 =	174
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	113 (A)		267 (B)

Prevalence Index = B/A = 2.36

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: E36W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					Sandy	
3-7	5YR 3/1	80	2.5YR 3/6	20	C	M	Sandy	Prominent redox concentrations
7-12	5YR 4/1	70	5YR 4/6	30	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ? Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: H19U

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): bottomland Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26903380 Long: -72.88407083 Datum:

Soil Map Unit Name: Udorthents - Urban Land Complex NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes 0	No	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
much of area recently inundated with stormwater

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 0	
Water Table Present?	Yes X	No	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0	**Wetland Hydrology Present?** **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Recent rainfall had resulted in localized inundation of the adjacent wetland

VEGETATION – Use scientific names of plants. Sampling Point: H19U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2. *Quercus palustris*	20	Yes	FACW
3. *Nyssa sylvatica*	10	No	FAC
4.			
5.			
6.			
7.			
	80	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Clethra alnifolia*	50	Yes	FAC
2. *Vaccinium corymbosum*	15	No	FACW
3. *Kalmia latifolia*	10	No	FACU
4. *Betula populifolia*	8	No	FAC
5.			
6.			
7.			
	83	=Total Cover	
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Smilax rotundifolia*	20	Yes	FAC
2.			
3.			
4.			
	20	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	138	x 3 =	414
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	183 (A)		524 (B)

Prevalence Index = B/A = 2.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: H19U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1						Sandy	
3-12	7.5YR 4/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: H19W

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): bottomland Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26904653 Long: -72.88417179 Datum:

Soil Map Unit Name: Udorthents - Urban Land Complex NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X	**No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	1
Water Table Present?	Yes X	No	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: H19W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	75	Yes	FAC
2. *Quercus palustris*	15	No	FACW
3. *Nyssa sylvatica*	10	No	FAC
4.			
5.			
6.			
7.			
	100	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Clethra alnifolia*	15	Yes	FAC
2. *Vaccinium corymbosum*	10	Yes	FACW
3. *Viburnum dentatum*	5	No	FAC
4.			
5.			
6.			
7.			
	30	=Total Cover	
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Smilax rotundifolia*	5	Yes	FAC
2.			
3.			
4.			
	5	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	110	x 3 =	330
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	135 (A)		380 (B)

Prevalence Index = B/A = 2.81

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: H19W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					Mucky Sand	
3-12	7.5YR 4/2	85	5YR 3/4	15	C	M	Sandy	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ? Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: B7U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26613223 Long: -72.88470274 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: B7U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Paspalum setaceum*	35	Yes	FACU
2. *Digitaria sanguinalis*	15	Yes	FACU
3. *Dichanthelium*	8	No	
4. *Hypochaeris radicata*	5	No	FACU
5. *Symphyotrichum lateriflorum*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	68 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	60 (A)		235 (B)
Prevalence Index = B/A =			3.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: B7U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1						Sandy	
3-11	7.5YR 3/2						Sandy	
11-15	7.5YR 3/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: B7W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26619678 Long: -72.88465694 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X	**No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	6
Water Table Present?	Yes X	No	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: B7W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus effusus*	50	Yes	OBL
2. *Hydrophilic grasses*	40	Yes	
3. *Paspalum laeve*	5	No	FAC
4. *Symphyotrichum lateriflorum*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		80 (B)

Prevalence Index = B/A = 1.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: B7W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2.5/1						Loamy/Clayey	
6-12	7.5YR 3/3	90	10YR 5/1	10	D	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: F19U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26242650 Long: -72.88275548 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No N	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No N	**within a Wetland?**	**Yes**	**No** N
Wetland Hydrology Present?	Yes	No N	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No x	Depth (inches):
Water Table Present?	Yes	No x	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No x	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: F19U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Unidentified grass*	40	Yes	
2. *Paspalum laeve*	30	Yes	FAC
3. *Krigia biflora*	20	No	FACU
4. *Plantago lanceolata*	10	No	FACU
5. *Paspalum setaceum*	5	No	FACU
6. *Symphyotrichum lateriflorum*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	110 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	70 (A)		245 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: F19U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/2	100					Sandy	
12-14	7.5YR 2.5/2	90	7.5YR 4/6	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven / New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: F19W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26247437 Long: -72.88275629 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 5

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Topgraphic depression. Outlet controlled by drop inlet elevation?

VEGETATION – Use scientific names of plants.

Sampling Point: F19W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Cyperus strigosus*	35	Yes	FACW
2. *Carex scoparia*	15	Yes	FACW
3. *Juncus effusus*	10	No	OBL
4. *Paspalum laeve*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	50	x 2 =	100
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		125 (B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: F19W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 3/2	100					Sandy	
5-13	7.5YR 3/2	90	7.5YR 4/6	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: East Haven / New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: G8U

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.261087 Long: -72.879992 Datum:

Soil Map Unit Name: Udorthents NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Much of the upland vegetation was mowed; soils are udorthents

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: G8U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. *Rosa multiflora*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 =Total Cover		
Herb Stratum (Plot size:)			
1. *Plantago lanceolata*	30	Yes	FACU
2. *Trifolium pratense*	10	Yes	FACU
3. *Potentilla argentea*	10	Yes	FACU
4. *Taraxacum officinale*	5	No	FACU
5. *Achillea millefolium*	3	No	FACU
6. *Hypochaeris radicata*	3	No	FACU
7. *Paspalum setaceum*	3	No	FACU
8.			
9.			
10.			
11.			
12.			
	64 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	69	x 4 =	276
UPL species	0	x 5 =	0
Column Totals:	69 (A)		276 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: G8U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	100					Sandy	
7-13	5YR 3/3	60	10YR 3/2	40	C	M	Sandy	Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed (HVN) City/County: East Haven/New Haven Sampling Date: 10-8-21

Applicant/Owner: City of New Haven State: CT Sampling Point: G8W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26108729 Long: -72.88005655 Datum:

Soil Map Unit Name: Udorthents NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area mapped as udorthents = graded and smoothed?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: G8W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus acuminatus*	60	Yes	OBL
2. *Ludwigia palustris*	20	No	OBL
3. *Setaria pumila*	10	No	FAC
4. *Juncus effusus*	5	No	OBL
5. *Persicaria hydropiperoides*	5	No	OBL
6. *Paspalum laeve*	3	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	103 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	0	x 2 =	0
FAC species	13	x 3 =	39
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	103 (A)		129 (B)
Prevalence Index = B/A =			1.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

_X_ 2 - Dominance Test is >50%

_X_ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: G8W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					Sandy	
3-12	7.5YR 3/2	90	2.5YR 4/6	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: A100U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.260675 Long: -72.882200 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	**Yes**	**No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Area contains historical fill material. Located in Wetland 6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A100U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Hypochaeris radicata*	25	Yes	FACU
2. *Plantago lanceolata*	20	Yes	FACU
3. *Schizachyrium scoparium*	15	Yes	FACU
4. *Rubus flagellaris*	5	No	FACU
5. *Potentilla argentea*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	70 (A)		280 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: A100U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1						Sandy	
3-8	5YR 3/3						Sandy	
8-13	5YR 4/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: Eversource State: CT Sampling Point: A100W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.26058504 Long: -72.88216529 Datum:

Soil Map Unit Name: Udorthents NWI classification: PEM2J

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area subjected to potential filling; vegetation subjected to routine mowing, hydrology altered via ditching, culverting and tide gates. Plot within Wetland 6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):	
Water Table Present?	Yes X	No	Depth (inches):	4
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A100W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus effusus*	60	Yes	OBL
2. *unidentified grass*	40	Yes	
3. *Symphyotrichum lateriflorum*	10	No	FAC
4. *Paspalum laeve*	5	No	FAC
5. *Viola lanceolata*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		110 (B)
Prevalence Index = B/A =			1.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: A100W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	5YR 2.5/1						Mucky Sand	
5-13	5YR 3/1	90	5YR 3/4	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ? Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: D84U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26093228 Long: -72.87935581 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area appeared to be augmented with historical fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D84U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. *Rubus allegheniensis*	35	Yes	FACU
2. *Rhus typhina*	20	Yes	UPL
3. *Elaeagnus umbellata*			UPL
4.			
5.			
6.			
7.			
	55 =Total Cover		
Herb Stratum (Plot size:)			
1. *Phragmites australis*	50	Yes	FACW
2. *Solidago rugosa*	8	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	58 =Total Cover		
Woody Vine Stratum (Plot size:)			
1. *Lonicera japonica*	65	Yes	FACU
2. *Celastrus orbiculatus*	15	No	UPL
3. *Vitis riparia*	15	No	FAC
4.			
	95 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	23	x 3 =	69
FACU species	100	x 4 =	400
UPL species	35	x 5 =	175
Column Totals:	208 (A)		744 (B)
Prevalence Index = B/A =			3.58

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: D84U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 4/3						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: D84W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26094363 Long: -72.87939637 Datum:

Soil Map Unit Name: NWI classification: PEM1/5

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X	**No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	2
Water Table Present?	Yes	No X	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D84W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Phragmites australis*	90	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		
Woody Vine Stratum (Plot size:)			
1. *Vitis riparia*	15	Yes	FAC
2. *Lonicera japonica*	15	Yes	FACU
3. *Celastrus orbiculatus*	15	Yes	UPL
4.			
	45 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	15	x 3 =	45
FACU species	15	x 4 =	60
UPL species	15	x 5 =	75
Column Totals:	135 (A)		360 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: D84W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2						Mucky Sand	
4-12	10YR 3/2	70	10YR 4/2	20	D	M		
			10YR 3/3	10	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

V

Appendix D – Photographs

APPENDIX D: PHOTOGRAPHS



Wetland 1 – PEM Portion Bordering Tuttle Brook



Wetland 2 – PFO1E



Wetland 3 - Looking North from the Grassy Area between the Air Traffic Control Tower and the East Ramp.



Wetland 4 - Looking north from Taxiway H



Wetland 5 - Looking Northwest from Taxiway C



Wetland 6 – PFO1E portion



Wetland 7 Along Tuttle Brook (West of the Runway 2 Approach)



Wetland 7 – Phragmites-dominated Marsh on Either Side of Runway 2 Approach

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 16 – WATER RESOURCE IMPACT TABLE

Inland Water Resource Impact Table
CT Department of Energy and Environmental Protection

Please add as many rows as necessary into the tables below.

Wetlands*			Direct Fill Impact				Additional Impact		Total Impact	
Wetland Name (Field ID)	Wetland Type: Existing (PFO/PSS/PEM)	Wetland Type: Proposed (if conversion) (PFO/PSS/PEM)	Activity[1]	Temporary or Permanent (T / P)	Impact Area (square feet)	Fill Volume (cubic yards)	Activity[2]	Impact Area (square feet)	CT/STATE Wetlands (square feet)	FEDERAL Wetlands (square feet)
Wetland 4, 5, 6			Parking lot	P	289280	88000			289280	175857
Wetland 4, 5, 6			New Structr.	P	45418				45418	0
Wetland 4, 5, 6			Grading	P	70037				70037	63130
Wetland 4, 5, 6			Parking lot	P	402				402	402
Wetland 4, 5, 6			Grading	P	160				160	160
Wetland 4, 5, 6			Grading	P	221				221	221
Wetland 4, 5, 6			Timber Mats	T	11447				11447	11447
Wetland 4, 5, 6			Timber Mats	T	194				194	194
Tide Gate			Dewatering	T	421				421	421
Total Wetland Impacts (all wetlands)					**417580**	**88000**			417580	251832

Watercourses and Waterbodies									Direct Fill Impact				Additional Impact		Total Impact	
Water Name (Field ID)	Water Name (USGS Name, if applicable)	Water Type (Perennial, Intermittent[3], Pond, Lake, Impoundment)	Flow Type[4]	Substrate[5]	Water Quality Class[6]	Drainage Area (square miles)	Bank/Edge Vegetation		Activity[1]	Temporary or Permanent (T / P)	Impact Area (square feet)	Fill Volume (cubic yards)	Activity[2]	Impact Area (square feet)	CT/STATE Waters (square feet)	FEDERAL Waters (square feet)
							Type	% Cover								
Total Watercourse Impacts (all watercourses/waterbodies)																

*CT defines inland wetlands as "land, including submerged land, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain" per the United States Department of Agriculture's Natural Resources Conservation Service Soil Survey. [CGS 22a-38(15)]

[1]Identify Direct Fill activity; examples may include use of timber mats, construction of a structure, road, trail, parking lot, etc.

[2]Identify Additional Impact activity; examples may include vegetation clearing, vegetation conversion, excavation/dredging, draining/dewatering/drawdown, inundation/flooding, grading, etc.

[3]CT defines intermittent watercourse as: "delineated by a defined permanent channel and bank and *the occurrence of two or more of the following* : (A) Evidence of scour or deposits of recent alluvium or detritus, (B) the presence of standing or flowing water for a duration longer than a storm incident, and (C) the presence of hydrophytic vegetation." [CGS 22a-38(16)]

[4]Watercourse flow characteristics include pools, runs, and/or riffles. If intermittent, write NA

[5]Watercourse substrates include silt/clay, sand, gravel, cobble, boulder, and/or bedrock.

[6]CT Water Quality Classification information is located on the DEEP website at https://www.ct.gov/deep/cwp/view.asp?a=2719&q=325618&deepNav_GID=1654

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 17 – MITIGATION PLANS

Wetland Mitigation Plan

April 2025

Prepared for:
Connecticut Department of Energy & Environmental Protection

Project Name:
Tweed New Haven Regional Airport Runway Extension and Terminal Expansion

Prepared by:
Hoyle Tanner
150 Dow Street
Manchester, NH 03101



and

eDesign Dynamics
247 W 35th Street, 10th Floor
New York, New York 10001



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Executive Summary

Introduction

This Compensatory Mitigation Plan (the Mitigation Plan) is submitted in support of the proposed Tweed New Haven Regional Airport Runway Extension and Terminal Expansion (the Proposed Project) on behalf of the Tweed New Haven Airport Authority and The New HVN, LLC. The design of the Proposed Project reflects an extensive effort to avoid or, when avoidance is not possible, minimize impacts to wetlands. Despite this effort, the Proposed Project will result in unavoidable impacts to regulated natural resource areas.

The applicants are entering into Permittee Responsible Mitigation with the goal of creating new salt marsh habitat and enhancing the existing salt marsh habitat surrounding the Tweed New Haven Airport. The enhancement will focus on reducing the dominance of *Phragmites australis* (common reed) and promoting native *Spartina alterniflora* (saltmarsh cordgrass) communities, to mitigate for unavoidable impacts as a result of the Proposed Project activities. The primary mitigation strategy is to increase the duration of inundation under highly saline conditions, which deters growth of *Phragmites.* The proposed mitigation uses the existing tide gate controls to alter the hydrology within the intertidal mitigation wetlands. The proposed mitigation includes increasing the duration of brackish water inundation within the mitigation wetlands by initially increasing the inundation time from four hours to six hours per tidal cycle, and with monitoring throughout the first growing season following commencement of the Mitigation Work Plan to adjust the inundation duration as needed in response to *Phragmites* growth. By adjusting the hydrological conditions, the aim is to reduce the competitive advantage of *Phragmites,* which thrives in lower salinity environments, and promote *Spartina* as an intertidal marsh species that is better adapted to higher salinity and more frequent tidal inundation.

In addition to enhancement efforts, the mitigation project will create new intertidal salt marsh habitat at the Tweed New Haven Airport property. Three upland areas have been identified where existing soil will be removed, and a clean, sandy planting medium will be placed at a one-foot depth with final grades being within the upper quarter of the tidal range. These areas will be planted with native vegetation, including *Spartina alterniflora* in the low marsh zones.

With the benefit of regulatory agency guidance, on behalf of the Tweed New Haven Airport Authority and The New HVN, LLC (the Applicants), has arrived at a Mitigation Plan that would meet the requirements of federal, state and city law. This Mitigation Plan provides a summary of the Applicants' efforts to date and the critical features of its proposed compensatory mitigation.

Project Impact

The Proposed Project Site is located at the Tweed New Haven Airport (Airport), which is on the boundary between the City of New Haven and the Town of East Haven, Connecticut. The Airport is situated approximately ¾-mile north of Long Island Sound, ¼-mile east of New Haven Harbor, and ¼-mile from Morris Cove.

The Proposed Project activities consist of extension of the main Runway 02-20, construction of a new terminal building on the east side of the Airport, construction of an associated taxi lane and apron,

construction of approximately 4,000 new parking spaces, construction of an access road and causeway connecting the new terminal to Proto Drive and associated ancillary grading and drainage. The increased runway length and terminal are necessary to increase the operational efficiency of the Airport while complying with the federal Aviation Administration (FAA) safety and design standards.

The unavoidable direct and indirect impacts that are under the jurisdiction of the State of Connecticut per Connecticut General Statutes Sections 22a-36 through Sec. 22a-45 and would result from the construction of the Proposed Project are as follows:

Table 1 Summary of Wetland Impacts

Wetland #	NWI Classification Code	Impacts CTDEEP (acre)	Impacts USACE (acres)
Wetlands 4, 5 and 6	PEM2J	8.74	4.94
Wetland 6	PSS	0.02	0.01
	PEM Phragmites	0.54	0.54
	PFO1E	0.01	0.01
Total		9.31	5.50

*Because the US Army Corps of Engineers (USACE) has determined that wetlands 4 and 5, which are PEM wetlands, are not Waters of the United States, the wetland impact that will require permitting under the USACE Individual Permit is 5.50 acres.

In its design the Applicants have sought to avoid, or when avoidance is not possible, minimize impacts to regulated natural resource areas resulting from the Proposed Project to the maximum extent practicable.

Tidal Water Surface Elevation and Salinity Data Collection

Tidal water surface elevation and salinity data were collected from the Tweed New Haven Airport proposed marsh mitigation areas from July to September 2024. The results of the data collection effort support that water surface elevations upstream of the tide gate structure are regulated to stay at or below elevation 2.0 feet NAVD88 during periods of normal operation. The results indicate that the tidal column may not fully penetrate into the dense stands of *Phragmites* within the marsh mitigation areas, potentially limiting the benefits of tidal exchange in these areas. The tidal prism does not fully extend to the upstream extents of the marsh as managed under normal operational procedure. Freshwater inputs appear to be lowering salinity levels in the upper regions of the northwest marsh. It was determined from the collected

data that the current duration of inundation within the existing stands of *Spartina* is six hours; this duration has been set as the initial target duration for enhancement activities at elevation 2.5 feet NAVD88.

Assessment of Mitigation Alternatives in Accordance with USACE Hierarchy

The 2020 USACE Mitigation SOP for New England establishes a preference hierarchy for compensatory mitigation, ranking mitigation bank credits as the highest priority, followed by In-Lieu Fee (ILF) mitigation, and Permittee-Responsible Mitigation (PRM). The first preferred option is not available as no tidal wetland mitigation banks exist within the service area. In this case, ILF would be the second in the hierarchy. However, federal regulations under 33 CFR Part 332 allow PRM to be selected over ILF if it can be demonstrated to be more ecologically appropriate, sustainable, and likely to succeed in replacing lost aquatic resource functions. The mitigation proposed in this plan provides stronger ecological benefits tailored to the affected watershed by the enhancement of 28.5 acres of tidal salt marsh complex and the creation of 3.61 acres of tidal salt marsh complex. The work directly addresses the specific resource needs of the historically impacted ecosystem and includes a robust long-term financial and site protection strategy that ensures the mitigation's enforceability and sustainability.

The enhancement and creation of tidal wetlands at the Airport is designed to restore the Morris Creek and Tuttle Brook tidal wetland system, a watershed that has been significantly degraded by altered hydrology, freshwater intrusion, and invasive species encroachment. ILF mitigation does not ensure that compensatory restoration will occur within the same hydrologic subunit, meaning that mitigation efforts could be implemented elsewhere within the ILF service area, potentially in a location that does not share the same functional deficiencies as the impacted wetlands. By contrast, the 28.5-acre enhancement and 3.61-acre creation of tidal wetlands specifically targets the hydrological imbalances in this tidal marsh system through controlled inundation, the removal of invasive *Phragmites australis*, and the promotion of native *Spartina alterniflora*. The planned tide gate modifications will increase tidal flushing, increase salinity levels, and improve conditions for estuarine-dependent species. These targeted hydrologic interventions are critical to ensuring the long-term resilience of the wetland system. Connecticut DEEP and other state and regional conservation agencies have long identified the restoration of tidal marsh function as a priority for coastal resilience, and this project aligns directly with those restoration goals.

In-Lieu Fee mitigation presents additional concerns regarding the reliability and timeliness of functional replacement. ILF programs operate by aggregating funds from multiple permittees before identifying and implementing restoration projects, which can create a functional lag where wetland losses remain uncompensated for years before a mitigation project is executed. This delay is particularly concerning for tidal wetlands, which are already among the most vulnerable ecosystems due to climate change and sea level rise. By contrast the proposed enhancement and creation of tidal wetlands at Tweed New Haven Airport ensures that mitigation actions commence concurrently with project impacts, eliminating the risk of prolonged ecological deficits. The proposed approach also includes monitoring of site-specific tidal hydrology, allowing for adaptive management that responds in real-time to observed ecological changes. The restoration strategy is based on direct, quantitative measurements of salinity levels, tidal exchange, and vegetation response, ensuring that the mitigation meets its performance standards and remains functionally successful over time. These detailed hydrologic assessments provide a higher level of scientific certainty than ILF mitigation, where functional equivalency to the impacted wetlands may not be directly measured or managed.

One of the primary advantages of ILF mitigation from a regulatory standpoint is that it shifts long-term responsibility for mitigation success to a third-party provider, reducing the administrative burden on the permittee. However, the Tweed New Haven project has been structured to address these concerns by including dedicated financial assurances, legal site protections, and a rigorous performance monitoring framework that meet or exceed USACE's requirements for long-term enforceability. The project will include secured funding mechanisms to support ongoing invasive species management, vegetation monitoring, and adaptive management measures for a period of no less than five years, ensuring sustained ecological function. In addition, the mitigation site will be legally protected in perpetuity through a recorded deed restriction, preventing future land conversion and securing the site's ecological integrity over the long term. The monitoring plan requires annual performance assessments, with specific ecological success criteria such as achieving a minimum of 85% *Spartina alterniflora* cover and no more than 15% *Phragmites australis* presence, ensuring that restoration goals are met through proactive corrective actions if necessary. Hydrological monitoring of water levels, salinity, and tidal connectivity will further support compliance with the plan objectives, providing a level of regulatory oversight and accountability equivalent to or exceeding that of an ILF program.

Proposed Mitigation Work Plan

The Mitigation Project will enhance 28.5 acres of tidal salt marsh complex within existing *Phragmites*-dominated marsh areas by increasing the depth and duration of inundation of tidal water within these marshes. The enhancement objectives will be primarily achieved by modifying the operational procedure of the existing tide gate. By increasing the sluice gate opening height during normal conditions and adjusting the timing of gate closures, the tide gate will allow for greater tidal exchange and prolonged inundation of brackish water upstream. This change will create favorable conditions for *Spartina alterniflora* growth while suppressing *Phragmites australis*. The storm event / wet weather operations procedure of the tide gate will remain unchanged, ensuring flood prevention through the use of the Watershed Drain Mode when severe weather is forecast. Opportunities to reduce drawdown timing and enhance tidal exchange 24 to 48 hours prior to forecasted wet weather events may also be evaluated, as conditions allow. This operational approach balances habitat enhancement goals with ongoing flood control requirements.

The Mitigation Project will also include the creation of 3.61 acres of tidal salt marsh complex within upland areas of the Airport property. This process will involve excavating existing upland material, ensuring tidal flow through the creation of tidal channels that connect with existing channels, placing a clean, sandy planting medium, and grading the site to appropriate elevations for tidal inundation—the upper quarter of the tidal cycle. The newly created marsh will be planted with native salt marsh vegetation, including *Spartina alterniflora* in low marsh zones, to support habitat function and ecological resilience.

Mitigation Monitoring

Mitigation project monitoring will be completed to determine if the project meets its Performance Standards and if measures are necessary to ensure that the Project accomplishes its objectives, according to the requirements of 33 C.F.R. § 332.6. Refer to the Section 5 Monitoring Plan for more information.

Mitigation Performance Standards – Enhancement Areas

The proposed Performance Standard is 85% coverage by *Spartina alterniflora* within the vegetated portions of the marsh complex. The proposed mitigation focuses on enhancing a tidal low marsh complex, comprised mostly of areas vegetated by *Spartina alterniflora,* with the remainder of the mitigation wetlands being comprised of mudflats and tidal channels.

Ideal low marsh systems in New England typically feature at least 70% *Spartina alterniflora* coverage (Association to Preserve Cape Cod (APCC), 2024). Given that the proposed mitigation wetland system experiences shorter durations of inundation than would a natural system due to regulation of water levels by the tide gate, it is anticipated that 50% of the total low marsh system will be capable of maintaining vegetation under these conditions. Mudflats and tidal channels will make up the remainder of the low marsh system and will remain essential components within the marsh complex by supporting habitat diversity and ecological function.

The following Performance Standards define the success criteria for the enhancement of **28.5 acres** of the tidal wetland Mitigation Project area:

- At least 85% coverage by *Spartina alterniflora* throughout the vegetated areas within the tidal low marsh complex.

- No greater than 15% coverage of *Phragmites australis* (common reed) within the 28.5 acres of salt marsh complex, requiring elimination of small patches and aggressive treatment of larger infestations, with progress documented throughout the monitoring period.

Mitigation Performance Standards – Creation Areas

Similar to the Enhancement Areas, the Performance Standard for the Creation Areas is 85% coverage by *Spartina alterniflora* within the vegetated portions of the low marsh complex. Given that the created marsh will be constructed within formerly upland areas, the site will be graded to be within the upper quarter of the tidal cycle to facilitate tidal inundation and support the establishment of *Spartina alterniflora*. To ensure tidal flow, tidal channels will be incorporated throughout the newly created salt marsh areas, enhancing habitat complexity and supporting the ecological function of the marsh complex.

The following Performance Standards define the success criteria for the **3.61 acres** of created salt marsh complex:

- At least 85% coverage by *Spartina alterniflora* within the vegetated areas of the created low salt marsh areas.

- No greater than 15% coverage of *Phragmites australis* within the created salt marsh areas, with targeted removal and management strategies to ensure long-term suppression.

1. Introduction

1.1 Project Information

The Applicants are entering into Permittee Responsible Mitigation to mitigate for the impact of proposed activities as a result of improvements at the Tweed New Haven Airport. This Mitigation Plan has been prepared in accordance with the New England District Compensatory Mitigation Standard Operating Procedures dated December 29, 2020 (USACE, 2020) and in accordance with the requirements of 33 C.F.R. Parts 325 and 332, inclusive.

The Proposed Project activities will impact 9.31 acres of inland freshwater wetlands jurisdictional for the State of Connecticut and 5.50 acres per USACE. The Applicants propose to enhance **28.5 acres** of intertidal wetland enhancement and **3.61 acres** of intertidal wetland creation within the Project Site through Permittee Responsible Mitigation. The mitigation ratio for the enhancement work is 5:1 and the ratio for the creation work is 1:1 based on communication with the CT Department of Energy and Environmental Protection (CT DEEP) and the US Army Corps of Engineers (USACE), refer to correspondence in Appendix C.

The Mitigation Site wetlands for enhancement are tidal wetlands located to the north, south, east and west of the proposed Project Site. As the existing wetlands on the Project Site are significantly degraded, being stormwater fed and dominated by invasive species, it is reasonable to conclude that the enhanced tidal wetlands will have improved functions and values as compared to the existing wetlands.

The proposed Mitigation Project will increase the depth and duration of saline conditions within the Mitigation Site enhancement wetlands, with the goal of encouraging growth of *Spartina alterniflora* within the low marsh, and concurrent reduction or eradication of the dense stands of *Phragmites* that are present. A more saline environment encourages long-term salt marsh enhancement by fostering the recovery of low salt marsh intertidal habitats, promoting the growth of *Spartina alterniflora*, and providing greater resilience against invasive species encroachment than freshwater wetlands. *Phragmites* is less tolerant of prolonged flooding and increased salinity, which inhibits its growth, while *Spartina alterniflora* is more tolerant of these conditions (Chambers et al., 1999).

In addition to the **28.5 acres** of enhanced intertidal wetlands, the Proposed Project will create **3.61 acres** of new salt marsh complex within previously upland areas. This newly created marsh will further support the overall mitigation strategy by increasing the extent of functional tidal wetland habitat within the site. Designed to integrate with the surrounding enhanced wetlands, the created marsh will be graded to within the upper quarter of the tidal cycle, planted with native salt marsh vegetation, and connected to existing tidal channels to ensure proper hydrology.

The following sources were used to map the existing wetlands at the site to inform this Mitigation Plan: an FHI Studio 2021 delineation (FHI 2021) and a McCue Environmental 2024 delineation (McCue 2024). The existing Proposed Project site information pertains to the wetland areas impacted by the Proposed Project activities and was primarily informed by the FHI Studio 2021 delineation report (see Appendix B1). The Mitigation Project site information pertains to the wetland areas to be restored and was primarily informed by the McCue Environmental 2024 delineation report (see Appendix B2). The FHI Studio 2021 delineation report offers a comprehensive investigation of the existing conditions, while the McCue Environmental 2024 delineation report reflects the mitigation project wetlands. The Proposed Project Site

and Mitigation Project Site wetlands are shown on Figure 1 Project Site wetlands mapped by FHI Studio and Figure 2 Mitigation Site wetlands mapped by McCue Environmental respectively.

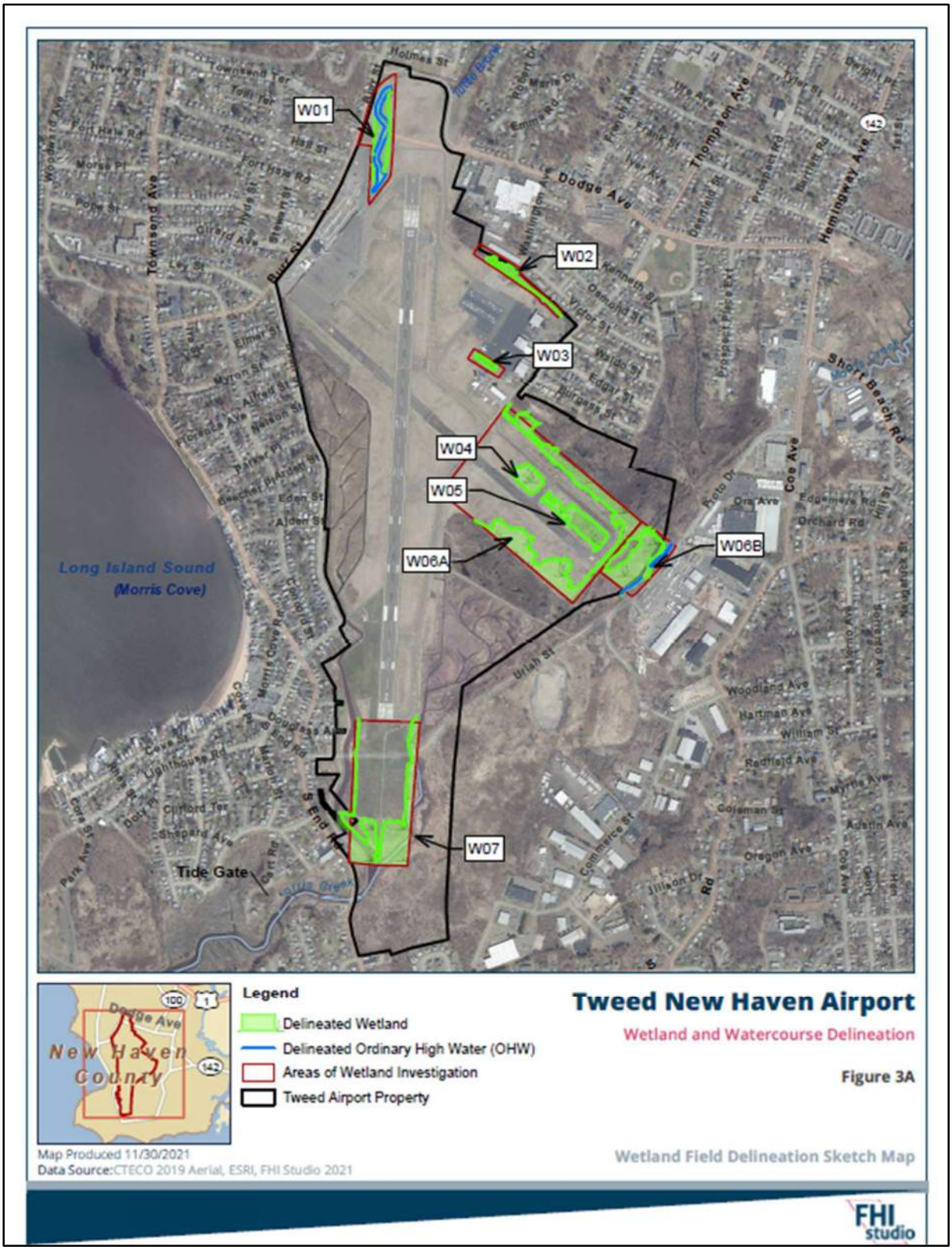

Figure 1 Project Site wetlands mapped by FHI Studio

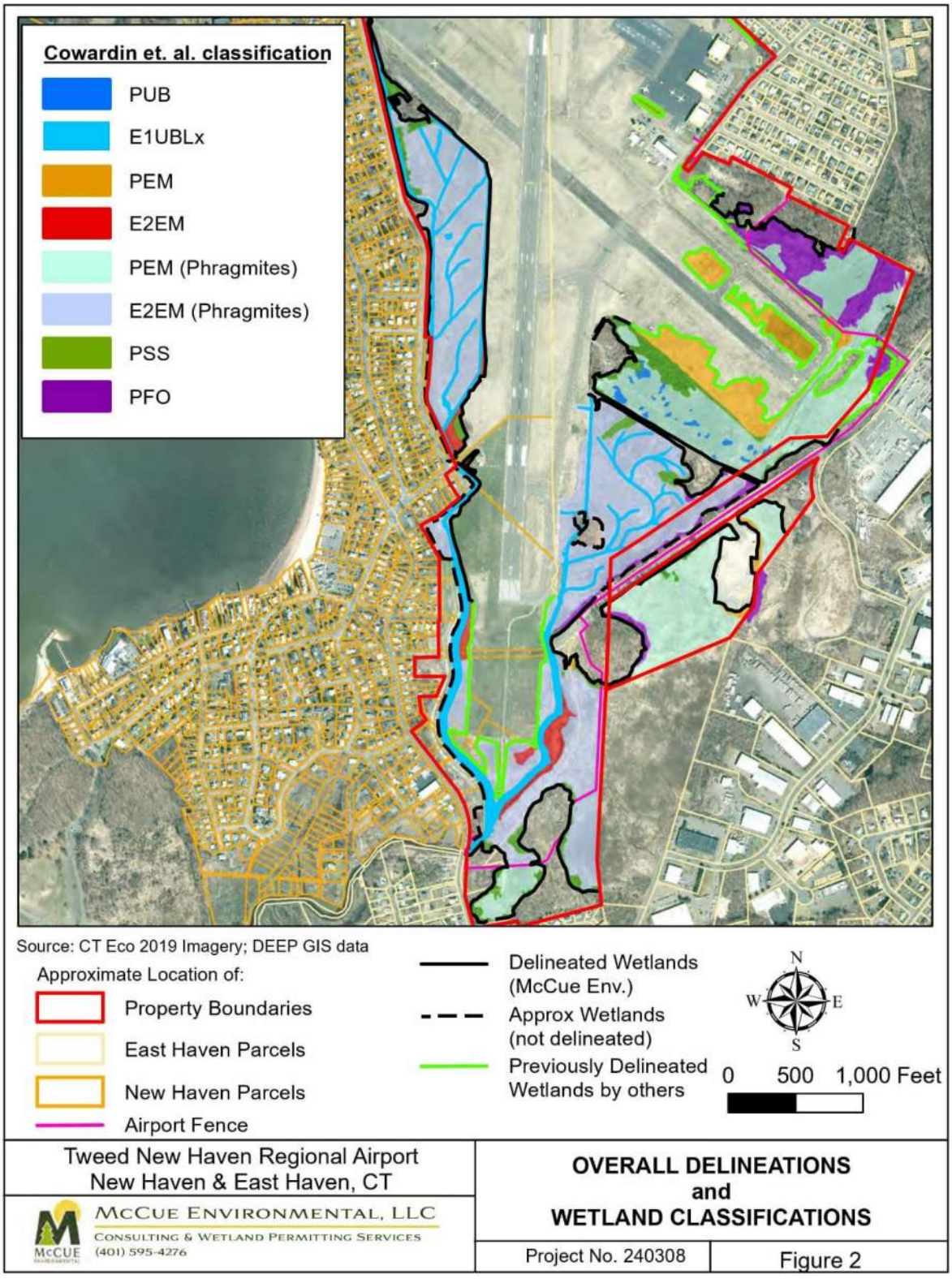

Figure 2 Mitigation Site wetlands mapped by McCue Environmental

1.2 Applicants' Efforts to Date

The Tweed New Haven Airport and FAA issued an Environmental Assessment for the Runway 02-20 Extension and Terminal Expansion Program in December 2023. During development of that NEPA analysis document, initial coordination with respective agencies regarding wetland impacts associated with the project resulted in the acknowledged need for wetland mitigation to offset the proposed unavoidable freshwater wetland impacts. There was agreement during those discussions that tidal wetland mitigation to enhance the historically altered tidal marsh areas within the airport property boundary would be acceptable as mitigation to offset freshwater wetland impacts. As continuation of that coordination, monthly meetings with representatives from USACE, CT DEEP and FAA began in February 2024 to provide updates on impact minimization and Mitigation Plan development- refer to Appendix C for relevant regulatory communication.

Wetlands that were identified for potential impact and to be potentially used for mitigation were delineated by McCue Environmental to supplement the delineations done by FHI Studios during the NEPA EA development, with functions and values assessments also completed, such that all wetlands within the airport boundary have been field delineated, assessed and assigned a Cowardin classification. See Appendix B and the design plans attached.

An extensive data collection effort was conducted within the salt marsh that will be targeted for enhancement to provide quantitative support for the proposed Mitigation Plan- refer to Sections 3 and 7 and Appendix D for additional information on that effort.

1.3 Prior Mitigation On-Site

Historically, mitigation has occurred within the airport boundary to address permit conditions from CTDEEP/OLISP permits #200003049-KZ, IW-2000-116, DIV-200003052 and WQC-20000305 within approximately 57 acres of tidal marsh on the west side of the airport along Dean Street and the east side of the airport south of Pig Farm Road as depicted on Figure 3, that consisted of:

- Installation of approximately 6,700 linear feet of tidal channels that increased the functions of the restoration areas;
- Modification of the tide gate to allow for tidal flows up to 3.5' NGVD; and
- Spraying, cutting and mulching of *Phragmites* within the tidal restoration areas.



Figure 3 Prior Mitigation On-Site

In 2013, to address impacts to freshwater and tidal wetlands due to installation of a wildlife fence and installation of cross-culverts under Pig Farm Road, CTDEEP/OLISP Certificate of Permission (COP) #201304084-KZ included mitigation within the east side tidal wetland south of Pig farm Road by:

- Installing 1,560 linear feet of new approximately 10’ wide tidal finger channels; and
- Tidal wetland enhancement and restoration of 3.8 acres of existing tidal wetlands by spraying, cutting and mulching *Phragmites.*

After reviewing the site’s permitting history, CT DEEP determined that the proposed 28.5 acres of tidal wetland enhancement may be credited toward mitigation at a 5:1 ratio, offsetting 5.7 acres of impact. CT DEEP also determined that any remaining impact areas must be addressed through tidal wetland creation at a 1:1 ratio, resulting in an overall increase in wetland area. Additional details can be found in the CT DEEP memo dated February 21, 2025, included in Appendix C: Regulatory Communication.

2. Proposed Project (Impact Site) Information

2.1 Existing Watershed & Hydrology

The proposed activities lie within Connecticut's South Central Shoreline watershed, specifically in the Farm River local basin subregion.[1] The surrounding water bodies include Morris Creek and Tuttle Brook. Morris Creek flows through a tide gate downstream of the Proposed Project Site before draining into Long Island Sound. The hydrology at the Proposed Project Site is affected by the existing tide gate, which regulates flow both into and out of the Airport's intertidal wetlands.

According to the CT DEEP Eco Viewer,[2] the 12-digit Hydrologic Unit for the Watershed Boundary Dataset for the Proposed Project is: HUC12: 020302030000; Name: Long Island Sound Deep.

2.1.1 Wetlands

The existing salt marsh complex at the Proposed Project site includes a wetland system with a network of excavated channels and marsh vegetation that is predominantly dominated by *Phragmites australis* (common reed), an invasive species that thrives in altered and low-salinity conditions. There is a limited expanse of mudflat habitat within the existing marsh complex.

The existing wetlands at the Project Site were delineated and characterized by FHI Studio in 2021 (FHI 2021), McCue Environmental (McCue 2024), and supplemented with information publicly available from the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory mapper (NWI). The Cowardin classification system for wetland and deepwater habitats in the United States was used to characterize the wetlands.

According to the FHI 2021 delineation, seven wetlands were delineated within the Project Site at the Airport, six of which were determined to be inland wetlands, and one which is tidal, as depicted in Figure 1 and Figure 2. These wetlands provide various functions, including sediment retention, nutrient removal, and flood flow alteration. Some of the inland wetlands within the Proposed Project Site are constructed and linked to the Airport's drainage systems.

The wetland systems primarily drain as follows:

- Wetland 1 drains into Tuttle Brook, a tributary to Morris Creek, which ultimately leads to Long Island Sound.
- Wetlands 2-5 drain into Morris Creek, either through direct surface water or groundwater discharge, similarly leading to Long Island Sound.
- Wetland 7 is tidally influenced and drains directly into Morris Creek and Tuttle Brook, both of which are connected to Long Island Sound.

[1] CT DEEP Subregional Drainage Basin Set, https://geodata.ct.gov/maps/66de3e3bf63e456ba32c12643f0d8bdc/about

[2] CT Environmental Conditions Online, https://cteco.uconn.edu/viewer/index.html?viewer=advanced

The following is a summary of the observed Proposed Project Site wetland systems:

1. **Wetland 1**:

    - Located at the northwestern limit of the Airport, Wetland 1 includes a reach of Tuttle Brook and associated vegetated wetlands. The brook runs through culverts under roads and service areas, and the surrounding wetlands are dominated by persistent emergent vegetation like broadleaf cattail (*Typha latifolia*) and common reed (*Phragmites australis*). It provides functions such as sediment retention, nutrient removal, and wildlife habitat.

2. **Wetland 2**:

    - Situated at the northeastern boundary of the Airport near the General Aviation parking area. This wetland includes a red maple swamp adjacent to a ditched wetland system. It is seasonally flooded and dominated by stands of *Phragmites*. Functions include sediment retention and nutrient removal.

3. **Wetland 3**:

    - A small, shallow basin wetland located between the Air Traffic Control Tower and the East Ramp. It mainly consists of palustrine emergent vegetation and collects runoff. The vegetation includes rushes and grasses, providing limited habitat but retaining water and sediments.

4. **Wetland 4**:

    - This is a constructed shallow drainage area located near Runway 32 and Taxiways C and H. It consists of palustrine emergent vegetation and is primarily maintained as a mowed area. Its primary hydrological function is collecting runoff from the surrounding impervious surfaces. The wetland has limited ecological value.

5. **Wetland 5**:

    - Similar to Wetland 4, Wetland 5 is also a shallow drainage area collecting sheet flow runoff. It is dominated by emergent vegetation and maintained as a lawn. Functions include stormwater retention and sediment control.

6. **Wetland 6**:

    - This wetland has two distinct portions: 6A is a mowed palustrine emergent wetland, while 6B is a forested wetland bisected by Morris Creek. Wetland 6A has low ecological value due to regular mowing, while 6B, which includes more diverse vegetation and hydrology, has slightly higher ecological value.

7. **Wetland 7**:

- A large tidal wetland dominated by *Phragmites*. It is influenced by tidal waters from Morris Creek and Tuttle Brook and provides significant habitat for estuarine species. This wetland also serves important functions in flood flow alteration and fish/shellfish habitat.

In general, these wetlands provide various ecological functions within the salt marsh complex including water retention, nutrient removal, and wildlife habitat, although the more disturbed wetlands (such as Wetlands 4 and 5) have compromised ecological value.

2.1.2 Tide Gates

The tide gate structure, located along a portion of Morris Creek approximately ¼ mile downstream of the airport, consists of two sluice gates and a flap gate. The sluice gates are situated on either side of the flap gate. The sluice gates are set into a concrete frame with 10' x 6' openings in the concrete face on the downstream ocean side, and 10' x 6' openings in the concrete face on the upstream side. The flap gate consists of a timber frame gate with three flexible rubber flap openings with a combined 10' x 6' opening that allows flow from upstream to pass freely and inhibits flow from the downstream ocean side. Refer to Figure 4 Tidal and tide gate elevation.

The inverts of the sluice gates are at -5.4' NAVD88, the inside top of frame on the ocean side is at elevation 0.2' NAVD88. The tidal cycle in this location ranges from -3.4' NAVD88 at Mean Low Water (MLW) to elevation 2.8 NAVD88 at Mean High Water (MHW).

The sluice gates are equipped with an automated SCADA system that allows for both automated and manual remote operation of the tide gates. The tide gates are currently operated to preemptively prepare for storm events to avoid flooding in the Morris Creek area under Watershed Drain Mode. The tide gate is operated in AUTO Mode during periods of normal operation, and Watershed Drain Mode in advance of a storm event.

During AUTO Mode, the left and right sluice gates are kept open to a fixed height at elevation -4.4 feet NAVD88, twelve (12) inches above the invert elevation of -5.4' NAVD88. This allows the tidal wetland systems to outlet freely during low tide conditions and prevents excessive rise in water surface elevations in the tidal wetland systems during the rising tidal cycle. Under normal operational procedures, water levels are managed to reach elevations of approximately 2.1 feet NAVD88 at a monitoring station located immediately upstream of the tide gate structure.

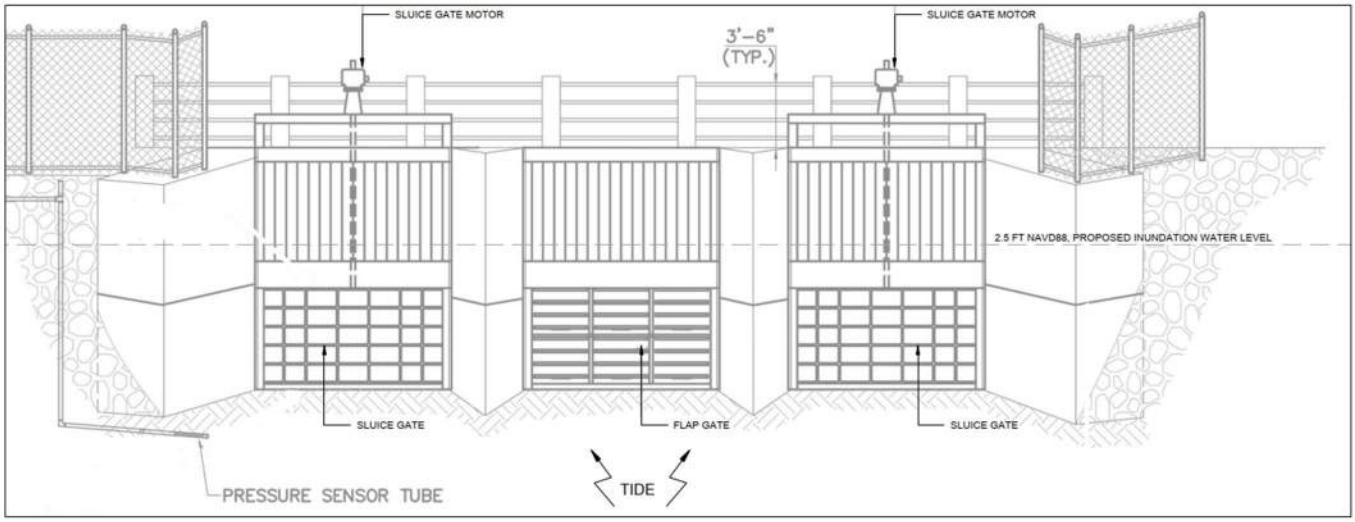

Figure 4 Tidal and tide gate elevation.

During periods of severe weather, particularly when heavy rain events are forecasted, the sluice gates are operated in Watershed Drain Mode. Watershed Drain Mode is typically initiated at least 48 hours before the onset of the severe weather event. Opportunities to reduce drawdown timing and enhance tidal exchange 24 to 48 hours prior to forecasted wet weather events may also be evaluated, as conditions allow. During this time, the Watershed Drain Mode is activated by operational staff to effectively reduce the risk of flooding by preemptively lowering the water levels upstream of the tide gate. To accomplish this, the gate is opened to 1.5 feet above the invert, or elevation -3.9 feet NAVD88, allowing the creek to drain excess water to Long Island Sound. A crucial step is to subsequently close the sluice gates before the next tidal cycle begins to rise to prevent seawater from flowing upstream into the creek.

If the tide gate system fails to operate remotely or if any faults occur that prevent automated operation either before, during, or after a storm event, manual drainage procedures must be implemented to ensure water management continues.

Once the storm event has subsided and water levels begin to stabilize, the tide gate system is returned to AUTO Mode to restore normal operations. In some cases, it is necessary to manually deactivate Watershed Drain Mode if it does not automatically revert to normal function.

2.2 Existing Soils

The soils at the Proposed Project Site were determined using the USDA Web Soil Survey[3] (WSS), as depicted in Figure 5 Soil map of Proposed Project Site.

The soils are predominantly poorly to very poorly drained, which is typical of wetland environments that support hydrophytic vegetation and have limited drainage capacity. Soils such as Walpole sandy loam, Scarboro muck, and (disturbed soils with fill materials) dominate the Airport site, indicating a history of human alteration and natural wetland conditions. These soils are indicative of saturated conditions that support wetland ecosystems making them highly suitable for salt marsh habitat enhancement. The

[3] USDA NRCS, Web Soil Survey, https://websoilsurvey.nrcs.usda.gov/app/

majority of the site is comprised of Udorthents Urban Land, indicating that the area has been highly disturbed and filled. The following is a summary of the predominant soils found in each wetland area.

- **Wetland 1**: Walpole sandy loam and Scarboro muck, classified as poorly to very poorly drained soils.
- **Wetland 2**: Walpole and Aquents soils with poorly drained fill materials.
- **Wetland 3**: Aquents, poorly drained fill materials supporting hydrophytic vegetation.
- **Wetland 4 and 5**: Aquents, similarly consisting of poorly drained fill materials.
- **Wetland 6**: Forested and scrub-shrub wetland with a combination of poorly drained fill materials.
- **Wetland 7**: Aquents, with tidal influence and poorly drained materials.



Figure 5 Soil map of Proposed Project Site.

2.3 Existing Vegetation

Existing vegetation at the Proposed Project Site was evaluated during the wetland delineation and ecological community mapping activities completed by FHI Studios in 2021, with information presented in FHI Studio's Wetland Delineation Report dated January 2022. The following vegetation was observed within the wetlands at the Proposed Project Site.

- **Wetland 1**: Dominated by persistent emergent vegetation such as *Phragmites australis*, *Typha latifolia* (broadleaf cattail), and *Onoclea sensibilis* (sensitive fern).
- **Wetland 2**: Characterized by a mix of *Acer rubrum* (red maple), *Nyssa sylvatica* (black gum), and *Quercus palustris* (pin oak), with stands of *Phragmites australis* dominating the emergent wetland portions.
- **Wetland 3**: Dominated by grasses and sedges such as *Juncus effusus* (soft rush), *Paspalum laeve* (field beadgrass, a native, CT state-threatened species), and *Ludwigia palustris* (water purslane).
- **Wetland 4 and 5**: These wetlands are composed of grasses, rushes, and sedges such as *Juncus effusus* (soft rush), *Paspalum leave* (field beadgrass), and other hydrophytic vegetation.
- **Wetland 6**: Includes a forested portion with *Acer rubrum* (red maple), *Lindera benzoin* (spicebush), and *Vaccinium corymbosum* (highbush blueberry), alongside emergent wetlands dominated by *Phragmites australis* and various sedge species.
- **Wetland 7**: Tidal wetland dominated by *Phragmites australis*, *Spartina alterniflora*, and *Distichlis spicata* (saltgrass).

Paspalum laeve, a state-listed threatened plant species, was identified in multiple wetland areas, including Wetlands 3, 4, and 5. This species is of conservation concern as it is found in only a few locations in Connecticut, mostly within the coastal zone. Refer to the Plant Survey and Protection Plan for the project for additional details.

2.4 Existing Wetlands and Aquatic Resource Quantifications

FHI Studio identified 6 freshwater wetland areas and 1 tidal wetland at the Proposed Project site, as described in the preceding sections and quantified in Table 2. The flagged boundaries were mapped using GPS equipment to capture precise spatial data. Wetland areas were calculated based on the location of the wetland flags using ArcGIS.

Table 2 Wetland impacts at the Proposed Project Site.

Wetland #	NWI Classification Code	Impacts CTDEEP (acre)	Impacts USACE (acres)
Wetlands 4, 5 and 6	PEM2J	8.74	4.94

Wetland 6	PSS	0.02	0.01
	PEM Phragmites	0.54	0.54
	PFO1E	0.01	0.01
Total		9.31	5.50

Hydrogeomorphic (HGM) Classification:

The Hydrogeomorphic (HGM) Classification for the wetlands is ESTUARINE FRINGE. As informed by "A hydrogeomorphic classification for wetlands,"[4] and defined in "The Development of Wetland Functional Assessment Models,"[5] "ESTUARINE FRINGE wetlands are found near ocean shorelines, and tidal estuaries at the mouths of streams. Similar to LACUSTRINE FRINGE wetlands, they transition into RIVERINE wetland landscapes upstream of the coast. This transition occurs when the wetland hydrology becomes more dominated by the stream hydrograph, and less dominated by tidal fluctuations. Many large, low gradient rivers have tidal influence far inland from the mouth. In such systems the transition from ESTUARINE FRINGE to RIVERINE may occur many miles upstream."

To the best of our assessment, it appears that the entire Proposed Project site consists of wetlands classified as ESTUARINE FRINGE. These wetlands are influenced predominantly by tidal fluctuations associated with their proximity to the estuarine environment of Long Island Sound. It is important to note that the tidal marsh complex is unique in that tidal flows are managed by a tide gate, which regulates hydrological connectivity and salinity levels, creating a distinct environment that differs from a naturally unimpeded tidal marsh system.

National Wetlands Inventory Wetlands Classification:

This section describes the mapped National Wetlands Inventory (NWI) Cowardin wetland classifications at the Proposed Project Site, and the classification assigned to the wetland areas based on information collected during the FHI 2021 field delineation. The Cowardin classification includes letter and number codes that correspond to classification nomenclature. Each of these classifications is further defined by

[4] Brinson, M. M. (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A270 053.

[5] National Association of Wetland Managers, "The Development of Wetland Functional Assessment Models Using the Hydrogeomorphic (HGM) Classification System," https://www.nawm.org/pdf_lib/region_4_training/the_development_of_wetland_functional_assessment_models_using_the_hgm_system.pdf

hydrology, vegetation type, and substrate, allowing for a detailed categorization of wetland systems. The Cowardin system helps in assessing the ecological functions and regulatory status of the wetlands and is widely used by federal agencies like the U.S. Fish and Wildlife Service (USFWS) for wetland conservation and management.

A total of six wetland habitat classes as defined by Cowardin were observed at the Proposed Project Site. A general description of the types of habitat classes that were observed is as follows:

1. **Palustrine (P)**:

    - Refers to inland freshwater wetlands, typically dominated by trees, shrubs, or emergent vegetation. These wetlands are not influenced by tidal waters and are often characterized by non-tidal marshes, swamps, and ponds. Examples include forested wetlands (PFO), emergent wetlands (PEM), and shrub wetlands (PSS).

        - **PEM (Palustrine Emergent)**: Wetlands with herbaceous plants like grasses, sedges, and rushes.

        - **PFO (Palustrine Forested)**: Wetlands dominated by trees like red maple.

        - **PSS (Palustrine Scrub-Shrub)**: Wetlands dominated by shrubs or small trees.

2. **Estuarine (E)**:

    - Wetlands which are found along coastal regions where freshwater mixes with saltwater, such as tidal marshes and mudflats. These wetlands are influenced by tidal action but are protected from the full force of ocean waves.

        - **E2EM (Estuarine Intertidal Emergent)**: Intertidal areas with emergent vegetation such as *Phragmites* or *Spartina*.

        - **E1UBL (Estuarine Subtidal Unconsolidated Bottom)**: Areas below the tide level with a bottom substrate of mud, sand, or gravel, often in tidal creeks.

3. **Riverine (R)**:

    - Riverine systems which are associated with rivers, streams, and creeks, and include the channels and banks of flowing waters. Wetlands in this category are often classified based on water flow and bottom composition.

        - **R2UB (Riverine Lower Perennial Unconsolidated Bottom)**: Channels of rivers or streams with permanent flow and a bottom substrate of mud or sand.

The following describes the Project Site wetlands classified according to these habitat classes, also shown in Table 3 Cowardin Wetland classifications within the Proposed Project Site.

1. **Palustrine Emergent (PEM)**:

- Found in several of the inland wetlands, including Wetlands 1, 3, 4, 5, and 6. These wetlands are characterized by emergent herbaceous vegetation, such as rushes, sedges, and grasses. Wetland 6 also includes a *Phragmites*-dominated emergent area.

2. **Palustrine Forested (PFO)**:

    - Present in Wetland 2 and part of Wetland 6. These wetlands are dominated by deciduous trees such as red maple and include shrub layers of species like spicebush and highbush blueberry.

3. Palustrine Scrub Shrub (PSS):

    - Present in Wetland 6 between PEM and PFO. These wetlands occur in low depressions with apparent high groundwater table and are characterized by shrubs and saplings of red maple, blueberry, spicebush and holly.

4. **Estuarine Intertidal Emergent (E2EM)**:

    - Found in Wetland 7, which is a tidal wetland influenced by saltwater from nearby Morris Creek and Tuttle Brook. The emergent vegetation in this wetland is dominated by *Phragmites australis* and halophytic (salt-tolerant) grasses like *Spartina alterniflora* and *Spartina patens*.

5. **Estuarine Subtidal Unconsolidated Bottom (E1UBL)**:

    - Associated with Wetland 7, this classification refers to the areas of open water with sandy or muddy bottoms in tidal creeks such as Morris Creek and Tuttle Brook. These subtidal areas are part of the estuarine system and are influenced by the tides.

6. **Riverine Lower Perennial Unconsolidated Bottom (R2UB)**:

    - Found in Wetland 1, which includes a reach of Tuttle Brook. This classification describes the riverine system with a bottom substrate of sand and organic material, supporting the hydrology of the surrounding wetlands.

Table 3 Cowardin Wetland classifications within the Proposed Project Site.

Wetland #	NWI Classification Code	Notes
Wetland 1	R2UB2/4, PEM1/5	Tuttle Brook. Riverine Lower Perennial Unconsolidated Bottom and Palustrine Emergent, persistent.
Wetland 2	PFO1Ed, PEM5H	Northeastern Wetland by General Aviation Parking. Palustrine Forested, Broad-leaved Deciduous, seasonally flooded/saturated, ditched, and Palustrine Emergent, *Phragmites*-dominated.
Wetland 3	PEM2J	Mowed Area Between ATC and East Ramp. Palustrine Emergent, nonpersistent, intermittently flooded/saturated.
Wetland 4 & 5	PEM2J	Shallow Drainage Areas. Palustrine Emergent, nonpersistent, intermittently flooded.

Wetland 6	PFO1E, PEM2, PSS	Morris Creek and Mowed Lawn Areas. Combination of Palustrine Forested, Broad-leaved Deciduous, seasonally flooded/saturated, Palustrine Emergent, nonpersistent and Palustrine Scrub Shrub.
Wetland 7	E2EM1/5P, E1UBL	Tidal Wetland. Estuarine Intertidal Emergent, persistent/*Phragmites*-dominated, irregularly flooded, and Estuarine Subtidal Unconsolidated Bottom.

Because the US Army Corps of Engineers (USACE) has determined that PEM wetlands 4 and 5 are not Waters of the United States, the wetland impact that will require permitting under the USACE Individual Permit is 5.50 acres.

2.5 Threatened, Endangered, and Species of Special Concern

The Natural Diversity Database (NDDB) query results for the Proposed Project area were received from the Connecticut Department of Energy and Environmental Protection (DEEP) on May 17, 2024. That review did not include the Mitigation Project areas, which were reviewed under a separate NDDB query. Those results were received on September 26, 2024 (dated September 24, 2024). According to DEEP records, populations of several state-listed species, including plants, fish, and birds, have been documented in the vicinity of the Airport's Proposed Project area. DEEP is tasked with assessing potential impacts on these species as part of the NDDB review.

Based on information received from DEEP, the Proposed Project and Mitigation site may provide potential habitat to endangered and threatened plant species as described below.

Plants: Several plant species were identified in the NDDB review. These include *Cirsium horridulum* (yellow thistle), *Leptochloa fusca* ssp. *Fascicularis* (salt pond grass), *Paspalum leave* (field paspalum), *Pedicularis lanceolata* (swamp lousewort), *Krigia biflora* (two-flowered cynthoa), *Plantago virginica* (hoary plaintain), and *Liatris novae-angliae* (New England blazing star).

Fish: Three fish species of special concern were identified: the sand tiger shark, Atlantic seasnail, and the radiated shanny. Consultation with DEEP's fisheries biologist has determined that the project will not affect these listed species (see Appendix C Regulatory Communication).

Birds: Grassland birds, including the grasshopper sparrow (endangered), eastern meadowlark (threatened), and bobolink (special concern), have been documented in the vicinity of the Airport Proposed Project area. Their sensitive periods during breeding and nesting (May to August) are highlighted, and the need for habitat management is emphasized. The DEEP program staff is currently working with the Applicants and their consultants to address impacts from the Proposed Project.

The DEEP response requested that the following be completed:

- Conduct species-specific plant surveys and submit detailed reports, including habitat descriptions, population numbers, and mitigation plans for any identified state-listed species.

- Finalize a Grassland Bird Habitat Mitigation Plan[6] before any further decisions on the Mitigation project, ensuring protection of their habitat during sensitive periods. DEEP indicated that a final determination for the Mitigation project will be delayed until mitigation measures for grassland birds are finalized.

A habitat assessment for the state threatened and endangered species was completed to determine the habitat requirements, suitability of the existing habitat to support these species, and other habitat characteristics that may be pertinent to the Mitigation Project. These are presented in Table 4 Habitat assessment for T&E species within the Proposed Project Site and/or in its vicinity.

Table 4 Habitat assessment for T&E species within the Proposed Project Site and/or in its vicinity.

Common Name	Scientific Name	Habitat Description	Flowering/ Reproducing	Breeding/ Nesting/ Fledgling Season	Habitat Potentially Present Onsite	Federal Status based on NDDB response
Yellow thistle	*Cirsium horridulum*	Coastal grasslands, airports, open-canopy trails, inner salt marsh borders, forest edges bordering salt marshes	Blooms June-July	N/A	Yes	State Endangered
Salt pond grass	*Leptochloa fusca ssp. fascicularis*	Coastal, brackish ponds, salt marsh borders, sandy depressions in coastal grasslands	Blooms/Fruits Aug-Nov	N/A	Yes	State Endangered
Field paspalum	*Paspalum laeve*	Hydric to moderately drained fields, grasslands, floodplains, vernal pools, utility ROWs, coastal grasslands	Fruits August-October	N/A	Yes	State Threatened
Swamp lousewort	*Pedicularis lanceolata*	Moist fields, swamp edges, wet meadows, stream edges, fresh tidal wetlands	Blooms mid-August-September	N/A	Yes	State Threatened
Two-flowered cynthia	*Krigia biflora*	Dry to wet meadows, fields, rocky woods, roadsides	Blooms June	N/A	Yes	State Threatened
Hoary plantain	*Plantago virginica*	Dry, rocky or sandy soils in pastures, grasslands, roadsides, traprock ridges	Blooms May-June	N/A	Yes	State Special Concern

[6] Note that the Applicants' Mitigation Plan for the grassland bird habitat has been developed as a separate document from this Mitigation Plan, which addresses impacts to wetland habitat at the Airport.

New England blazing star	*Liatris novae-angliae*	Sandplains, dry fields, rocky outcrops, roadsides	Blooms August-September	N/A	Yes	State Special Concern
Grasshopper sparrow	*Ammodramus savannarum*	Large patches of grasslands (30 acres or more)	N/A	May 1-Aug 30	Yes	State Endangered
Eastern meadowlark	*Sturnella magna*	Large patches of grasslands (15 acres or more)	N/A	May 1-Aug 15	Yes	State Threatened
Savannah sparrow	*Passerculus sandwichensis*	Large patches of grasslands (10 acres or more)	N/A	April 1-Aug 30	Yes	State Special Concern
Bobolink	*Dolichonyx oryzivorus*	Large patches of grasslands (5 acres or more)	N/A	May 1-Aug 30	Yes	State Special Concern

2.6 Existing Wetlands Functions and Values Assessment

Wetland functions and values were documented in accordance with guidelines from the United States Army Corps of Engineers *Highway Methodology Supplement*.[7] The following sections provide a summary of the Wetland Functions and Values and the documented results Functions and Values for the Airport site wetlands.

2.6.1 Existing Wetlands Functions and Values

Wetland functions are the properties or processes of a wetland ecosystem that aid in promoting an equilibrium in the wetland and surrounding environment. Wetland functions relate to the ecological significance of wetland properties without regard to subjective human values, and to the elements 1 through 8 on the following list. Values are the societal benefits resulting from one or more of the functions and the physical characteristics associated with a wetland, incorporated into elements 9 through 13 on the following list.

1. **Groundwater Recharge/Discharge -** The potential for a wetland to act as a source of groundwater recharge and/or discharge. Recharge describes the potential for the wetland to contribute water to an underlying aquifer. Discharge relates to the potential for the wetland to serve as a source of groundwater transfer to the surface.
2. **Flood-flow Alteration -** The effectiveness of the wetland to reduce flood damage by attenuation of floodwaters for an extended period following heavy precipitation and runoff events.
3. **Fish and Shellfish Habitat -** The ability of the seasonal or permanent waterbodies associated with the wetland to provide habitat for fish and shellfish.
4. **Sediment/Toxicant/Pathogen Retention -** The ability to reduce or prevent the degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens.
5. **Nutrient Removal/Retention/Transformation -** The ability to prevent excess nutrients from entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries and

[7] USACE, The Highway Methodology Workbook Supplement, https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/HighwaySupplement6Apr2015.pdf

causing adverse effects.

6. **Production Export (Nutrient) -** The ability to produce food or usable products for humans and other organisms.
7. **Sediment/Shoreline Stabilization -** The ability to effectively stabilize streambanks and shorelines against erosion.
8. **Wildlife Habitat -** The effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland wedge. Resident and migrating species are considered along with the potential for any state or federally listed species occurring within the target wetland.
9. **Recreation -** The effectiveness of the wetland and associated watercourses to provide recreational opportunities such as boating, fishing, hunting, and other passive recreational activities. Consumptive activities consume or diminish the plants, animals, or other resources that are intrinsic to the wetlands whereas non-consumptive activities do not.
10. **Education/Scientific Value -** The effectiveness of the wetland as a site for an "outdoor classroom" or as a location for scientific research.
11. **Uniqueness/Heritage -** The effectiveness of the wetland or its associated waterbodies to produce certain special values. Special values may include such things as archaeological sites, unusual aesthetic quality, historical events, or unique plants, animals, or geologic features.
12. **Visual Quality/Aesthetics -** The ability to provide pleasing or unique visual and aesthetic qualities.
13. **Threatened or Endangered Species Habitat -** The effectiveness of the wetland or associated waterbodies to specifically support threatened or endangered species.

The USACE developed a list of "Qualifiers" for each of the 13 wetland functions and values. Qualifiers include observed vegetation conditions, hydrologic conditions, size, adjacent area conditions, and the availability of public access, among several other wetland characteristics.

2.6.2 Existing Wetlands Functions and Values Assessment

For each of the wetland functions and values described in the previous section, FHI Studio reviewed and evaluated applicable criteria listed by the USACE. The resulting summary of wetland functions and values is provided in Table 5 below.

Table 5 Summary of Project Site wetland functions and values.

Wetland	Groundwater Recharge/ Discharge	Flood flow Alteration	Wildlife Habitat	Sediment/Toxicant Retention & Nutrient Removal	Uniqueness/ Heritage
Wetland 1	Significant due to connection with Tuttle Brook	High, storing and conveying floodwaters	Moderate to high, diverse riverine habitats	High, filters pollutants before reaching Tuttle Brook	–

Wetland 2	Moderate, due to groundwater-fed ditches	–	Moderate, influenced by urbanization	Moderate to high, especially in *Phragmites* areas	Presence of *Paspalum laeve* elevates value
Wetland 3	Low to moderate, collects surface runoff	–	Low to moderate, supports *Paspalum laeve*	Moderate, acts as a small catchment area	–
Wetlands 4 & 5	Limited, shallow and regularly mowed	–	Low, though *Paspalum laeve* is present	Moderate, filters runoff from runways and taxiways	*Paspalum laeve* presence significant
Wetland 6	Moderate, fed by surface and groundwater	–	Moderate to high, diverse hydrophyte communities	High, filters pollutants from Morris Creek	Presence of *Paspalum leave,* a CT-threatened wetland species
Wetland 7	–	High, mitigates floods due to tidal nature	High, supports halophytes and estuarine wildlife	High, filters tidal water through extensive vegetation	High, tidal marsh system in urban setting

2.6.2.1 Groundwater Recharge and Discharge

Groundwater recharge/discharge is a suitable although not a principal function of the Airport site wetlands. The presence of poorly drained soils and extensive urban development throughout the Airport site reduces the likelihood of groundwater exchange across the site as a whole.

The limited groundwater recharge and discharge potential exists throughout the Airport site wetlands, as described below.

- **Wetlands 1, 3, 4, and 5** have groundwater recharge potential, especially in areas where high groundwater tables and mowed lawn areas increase recharge. Wetland 3's catch basin also regulates the water table, promoting this function.
- **Wetland 2**: Provides limited groundwater recharge.
- **Wetland 6**: The portions of Wetland 6A (mowed lawn) have low recharge/discharge potential, but the 6B section, with forested and scrub-shrub wetlands, contributes moderately to groundwater discharge.
- **Wetland 7**: Although tidal, Wetland 7 contributes to groundwater recharge due to its hydrological connection to Morris Creek.

2.6.2.2 Flood-flow Alteration

Flood-flow alteration is listed as a suitable and principal function for the freshwater inland wetlands within the Airport site, although the actual capacity for this function is relatively limited in most areas. Wetland 7, despite being a tidal system, is noted as not having flood-flow alteration as a suitable or principal function.

Wetlands 1 and 7 have the highest theoretical potential for flood-flow alteration due to their connection with Tuttle Brook and Morris Creek, but even these wetlands are somewhat constrained. Wetland 1, located along a relocated reach of Tuttle Brook, benefits from its proximity to the watercourse and surrounding vegetation, but its overall contribution to flood retention is diminished by its highly modified state. Wetland 7 plays a marginal role in absorbing floodwaters from Morris Creek, though its ability to truly buffer significant flood events is limited.

By contrast, Wetlands 2 through 6 offer even more limited flood-flow alteration functions. These wetlands are primarily isolated and poorly connected to larger hydrologic systems, making them less effective for stormwater retention. Wetlands 3, 4, and 5 function as shallow drainage areas designed to collect surface runoff from adjacent airport infrastructure, but their small size and lack of substantial connections to major waterways limit their flood-retention potential. Wetland 6, although slightly more hydrologically complex due to its proximity to Morris Creek, offers only modest flood-flow alteration due to the presence of mowed areas and intermittent flooding. Overall, while some flood-flow alteration is possible, the quality and structure of these wetlands reduce their effectiveness in this role.

2.6.2.3 Fish and Shellfish Habitat

Fish and shellfish habitat is neither a suitable nor principal function of the freshwater inland wetlands on the Airport site, reflecting the generally low-quality habitat these areas provide. These freshwater wetlands lack the necessary characteristics, such as hydrologic connectivity and ecological diversity, to support fish or shellfish populations. In contrast, Tidal Wetland 7 offers some potential due to its estuarine intertidal nature, but it is still a compromised habitat. Although the wetland features unconsolidated bottom areas and irregular tidal flooding, which typically benefit fish and shellfish, the dominance of *Phragmites australis*, an invasive species, reduces the overall ecological quality of the habitat. While native halophytic grasses like *Spartina alterniflora*, *Spartina patens*, and *Distichlis spicata* are present and offer some shelter and nursery grounds, the overall habitat is suboptimal due to the invasive vegetation. Moreover, the presence of unconsolidated bottom areas and tidal flow in Wetland 7 might offer foraging and spawning grounds, but the extent of its suitability is undermined by the wetland's degraded condition. The organic matter and sediment that would typically support a diverse food web are limited by the habitat's compromised state, reducing its effectiveness for resident and migratory fish species. Furthermore, according to the Essential Fish Habitat Mapper from the National Oceanic and Atmospheric Administration (NOAA)[8], no Habitat Areas of Particular Concern were identified within the project area, reinforcing the conclusion that the site offers limited value as fish or shellfish habitat.

2.6.2.4 Sediment/Toxicant/Pathogen Retention

The wetlands within the Airport site are determined to provide sediment/toxicant/pathogen retention as both a suitable and principal function, but this function is performed in the context of low-quality wetlands that are generally degraded and lack ecological complexity. While these wetlands do help capture sediment and filter pollutants, their overall ability to contribute to broader ecosystem health is diminished by poor habitat conditions, invasive species, and human disturbance.

[8] NOAA Fisheries, Essential Fish Habitat Mapper
https://www.habitat.noaa.gov/apps/efhmapper/?page=page_3

- Wetlands 1, 2, 3, 4, and 5 demonstrate high sediment retention primarily because of their locations near impervious surfaces such as runways and taxiways, which generate runoff. These wetlands act as basic traps for sediment and pollutants but are heavily influenced by the surrounding airport infrastructure. Although they capture runoff, their artificial or disturbed nature limits their overall ecological value. In natural wetland systems, diverse vegetation helps stabilize sediments over time, and a complex hydrologic regime allows for better sediment processing and long-term storage. In contrast, the existing wetlands may lack the capacity to stabilize and retain sediment over extended periods, making them less effective in maintaining long-term sediment retention compared to healthier, more biodiverse wetlands.
- Wetland 6B offers moderate sediment retention in its scrub-shrub and forested portions, but its effectiveness is limited by the presence of mowed areas and intermittent flooding. While it can trap some sediment from surface runoff, the degraded condition of much of the wetland reduces its capacity to perform this function effectively compared to more natural, undisturbed wetlands.
- Wetland 7 shows high sediment retention, particularly in its *Phragmites*-dominated zones and estuarine areas. However, despite its capacity to retain sediment due to tidal influences and unconsolidated bottom areas, the dominance of the invasive *Phragmites australis* reduces the ecological quality of the wetland, making it less effective in supporting broader wetland functions. The invasive species limits the diversity of habitat and natural processes, and although it may physically retain sediment, the wetland's overall health and ecological function remain compromised.

In conclusion, while the wetlands on the Airport site do perform the function of sediment/toxicant/pathogen retention, this function is largely the result of disturbed, artificial, or degraded conditions, limiting the wetlands' value beyond their basic role in filtering runoff from the surrounding infrastructure. Their capacity to contribute to ecosystem resilience and water quality improvement is hindered by poor habitat quality and limited biodiversity.

2.6.2.5 Nutrient Removal/Retention/Transformation

Nutrient removal has been identified as both a principal and suitable function for all wetlands on the Airport site, though the overall effectiveness varies due to the poor quality and degraded conditions of many of these wetlands. While these wetlands do capture and process nutrients, their artificial or disturbed state, dominated by invasive species and limited native vegetation, diminishes their overall ecological value.

- Wetland 1, located along Tuttle Brook, features emergent vegetation such as *Phragmites australis* and *Typha latifolia* (broadleaf cattail), which are effective in nutrient uptake. However, the dominance of invasive *Phragmites* reduces the quality of the habitat and limits its broader ecological benefits, even though nutrient removal remains a function of this wetland.
- Wetland 2, a red maple swamp, processes nutrients effectively due to seasonal flooding and emergent vegetation like *Phragmites australis* and *Acer rubrum*. The small channel system and proximity to developed areas, which likely contribute nutrient-rich runoff, make this wetland suitable for nutrient removal. However, the dominance of *Phragmites* and the surrounding development decrease the overall quality of nutrient processing.
- Wetland 3 serves as a shallow basin wetland with emergent species like soft rush and water purslane, enhancing its ability to retain water and capture nutrients. While it does perform nutrient removal, its isolated nature and collection of runoff from impervious surfaces indicate that it is

functioning in a low-quality, artificial environment, which limits the long-term ecological benefits it provides.

- Wetlands 4 and 5, located in constructed drainage areas, demonstrate limited nutrient removal due to their shallow, intermittently flooded conditions and small size. While the vegetative cover, including soft rush and straw-colored flatsedge, helps uptake nutrients from collected stormwater, these wetlands are largely artificial systems with minimal natural function, restricting their overall contribution to nutrient removal.
- Wetland 6 is a more complex system, with both mowed (6A) and natural (6B) portions. The *Phragmites*-dominated areas and red maple in Wetland 6B contribute to nutrient removal, particularly where Morris Creek interacts with the wetland. However, the mowed and managed sections (6A) are much less effective due to human disturbance and regular maintenance, reducing the wetland's overall capacity for nutrient capture and processing.
- Wetland 7, despite its tidal influence, is dominated by invasive *Phragmites australis*. Though it contains native salt marsh species like *Spartina alterniflora*, the presence of *Phragmites* limits its ecological quality. The tidal nature does increase the wetland's ability to process nutrients, especially nitrogen, but the overall poor habitat quality affects its capacity to provide comprehensive nutrient removal benefits.

2.6.2.6 Production Export

Wetlands 1, 4, 5, 6B, and 7 exhibit a high production export function, but this function is largely influenced by their poor ecological quality and the dominance of invasive species. While these wetlands do produce a substantial amount of organic material, much of it is contributed by *Phragmites australis*, an invasive plant that reduces biodiversity and habitat quality. Although the wetlands have the potential to support invertebrates and fish that rely on detritus and organic matter, the overall value of this production is limited by the degraded condition of the wetlands.

- Wetland 1 produces organic material from its vegetated areas, but the dominance of *Phragmites* and the modified hydrology limit its ability to support a diverse range of species. Wetlands 4 and 5, with their limited emergent vegetation, contribute some organic material to the system, but their artificial nature and small size restrict their overall ecological significance.
- Wetland 6B is more effective in exporting organic material due to the palustrine emergent and forested wetlands dominated by red maple, spicebush, and extensive *Phragmites*. These species produce large amounts of leaf litter and plant detritus, which can be transported downstream via the permanently flooded channels and connection to Morris Creek. However, the presence of *Phragmites* limits the ecological value of the organic material being exported, reducing the wetland's overall contribution to a healthy aquatic food chain.
- Wetland 7 generates significant organic matter, but this is largely due to the extensive stands of *Phragmites australis* present. While the wetland's tidal influence facilitates the movement of organic material into nearby estuarine systems, the poor quality of the habitat, dominated by invasive species, limits the broader ecological benefits typically associated with production export in more diverse and healthy wetland systems.

2.6.2.7 Sediment/Shoreline Stabilization

Wetlands 1, 4, 5, 6B, and 7 exhibit sediment and shoreline stabilization functions, but their effectiveness is moderated by the poor quality of these wetlands, which are often dominated by invasive species and

impacted by human activities. These wetlands provide limited sediment trapping and stabilization function due to their vegetation and hydrologic connections, the low ecological quality reduces their overall ability to provide sustained stabilization. Wetland 7, for example, provides tidal shoreline protection due to its connection to Morris Creek and Long Island Sound, but the dominance of *Phragmites australis* limits the diversity and resilience of the shoreline. Although *Spartina* species are present and help prevent erosion, the overall habitat quality is compromised by the invasive vegetation, affecting the long-term stability of the sediment.

In contrast, Wetlands 2 and 3 provide moderate stabilization functions. While their emergent and forested vegetation does help anchor soil and reduce erosion, their smaller size and limited hydrological connections lessen their impact compared to the larger wetlands. These wetlands, although functioning to some degree, are not as effective in shoreline stabilization due to their isolated nature and the influence of surrounding infrastructure, further limiting their overall ecological contributions.

2.6.2.8 Wildlife Habitat

The wetlands on the Airport site are generally low-quality habitats for wildlife due to their level of disturbance and management. Wetlands 1, 6B, and 7 offer relatively higher wildlife habitat value compared to the others, but even these are limited by factors such as regular mowing, invasive species dominance, and proximity to airport infrastructure. While Wetland 7 benefits from its tidal influence and estuarine characteristics, supporting some species of aquatic organisms, birds, and small mammals, the overall habitat quality is constrained by the dominance of *Phragmites australis*, an invasive species. Wetlands 3, 4, and 5 provide moderate wildlife habitat value; however, these areas are heavily influenced by human activities such as regular mowing and adjacent airport operations, which significantly limit their potential to support diverse or sensitive wildlife. Wetland 6A is the lowest quality in terms of habitat, as it is primarily a managed, mowed lawn, further reducing its capacity to support any significant wildlife populations.

2.6.2.9 Recreation

Recreational opportunities are nonexistent in the wetlands around the Airport due to their location within the airport property, safety restrictions, and proximity to runways and taxiways. None of the wetlands are accessible to the public. The primary focus of these areas remains on airport operations, not recreation, further diminishing their value for public engagement.

2.6.2.10 Education/Scientific Value

The educational and scientific value of these wetlands is generally limited, though Wetlands 1, 6B, and 7 offer some potential for research, particularly in areas such as wetland plant communities, hydrology, and tidal ecology. Wetland 7 is somewhat more significant due to its connection with tidal processes and the opportunity it presents for studying coastal wetlands in a highly urbanized environment. However, most of these wetlands, including Wetlands 4 and 5, are low-quality or constructed systems with unique hydrology but minimal natural function, making them only moderately useful for educational purposes. These smaller, more artificial wetlands may provide insights into the management of urbanized wetlands, but their value for broader scientific research is limited.

2.6.2.11 Uniqueness/Heritage

The uniqueness of the wetlands at the Airport is generally low, except for specific elements such as the presence of the state-threatened *Paspalum laeve* in Wetlands 2 and 3. This rare plant species adds some ecological significance to otherwise disturbed or low-functioning wetlands. Wetland 7 stands out slightly due to its estuarine influence, connecting to Morris Creek and Long Island Sound, which contributes to its uniqueness. However, despite these features, the wetlands overall are relatively typical for urbanized environments and do not display a high degree of uniqueness value beyond these isolated cases.

2.6.2.12 Visual Quality/Aesthetics

The visual and aesthetic quality of the wetlands surrounding the Airport is largely low, with the exception of Wetland 7, which offers scenic views tied to its tidal nature and proximity to Morris Creek. The connection to the tidal system and the open water areas provides some level of aesthetic appeal. Wetlands 1 and 6B contribute marginally to the area's visual quality due to their more natural vegetation. In contrast, Wetlands 4, 5, and 6A are largely dominated by mowing and infrastructure, making them aesthetically insignificant.

2.6.2.13 Threatened or Endangered Species Habitat

While the habitat potential for endangered species across most of these wetlands is generally low, wetlands 1, 2, and 3 hold some value due to the presence of *Paspalum laeve*, a state-threatened species. The occurrence of this plant indicates some conservation importance, but otherwise, these wetlands do not support a wide range of sensitive or endangered species. The botanical mapping of *Paspalum laeve* shows the species adjacent to the wetlands at an elevation higher than would be impacted by the proposed tide gate modifications. Wetland 7, due to its estuarine size and influence, offers potential for habitat improvement to support additional rare or endangered species, but overall, the habitat quality remains constrained by invasive species and limited diversity.

2.6.2.14 Existing Wetlands Function & Values Assessment Conclusion

The wetlands surrounding the Airport generally exhibit low to moderate ecological functions and values, with some exceptions. Wetlands 1, 6B, and 7 provide the highest ecological value, primarily through their roles in sediment stabilization, nutrient removal, and production export. Wetland 7, in particular, is critical due to its connection to the tidal system of Morris Creek and Long Island Sound, supporting a variety of aquatic species and contributing significantly to tidal shoreline protection. The combination of tidal exchange, native halophytic vegetation, and its estuarine influence makes Wetland 7 the most ecologically important wetland in the area. Wetlands 1 and 6B also provide essential functions, especially in nutrient removal and wildlife habitat, thanks to their more natural vegetation and hydrologic connectivity. However, their proximity to airport infrastructure limits their potential for supporting diverse wildlife populations.

In contrast, Wetlands 2, 3, 4, and 5 have lower ecological functions, particularly due to regular mowing, human disturbances, and their more isolated or constructed nature. While these wetlands contribute to sediment stabilization and nutrient removal, their capacity to support wildlife and provide habitat is diminished by their maintenance and location near runways and taxiways. Wetlands 4 and 5 offer some educational value due to their unique hydrology as constructed drainage areas, though their ecological contributions are modest. Overall, the recreational value of all the wetlands is minimal, as public access is

restricted due to their location within the airport property, and the aesthetic value is generally low except for Wetland 7, which augments the natural scenery around Morris Creek.

For additional information on the Proposed Project (Impact) Site, refer to Appendix G.

3. Mitigation Project

3.1 Mitigation Project Overview – Enhancement Areas

The Mitigation Project will enhance **28.5 acres** of low tidal marsh habitat with the re-growth of *Spartina alterniflora* and significant reduction of *Phragmites australis* throughout the Mitigation Project area wetlands. These conditions will be achieved by increasing the depth and duration of inundation of the *Phragmites australis*-dominated wetlands with highly saline tidal water, alongside active control and management of the existing stands of *Phragmites*. These proposed conditions will provide increased inundation depth in the tidal wetlands between the mean tide level and mean high water level, significantly benefiting the low marsh regions.

The Mitigation Projects will achieve these objectives by completing the following:

- Adjustments to normal tide gate operation to achieve inundation in the Mitigation Project wetlands to elevation 2.5 feet NAVD88;
- Increasing initial inundation duration to six (6) hours;
- Implementing a mowing program as detailed below; and
- Implementing an Adaptive Management Plan if the Mitigation Project Performance Standards are not met.

This maximum inundation elevation of 2.5 feet' NAVD88 has been assigned to avoid flooding the Airport runway safety areas and adjacent properties, while allowing for periodic inundation of an extensive area of *Phragmites*-dominated Mitigation Site wetlands.

A tide gate adjacent to the Airport will be adjusted to achieve optimal inundation levels and is automated, designed to regulate tidal flow and salinity levels effectively. The current SCADA programming logic controls the gate to maintain water surface elevations upstream below elevation 2.0 feet NAVD88, while allowing periodic flushing to increase brackish water conditions. Planned upgrades to the system include improvements to the gate's responsiveness and fine-tuning its programming for greater alignment with tidal cycles and ecological goals. This trusted system employs robust computer programming to ensure consistent operation. See Appendix D Tidal Monitoring Analysis.

The proposed inundation level will align with the tidal regime and will be managed through adaptive tide gate operations to achieve an optimal balance between *Phragmites* suppression (using saline water exposure to facilitate the transition to native *Spartina* and low marsh habitats) and stormwater management.

Mitigation Performance Standards are to be achieved at the close out of the Mitigation Work Plan (MWP), following a five-year monitoring period. Adaptive management will be implemented as needed within the first year after commencement of the MWP, based on specific triggers outlined in section 3.7 Mitigation

Performance Standards – Enhancement Areas. The areas of inundation will be monitored regularly during the 5-year monitoring period, as intertidal habitat transitions from *Phragmites* dominated wetland to low salt marsh habitat, including the re-growth of *Spartina alterniflora*.

See Appendix A: Proposed Tidal Wetland Design depicting the proposed design and layout of the Mitigation Project.

3.2 Mitigation Project Overview – Creation Areas

The Mitigation Project will create **3.61 acres** of new tidal salt marsh complex by converting upland areas into intertidal habitat that supports native salt marsh vegetation, particularly *Spartina alterniflora* in the low marsh zone. The created marsh will be designed to integrate with the surrounding enhanced wetlands and will be graded to appropriate elevations to facilitate tidal exchange.

The Mitigation Project will achieve these objectives by completing the following:

- Excavating existing upland material in designated creation areas to a base elevation of approximately 1.0 feet NAVD88.
- Placing clean sand to meet the final design grades as depicted on the grading plan, ensuring appropriate elevations for tidal habitat establishment. The clean sand will be placed along a 3% slope, starting at elevation 2.3 feet NAVD88 and extending downward to the lower excavation limits.
- Constructing tidal channels to connect the created salt marsh with existing channels, ensuring adequate drainage and tidal flushing.
- Planting the vegetated portions of the newly created marsh with *Spartina alterniflora* to establish a functional low marsh ecosystem. The final site elevations and tidal channel layout have been designed to support sustained tidal inundation, ensuring the long-term success of the created salt marsh. Unlike the enhancement areas, which rely on increased tidal inundation to shift existing vegetation composition, the creation areas will be developed from the ground up, establishing an entirely new intertidal habitat. These efforts will expand the footprint of functional salt marsh within the Mitigation Site, increasing ecological resilience, improving habitat connectivity, and supporting critical estuarine functions.

See Appendix A: Proposed Tidal Wetland Design depicting the proposed design and layout of the Creation Areas.

3.3 Mitigation Site Location

The Mitigation Project will focus on the enhancement and creation of tidal wetlands within the Airport property boundary. The tide gate is located along Morris Creek, approximately 1/4 mile downstream from the Airport. The latitude and longitude for the Airport according to Google Maps is 41.263937, -72.886305.

The Mitigation Project will occur within a maximum elevation of 2.5 feet NAVD88 and within the Mitigation Project wetlands. These wetland areas were described by McCue and include the following flag series: WF100-WF194; WF300-WF384; WF400-WF459; WF500-WF714; WF800-WF941; and WF1000-WF1347.

3.4 Mitigation Site Selection

The selected Mitigation Site holds significant value as it encompasses critical intertidal marsh habitat, recognized as essential in Connecticut for supporting diverse coastal ecosystems.[9] Located on the same property as the Proposed Project impact area at the Airport, the Mitigation Site ensures that tidal wetland improvement efforts occur onsite rather than offsite. Mitigating onsite offers numerous advantages, including maintaining ecological continuity, minimizing the disruption of existing hydrologic systems, and addressing impacts within the same watershed.

The Airport site where the mitigation will take place is located along the Connecticut coastline, less than a mile from the Long Island Sound. The Mitigation Site is optimally positioned to support low marsh tidal wetland habitat, which offers numerous ecological benefits, including serving as a nursery ground for fish and shellfish species and providing flood protection. The proximity to Long Island Sound also improves the potential for saltmarsh plant regrowth, particularly for native species such as *Spartina alterniflora,* essential for a thriving low marsh ecosystem.

In addition, a unique feature of the Mitigation Site is the presence of a tide gate, which allows for an innovative approach of controlled management of tidal water inundation. This adaptability enables close monitoring and fine-tuning of saltwater exposure to promote conditions unfavorable for invasive *Phragmites* and conducive to native salt marsh species. Unlike a traditional wetland enhancement project, which may require extensive earthwork, this inundation-focused approach minimizes site disruption, lowers costs, and reduces the carbon footprint by eliminating the need for large volumes of soil excavation, offsite disposal, and placement of imported clean sand. By leveraging natural processes, this unique site supports a sustainable return of native vegetation, allowing *Spartina* to re-grow naturally, with targeted replanting only if necessary. This nature-based approach ensures the site can regenerate in a way that prioritizes ecological integrity and long-term resilience.

The Mitigation Project consists of heavily regulated and managed tidal wetland areas, where hydrological processes and tidal exchange are actively controlled by management of the tide gate. This level of intervention creates a highly distinctive ecological and hydrological setting, diverging significantly from natural tidal wetlands, making it a unique site with no directly comparable reference system in terms of its management and resulting conditions.

A portion of the Mitigation Site will be dedicated to the creation of new tidal salt marshes within existing upland areas. Unlike the enhancement areas, which rely on controlled inundation to shift existing vegetation composition, these creation areas will involve excavation and regrading to establish appropriate tidal elevations. The design includes excavating upland material, placing clean sand to meet final grades, and constructing tidal channels to ensure proper hydrologic connectivity. These newly

[9] CT ECO Basic Data Guide, Connecticut Critical Habitats, https://cteco.uconn.edu/guides/Critical_Habitat.htm

created wetlands will integrate with the existing salt marsh complex and surrounding enhancement areas, expanding the footprint of functional tidal marsh habitat within the Mitigation Site.

3.5 Mitigation Project Goals – Enhancement Areas

The following Mitigation Project goals have been established to address the ecological impacts and promote habitat improvement to inform mitigation efforts for the Proposed Project. These goals focus on the enhancement of wetland functions and values, habitat improvements for state-listed species, and enhancement of ecosystem services, while balancing the operational needs of the Airport.

1. Enhance Wetland Hydrology and Enhance Floodflow Alteration

Goal: Improve the capacity of wetlands located on the Airport property to store, filter, and slowly release floodwaters, thereby reducing the potential for downstream flooding and enhancing groundwater recharge.

Approach: Revive natural hydrological connections between the wetlands and adjacent water bodies such as Morris Creek and Tuttle Brook; maintain proper water levels by addressing obstructions caused by invasive *Phragmites.*

Projected Outcome: Enhanced floodwater retention capacity, reducing downstream flood risks and improving resilience against storm events.

2. Improve Sediment Retention and Shoreline Stabilization

Goal: Increase the wetlands' ability to trap sediment and stabilize shorelines to protect water quality and reduce erosion.

Approach: Inhibit invasive species, particularly *Phragmites*, and enhance the growth of native *Spartina alterniflora* in estuarine intertidal wetland areas. The native *Spartina* anchors soils and enhances sediment retention along watercourses.

Projected Outcome: Reduced erosion and sedimentation into surrounding water bodies, leading to improved water quality and improved shoreline stability.

3. Enhance Nutrient Removal and Water Filtration

Goal: Improve nutrient uptake and water filtration within the wetlands, thereby contributing to water quality improvement in adjacent water bodies.

Approach: Allow for the re-growth of native plant species in estuarine wetland areas that are effective at nutrient cycling and pollutant filtration. Enhance hydrological flow to allow for better nutrient capture and transformation.

Projected Outcome: Improved capacity for wetlands to remove excess nutrients from stormwater runoff, reducing risks of eutrophication in Long Island Sound.

4. Enhance and Improve Wildlife Habitat

Goal: Enhance the habitat quality of the wetlands to support diverse wildlife, including state-listed threatened and endangered species.

Approach: Enhance the regrowth of native vegetation in wetland areas to create suitable habitats for species such as *Spartina alterniflora* (salt marsh cordgrass). Remove *Phragmites* and other invasive species that limit biodiversity and habitat quality. Enhance habitat structures through reconnected hydrological features.

Projected Outcome: Increased biodiversity and improved natural area conditions for the enhancement of intertidal marsh, a critical habitat in Connecticut that supports a diversity of state-listed threatened and endangered species.

5. Mitigate for Impacts to Fish and Shellfish Habitat

Goal: Enhance the habitat potential for aquatic species by improving wetland conditions and hydrological connections to adjacent estuarine systems.

Approach: Enhance tidal wetlands and improve connections to Morris Creek to improve spawning and nursery habitats for fish and shellfish. Facilitate the re-growth of native salt marsh vegetation to support nutrient cycling and habitat for estuarine species.

Projected Outcome: Improved habitat for fish and shellfish, contributing to the health of local aquatic ecosystems and supporting broader estuarine food webs.

3.6 Mitigation Project Goals – Creation Areas

The following goals have been established for areas where existing upland will be converted to tidal wetland habitat. These goals support the overall mitigation strategy by expanding wetland acreage, establishing self-sustaining hydrologic and vegetative conditions, and contributing to the long-term resilience of coastal wetland systems in the face of sea level rise and habitat fragmentation.

1. Establish Tidal Hydrology in Former Upland Areas

Goal: Create suitable hydrologic conditions in currently upland areas to support the development of tidal wetland communities.

Approach: Lower site elevations and regrade to appropriate intertidal contours and ensure connectivity to existing tidal channels and flow paths through proximity to Morris Creek and the surrounding salt marsh system.

Projected Outcome: Regular tidal inundation within the designed elevation range, supporting the creation of functional intertidal wetland habitat.

2. Initiate Native Salt Marsh Vegetation Communities

Goal: Support the growth of native tidal wetland vegetation, particularly *Spartina alterniflora* and other low marsh species, in created wetland areas.

Approach: Plant appropriate native species within designed elevation zones. Manage early successional dynamics to control invasive colonizers.

Projected Outcome: Initial creation of native low marsh plant cover, leading to the development of a self-sustaining vegetative community appropriate to tidal wetland conditions.

3. Provide Foundational Habitat Structure and Connectivity

Goal: Support early-stage habitat development for estuarine wildlife through increased habitat area and connectivity.

Approach: Design wetland creation areas to integrate with adjacent tidal marsh habitats, including tidal channels that facilitate wildlife use.

Projected Outcome: Utilization of created wetlands by estuarine and marsh-dependent species, contributing to regional habitat patch connectivity and broader ecological function.

4. Support Long-Term Wetland Resilience and Adaptation

Goal: Develop a site foundation capable of adapting to dynamic coastal conditions, including sea level rise.

Approach: Design a resilient grading profile that positions low salt marsh plantings within the upper quartile of the tidal range and use monitoring data to guide adaptive management strategies.

Projected Outcome: Created tidal wetlands that demonstrate trajectory toward long-term stability, with the potential to persist and evolve as sea levels change.

3.7 Mitigation Performance Standards – Enhancement Areas

Mitigation Performance Standards have been developed according to the Ecological Performance Standard Criteria (USACE, 2020). These standards have been developed for project specific conditions to be clear, concise, and measurable, and to be used to assess whether the mitigation project is achieving its objectives.

It is important to note that the proposed mitigation activities focus on enhancement of **28.5 acres** of tidal low marsh complex. The low marsh complex is predominantly vegetated by the hydrophytic grass *Spartina alterniflora* and contains mudflats and tidal channels. [10]

Within the low marsh complexes found in New England, typical percent coverage by *Spartina alterniflora* is observed to be 70% or greater within optimal salt marsh systems. *Spartina*-dominated marsh areas, mudflats, and tidal channels are all critical components of a healthy salt marsh ecosystem, providing habitat diversity and supporting ecological functions. The extent of colonization by *Spartina* within the low marsh system is based on a complicated balance of factors, including tidal range and frequency, salinity levels, and hydrological connectivity.

[10] USDA NRCS. (2002). "Plant guide for smooth cordgrass (*Spartina alterniflora*)." Natural Resources Conservation Service, USDA.

Given that the existing wetland system is regulated such that the duration of inundation by brackish water is reduced, it is anticipated that the enhanced aerial extent of *Spartina* will be less than that experienced for optimal typical salt marsh systems. This Mitigation Project sets a target of at least 50% *Spartina alterniflora* coverage across the entire restored tidal low marsh complex, with mudflats and channels forming the remaining areas of the complex. A healthy salt marsh relies on each of these habitat typologies for biodiversity and ecological functions.

The following Performance Standards define the success criteria for the enhancement of **28.5 acres** of the tidal wetland Mitigation Project area. The Performance Standards are to be achieved by the end of the five-year monitoring period, with Adaptive Management Plan (AMP) measures triggered as outlined below, based on ongoing monitoring results within the enhancement areas.

Mitigation Plan Performance Standards:

- At least 85% coverage by *Spartina alterniflora* throughout the vegetated areas within the tidal low marsh complex.

- No greater than 15% coverage of *Phragmites australis* (common reed) within the 28.5 acres of salt marsh complex, requiring elimination of small patches and aggressive treatment of larger infestations, with progress documented throughout the monitoring period.

Trigger for AMP Phase One in the Enhancement Areas:

- If the team determines that AMP Phase One is warranted, it will be initiated if monitoring data show that average *Phragmites* height and stem density within the salt marsh complex have not decreased by at least 15% compared to baseline conditions.

Baseline monitoring will be conducted prior to commencement of the Mitigation Work Plan (MWP) to document existing site conditions. Within one year after commencement of the MWP, Phase One of the AMP may be triggered to initiate corrective measures based on observed outcomes. Refer to Section 3.13 Mitigation Project Schedule – Enhancement Areas.

The outlined Performance Standards for the tidal wetland Mitigation Project are SMART as they are:

- Specific, detailing clear success criteria such as the required areal extent and coverage of *Spartina alterniflora*, acceptable coverage of non-vegetated areas, and control measures for *Phragmites australis*.

- Measurable, providing quantifiable thresholds, ensuring progress can be assessed objectively.

- Attainable, as the proposed criteria align with ecological benchmarks typical of functional tidal wetlands and are achievable with appropriate enhancement techniques.

- Reasonable (Practicable), focusing on site-specific ecological goals and addressing invasive species management in a feasible manner.

- Trackable, allowing for consistent monitoring and documentation over time, with clear metrics and requirements (e.g., tracking vegetation cover percentages and invasive species treatment efforts) to evaluate compliance and project success.

3.8 Mitigation Performance Standards – Creation Areas

Mitigation Performance Standards for the salt marsh creation areas have also been developed in accordance with the Ecological Performance Standard Criteria (USACE, 2020) to ensure clear, measurable, and objective assessment of project success. While the enhancement portion of the Mitigation Project focuses on improving conditions within existing tidal wetlands, the creation effort will establish **3.61 acres** of entirely new intertidal salt marsh habitat within previously upland areas.

Newly created salt marshes require careful consideration of grading, substrate stability, and tidal exchange to support the development of a self-sustaining, functional marsh system. The goal is to achieve a vegetated low marsh dominated by *Spartina alterniflora*, with appropriate siting of tidal channels to enhance habitat diversity and ecological function.

Within healthy, naturally occurring low marsh complexes in New England, *Spartina alterniflora* typically covers 70% or greater of the vegetated areas. For the created salt marsh, the target *Spartina alterniflora* coverage is set at 85% within the vegetated areas, recognizing that the establishment of marsh vegetation is influenced by hydrology, soil conditions, and salinity fluctuations. Hydrologic connectivity will be achieved through the construction of tidal channels linking the newly created areas to existing marsh systems, ensuring proper inundation and drainage.

The following Performance Standards define the success criteria for the **3.61 acres** of newly created salt marsh complex. The Performance Standards are to be achieved by the end of the five-year monitoring period, with adaptive management measures triggered as outlined below, based on ongoing monitoring results within the Creation Areas:

- At least 85% vegetative coverage by *Spartina alterniflora* within the vegetated portions of the created salt marsh.

- No greater than 15% coverage by *Phragmites australis* within the created marsh areas, with targeted removal and management measures to ensure suppression of invasive species, with progress documented throughout the monitoring period.

Trigger for the Adaptive Management Plan in the Creation Areas:

- The team will conduct ongoing monitoring within the Creation Areas. Within one year after commencement of the MWP in Creation Areas, the AMP may be triggered to initiate corrective measures based on observed outcomes. For additional details on the schedule and adaptive management strategies for the Creation Areas, refer to Section 3.14 Mitigation Project Schedule – Creation Areas and to Section 4.6 AMP in Creation Areas.

3.9 Tidal and Salinity Data Collection

Tidal water surface elevation and salinity data were collected from the Tweed New Haven Airport proposed marsh mitigation areas from July to September 2024. The monitoring was conducted using strategically placed salinity and water level data loggers to evaluate the potential effects of proposed mitigation actions, including increasing tidal exchange and elevation of brackish water inundation upstream of the tide gate. The collected data was analyzed to assess variability in tidal water surface

elevation and salinity, with a focus on understanding correlation to tide gate management. The results of the data collection are documented in the *Tweed New Haven Tidal Monitoring Report*, included as Appendix D.

Tidal water surface and salinity data was collected at 7 locations from July to August 2024 as shown in Figure 6 to provide a baseline characterization of conditions experienced within the proposed Mitigation wetlands, with targeted data collection within existing stands of *Phragmites*. The collected tidal water surface elevations and salinities at these locations are shown in Figure 7 and Figure 8. Figure 9 shows the maximum salinities recorded on July 25, 2024.



Figure 6 Data logger locations pre-relocation.

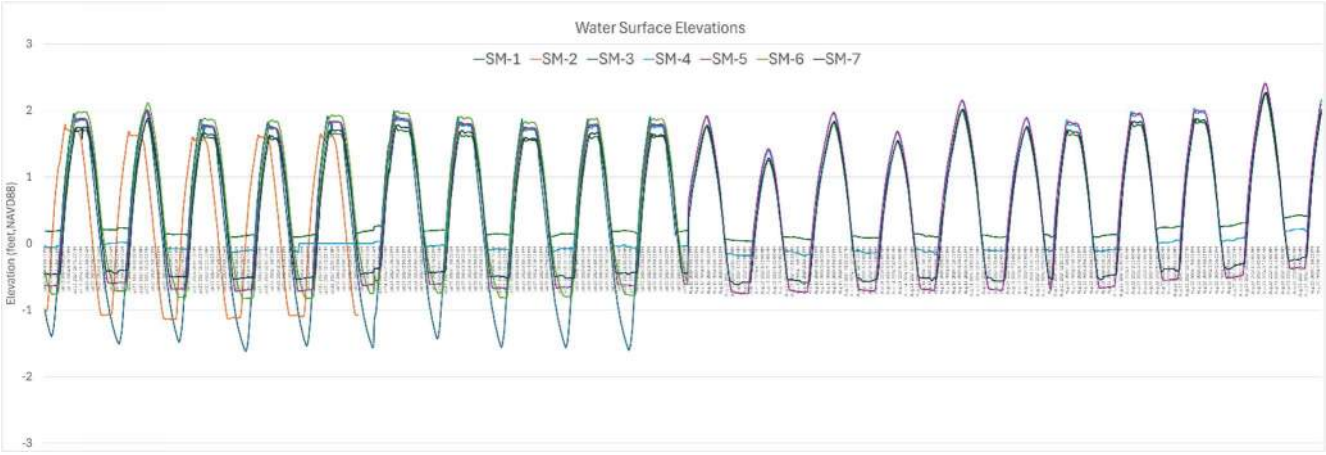

Figure 7 Pre-relocation elevation (NAVD88): July 19, 2024 to August 23, 2024

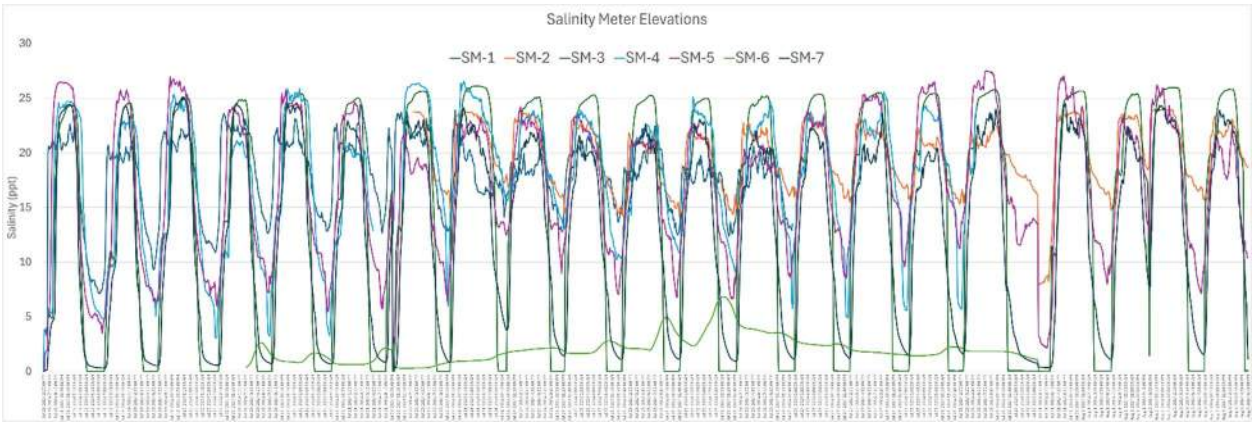

Figure 8 Pre-relocation salinity (ppt): July 19, 2024 to August 23, 2024.

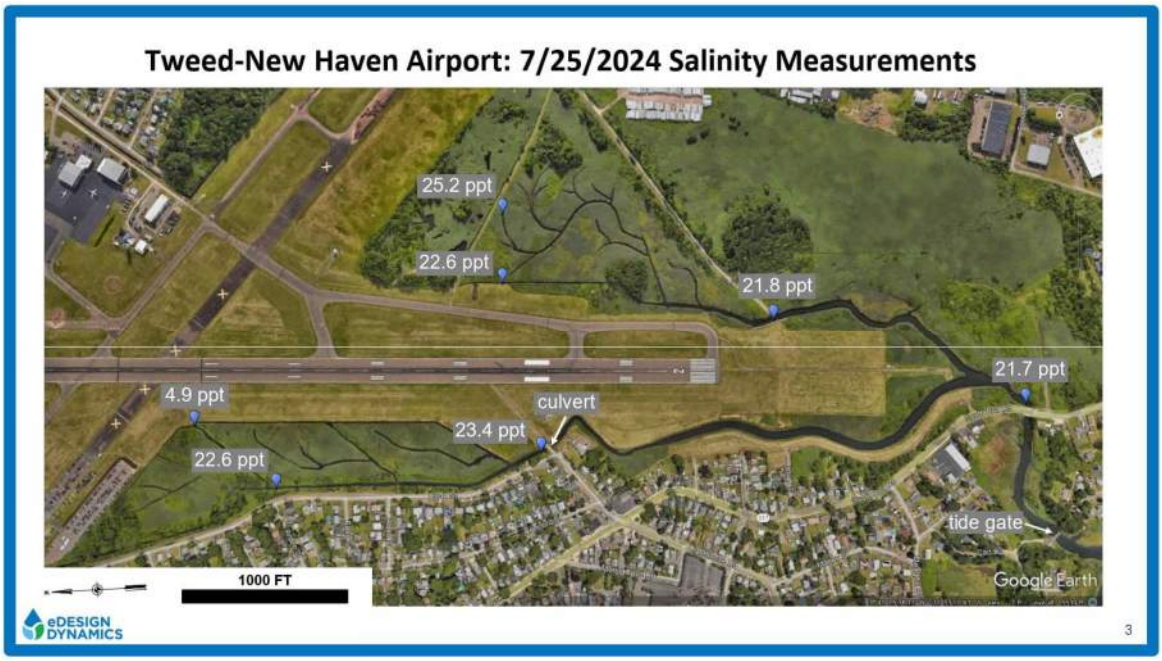

Figure 9 Pre-relocation salinity measurements, 7/25/2024

The data loggers were then moved to specifically target known stands of *Spartina alterniflora* within the proposed Mitigation wetland areas, to ascertain if the thriving *Spartina* areas were experiencing different water level or salinity conditions than the areas dominated by *Phragmites*. The loggers were left in this second location from late August 28, 2024, to September 20, 2024, as shown in Figure 10. Water surface elevation and salinity data collected from this time period are shown in Figure 11 and Figure 12. Figure 13 shows the maximum salinities recorded on September 15, 2024.



Figure 10 Data logger locations post-relocation

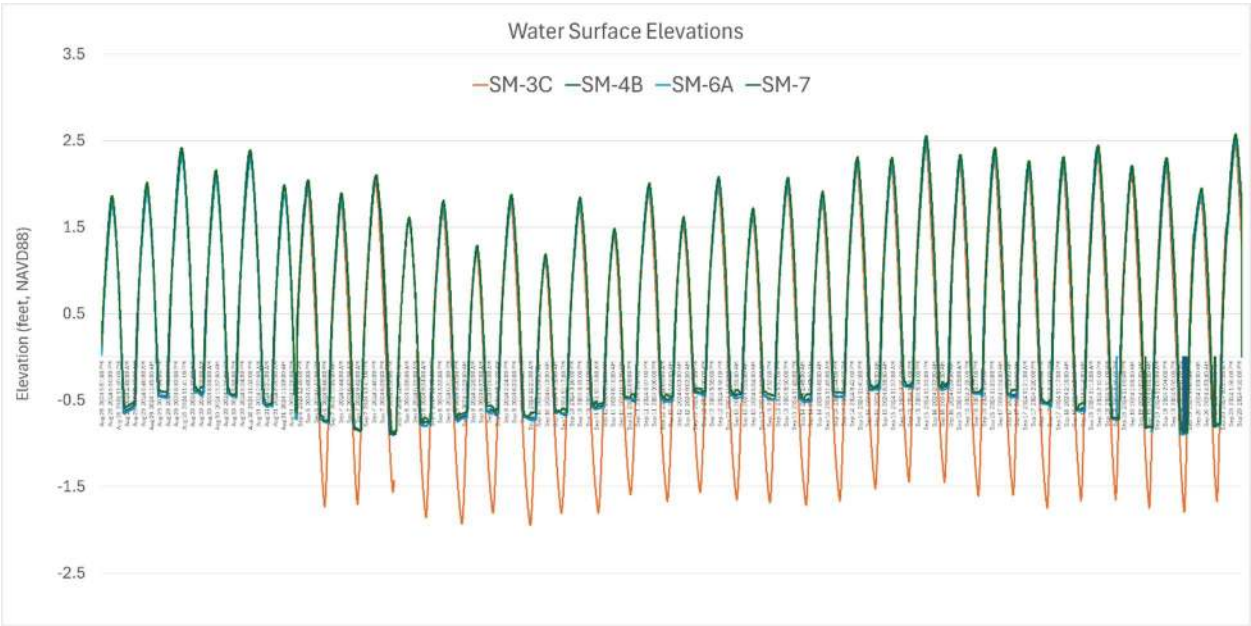

Figure 11 Post-relocation elevation (NAVD88): August 28, 2024 to September 20, 2024

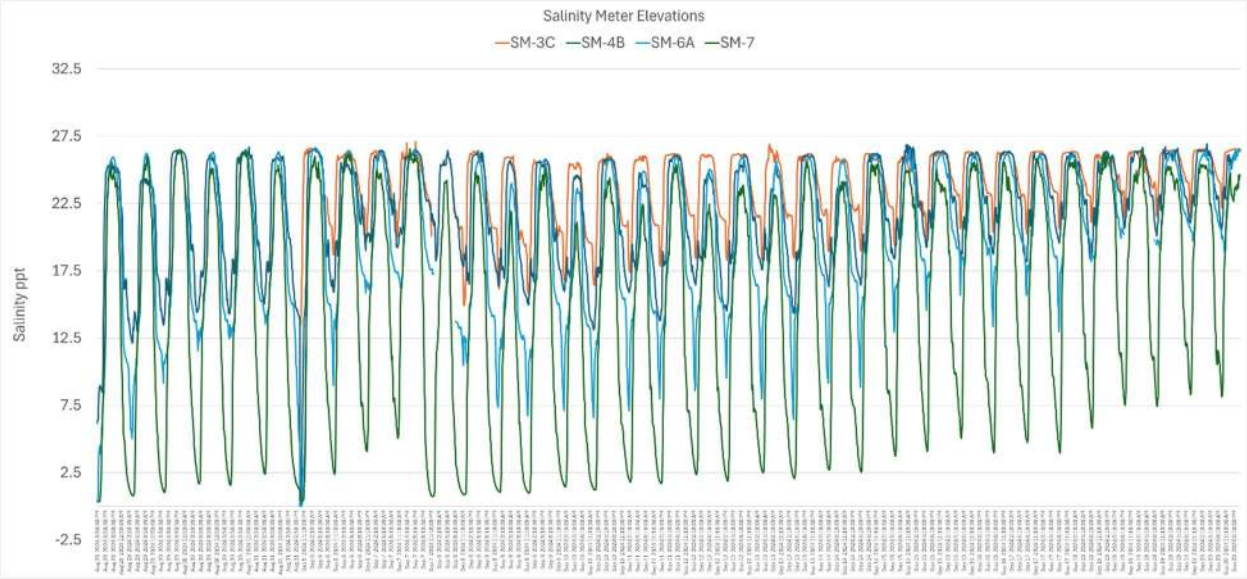

Figure 12 Post-relocation salinity (ppt): August 28, 2024 to September 20, 2024



Figure 13 Post-relocation salinity measurement, 9/15/2024

The results of the data collection effort support that water surface elevations upstream of the tide gate structure are regulated to stay at or below elevation 2.0 feet NAVD88 during periods of normal operation. The results indicate that the tidal column may not fully penetrate into the dense stands of *Phragmites* within the marsh mitigation areas, potentially limiting the benefits of tidal exchange in these areas. The tidal prism does not fully extend to the upstream extents of the marsh as managed under normal operational procedure. Freshwater inputs appear to be lowering salinity levels in the upper regions of the northwest marsh. It was determined from the data that the current duration of inundation within the existing stands of *Spartina* is six hours (average elevation 0.6 feet NAVD88); this duration has been set as the target duration for enhancement activities at elevation 2.5 feet NAVD88.

Research on the expansion and control of *Phragmites australis* in tidal wetlands has demonstrated that water salinity strongly influences soil salinity, which in turn affects plant community composition. For example, Hellings & Gallagher showed that increasing water salinity to 15–30 ppt significantly reduced *Phragmites* height, biomass, and underground reserves, indicating that sustained high water salinity can shift soil conditions to favor halophytic species like *Spartina alterniflora.* Their findings support the use of water salinity as an indicator of soil salinity in consistently flooded low marsh environments, as frequent tidal inundation facilitates the quick alignment of surface water and soil porewater salinity levels. A study by Medeiros, White, and Howes examined the role of salinity and competition in the replacement of *Phragmites australis* by *Spartina alterniflora* in New England salt marshes, demonstrating that elevated water salinity can effectively drive shifts in plant dominance. The research found that while both species exhibited reduced growth at higher salinity levels, *Phragmites* was disproportionately affected compared to *Spartina*, which exhibits greater tolerance to salinity. (Chambers et al., 2003) highlighted the role of water salinity as a proxy for soil salinity in determining the distribution and expansion of *Phragmites australis* in tidal wetlands. The research found that *Phragmites* invasion is constrained in areas where water salinity exceeds 10 ppt, as higher salinity leads to increased soil sulfide levels and reduced plant vigor. Field observations and experimental data confirm that soil salinity closely follows water salinity gradients, with frequent tidal exchange helping to maintain salinity levels that limit *Phragmites* colonization while favoring native marsh species like *Spartina alterniflora*.

Under a given tidal regime, soil salinity tends to reach a dynamic equilibrium, fluctuating within a predictable range at high tide and at low tide. If the tidal regime is altered to allow for a longer duration of high tide, this equilibrium shifts, potentially resulting in a new salinity range. This shift occurs because prolonged exposure to saline water increases the amount of salt that enters soil pore spaces.

Salt enters the soil through two primary mechanisms: convection and diffusion. Convection refers to the physical movement of saline water into the soil driven by tidal flow, while diffusion is the process by which salt ions move from areas of higher concentration (in the tidal water) to areas of lower concentration (within the soil). Together, these processes are described by the convection-diffusion equation, which governs solute transport in porous media (Guimond & Tamborski, 2021). As tidal inundation persists, more saltwater is introduced and retained within the soil, allowing greater penetration and retention of salt. This dynamic is often modeled similarly to a pollutant plume, with saline water moving with the groundwater (advection) and expanding outward due to diffusion, ultimately leading to an overall increase in soil salinity.

The collected tidal water surface elevation and salinity data demonstrate that increased tidal exchange will elevate salinity levels within the mitigation area, supporting the transition from a *Phragmites*-dominated system to a *Spartina*-dominated tidal low marsh. Given that low marsh habitats are regularly inundated by tidal waters, soil salinity in these areas is closely correlated with water salinity, as frequent tidal exchange allows for rapid equilibration between surface water and soil porewater.

It is also important to note that the use of reference sites is a well-established and effective strategy in wetland enhancement and creation, providing benchmarks for target hydrology, vegetation composition, and functional performance. In the case of this mitigation site, the presence of existing stands of *Spartina alterniflora* within the mitigation area offers a unique opportunity to use on-site reference conditions. These areas of low marsh vegetation are already adapted to the tidal regime proposed in the mitigation plan, including approximately six hours of inundation at elevations up to 2.5 feet NAVD88.

3.10 Mitigation Work Plan – Enhancement Areas

To achieve the Performance Standards, the tide gates located downstream of the Airport site will be controlled to increase the depth and duration of inundation of the stands of *Phragmites* located in the upstream tidal wetlands at the Airport. This will be combined with a mowing program to further inhibit the growth and spread of *Phragmites*. The increase in brackish water inundation, combined with mechanical control methods, will promote a more resilient and functioning salt marsh ecosystem.

Unlike traditional restoration projects involving significant construction activities, the Mitigation Work Plan employs an ecosystem-based approach centered on targeted inundation with saline water and mowing to control invasive *Phragmites* and promote the re-growth of native *Spartina*. While there are no typical construction elements such as grading or excavation, oversight will focus on ensuring the proper execution of inundation and mowing strategies, monitoring the hydrological response, and assessing ecological outcomes. This adaptive approach emphasizes ongoing monitoring and adjustments allowing the project to respond dynamically to observed site conditions and ecological feedback.

The FAA was involved in monthly coordination meetings with CT DEEP and USACE and has stated that the Mitigation Project, as reviewed by the FAA's Senior Wildlife Biologist Amy Anderson, would not be viewed as a wildlife attractant and adheres to the guidance on land uses within the FAA Advisory Circular AC 150/5200-33C *Hazardous Wildlife Attractants on or near Airports*, dated 2020.

The initial activities for the Mitigation Project will commence during year one of the implementation of the Mitigation Project and include:

- Adjustments to the tide gate operational procedure to allow for the inundation of *Phragmites australis* with saline water for an extended period of time to weaken its growth followed by;
- Scheduled mowing and removal of the cut *Phragmites australis* biomass to prevent regrowth and support native tidal wetland habitat enhancement; and
- Consistent monitoring and management of the Mitigation Project to achieve desired objectives.

A wetland scientist shall be on-site to monitor implementation of the Mitigation Work Plan to ensure compliance with the Mitigation Plan and to adjust when appropriate to meet mitigation goals. See the Monitoring Plan Section 5 in this Mitigation Plan for more information.

Mowing Program - Mowing will be conducted twice per year to effectively manage *Phragmites* growth and prevent its spread. Mowing reduces photosynthetic capacity and depletes energy reserves stored in the rhizomes. Studies have shown that repeated cutting can reduce *Phragmites* biomass and growth rate (Hazelton et al., 2014).

- Pre-mowing surveys will be conducted to ensure compliance with NDDB-listed bird species protection, ensuring that no sensitive species are present.

- Mowing will occur during two periods a year, in the early summer (June 15 – July 15) and in the fall (September 1 September 30).

- Before the first tide gate modification, mowing may take place as needed, only after pre-mowing bird and plant surveys have been completed.

Adjustments to Inundation - Maintain standing brackish water over mowed areas to increase salinity levels and suppress *Phragmites* regrowth. Monitoring will assess whether this approach successfully reduces *Phragmites* and allows *Spartina* to increase.

Grading / Excavation - To avoid excess sedimentation and disturbance within the existing wetlands, excavation and removal of *Phragmites australis* is not proposed at this time. Mowing and removal of the above ground *Phragmites* biomass is proposed during initial implementation of the Mitigation Project. Therefore, **no grading changes are proposed** as part of the Mitigation Project for Enhancement Areas. Any grading or earthwork, if required, will be addressed as part of the AMP.

Erosion Controls - Similarly, **no erosion controls will be necessary**, as the Mitigation Project for Enhancement Areas does not involve construction or earthwork. Any earthwork activities, if required as part of future adaptive management, will be addressed under the AMP. Any actions beyond increased inundation and mowing of *Phragmites* will be addressed as part of the AMP.

Adjustments to the Mowing Program and Adjustments to Inundation, along with proposed mitigation monitoring, are further described in the following sections.

3.10.1 Mowing Program

The mowing program for the Mitigation Project has been designed to control *Phragmites australis* while protecting the NDDB-listed plant and bird species of concern. The approach will balance management of invasive species with careful timing to minimize impacts to sensitive habitats and species during critical periods such as breeding and growing seasons.

Pre-mowing surveys shall be conducted prior to each mowing event to ensure no listed bird or plant species are present in the immediate mowing areas. If bird nesting or sensitive plants are identified, mowing shall be adjusted or delayed to protect those species.

Year-Round Mowing Guidelines:

- **Frequency**: Mowing will occur twice per year to effectively manage *Phragmites* growth and prevent its spread. The mowing program of *Phragmites* will occur during the early summer (between June 15 – July 15) and during the fall (September 1 – September 30).

- **Height**: Vegetation will be mowed or selectively cut to a height of approximately 6-8 inches above existing grade to ensure *Phragmites* regrowth is suppressed while protecting lower-lying native plants. Mowing will be limited to areas with monoculture stands of *Phragmites*. In mixed vegetation areas, selective cutting will be employed to avoid impacting desirable plant species.

- **Removal of Cuttings**: All cut, above-ground biomass of *Phragmites* material must be removed from the site to prevent regrowth, and care must be taken to avoid soil surface compaction that could lead to grade changes.

    - All debris generated from removals must be transported off-site and properly disposed of at an approved facility, in compliance with applicable regulations. Disposal shall be conducted at the contractor's expense.

Specific Mowing Schedule:

- **Early Summer Mowing (June 15 - July 15)**:
  - **Purpose**: Target early-season *Phragmites* growth before seed production begins, reducing the risk of seed dispersal.

  - **Bird Protection**: To avoid disturbing NDDB-listed bird species, this mowing will be scheduled after the nesting season for ground-nesting birds but before young birds are fledging.

- **Fall Mowing (September 1 – September 30)**
  - **Purpose**: A mowing in the fall will target *Phragmites* regrowth, ensuring it is weakened before the winter dormancy period.

  - **Bird Protection**: Conduct mowing after migratory birds have left the area, ensuring no disturbance to bird species during migration.

- **Initial Mowing (as needed)**
  - An initial mowing is planned prior to the first tide gate modification and will be conducted as needed, and only after the completion of pre-mowing bird and vegetation surveys.

3.10.2 Adjustments to Inundation

The Mitigation Project includes manipulating the inundation level of tidal wetlands within the Airport by the management of tide gate operations coordinated with the tidal cycle.

The proposed mitigation approach will be controlled by changes to the existing tide gate operational procedure and implementation of means to lock the flap gate structure. Any actions beyond increased inundation and mowing of *Phragmites* will be addressed as part of the AMP.

The tide gate operation will be modified to allow greater tidal exchange and prolonged inundation of brackish water in the mitigation wetlands, supporting the shift from *Phragmites australis* dominance to *Spartina alterniflora*. The revised operational procedure focuses on increasing the water levels upstream of the tide gate within the tidal wetlands at the Airport. The timing of tide gate closures will be adjusted to maintain brackish conditions for longer periods than previously permitted by the existing operation of the gate, while still preserving flood control during storm events.

The following outlines the proposed tide gate operational procedure to achieve the proposed Mitigation actions:

1. **Tide Gate Operation in Normal Conditions**:

   - The sluice gates will be opened to allow the water surface elevation (WSE) upstream to reach the desired water level of 2.5’ NAVD88. The exact opening measurement of the sluice gates will be based on tide gate monitoring.

   - Once the desired water level of 2.5’ NAVD88 is achieved, the sluice gates will be closed, allowing the brackish water to remain upstream for an extended period. Based on review of the tidal data collected for the site, the inundation period at elevation 2.5’ NAVD88 and

below will be inundated for an initial period of six (6) hours. To sustain a water level of 2.5' throughout the marsh, the tide gate will be closed when the water level immediately upstream of the tide gate reaches 2.59'. Through H&H modeling it was determined that closure at 2.59' maintains a WSE of 2.5 ft for six hours in the upper reaches of the marsh. Refer to Appendix D Tidal Monitoring Analysis and Appendix H Hydraulic Analysis of Proposed Tide Gate Operation for further information on the planned inundation water level.

- The existing flap gate will be replaced with a mechanized sluice gate to be kept shut during this operation, except during storm events, to prevent premature drainage and maintain brackish conditions. The mechanized sluice gate provides a means of locking to achieve optimal flooding duration. Should water levels upstream of the tide gates exceed maximum allowable elevations due to groundwater and surficial water inputs, the sluice gates will be opened until desired elevations are reached.

- These changes to operational procedure will be made by reprogramming the automated Supervisory Control and Data Acquisition (SCADA) system that controls the AUTO operational mode.

- The proposed WSE of 2.5' was determined to be the highest allowable that would not flood the Airport's safety areas and would not increase the risk of flooding to nearby properties, residents, or roads. The proposed inundation at a WSE of 2.5' will only take place during dry weather periods where there will be no additional inputs to the system and no change in WSE. Figure 14 shows an inundation map that depicts proposed conditions.

By raising the normal height of the sluice gate and timing its closure to keep water levels higher for longer upstream, the modified procedure will support tidal wetland enhancement at the Airport while still protecting against flooding. The automated system will still allow for real-time adjustments when necessary to balance habitat goals with flood control measures.

See Appendix D Tidal Monitoring Analysis and Appendix H Hydraulic Analysis of Proposed Tide Gate Operation for more information.

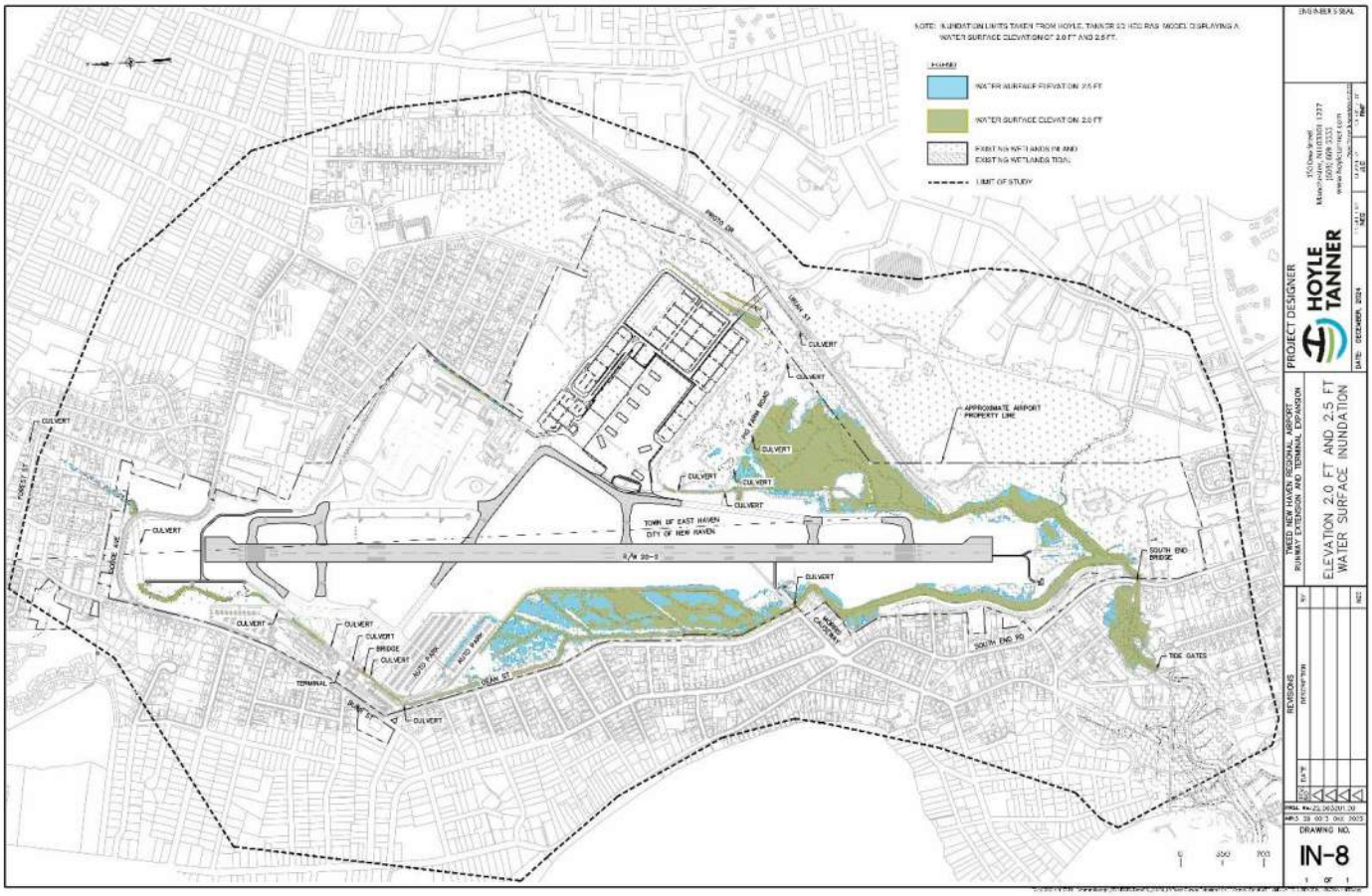

Figure 14 Water surface inundation at 2.0' (existing condition) and 2.5' (proposed condition)

2. **Storm Event Procedure**:

    - When severe weather is forecast, the tide gate will be switched to Watershed Drain Mode, preemptively lowering water levels upstream to prevent flooding as previously described. There will be no loss of storage in the system during rain events as a result of the Work Plan.

    - During this period, the gates will function as they do under current storm preparation guidelines, with automatic adjustments to manage water levels both upstream and downstream of the tide gate.

3.11 Mitigation Work Plan – Creation Areas

The construction of the salt marsh creation areas will be executed using standard best management practices for wetland creation to minimize disturbance to adjacent habitats. The work will follow a structured sequence, including site preparation, excavation, placement of imported soil, tidal channel construction, planting, installation of waterfowl barriers, and post-construction monitoring.

3.11.1 Pre-Construction Activities

Prior to construction, pre-construction surveys will be conducted to ensure that no federally or state-listed bird or plant species are present within the planned creation areas. If nesting birds or sensitive plant species are identified, work will be adjusted or delayed to avoid impacts in accordance with regulatory guidelines as determined by the associated Mitigation Plans developed to address species impacts with CTDEEP.

Erosion and sediment control (E&S) measures will be installed along the perimeter and interior of the creation sites to protect adjacent wetland resource areas that are not designated for disturbance. These controls will include silt fencing, straw bales, and other appropriate measures to prevent sediment migration into undisturbed areas. E&S measures will remain in place and be actively maintained throughout the duration of construction.

3.11.2 Excavation and Removals

Excavated material will be characterized for disposal, analyzing for federal, state, and facility-specific criteria. Additional protocols for soil characterization and handling will be outlined in the Contract Documents for the Mitigation Project. All excavated material will be transported offsite to a suitable disposal facility.

The existing creation sites are currently upland vegetation communities with a mix of early successional trees, shrubs, vines, and herbaceous species. To transition these areas into a functioning tidal salt marsh complex, soil will be excavated to an elevation of 1.0 feet NAVD88 with sand being placed to an elevation of approximately 2.0 feet NAVD88 to achieve target elevations for low marsh vegetation.

To limit disturbance and minimize erosion risks, the amount of exposed soil will be carefully managed, ensuring that only the areas actively undergoing excavation and grading remain open at any given time.

3.11.3 Grading and Placement of Clean Sand

Once excavation is complete, clean, low-nutrient sandy planting medium will be placed within the creation areas to achieve final elevations that support low salt marsh habitat. The creation sites will be graded to the final design elevations as shown on the Grading Plan, ensuring a 3% slope from a high elevation of 2.3’ NAVD88 downward. This grading approach will ensure proper tidal inundation and drainage to support salt marsh vegetation establishment.

Tidal channels will also be constructed and graded to connect the created marsh areas to existing tidal channels, ensuring proper hydrologic exchange. These channels will facilitate the distribution of water during tidal flooding and aid in drainage as the tide recedes, promoting natural sediment transport and salinity regulation.

3.11.4 Vegetation Planting

Once final grades are established, native salt marsh vegetation will be planted to facilitate marsh development. *Spartina alterniflora* plugs will be planted 18 inches on center across the vegetated portions of the created marsh. Planting will be conducted by hand to minimize disturbance.

To protect newly planted *Spartina* from waterfowl herbivory, temporary waterfowl exclusion barriers will be installed immediately after planting. These barriers will remain in place until plantings are well rooted and vegetated areas reach 85% cover.

3.11.5 Post-Construction Activities

Upon completion of construction, all access roads and staging areas used during excavation and grading will be returned to their pre-construction conditions. Any temporary infrastructure installed for construction access will be removed, and disturbed areas outside of the created marsh footprint will be stabilized as necessary.

A five-year monitoring program will commence following commencement of the MWP to assess the success of the newly created salt marsh. Within one year after commencement of the MWP in Creation Areas, the AMP may be triggered to initiate corrective measures based on observed outcomes. For additional details on the schedule and adaptive management strategies for the Creation Areas, refer to Section 3.14 Mitigation Project Schedule – Creation Areas and to Section 4.6 AMP in Creation Areas.

3.12 Mitigation Monitoring

Project monitoring will determine if the mitigation efforts meet the set Performance Standards and if measures are necessary to ensure the Project is accomplishing its objective, according to the requirements of 33 C.F.R. § 332.6. Monitoring reports will be submitted to assess the development and condition of the mitigation project.

Within one year after commencement of the MWP in Enhancement Areas and the MWP in Creation Areas, then AMP may be triggered to initiate corrective measures based on observed outcomes.

Refer to the Monitoring Plan Section 5 of this Mitigation Plan for information on the specific mitigation monitoring protocols, scopes, and reporting requirements for monitoring to occur after implementation of the Mitigation Work Plan and as needed to occur during the AMP in the Enhancement Areas and/or the AMP in the Creation Areas.

3.13 Mitigation Project Schedule – Enhancement Areas

The Mitigation Project activities for enhancement of the tidal wetlands will follow a phased approach to ensure the improvement of wetland functions and compliance with USACE guidelines.

The timetable shown in Table 6 outlines the target dates of key mitigation milestones for the enhancement areas:

Table 6 Implementation Schedule for Enhancement Areas.

ACTIVITY	DATE
Secure all necessary permits and approvals from USACE and other regulatory bodies for the Mitigation Project	January 2026
Baseline monitoring before commencement of the Mitigation Work Plan (MWP)	October 2025
Commencement of the Mitigation Work Plan (MWP)	March 2026

Annual vegetation monitoring	August 2026
Within one year after commencement of the MWP, AMP Phase One may be triggered.	September 2026
Annual vegetation monitoring	August 2027
If applicable – AMP Phase Two is triggered.	September 2027
Annual vegetation monitoring	August 2028
If applicable -- AMP Phase Three is triggered.	September 2028
Annual vegetation monitoring	August 2029
If applicable -- AMP Phase Four is triggered.	September 2029
Annual vegetation monitoring	August 2030
Annual vegetation monitoring	August 2031
Completion and Closeout of the MWP, including achievement of the MWP Performance Standards	October 2031
Regulatory Release and Commencement of Long-Term Management Plan (LTMP)	December 2031
If applicable – additional one-year period of monitoring and adaptive management enhancements to determine if final MWP Performance Standards are met. If the MWP Performance Standards are not met after an additional one-year period, then monitoring and adaptive management enhancements shall occur for another one-year period; this cycle of additional one-year periods to continue to occur until the MWP Performance Standards have been met.	September 2031 – September 2032

Annual monitoring is conducted in August, prior to the September mowing program, to allow the team to evaluate whether adaptive management strategies should be implemented. Monitoring in August is specifically timed to capture the majority of the growing season, ensuring that vegetation assessments reflect the peak condition of the wetland and provide the most accurate data for performance evaluation.

3.14 Mitigation Project Schedule – Creation Areas

The implementation schedule for the creation areas aligns with the enhancement areas but follows a more straightforward timeline focused on construction, monitoring, and adaptive management, if needed. Following the securing of necessary permits, baseline monitoring will first be conducted, with construction commencing soon after. Once the marsh creation work is complete, annual vegetation monitoring will occur every August for five years, to assess the growth of *Spartina alterniflora*. Within one year of initiating the MWP in the Creation Areas, an Adaptive Management Plan may be activated to implement corrective actions based on observed outcomes. After the 5-year monitoring period and upon successful achievement of Performance Standards, the MWP will be completed, followed by regulatory release and the commencement of long-term management.

Table 7 Implementation Schedule for Creation Areas.

ACTIVITY	DATE
Secure all necessary permits and approvals from USACE and other regulatory bodies for the Mitigation Project	January 2026
Commencement of the Mitigation Work Plan (MWP) for Creation Areas including site preparation, excavation and removals, and grading	March – April 2026

Complete the MWP including placement of sand, planting, and installation of waterfowl barrier	May 2026
Annual vegetation monitoring	August 2026
Within one year after commencement of the MWP, AMP strategies may be triggered.	September 2026
Annual vegetation monitoring	August 2027
Annual vegetation monitoring	August 2028
Annual vegetation monitoring	August 2029
Annual vegetation monitoring	August 2030
Annual vegetation monitoring	August 2031
Completion and Closeout of the MWP, including achievement of the MWP Performance Standards	October 2031
Regulatory Release and Commencement of Long-Term Management Plan (LTMP)	December 2031

3.15 Mitigation Project Responsible Parties

The responsible parties for the Mitigation Project will ensure that all relevant stakeholders are actively engaged in the successful execution of the Mitigation Work Plan, including the Adaptive Management Plan as applicable. The Airport is a commercial service airport owned by the City of New Haven. TNHAA has full control of the operation and management of the airport, including land, buildings and easements by virtue of a lease to the authority by the City of New Haven. On August 19, 2022, TNHAA entered into a long-term Lease & Development Agreement with The New HVN, LLC.

The New HVN, LLC will be included in all phases of planning and implementation to maintain alignment with the lease agreement and broader project objectives. The team, comprised of Hoyle Tanner and eDesign Dynamics, will lead the technical aspects of the project, leveraging their expertise to deliver the outcomes described in this Mitigation Plan. Additionally, a wetland scientist or ecologist will perform the vegetation surveys. Other professionals will be brought on to the team as needed to provide specialized knowledge and oversight, ensuring that the Mitigation Work Plan is executed in accordance with regulatory requirements and ecological best practices. This collaborative approach will promote accountability and ensure that the goals of the Mitigation Plan are met.

4. Adaptive Management Plan

4.1 Adaptive Management Plan Overview

The AMP provides an approach for the implementation of actions based on monitored conditions to address foreseeable and unforeseen circumstances that may adversely impact Mitigation Project success. The AMP has been developed according to the requirements of 33 C.F.R. § 332.7(c).

Monitoring results will guide decisions on whether additional management actions are necessary. The AMP will be implemented, if required, within one year after implementation of the Mitigation Work Plan within both the Enhancement Areas and Creation Areas. During this time, the Applicants will enact repairs to the Mitigation Project and/or additional activities as outlined in the AMP, with the goal of achieving the stated Performance Standards.

For the enhancement areas, AMP phases will include monitoring of the following: water level monitoring (monthly water level monitoring will be conducted to assess the extent of tidal inundation in addition to monthly tide gate inspections and salinity assessments); vegetation monitoring (annual vegetation surveys will assess plant composition, height, stem density, & health and the adjustment of monitoring transects within the salt marsh complex as needed); invasive species monitoring (rapid invasive species surveys will be conducted from May to October to track *Spartina alterniflora* growth and *Phragmites australis* regrowth); and wildlife monitoring (wildlife presence and species observations will be documented during the same time as the annual vegetation surveys).

For the creation areas, the AMP provides straightforward corrective strategies to ensure the successful establishment of a functional tidal marsh. These strategies include supplemental planting, substrate stabilization measures, such as additional sand placement to address sediment loss, and/or tidal channel adjustments to improve hydrologic connectivity if needed. Invasive species control will be implemented through manual removal or, if necessary, selective herbicide application. To mitigate waterfowl grazing, additional temporary exclusion barriers will be installed as needed to protect plantings. These adaptive strategies will ensure that the created salt marsh meets Performance Standards at the end of the 5-year monitoring period and develops into a resilient tidal wetland habitat.

Refer to Sections 5.6.5 and 5.6.6. Monitoring Scopes for more detail on each of the monitoring scopes.

4.2 AMP Phase One in the Enhancement Areas: Initial Hydrologic & Vegetative Management

Objective: Enhance salinity exposure and reduce *Phragmites australis* competitiveness by increasing tidal exchange and targeted herbicide application.

Actions:

Herbicide Application: Selective spot treatments with herbicide are part of the integrated management approach, ensuring careful application to minimize impacts on non-target species. Apply an approved herbicide (e.g., glyphosate or imazapyr) specifically formulated for wetlands to areas of *Phragmites* regrowth. Herbicide treatment in conjunction with hydrologic manipulation has been shown to effectively control *Phragmites* (Kettenring & Adams, 2011). The timing of the application is critical; it shall occur in the fall, when *Phragmites* is transporting nutrients to its roots.

Given the application of herbicide in the fall, mowing will only be performed once a year, during the early summer period from June 15 through July 15. Note that the mowing program will continue once a year in the early summer with an herbicide application in the fall for all Phases of the AMP.

Extended Inundation: Increase the duration of brackish water inundation following herbicide application. Increased inundation time of the treated area in brackish water for an extended period will further stress *Phragmites* and prevent regrowth.

Excavate Tidal Channels: Excavate a series of tidal channels to improve tidal flushing. Additional deepening of existing tidal channels to facilitate greater tidal exchange, increasing both the frequency and extent of brackish water inundation. These actions will enhance the marsh's

ability to naturally regulate salinity levels and support native vegetation. Increased tidal flushing reduces the risk of freshwater ponding, which favors *Phragmites* (Rooth et al., 2003).

- Soil Testing: Soil testing is required prior to excavation and disposal of material offsite, to determine contamination levels, if any, and ensure that the material is disposed of in an appropriate, approved facility in compliance with regulatory standards.

- Transport to Landfill: The excavated material is to be loaded into a truck and secured with a cover to prevent the material from shifting or blowing away during transport to the landfill.

- Workers are to remain vigilant to prevent spreading invasive *Phragmites*, using vehicle transport, avoid walking the grounds within the Airport, and minimizing direct contact with bare ground to limit the risk of unintentional propagation.

- Equipment: All trucks, excavation equipment, and all other equipment and vehicles utilized for manual excavation will be regularly cleaned within the wash area garage located onsite at the Airport and inspected to prevent the spread of invasive species.

- Gear and Clothing: After handling *Phragmites*, workers will thoroughly clean gear and clothing to prevent spreading viable plant fragments or seeds. Workers will thoroughly wash off boots in the wash area garage at the Airport. Workers' clothing and PPE will be placed in sealed bags for laundering off-site.

The location(s) for herbicide application, tidal channel excavation, and the time period for inundation extension will be informed by the monitoring scopes performed by the team.

Trigger for AMP Phase Two:

- If the team determines after one year that AMP Phase Two is warranted, it will be initiated if monitoring data show that average *Phragmites* height and stem density within the salt marsh complex have not decreased by at least 20% compared to baseline conditions.

4.3 AMP Phase Two in the Enhancement Areas: Expanded Hydrologic Improvement and Invasive Species Control

Objective: Further improve tidal exchange and suppress *Phragmites* regrowth by expanding channel excavation and continuing to mow once a year in the early summer with additional herbicide application in the fall.

Actions:

Continued Herbicide Application: Selective spot treatments with herbicide are part of the integrated management approach, ensuring careful application to minimize impacts on non-target species. Apply an approved herbicide (e.g., glyphosate or imazapyr) specifically formulated for wetlands to areas of *Phragmites* regrowth. Herbicide treatment in conjunction with hydrologic

manipulation has been shown to effectively control *Phragmites* (Kettenring & Adams, 2011). The timing of the application is critical; it shall occur in the fall, when *Phragmites* is transporting nutrients to its roots.

Given the application of herbicide in the fall, mowing will only be performed once a year, during the early summer period from June 15 through July 15. Note that the mowing program will continue once a year in the early summer with an herbicide application in the fall for all Phases of the AMP.

Additional Tidal Channel Excavation: Expand and deepen the network of tidal channels to enhance tidal flushing, increasing brackish water inundation frequency and extent, improving salinity regulation, supporting native vegetation, and reducing freshwater ponding that favors *Phragmites*.

- Soil Testing: Soil testing is required prior to excavation and disposal of material offsite, to determine contamination levels, if any, and ensure that the material is disposed of in an appropriate, approved facility in compliance with regulatory standards.

- Transport to Landfill: The excavated material is to be loaded into a truck and secured with a cover to prevent the material from shifting or blowing away during transport to the landfill.

- Workers are to remain vigilant to prevent spreading invasive *Phragmites*, using vehicle transport, avoid walking the grounds within the Airport, and minimizing direct contact with bare ground to limit the risk of unintentional propagation.

- Equipment: All trucks, excavation equipment, and all other equipment and vehicles utilized for manual excavation will be regularly cleaned within the wash area garage located onsite at the Airport and inspected to prevent the spread of invasive species.

- Gear and Clothing: After handling *Phragmites*, workers will thoroughly clean gear and clothing to prevent spreading viable plant fragments or seeds. Workers will thoroughly wash off boots in the wash area garage at the Airport. Workers' clothing and PPE will be placed in sealed bags for laundering off-site.

The location(s) for herbicide application and additional tidal channel excavation will be informed by the monitoring scopes performed by the team.

Trigger for AMP Phase Three:

- If the team determines after one year that AMP Phase Three is warranted, it will be initiated if monitoring data show that average *Phragmites* height and stem density within the salt marsh complex have not decreased by at least 25% compared to baseline conditions.

4.4 AMP Phase Three in the Enhancement Areas: Elevation Modification and Targeted Removal of *Phragmites*

Objective: To enhance native tidal wetland habitat by excavating *Phragmites*-dominated areas and lowering elevations to suitable tidal levels for the natural re-growth by *Spartina alterniflora*.

Actions:

- **Continued Herbicide Application**: Selective spot treatments with herbicide are part of the integrated management approach, ensuring careful application to minimize impacts on non-target species. Apply an approved herbicide (e.g., glyphosate or imazapyr) specifically formulated for wetlands to areas of *Phragmites* regrowth. Herbicide treatment in conjunction with hydrologic manipulation has been shown to effectively control *Phragmites* (Kettenring & Adams, 2011). The timing of the application is critical; it shall occur in the fall, when *Phragmites* is transporting nutrients to its roots.

  Given the application of herbicide in the fall, mowing will only be performed once a year, during the early summer period from June 15 through July 15. Note that the mowing program will continue once a year in the early summer with an herbicide application in the fall for all Phases of the AMP.

- **Manual Excavation**: In areas where *Phragmites* persists, manual excavation of rhizomes and stems will be conducted to remove any extensive monocultures. This method is labor-intensive but can be effective in small patches where other methods have been less successful.

    - Soil Testing: Soil testing is required prior to excavation and disposal of material offsite, to determine contamination levels, if any, and ensure that the material is disposed of in an appropriate, approved facility in compliance with regulatory standards.

    - Transport to Landfill: The excavated material is to be loaded into a truck and secured with a cover to prevent the material from shifting or blowing away during transport to the landfill.

    - Workers are to remain vigilant to prevent spreading invasive *Phragmites*, using vehicle transport, avoid walking the grounds within the Airport, and minimizing direct contact with bare ground to limit the risk of unintentional propagation.

    - Equipment: All trucks, excavation equipment, and all other equipment and vehicles utilized for manual excavation will be regularly cleaned within the wash area garage located onsite at the Airport and inspected to prevent the spread of invasive species.

    - Gear and Clothing: After handling *Phragmites*, workers will thoroughly clean gear and clothing to prevent spreading viable plant fragments or seeds. Workers will thoroughly wash off boots in the wash area garage at the Airport. Workers' clothing and PPE will be placed in sealed bags for laundering off-site.

- **Lower the Elevation within Excavated Areas:** In areas where monoculture stands of *Phragmites* are excavated, lower the elevation to align with the optimal tidal wetland elevations that have been shown to support successful *Spartina alterniflora* re-growth.

The location(s) for herbicide application and manual *Phragmites* excavation and the target elevation for the lowering of *Phragmites*-removal areas will be informed by the monitoring scopes performed by the team.

Trigger for AMP Phase Four:

- If the team determines after one year that AMP Phase Four is warranted, it will be initiated if monitoring data show that average *Phragmites* height and stem density within the salt marsh complex have not decreased by at least 30% compared to baseline conditions.

4.5 AMP Phase Four in the Enhancement Areas: Final Elevation Adjustments and Active Planting

Objective: Enhance a resilient *Spartina alterniflora* cover by refining elevations, adding clean sand, and planting native marsh vegetation. Includes expanding upon the action from Phase Three of excavating areas of *Phragmites* and lowering the elevation of excavated areas to the tidal elevations where successful *Spartina alterniflora* regrowth has been observed.

Actions:

- **Additional Areas of Manual Excavation**: Includes additional areas of *Phragmites* manual excavation expanding upon the areas excavated from Phase Three.
    - Soil Testing: Soil testing is required prior to excavation and disposal of material offsite, to determine contamination levels, if any, and ensure that the material is disposed of in an appropriate, approved facility in compliance with regulatory standards.
    - Transport to Landfill: The excavated material is to be loaded into a truck and secured with a cover to prevent the material from shifting or blowing away during transport to the landfill.
    - Workers are to remain vigilant to prevent spreading invasive *Phragmites*, using vehicle transport, avoid walking the grounds within the Airport, and minimizing direct contact with bare ground to limit the risk of unintentional propagation.
    - Equipment: All trucks, excavation equipment, and all other equipment and vehicles utilized for manual excavation will be regularly cleaned within the wash area garage located onsite at the Airport and inspected to prevent the spread of invasive species.
    - Gear and Clothing: After handling *Phragmites*, workers will thoroughly clean gear and clothing to prevent spreading viable plant fragments or seeds. Workers will thoroughly wash off boots in the wash area garage at the Airport. Workers' clothing and PPE will be placed in sealed bags for laundering off-site.

- **Clean Sand Placement**: Place a one-foot depth of a clean sandy planting medium in areas of manual excavation. The finished grades of the over-excavated areas will be designed to meet the tidal elevations where successful *Spartina alterniflora* regrowth has been observed elsewhere within the Airport site.

- **Plug Planting**: Planting plugs of *Spartina alterniflora* within the excavated, new sandy zones, at optimal tidal elevations will encourage the regrowth of a dense, resilient cover of native vegetation, supporting the enhancement of the tidal wetland habitat.

The design of the additional areas of excavation, clean sand placement, and plug planting will be informed by the water level monitoring, vegetation monitoring, and invasive species monitoring scopes.

If the Mitigation Work Plan (MWP) Performance Standards are not met by the end of the 5-year period of monitoring and adaptive management, then monitoring and adaptive management measures will be extended for an additional year. If the standards remain unmet after this period, successive one-year extensions will continue until the MWP Performance Standards are achieved. Adaptive management measures may include one or a combination of actions, determined by the team based on lessons learned from the effectiveness of previous AMP phase enhancements.

4.6 AMP in the Creation Areas

The AMP for the salt marsh creation areas is designed to ensure the successful creation of a salt marsh system. Unlike the enhancement areas, which require a phased approach to manage hydrology and invasive species, the creation areas will follow a more straightforward set of corrective strategies. If monitoring results indicate a need for corrective measures, AMP strategies in the creation areas will be implemented within one year following the Mitigation Work Plan's commencement, as determined by the team. These strategies focus on vegetation establishment, substrate stability, and tidal connectivity, ensuring the created marsh functions as intended.

Supplemental Planting of *Spartina alterniflora*

Supplemental planting of *Spartina alterniflora* will be implemented in underperforming sections. Plugs will be planted at 18-inch spacing to enhance vegetative cover and promote natural expansion.

Substrate Stabilization

Additional sand placement may be required in areas where significant sediment loss has occurred to restore target elevations for low marsh habitat.

Tidal Channel Adjustment and Hydrologic Connectivity

If tidal channels fail to maintain proper hydrologic connectivity, modifications will be made to ensure adequate tidal exchange. Minor regrading or sediment removal may be conducted to clear obstructions and improve drainage.

Invasive Species Control

If *Phragmites australis* or other invasive species establish within the created marsh, targeted removal efforts will be implemented. Manual removal and/or selective herbicide application (if necessary and approved) may be utilized to suppress invasive regrowth.

Wildlife Protection and Herbivory Management

If plant loss is attributed to waterfowl grazing, additional temporary waterfowl exclusion barriers will be installed to protect young plantings until they become well established.

By implementing these adaptive management strategies as needed, the Mitigation Project will ensure that the newly created salt marsh areas develop into functional tidal wetland habitat that meets the Mitigation Project Performance Standards.

4.7 Adaptive Management Plan Conclusion

The AMP Plan provides a flexible framework for both the enhancement and creation of tidal wetland habitat. By adjusting management strategies based on monitoring results, the AMP in the Enhancement Areas plan aims to reduce *Phragmites australis* dominance and enhance the conditions for *Spartina alterniflora* re-growth. For the creation areas, the AMP will ensure the successful establishment of the newly constructed salt marsh by addressing vegetation establishment, substrate stability, and tidal connectivity through targeted corrective actions. Regardless, it is anticipated that the initial Mitigation Project efforts will significantly expand and improve the tidal wetland habitat.

5. Monitoring Plan

5.1 Monitoring Plan Overview

Monitoring of the Mitigation Project will be completed to determine if the project meets its Performance Standards at the end of the 5-year monitoring period and to determine if adaptive measures are necessary to ensure the Project is accomplishing its objective, according to the requirements of 33 C.F.R. § 332.6.

Following completion of the Mitigation Work Plan, a Notification of Construction Completion shall be submitted to the USACE within 60 days. This includes a signed letter to USACE, Policy and Technical Support Branch or email to CENAE-R@usace.army.mil, specifying the date of completion of the mitigation work and the USACE permit number.

If Mitigation Project activities are initiated in but are not completed by December 31 of any given year, the permittee will provide the USACE Policy and Technical Support Branch, a letter providing the date mitigation work began and the work completed as of December 31. The letter will be sent or emailed to CENAE-R@usace.army.mil no later than January 31 of the next year. The letter will include the USACE permit number.

Following commencement of the Mitigation Work Plan, monitoring will occur throughout the first five years within the Mitigation Project wetlands. The Monitoring Plan has been developed according to the requirements of 33 C.F.R. § 332.6.

The enhanced and created salt marsh areas are expected to provide intertidal habitat services consistent with successful salt marshes throughout Long Island Sound. Through sustaining diverse benthic

communities and generating plant material for forage, salt marshes attract and sustain nesting and migrating birds, spawning fish, mollusks, crabs, and other invertebrates. Periodic monitoring is designed to assess the presence and trajectories of both fauna and flora throughout the five-year period, and to signal the need for additional action if damages are observed or if growth performance goals are not met. The information will also help determine the need for additional maintenance and/or adaptive management at the site, and to provide benchmarks for use in assessing damages from storms or from other catastrophic events.

5.2 Monitoring Protocol Overview

The monitoring protocol is designed to establish a replicable set of field observations performed at well-defined monitoring plots or quadrats to assess the progress towards, and the success or failure of, the proposed enhancement of salt marsh habitat. This protocol will be used for a minimum period of five years post-implementation of the Mitigation Project Work Plan to provide consistent and replicable methodology and parameters for measurement and documentation.

The vegetation monitoring scope will include a macro-scale, or overview assessment each year. The overview assessment will occur annually, in July, one month prior to the annual vegetation survey to occur in August. This timing ensures sufficient above-ground biomass production by *Spartina alterniflora*. To support this effort, the team will review high-resolution, updated aerial imagery of the site using platforms such as Skywatch or a similar service.

Given the dynamic nature of salt marsh ecosystems, where mudflats, tidal channels, and vegetated areas can shift over time, the aerial imagery review will verify the extent and distribution of low marsh habitat areas within the marsh complex on an annual basis. The vegetation monitoring scope within the marsh complex will be guided by the findings of the overview assessment. Based on the evaluation of the low marsh habitat, the placement of monitoring transects will be adjusted as needed to ensure they traverse through vegetated and representative portions of the complex. The team will work closely with a wetland scientist to determine the optimal transect locations.

For the creation areas, where habitat conditions are expected to remain more stable over time, monitoring transects and quadrats will remain fixed to allow for direct comparisons of vegetation coverage throughout the monitoring period. Vegetation monitoring will be conducted by a wetland scientist in accordance with the monitoring protocols outlined in this Mitigation Plan.

As Connecticut does not have state specific guidelines, the protocols outlined below are based on the *NYSDEC New York State Salt Marsh Restoration and Monitoring Guidelines* (2000),[11] which provide specific instructions for documenting vegetative success at enhancement sites.

5.3 Monitoring Transects

Transects will be established at approximately 250-meter intervals. End points will be marked with stakes for the duration of the monitoring period. Transects will be established at approximately 250-meter intervals, extending across representative sections of the low salt marsh complex, ensuring coverage across the tidal gradient and capturing variations in vegetation and hydrologic conditions throughout the enhanced and created wetlands. This placement provides consistent spacing and spans the full range of

[11] New York State Salt Marsh Restoration and Monitoring Guidelines, https://extapps.dec.ny.gov/docs/wildlife_pdf/saltmarsh.pdf

enhanced habitat, from areas of less frequent inundation to those regularly exposed to tidal flows, supporting comprehensive monitoring of enhancement success.

5.4 Monitoring Quadrats

Place quadrats (one square-meter) along the transects at a minimum of three different elevations (i.e., a minimum of three quadrats per transect). Within a single vegetation zone (e.g., low marsh *Spartina alterniflora* zone), quadrats must be located at least three meters apart along the length of the transect. Quadrat locations will be measured and recorded with respect to distance from one end of the transect stake.

5.5 Fixed-Point Photo Stations

The transect end point stakes will serve as the permanent photo stations for photographic monitoring. Photographs shall be taken at each end of each transect throughout the Mitigation Project area. In addition, provide an overview photograph or photographs of the entire Mitigation Project site and consistently use this location(s) for the duration of photo monitoring. Photographs shall be taken at low tide (avoiding spring tide and full moon periods) and shall be labeled with the location code, the direction of view, the date, the time, and the tide.

5.6 Progress and Monitoring Reports

A Progress and Monitoring Report describing the results of the monitoring, assessment and management activities will be submitted to the regulators by December 15th of each year for 5 years following the completion of the Mitigation Project. While separate Monitoring Reports will be prepared for the enhancement areas and creation areas, both will follow the same structure and submission timeline as is described in this section.

Annual monitoring reports will be submitted to the appropriate regulatory agencies, including reporting on the monitoring scope data for water levels, vegetation health, invasive species management, wildlife observations, and contingency inspections. Reports will be compiled according to the guidelines outlined in this Progress and Monitoring Report section of the Mitigation Plan.

The monitoring scopes will be performed at the frequencies as outlined in the Monitoring Plan and will continue for five years post-implementation of the Monitoring Project. The Monitoring Report will document each of the parameters monitored and will describe all observed conditions that may require or lead to corrective action. The Report will also detail any recommendations for corrective action for further discussion with the Permittee, regulators, and site owner, along with a workplan and schedule for completion or work to occur each year. At the successful termination of the five-year monitoring period, the Permittee will submit mitigation status and closure documents, including a final assessment of the Mitigation Project for review by the regulators, and the site will become the responsibility of the site owner.

The Monitoring Report will be in the following format:

5.6.1 Project Overview

- A Self-Certification Form will be completed and signed as the transmittal coversheet for each annual monitoring report and will indicate the permit number and the monitoring report number.

See Appendix E Mitigation Monitoring: Transmittal and Self Certification Form & Project Overview Form.

- A Project Overview Form will be included at the beginning of each annual monitoring report and will summarize problems which need immediate attention (e.g., severe invasive species problem, serious erosion, losses from herbivory, disease, etc.). See Appendix E Mitigation Monitoring: Transmittal and Self Certification Form & Project Overview Form.
- Summary data to substantiate the success and/or potential challenges associated with the proposed compensatory Mitigation Project, including:
    - Address Performance Standards achievement and/or measures to attain the standards.
    - Describe the monitoring inspections (and include dates of the inspections) completed for each monitoring scope that occurred since the last report.
    - Concisely describe adaptive actions done during the prior monitoring year to meet the performance or success standards – actions such as modifying the inundation period, controlling invasive plant species (with inundation, herbicide, or mechanical methods), re-grading the site, placing clean sand and planting, etc. Also describe any other adaptive actions done at each site.
    - Report the status of all erosion control measures on the Mitigation Site. Are they required as the Mitigation Project does not include any earthwork? If the measures have been deemed necessary by the AMP, are they in place and functioning? If temporary measures are no longer needed, shall they be removed?

5.6.2 Maps/Plans

Maps will be generated showing the location of the Mitigation Project site, adjacent landscape features and habitat types, locations of photographic reference points, transects, quadrat locations, and/or other features pertinent to the Mitigation Plan.

5.6.3 Corrective Actions

The team will describe the present conditions of the Mitigation Project and its trajectory within the planned transition of the intertidal wetland plant community. If applicable, the Report will include a brief discussion of the challenges and potential corrective actions proposed by the Permittee, including a timetable for subsequent interventions, as guided by the AMP.

5.6.4 Report Appendices

Appendix A -- An as-built plan showing the locations and extents of the tidal wetland plant communities to be enhanced or created as part of the Mitigation Project. Within each community type, the plan shall list each of the species present along with observations of soil and soil moisture regimes.

Appendix B – A vegetative species list of invasive species within the tidal wetland areas. The invasive species list will include those that cover at least 5 percent of their vegetative layer. The section will include discussion of the potential encroachment risk associated with the invasive species.

Appendix C -- Representative photos of the Mitigation Site taken from the same locations for each monitoring event. Photos will be dated and clearly labeled with the direction from which the photo was taken, and photo locations will be identified on the appropriate maps.

5.6.5 Monitoring Scopes for the Enhancement Areas

There are several distinct types of monitoring scopes to be conducted as part of the Monitoring Plan:

1. **Pre-Mitigation Benchmarking including Baseline Monitoring 4-5 Weeks Before Implementation**

    - Prior to any Mitigation Project activities, a set of photographs at the fixed-point photo stations will be taken to document conditions within the tidal wetlands where the mitigation is planned.

    - Baseline monitoring will include an overview assessment of the salt marsh complex, including the evaluation of high resolution, continually updated aerials of the low salt marsh habitat complex, to inform the placement of monitoring transects through vegetated portions of the complex.

    - Utilizing the transect and quadrat methodology, initial *Spartina alterniflora* and *Phragmites australis* coverage within the salt marsh complex will be monitored to determine pre-enhancement conditions. *Spartina* coverage will be assessed within the vegetated areas of the low salt marsh complex, while the extent of *Phragmites* will be evaluated throughout the salt marsh complex, including tidal channels and mudflats within the 28.5 acre complex. In addition, the baseline transect and quadrat monitoring will document the average height and stem density of *Phragmites australis* within the salt marsh complex before enhancement activities and implementation of the Mitigation Work Plan.

        - The following parameters will be monitored at each quadrat.
            - Plant coverage: visual estimates of percent vegetative cover of *Spartina alterniflora,* percent cover of invasive *Phragmites australis,* and bare soil present within each quadrat.
            - Stem density: Randomly select one 0.25 m^2 corner of the 1.0 m^2 quadrat. Count all live stems of any plant species found within that section.
            - Plant height: Using the same quadrat randomly selected for stem density, measure all live stems of any plant species from the base of the plant to the top of the stem in meters.

    - Given the innovative approach of the Mitigation Work Plan to utilize mowing and inundation of *Phragmites* to promote the enhancement of *Spartina,* monitoring will be conducted 4-5 weeks prior to implementation rather than exclusively post-implementation, as typically required by USACE guidelines.

      Four to five weeks before implementation and commencement of the Mitigation Project, representatives of the team will walk the site (with the property owner and regulators if requested) to assess compliance with submitted workplans. The team will document the transect with photographs and will record any concerns raised by the regulators present. If any further interventions or corrections are requested, these will be discussed at the

time of the inspection and memorialized in writing. Any follow-up on corrective measures will be submitted in a subsequent report.

2. **Water Level Monitoring:**
    - The water level and tide gate inspections will be conducted by the team. Data will be reviewed monthly by the team and any discrepancies will prompt corrective actions (e.g., adjusting the operation schedule of the tide gate).
    - If AMP measures are implemented, the team will document each action taken in detail and monitor the resulting changes.
    - Water levels upstream of the tide gate will be monitored continuously using automated gauges to ensure that levels consistently reach and maintain 2.5' feet NAVD88 during tidal operations.
    - Monthly inspections will be performed by the team throughout the year (January through December) to ensure the tide gate operates as intended.
        - Any debris or blockages affecting the gate's functionality will be cleared.
        - Mechanical parts will be serviced bi-annually to ensure smooth operation.
    - The team will conduct monthly monitoring of salinity and water levels throughout the year (January through December) to ensure brackish water levels are maintained.
    - The team will prepare the Water Level Monitoring section(s) of the annual Progress and Monitoring Report summarizing inspections, findings, and adaptive management activities, and will provide a general assessment of progress with recommendations to ensure that the Mitigation Project is advancing toward the intended result.
3. **Vegetation Monitoring:**
    - An overview assessment will be performed by the team in July, one month prior to the annual vegetation survey. Based on the evaluation of high resolution, continually updated aerials of the low salt marsh habitat complex, the placement of monitoring transects will be adjusted as needed to ensure they traverse through vegetated and representative portions of the complex. The team will work closely with the wetland scientist to determine the optimal transect (and corresponding quadrat) locations.
    - The annual vegetation survey inspection will be conducted by a wetland scientist or ecologist. The inspector will monitor and document parameters within the monitoring quadrats. The inspectors will evaluate if the Mitigation Project is advancing toward the intended result.
    - Comprehensive vegetation surveys will be performed once annually, in August.
        - The following parameters will be monitored at each quadrat.
            - Plant species occurring: Plant species occurring in each quadrat will be recorded.
            - Stem density: Randomly select one 0.25 m^2 corner of the 1.0 m^2 quadrat. Count all live stems of any plant species found within that section.

        - Plant height: Using the same quadrat randomly selected for stem density, measure all live stems of any plant species from the base of the plant to the top of the stem in meters.
        - Signs of disease, predation, or other disturbance: Monitor these signs in each quadrat and along the length of the transect.

- If AMP measures are implemented, the wetland scientist or ecologist in consultation with the team, will document each action taken in detail and monitor the resulting changes.
- The wetland scientist, ecologist, and/or team will prepare the Vegetation Monitoring section(s) of the annual Progress and Monitoring Report summarizing inspections, findings, and adaptive management activities, and will provide a general assessment of progress with recommendations to ensure that successional growth is advancing toward the intended result.

4. Invasive Species Monitoring:

- The team will perform rapid invasive species surveys during the growing season (May through October), before the planned mowing program, to track changes in species composition, particularly the enhancement of *Spartina alterniflora* and *Phragmites australis* regrowth rate and biomass reduction since the previous survey.
    - The rapid surveys will include visual estimates of percent vegetative cover of *Spartina alterniflora,* percent cover of invasive *Phragmites australis,* and bare soil present within each quadrat.
    - Plant community composition will be quantified by comparing the absolute coverage of invasive species (i.e., *Phragmites australis*), and the absolute cover of native species (i.e., *Spartina alterniflora*) with the total cover of all species within each quadrat.

- If AMP measures are implemented, the team will document each action taken in detail and monitor the resulting changes.
- The team will prepare the Invasive Species section(s) of the annual Progress and Monitoring Report summarizing inspections, findings, and adaptive management activities, and will provide a general assessment of progress with recommendations to ensure that the Mitigation Project is advancing toward the intended result.

5. Wildlife Monitoring:

- Wildlife presence will be documented during the annual vegetation survey conducted by the wetland scientist or ecologist.
- During inspections, the presence and/or evidence of native and migratory wildlife species including birds, mammals, reptiles, amphibians, crustaceans and, when possible, insects and macroinvertebrates will be assessed via direct observation. The inspector shall identify wildlife species found to be using the site and how they are using it (i.e., nesting, feeding, shelter, over-wintering, etc.).

- Taxonomic description of wildlife or evidence thereof will be noted as to species and general location within the mitigation areas. Anecdotal observations of wildlife utilizing the site will also be recorded and reported as part of the annual Progress and Monitoring Report.

- The inspector and/or team will prepare the Wildlife Monitoring section(s) of the annual Progress and Monitoring Report summarizing inspections and wildlife observations.

6. **Contingency Monitoring:**

   - The team will inspect the Mitigation Project site for damage after destructive events such as high-energy storms and flooding. Inspections will occur as-needed after such events and annually in early spring.
   - At areas within the site where damage is observed, a more detailed inspection plan will be developed to document and inform the need for structural repairs. If the integrity of the Mitigation Project wetlands is in question, a targeted water level and vegetation monitoring plan for the affected area will be developed in accordance with the protocols outlined in this Mitigation Plan.
   - In addition and as needed, the team will identify any loss or movement of soils within the mitigation areas, and will assess the causes of scour, erosion, or deposition. If necessary, the team will coordinate with the Applicants to visit the locations to identify options to mitigate the causes and provide recommendations for improvement.
   - Once corrections or repairs are completed, the Applicants, in consultation with the team, shall document conditions and prepare a memorandum summarizing the events, conditions and corrective actions for delivery to the regulators. The memorandum shall become part of the subsequent annual Progress and Monitoring Report.

5.6.6 Monitoring Scopes for the Creation Areas

1. **Vegetation & Invasive Species Monitoring (Annually in August):**

   - Conduct fixed-point photo documentation.
   - Conduct vegetation surveys using the fixed transect and quadrat method.
   - Record percent cover of *Spartina alterniflora* and any presence of invasive species (*Phragmites australis* or others).
   - Measure stem density and plant height of *Phragmites australis* within the quadrats.
   - Document signs of stress, disease, predation, or other disturbances affecting plant health.
   - If *Phragmites* or other invasives are present, document coverage and determine if adaptive management strategies (e.g., manual removal, selective treatment) are necessary.

2. **Erosion Monitoring (Twice a year, in the Spring & Fall):**

- Assess the functionality of tidal channels to ensure they remain clear and connected to the larger marsh system.
- Observe sediment movement, erosion, and signs of accretion within the marsh.
- Verify that tidal inundation patterns align with expected conditions to support low marsh habitat.

3. **Wildlife Observations (During Annual Vegetation Surveys):**
   - Document general wildlife usage, including bird, fish, and invertebrate activity within the created marsh.
   - Record signs of herbivory or predation on newly established vegetation.
4. **Post-Storm or Contingency Monitoring (As Needed):**
   - Conduct site inspections following significant storm events to assess any erosion, sediment loss, or structural instability.
   - Document any necessary corrective actions and report findings.

6. Long Term Management Plan (LTMP)

6.1 LTMP Overview

Upon the successful completion of the five-year mitigation and monitoring period (or longer if implementation of Adaptive Management Plan Phases One through Four in the Enhancement Areas becomes necessary), the Applicants will submit the final Progress and Monitoring Report for both the Enhancement Area and Creation Area mitigation projects. A Long-Term Management Plan will be developed at that time that describes how the Mitigation Projects will be managed after the Performance Standards have been achieved, including the long-term financing mechanism and the party responsible for the Long-Term Management. The Long-Term Management Plan will be developed in accordance with 33 C.F.R. § 332.7(d) and may include long-term management including maintenance and access of the tide gate, conservation easement enforcement, signage, fencing, non-native invasive species management, tax payments, maintenance of property insurance, and reporting.

The LTMP is intended to provide site-specific guidance for inspections, assessments, and management of the site to assure ongoing success of the proposed mitigation. The LTMP will consist of monitoring, assessment of the results of monitoring, and guidelines for management (if necessary) to ensure the long-term performance of the Mitigation Project.

See Section 9 of this document for Financial Assurance and Long-term Site Protection, to be finalized within the Final Plan.

6.2 Recommended Methods for Inspection and Assessment

The LTMP will provide The New HVN, LLC with a set of guidelines for inspection and long-term site assessments. The following recommended assessment goals/guidelines will be configured to the particulars of the Mitigation Site, including the following:

- Determine (as best as possible) the safety of the surroundings. Do not enter an unsafe area. Some initial assessment items may include fallen power lines, fallen trees, slope instability, or rising water levels that could trap an inspector;
- Inspect the site for damages. Document the results of the event. Determine the cause for failure (i.e., excessive erosion, plant death, slope failure);
- Remove debris and/or foreign matter from the area where possible;
- Determine if temporary or permanent benchmarks utilized during construction of the Mitigation Project are intact and are currently correct or if new benchmarks need to be set as necessary;
- Conduct an assessment of the existing conditions. Have conditions changed dramatically? Are the current conditions suitable to meet the original goals of the mitigation measure? Is ecological succession proceeding as intended?
- Produce a list of potential remedies for any observed disturbances or failures. Assess the potential impact and benefit of each remedy to determine if the net benefit will outweigh the potential impact.
- Select the remedy that will have the greatest benefit. Keep in mind that the remedy that has the greatest benefit may be the “do nothing” option if the remedy will provide a higher impact to existing resources than a benefit to future resources.
- Consult with all appropriate regulatory agencies to determine any other safety or construction practices that will be necessary to move forward for the selected remedy, and to confirm that the intended goals of the intervention are consistent with regulatory goals and guidelines.

6.3 Corrective Actions

Should a climate event or other disturbance occur after the five-year monitoring period, or if unsatisfactory progress is observed during site inspections and assessments listed above, then corrective actions will be designed and completed to address the unsatisfactory conditions or damages to the Mitigation Site. A Corrective Action Plan will be prepared to cover the proposed intervention, if warranted. The Plan will describe the disturbances, growth trajectories, the inspection actions that were completed, and the assessment that led to the selected corrective actions. If required, the corrective actions will be submitted to regulatory agencies for review.

In addition to encroachment by non-native plant species, unforeseen events could include sabotage or vandalism, earthquake, fire, plant community failure of unknown origin, insect damage, hurricanes, tornados, flooding, or similar natural disasters.

7. Mitigation Project Site

7.1 Mitigation Project Site Location

The Mitigation Site wetlands are located adjacent to the Proposed Project area, primarily the eastern and southern portions of the property and areas near Pig Farm Road and Uriah Street. In addition, there is a Mitigation Site wetland area located to the northwest of the Proposed Project area. Refer to Figure 1 Project Site wetlands mapped by FHI Studio and Figure 2 Mitigation Site wetlands mapped by McCue Environmental. These wetlands consist of forested, scrub-shrub, and emergent types, including *Phragmites*-dominated areas, and are adjacent to both developed Airport operations areas and disturbed uplands.

7.2 Current Owners

The Mitigation Site wetlands are entirely owned by the City of New Haven and are managed by the Tweed New Haven Airport Authority. The airport is currently leased for operations by The New HVN, LLC.

7.3 Current Land Use and Surrounding Land Use

Given that the Mitigation Project site wetlands are located adjacent to the Proposed Project Site, the current and surrounding land use is the same.

7.4 Mitigation Project Site Soils

The site soils are similar to those mapped for the Proposed Project Site. Soils within the Mitigation Project wetland areas primarily consist of hydric soils, including Walpole sandy loam, Scarboro muck, and Westbrook mucky peat, which support wetland functionality. Adjacent upland soils vary by location, with common types including Deerfield loamy fine sand, Udorthents-Urban Land Complex, and the Cheshire-Holyoke complex. Mitigation Site Soils are depicted in Figure 15 Mitigation Project Site soils. These are described below.

- **WF100 – WF194**: Hydric soils are primarily Walpole sandy loam and Westbrook mucky peat, while adjacent upland soils are Deerfield loamy fine sand and Udorthents-Urban Land Complex.
- **WF300 – WF384**: Westbrook mucky peat hydric soils with adjacent upland soils of Udorthents-Urban Land Complex.
- **WF400 – WF459**: Hydric soils include Westbrook mucky peat, with adjacent upland soils of Udorthents-Urban Land Complex and Udorthents, smoothed.
- **WF500 – WF714**: Sulfaquents hydric soils with soils underlying the delineated wetlands most closely resembling the Westbrook mucky peat; adjacent upland soils are Deerfield loamy fine sand, Penwood loamy sand, Cheshire-Holyoke complex, Penwood-Urban Land Complex, and Udorthents smoothed.
- **WF800 – WF941**: Sulfaquents hydric soils; upland adjacent soils include Holyoke rock-outcrop complex and Udorthents smoothed.

- **WF1000 – WF1347**: Hydric soils include Westbrook mucky peat and Gales Ferry silt loam, intertidal. Adjacent upland soils include: Udorthents-Urban Land Complex.

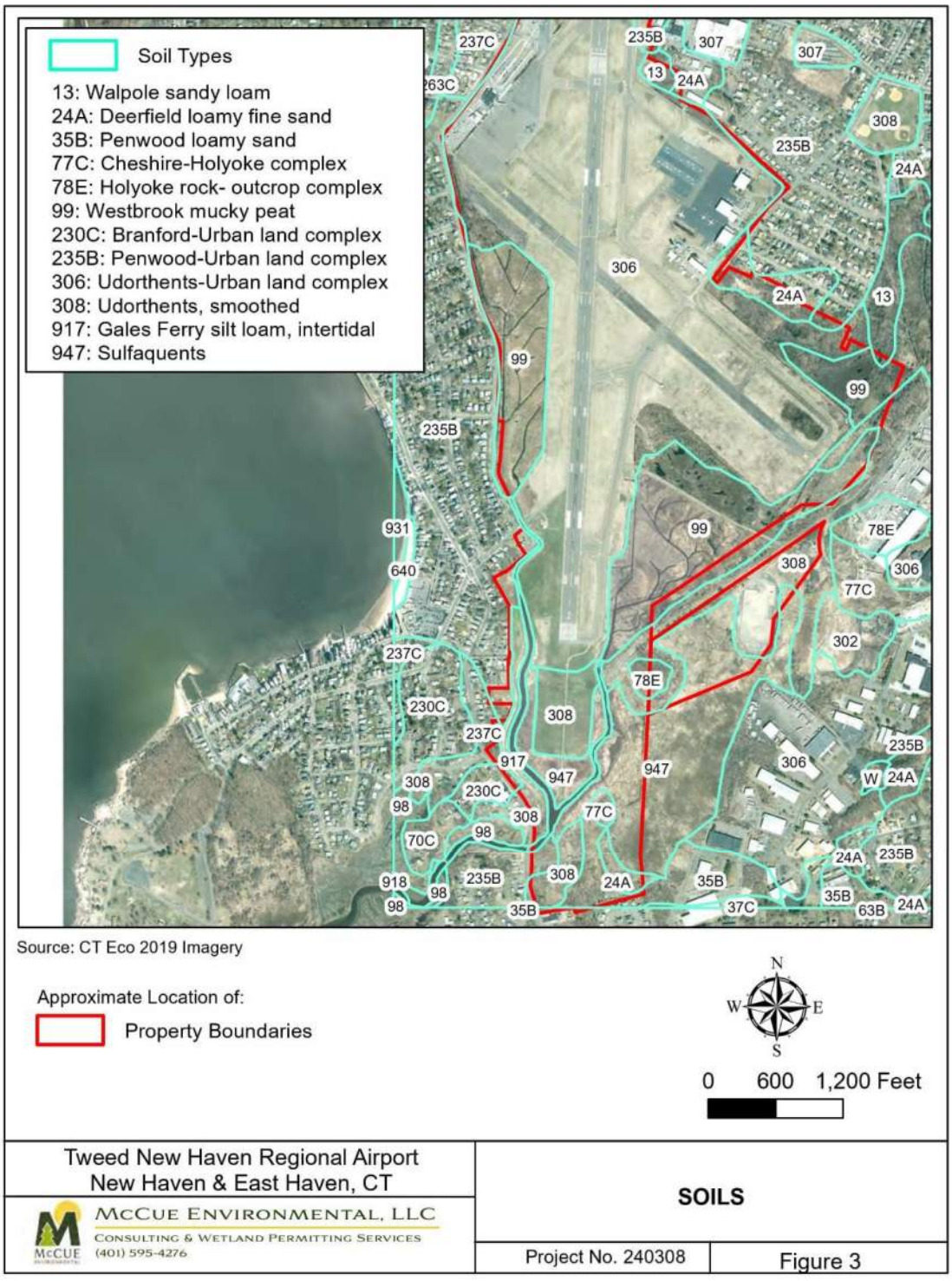

Figure 15 Mitigation Project Site soils

7.5 Mitigation Project Site Watershed & Hydrology

The salt marsh complex at the Mitigation Project site consists of a wetland system featuring excavated channels and marsh vegetation largely dominated by *Phragmites*. Expansive mudflat habitat is currently limited within the existing marsh complex. The Mitigation Project wetlands have varying hydrologic regimes, ranging from seasonally flooded, semi-permanently flooded, to irregularly flooded zones, depending on their location and proximity to disturbances.

These wetlands include a variety of Cowardin classification wetland types:

- **Forested Wetlands (PFO)**: Composed primarily of red maple and other deciduous species, these areas are seasonally flooded and form a significant part of the site's wetland network.
- **Scrub-Shrub Wetlands (PSS)**: These wetlands are dominated by species like arrowwood, pussy willow, and swamp azalea, often found along disturbed edges of the wetland areas.
- **Emergent Wetlands (PEM)**: Areas dominated by *Phragmites australis* and other emergent species, typically found in the more interior sections of the wetland areas. These are often semi-permanently or seasonally flooded.
- **Estuarine Emergent Wetlands** (E2EM): Estuarine intertidal emergent marsh areas. Additional descriptors indicate frequency of inundation and presence of *Phragmites australis*.

The following table includes a description of the Cowardin classifications for the observed Mitigation Site wetlands. See also Figure 16 Mitigation Project Site wetlands.

Table 8 Cowardin wetland classifications for Mitigation Site wetlands.

Wetland #	Cowardin Classification Code	Notes
WF100–WF19 North Area Delineation	PEM1/5F	Palustrine (P), Emergent persistent (EM1), Phragmites australis (5), Semi permanently Flooded (F)
	PFO1E	Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E)
WF300–WF384 North of Pig Farm Road	PEM1E	Palustrine (P), Emergent (EM), persistent (1), Seasonally Flooded/Saturated (E)
	PEM1/5F	Palustrine (P), Emergent persistent (EM1), Phragmites australis (5), Semi permanently Flooded (F)
	PSS1E	Palustrine (P), Scrub-Shrub (SS), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E)
	PUBH	Palustrine (P), Unconsolidated Bottom (UB), Permanently Flooded (H)

WF400–WF459 South of Pig Farm Road	E1UBLx E2EM1Pd PFO1E PSS1E	Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x) Estuarine (E), Intertidal (2), Emergent persistent (EM1), Irregularly Flooded (P), Partially Drained/Ditched (d) Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E) Palustrine (P), Scrub-Shrub (SS), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E)
WF500–WF714 South Area Delineations	E1UBLx E2EM1/5Pd E2EM5/1P PEM PSS	Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x) Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d) Estuarine (E), Intertidal (2), Emergent (EM), Phragmites australis (5), Persistent (1), Irregularly Flooded (P) Palustrine (P), Emergent (EM) Palustrine (P), Scrub-shrub (SS)
WF800–WF941 Uriah Street Area & Town Fair Tire Delineations	E2EM1/5Pd PEM PFO PSS	Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d) Palustrine (P), Emergent (EM) Palustrine (P), Forested (FO) Palustrine (P), Scrub-shrub (SS)
WF1000-WF1347 West Area Delineations	E1UBLx E2EM1/5Pd E2EM1P PFO1E	Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x) Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d) Estuarine (E), Intertidal (2), Emergent (EM), Persistent (1), Irregularly flooded (P) Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E)

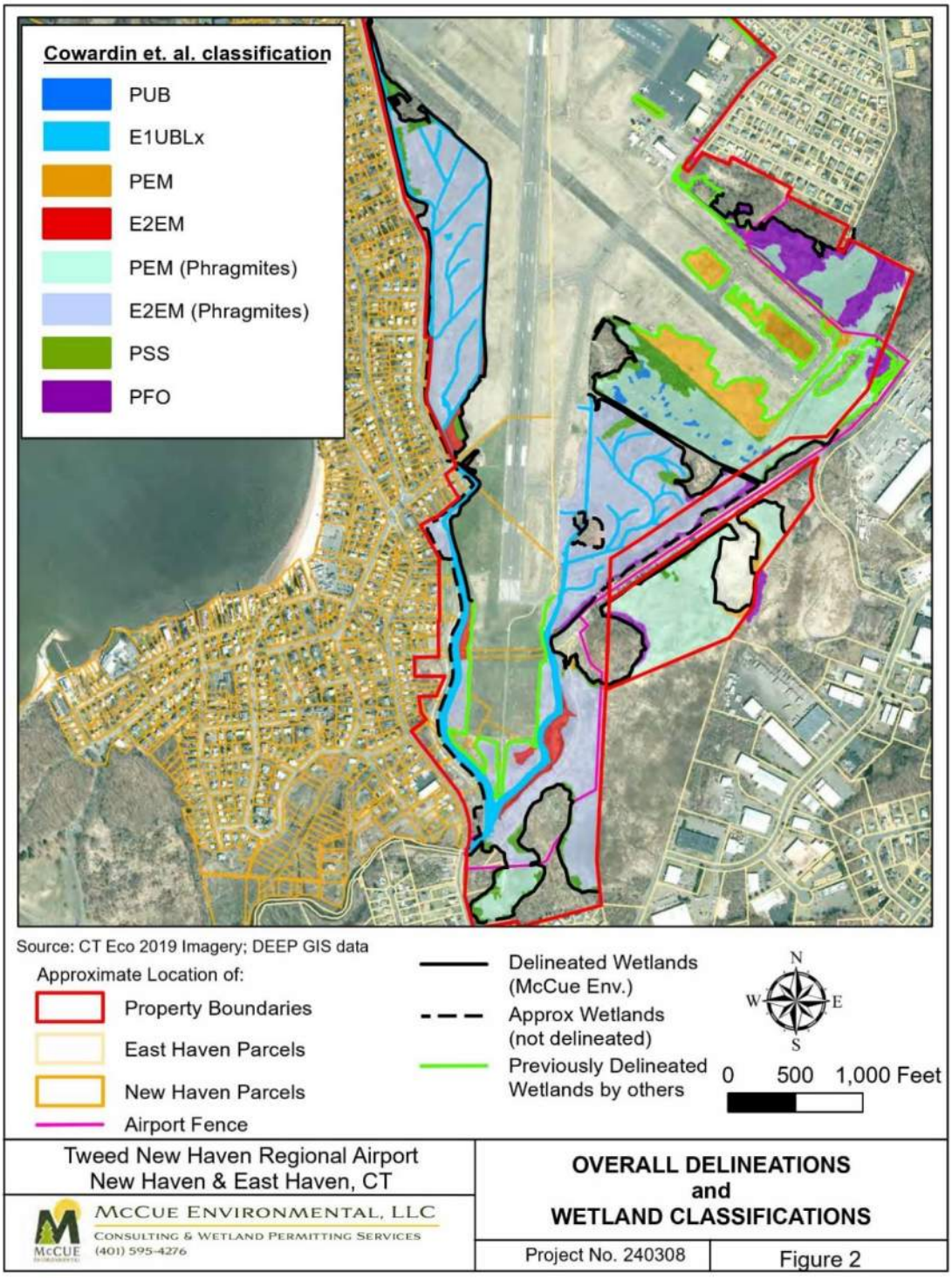

Figure 16 Mitigation Project Site wetlands

According to the CT DEEP Eco Viewer,[12] the 12-digit Hydrologic Unit for the Watershed Boundary Dataset for the Mitigation Project site is: HUC12: 020302030000; Name: Long Island Sound Deep.

7.6 Mitigation Project Site Vegetation

The Mitigation Project site includes areas of intertidal marsh vegetation, with plant communities adapted to fluctuating tidal conditions. Typically, in healthy, native marshes, species such as *Spartina alterniflora* (smooth cordgrass) dominate in addition to *Distichlis spicata* (saltgrass) and *Juncus gerardii* (saltmeadow rush) providing critical habitat for fish, shellfish, and bird species, as well as stabilizing sediments and enhancing water quality. However, throughout the Mitigation Project site at the Airport, these native wetland communities have been predominantly displaced by *Phragmites australis*, an invasive reed that dominates the wetlands, forming dense, tall stands that reduce plant diversity and alter marsh hydrology. *Phragmites* typically grows in thick monocultures, shading out other plants, reducing habitat quality for native wildlife, and altering natural tidal flow patterns, diminishing the overall resilience and ecological function of the marsh.

The upland areas proposed for tidal wetland creation include a mix of early successional and edge vegetation communities. These areas are located adjacent to existing tidal wetlands but remain outside the regular influence of tidal hydrology. Vegetation consists of a patchwork of upland woody and herbaceous species, including vines, saplings, shrubs, and young trees. These areas show signs of past disturbance, edge effects, and ecological fragmentation. The upland habitat slated for tidal wetland creation is not considered high-functioning, as it lacks the hydrologic connectivity, species composition, and structural diversity characteristic of more intact upland systems. The proposed conversion of these uplands into tidal marsh will transform these underperforming habitats into ecologically valuable systems that support coastal resilience, water quality enhancement, and habitat for estuarine wildlife.

An additional vegetation assessment was presented in a memo by BSC Group dated November 8, 2024, in response to an NDDB request (see Appendix F BSC Group Tide Gate Survey Results Summary). The following is a table listing the dominant and non-dominant vegetation at each tidal gate survey location (i.e., Table 2 within the Appendix F Results Summary). The tidal gate survey locations were sited by a senior botanist within the tidal marsh areas to experience an increase in water levels as a result of the Mitigation Project.

Table 9 Tidal gate survey locations and descriptions.

Location	Dominant Vegetation	Non-Dominant Vegetation
PP1	common reed (*Phragmites australis*)	climbing hempvine (*Mikania scandens*) multiflora rose (*Rosa multiflora*) poison ivy (*Toxicodendron radicans*), saltmarsh cordgrass (*Sporobolus alternifolorus*) Callery pear (*Pyrus calleryana*) small white aster (*Symphyotrichum racemosum*)
PP2	common reed (*Phragmites australis*)	climbing hempvine (*Mikania scandens*) poison ivy (*Toxicodendron radicans*) sawbrier (*Smilax glauca*)

[12] CT Environmental Conditions Online, https://cteco.uconn.edu/viewer/index.html?viewer=advanced

		blackberry (*Rubus ssp.*) multiflora rose (*Rosa multiflora*)
PP3	common reed (*Phragmites australis*)	multiflora rose (*Rosa multiflora*) honeysuckle (*Lonicera ssp.*) groundsel tree (*Baccharis halimifolia*)
PP4	common reed (*Phragmites australis*)	groundsel tree (*Baccharis halimifolia*)
PP5	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alternifolorus*) groundsel tree (*Baccharis halimifolia*)
PP6	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alternifolorus*)
lPP7	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alternifolorus*) groundsel tree (*Baccharis halimifolia*)
PP8	common reed (*Phragmites australis*)	fat-hen (*Atriplex prostrata*) saltgrass (*Distichlis spicata*) saltmeadow rush (*Juncus gerardii)* groundsel tree (*Baccharis halimifolia*) Carolina sea-lavender (Limonium *carolinianum*) Virginia glasswort (*Salicornia depressa*)
PP9	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alternifolorus*)
PP10	common reed (*Phragmites australis*)	groundsel tree (*Baccharis halimifolia*) showy goldenrod (*Solidago speciosa*) Oriental bittersweet (*Celastrus orbiculatus*) autumn olive (*Elaeagnus umbellata*)
PP11	common reed (*Phragmites australis*)	N/A
PP12	common reed (*Phragmites australis*)	poison ivy (*Toxicodendron radicans*) pin oak (*Quercus palustris*) groundsel tree (*Baccharis halimifolia*) saltgrass (*Distichlis spicata*) seaside goldenrod (*Solidago sempervirens*) shining sumac (*Rhus copallinum*)
PP13	common reed (*Phragmites australis*)	spartina grass (*Sporobolus alterniflorus*) groundsel tree (*Baccharis halimifolia*) woolly sedge (*Carex pellita*) swamp rose mallow (*Hibiscus moscheutos*)
PP14	common reed (*Phragmites australis*)	N/A
PP15	common reed (*Phragmites australis*)	N/A
PP16	common reed (*Phragmites australis*)	N/A

7.7 Mitigation Project Site Threatened and Endangered Species

The Natural Diversity Database (NDDB) query results identified several state-listed threatened and endangered species potentially present within the Mitigation Project area. These include a variety of plant species such as the yellow thistle (*Cirsium horridulum*), salt pond grass (*Leptochloa fusca* ssp. *fascicularis*), and field paspalum (*Paspalum laeve*), all of which rely on specific habitats like coastal grasslands, brackish ponds, and wet meadows. In addition, grassland birds such as the grasshopper

sparrow (*Ammodramus savannarum*), eastern meadowlark (*Sturnella magna*), and bobolink (*Dolichonyx oryzivorus*) are at risk, with sensitive breeding seasons that need careful consideration during project activities. The DEEP has requested species-specific plant surveys, consultation with fisheries biologists regarding aquatic species, and the finalization of a Grassland Bird Habitat Mitigation Plan to ensure the protection of these habitats during the sensitive periods of breeding and nesting.

Coordination with Bruce Williams Senior Fisheries Biologist, Diadromous Fish and Habitat Conservation and Enhancement Programs, Bureau of Natural Resources – Fisheries Division, DEEP, indicated that the three listed fish species on the NDDB report would not be present within the project area (Appendix C).

The proposed Wetland Mitigation Plan for the project area is designed to enhance the habitat for any state-listed species that is tidal marsh dependent by restoring native *Spartina*, improving hydrological conditions, and reducing invasive *Phragmites*. These actions are expected to provide significant benefits, particularly for plant species *Spartina alterniflora*, which depend on undisturbed tidal wetlands.

According to the BSC Group *Tidal Gates Results Summary* included as Appendix F, which included a 2024 Rare Plant Survey, no rare species were observed. According to the report:

> "No target species were observed in the Tidal Gate survey locations during the October 2024 surveys. Due to the moderate to heavy density of common reed in the survey areas, the habitat in these areas is unsuitable for any of the target species. Observations of the cover type during the survey indicate that areas to be impacted by tidal changes are currently 98% or more infested by common reed. Areas already experiencing more frequent tidal influence currently are comprised of 99% saltmarsh cordgrass (*Sporobolus alterniflorus [Spartina alterniflora]*). The areas currently experiencing consistent tidal influence only comprise a small percentage of the total area."

7.8 Mitigation Project Site Wetland Functions and Values

McCue Environmental performed a wetland functions and values assessment based on the methodology described in *Wetlands Functions and Values: A Descriptive Approach,* set forth in the supplement to The Highway Methodology Workbook (the Supplement) by the New England Division of the USACE (1999).[13] This method incorporates wetland science and best professional judgement in data collection toward a qualitative description of the physical and biological characteristics of the wetlands.

7.8.1 Groundwater Recharge and Discharge

The current capacity for groundwater recharge and discharge in the Airport site wetlands is somewhat limited due to disturbed hydrology and the dominance of invasive species like *Phragmites australis,* which can alter soil and water conditions. However, wetlands in the WF100, WF400/809, and WF500/600 series likely contribute to groundwater recharge by allowing water to percolate through the soil, particularly in areas with better hydrological connections and native vegetation. Wetlands in the WF300 series provide moderate recharge and discharge, though their smaller size and isolated nature limit this function.

[13] USACE, The Highway Methodology Workbook Supplement, https://www.nae.usace.army.mil/Portals/74/docs/regulatory/Forms/HighwaySupplement6Apr2015.pdf

7.8.2 Flood-flow Alteration

The wetlands targeted for the Mitigation Project exhibit varying capacities for flood-flow alteration, with some areas currently limited by degraded conditions and invasive species. Wetlands in the WF100 series already provide moderately high floodwater storage, but their potential is restricted by the presence of *Phragmites* and other invasive species. Wetlands in the WF300, WF500/600, and WF700/810 series offer moderate to high flood-flow alteration, but their capacity is diminished by disturbed hydrological conditions and the dominance of invasive vegetation. WF400/809 wetlands have high flood storage capability due to their size and location but could function more effectively with improvement. The mitigation strategy for the enhancement areas aims to expand floodwater retention across all these wetlands by improving hydrological connections and reintroducing native vegetation, allowing the wetlands to better absorb and release floodwaters, reducing the risk of downstream flooding.

7.8.3 Fish and Shellfish Habitat

The current wetlands targeted for mitigation provide limited value for fish and shellfish habitat, particularly due to their dominance by invasive species like *Phragmites* and the altered hydrology that reduces suitable habitat conditions. Wetlands in the WF400/809 and WF500/600 series are located near tidal areas and have some potential for supporting aquatic species, but the lack of diverse native vegetation and the presence of disturbances limit their ecological value. Additionally, many of these wetlands are too isolated or disturbed to effectively support fish and shellfish populations.

The mitigation strategy will greatly enhance the potential for fish and shellfish habitat by improving hydrological connectivity and native vegetation, particularly in the estuarine wetlands. By reintroducing native species such as *Spartina* and improving water flow between wetlands and adjacent watercourses, the enhanced wetlands will provide better breeding and nursery grounds for fish and shellfish. This will not only benefit aquatic species but also support the broader food web that depends on healthy wetland ecosystems.

7.8.4 Sediment/Toxicant/Pathogen Retention

Sediment and toxicant retention are key functions of these wetlands, though their current performance is impacted by invasive species and disturbed conditions. Wetlands in the WF100 and WF400/809 series currently demonstrate high retention of sediments and pollutants, as they are strategically located near impervious surfaces where they trap runoff. Wetlands in the WF500/600 and WF700/810 series also exhibit high sediment retention, though their long-term effectiveness is limited by degraded plant communities. Wetlands in the WF300 series provide moderately high retention, but improvements can be made through the proposed Mitigation Project. The proposed mitigation will increase the efficiency of nutrient cycling, pollutant filtration, and sediment stabilization by replacing invasive species with native plants, which are better suited for long-term retention and pollutant breakdown.

7.8.5 Nutrient Removal/Retention/Transformation

The wetlands currently provide moderate to high nutrient removal capabilities, but their effectiveness is hindered by the presence of invasive species, particularly *Phragmites australis*, which dominates many of the wetland areas. The WF100, WF400/809, and WF500/600 wetlands are particularly effective in capturing and processing nutrients from runoff and surrounding developed areas, though the overall ecological function is diminished by the poor-quality vegetation. The WF300 wetlands provide moderate nutrient retention, though their smaller size and degraded condition limit their efficiency. The proposed

Mitigation Project, which will involve the removal of invasive species and the reintroduction of native plants, will significantly improve nutrient cycling in these wetlands.

7.8.6 Production Export

The production export function, which refers to the movement of organic material such as leaf litter and plant detritus, is currently limited by the dominance of invasive species and disturbances. Wetlands in the WF400/809 and WF500/600 series produce substantial amounts of organic material, but the ecological value of this material is reduced by the prevalence of *Phragmites*, which provides less ecological benefit compared to native species. WF100 and WF300 wetlands offer some level of production export, but the quality and diversity of the organic material are low. The Mitigation Project will improve this function by enhancing the growth of native vegetation, which will produce more ecologically valuable organic material that can support the aquatic food chain and enhance overall ecosystem health.

7.8.7 Sediment/Shoreline Stabilization

Sediment and shoreline stabilization is an important function of these wetlands, particularly in areas where runoff from impervious surfaces carries sediments and pollutants. Wetlands in the WF100, WF400/809, and WF500/600 series are currently effective in trapping sediments and stabilizing shorelines, but the dominance of invasive species limits the long-term effectiveness of this function. WF300 wetlands provide moderate stabilization, but their small size and degraded condition make them less effective in preventing erosion and sediment transport. The proposed Mitigation Project efforts enhance sediment and shoreline stabilization by the regrowth of native plant species, such as *Spartina alterniflora*, which are more effective in trapping sediments and reinforcing shorelines than invasive species like *Phragmites*. By reducing the dominance of *Phragmites* and improving hydrologic connectivity, the enhancement will foster resilient plant communities that stabilize soils, reduce erosion, and filter pollutants from runoff.

7.8.8 Wildlife Habitat

While the wetlands provide some wildlife habitat, the overall quality is compromised by *Phragmites* and other invasive species, which limit biodiversity and habitat complexity. The WF100 and WF400/809 wetlands offer relatively high habitat value, but the presence of invasive species reduces their ability to support a wide variety of species. Wetlands in the WF300 and WF500/600 series provide moderate wildlife habitat but are similarly hindered by invasive plant dominance. Mitigation efforts will significantly improve wildlife habitat across all these wetlands by removing invasive species and allowing native vegetation to re-grow, creating diverse and ecologically rich habitats capable of supporting a diversity of species, including birds, amphibians, and aquatic organisms.

7.8.9 Recreation

Currently, these wetlands offer low recreational value due to their location on Airport property and their degraded conditions. However, the Mitigation Project will enhance the visual and ecological quality of the wetlands, creating opportunities for passive recreation outside of the Airport boundaries, such as birdwatching.

7.8.10 Education/Scientific Value

The wetlands targeted for enhancement and creation hold potential for scientific study, particularly in the areas of wetland hydrology, nutrient cycling, and biodiversity. Currently, the WF100, WF400/809, and

WF500/600 wetlands are valuable for research, but their degraded condition and the dominance of invasive species limit their full potential. The enhancement efforts will improve their educational and scientific value by improving their ecological function and making them prime examples of enhanced wetlands in an urbanized area. These wetlands will serve as useful sites for ongoing scientific research including but not limited to: the manipulation of a saline water inundation period as a *Phragmites* control method; wetland recovery; the role of native vegetation in supporting wildlife, and the management and control of stormwater volume within an Airport and wetland landscape.

7.8.11 Uniqueness/Heritage

The uniqueness of the wetlands is somewhat diminished by the presence of invasive species like *Phragmites*, but there is still potential for improvement. Wetlands in the WF100, WF400/809, and WF500/600 series are notable for their diverse plant communities, which will be further enriched through Mitigation Project efforts. These wetlands have the potential to become more ecologically unique once invasive species are removed and native plants are reintroduced, enhancing their value for conservation and improving their role in supporting rare or threatened species.

7.8.12 Visual Quality/Aesthetics

The visual quality of the wetlands is currently low due to invasive species and disturbances, but the proposed mitigation will significantly enhance their aesthetic value. The Mitigation Plan will replace monocultures of invasive species with a native plant tidal wetland community, improving the wetlands' scenic qualities. This will also make the wetlands more visually appealing for passive recreation.

7.8.13 Threatened or Endangered Species Habitat

The wetlands, particularly in the WF100, WF300, and WF400/809 series, hold potential habitat for endangered species, though the presence of invasive species limits their suitability. By enhancing native plant species and improving the overall ecological health of the wetlands, the Mitigation Plan will increase the likelihood that these areas can support endangered or rare species, contributing to broader conservation efforts.

7.8.14 Conclusion

The wetlands targeted for the Mitigation Plan currently provide important ecological functions, such as flood-flow alteration, sediment retention, nutrient removal, and wildlife habitat. However, these functions are significantly limited by the presence of invasive species, degraded hydrological conditions, and disturbances from surrounding airport infrastructure. The proposed Mitigation Plan will greatly enhance the ecological value of these wetlands. Increased frequency and depth of inundation will lead to the regrowth of native low marsh species, leading to more resilient wetlands capable of supporting biodiversity and improving water quality.

Overall, these improvements will benefit both the local environment and the broader watershed, creating healthier and more productive wetland systems.

7.9 Mitigation Project Planned Outcomes

7.9.1 Planned Hydrology

The proposed activities of controlling water levels at the Morris Creek Tide Gate are anticipated to result in significant hydrological changes, which will directly influence the reduction of *Phragmites australis* and

promote the growth of *Spartina alterniflora*. These changes will lead to a tidal regime that is better suited to support native salt marsh species.

Below is a detailed description of the expected changes to the hydrology:

1. Increased Tidal Flow and Water Level Elevation:

By opening the tide gate on the rising tide and closing it at 2.5 feet NAVD88, water from Long Island Sound will flow more freely into the upstream wetlands, increasing the overall water levels in these areas. The existing Mean High Water (MHW) elevation at the site is 2.85 feet NAVD88, and this controlled flooding will ensure the upstream areas remain inundated just below or around MHW. The increased tidal inundation will promote the growth and spread of *Spartina alterniflora,* a species adapted to higher salinity and tidal environments

2. Prolonged Periods of Submersion:

After the tide gate is closed, holding the water level at the 2.5 feet NAVD88 elevation for extended periods will result in sustained submersion of the wetland areas. This will extend the hydroperiod, or the duration of time the wetland is saturated or inundated with water, particularly in zones below the MHW elevation.

Phragmites australis is poorly adapted to these prolonged periods of higher salinity and submersion, which will weaken its competitive advantage. In contrast, *Spartina alterniflora*, which thrives in fluctuating tidal environments, will be better suited to capitalize on these new hydrological conditions.

3. Increased Salinity and Tidal Fluctuation:

The tidal water from Long Island Sound will gradually raise salinity levels in the upstream areas, increasing soil salinity over time. With high and low tides fluctuating between 2.85 feet and -3.35 feet NAVD88, the controlled tidal flow will create more variation in water levels and salinity. This environment will support the growth of salt-tolerant plants like *Spartina alterniflora*, which thrive in these brackish, tidal conditions.

4. Maintenance of Overland Flow and Tuttle Brook Flow:

The proposed tidal modifications will not disrupt the existing overland flow or the flow from Tuttle Brook. Freshwater inputs from these sources will continue, but the controlled tidal inflows from the tide gate will dominate the hydrological regime, creating a balanced brackish environment. This brackish condition will further limit the spread of *Phragmites australis* and support a more diverse wetland plant community, including native salt marsh species.

Refer to Appendix D Tidal Monitoring Analysis for contextual information on the planned hydrology for the Mitigation Project.

7.9.2 Planned Soils

No changes to the existing soils are planned as part of the enhancement activities for this Mitigation Project. The current soil conditions are deemed suitable for supporting the desired tidal wetland habitat,

given the anticipated changes in hydrology. The manipulation of water levels and salinity is expected to naturally improve soil conditions for the re-growth of native species like *Spartina alterniflora*, without the need for soil amendments or replacement. The existing soils have been found to be supportive of hydrophytic vegetation, and their chemical and physical properties are appropriate for sustaining the planned enhancement activities.

7.9.3 Planned Vegetation

The primary objective of the vegetation plan is to restore tidal wetland habitat by encouraging the growth of native plant species such as *Spartina alterniflora* and suppressing the invasive *Phragmites australis*. The re-growth of *Spartina* will be facilitated by adjusting the hydrology to favor brackish water conditions, which will naturally deter *Phragmites* dominance. For the creation areas, direct plantings will be implemented as part of the Mitigation Project, whereas in the enhancement areas, the desired vegetation is expected to recolonize once appropriate hydrological conditions are restored.

Monitoring will be conducted to ensure that native, salt-tolerant species increase in coverage, and any necessary adaptive management actions, such as selective planting or invasive species control, will be implemented as discussed in the AMP.

7.9.4 Planned Habitat Features

These hydrological modifications will create conditions that naturally suppress *Phragmites australis*, which prefers less tidal influence, and instead favor *Spartina alterniflora*, which thrives in more saline, tidally influenced environments. Over time, the increased tidal influence, salinity, and fluctuating water levels will shift the competitive balance in favor of native salt marsh species, resulting in enhanced biodiversity and improved ecological function of the wetlands.

7.9.5 Planned Buffers

At this time, no additional buffers are planned as part of the Mitigation Project. The focus of this Project is on tidal wetland enhancement and creation within the Airport boundaries. The proximity of the wetlands to developed or disturbed areas will be considered in the LTMP, but no new buffer zones are currently proposed as part of the Mitigation Project or the AMP. Should future monitoring indicate a need for additional protective buffers, adjustments will be considered as part of the adaptive management approach.

7.10 Mitigation Project Invasive Species Control Plan (ISCP)

The Mitigation Plan for this tidal wetland Mitigation Project inherently addresses invasive species control by employing a targeted inundation strategy to manage and reduce the presence of *Phragmites australis* (common reed), one of the most pervasive invasive species in New England wetlands. Through extended periods of saline water exposure, this approach leverages natural hydrologic processes to create conditions that inhibit *Phragmites* growth and promote the re-growth of native salt marsh vegetation, specifically *Spartina alterniflora*. Given this focused methodology, a separate Invasive Species Control Plan (ISCP) has not been included, as invasive species management is central to the design of this Mitigation Project.

The extended inundation of brackish water serves as both a preventive and active control measure against the spread and re-colonization of *Phragmites* and other potential invasive species. By modifying the wetland's salinity regime, the Mitigation Project creates an environment that is less conducive to

invasive species colonization while supporting resilient native plant communities. In addition to extended inundation, the Mitigation Project includes the twice annual mowing of *Phragmites* and the removal of the *Phragmites* above-ground biomass following each mowing to limit regrowth. The team referred to the "Guidelines for Disposal of Terrestrial Invasive Plants"[14] published by the University of Connecticut when drafting the Mitigation Plan. Invasive material will be bagged and disposed of offsite within a landfill and special care will be taken to wash off all equipment and gear to prevent the spread of *Phragmites*. Herbicide application is addressed within the Adaptive Management Plan and would only be implemented if the Mitigation Project's Performance Standards are not met. A selective spot treatment of herbicide specifically formulated for wetlands would be applied to the *Phragmites* in the fall, when the plant is transporting nutrients to its roots.

The Mitigation Plan also inherently addresses the risk of future invasive species colonization, considering both local and regional threats from species like *Phragmites* that commonly invade through mechanisms such as contaminated equipment or waterborne seed dispersal. By establishing a robust monitoring and adaptive management framework, the Mitigation Plan ensures early detection and response to any re-emergence of invasive species, allowing for adaptive control measures if necessary. This adaptive management approach enables targeted actions to be taken based on observed conditions. Furthermore, the Mitigation Plan ensures that no invasive or non-native species listed under the "Invasive and Other Unacceptable Plant Species" will be planted on the site, adhering to Appendix K of the USACE 2020 guidelines.

8. Determination of Credits

As part of the construction of the Proposed Project, approximately 9.31 acres of filling will be required within resource areas jurisdictional per the State of Connecticut General Statutes. Because the US Army Corps of Engineers (USACE) has determined that wetlands 4 and 5, which are PEM wetlands, are not Waters of the United States, the wetland impact that will require permitting under the USACE Individual Permit are 5.50 acres. Proposed Project impacts have been minimized to the greatest extent practicable, and unavoidable impacts (whether short-term or permanent) have been quantified as the basis for the Mitigation Project outlined in this Mitigation Plan. The proposed Mitigation Project compensates for the unavoidable impacts to freshwater inland wetlands.

The proposed mitigation strategy to address the Proposed Project Site impacts is as follows:

- The Applicants would undertake approximately **28.5 acres** of tidal wetland enhancement adjacent to the project area.

- The Applicants would undertake approximately **3.61 acres** of tidal wetland creation adjacent to the project area.

[14] Guidelines for Disposal of Terrestrial Invasive Plants, The Connecticut Department of Energy and Environmental Protection and the University of Connecticut, 2011, published on the Ecological Landscape Alliance website, https://www.ecolandscaping.org/09/landscape-challenges/invasive-plants/guidelines-for-disposal-of-terrestrial-invasive-plants/#:~:text=The%20best%20time%20to%20dispose,plants%20on%20site%20if%20possible

8.1 Compensatory Mitigation Requirements

According to the USACE 2008 Mitigation Rule, "Compensatory mitigation can be carried out through four methods: the restoration of a previously-existing wetland or other aquatic site, the enhancement of an existing aquatic site's functions, the establishment (i.e., creation) of a new aquatic site, or the preservation of an existing aquatic site."[15]

The proposed Mitigation Project will result in the enhancement of 28.5 acres of tidal wetlands.

In addition, the proposed Mitigation Project will result in the creation of 3.61 acres of tidal wetlands.

The Mitigation Project offsets impact to 9.31 acres of freshwater wetlands under the jurisdiction of the State of Connecticut and 5.50 acres under the jurisdiction of the USACE. These values meet the requirements set forth for the project by CTDEEP and exceed the compensatory mitigation ratios outlined by USACE, ensuring that the newly enhanced and created wetlands are of greater ecological value than the freshwater inland wetlands being impacted by the Proposed Project.

8.2 Mitigation Ratio Rationale

The proposed improvements will enhance **28.5 acres** and create **3.61 acres** of tidal wetland. As noted above, the Proposed Project will impact approximately 9.31 acres CT DEEP/5.5 acres USACE low quality palustrine habitat. This results in a compensatory mitigation ratio of 5:1 for the State of Connecticut and 5:1 for the USACE for the enhancement and 1:1 for the creation areas.

Following a review of the site's prior mitigation history, CT DEEP concluded that the proposed 28.5 acres of tidal wetland enhancement may be credited toward mitigation at a 5:1 ratio, offsetting 5.7 acres of impact. CT DEEP also determined that any remaining impact areas must be addressed through tidal wetland creation at a 1:1 ratio, resulting in an overall increase in wetland area. Additional details can be found in the CT DEEP memo dated February 21, 2025, included in Appendix C: Regulatory Communication.

Overall, the proposed tidal wetland enhancement and creation will provide higher functions and values than those provided by the wetlands impacted by the Proposed Project.

Typically, inland wetland impacts are mitigated with creation, restoration or enhancement of inland wetlands, however, in this unique situation the regulatory agencies recognized the opportunity to provide enhancement to the historically altered tidal wetland that surrounds the airport. Enhancing these wetlands to improved functionality will more than compensate for the impacts to what are currently mostly mowed in-field inland wetlands that have very limited functionality and no opportunity for that functionality to be enhanced even if the project were not to take place. Additionally, a small portion of the mitigation site will involve the creation of tidal salt marsh, further expanding the extent of functional wetland habitat. The location of wetlands 4, 5 and 6, within the boundary of an active airport, does not suggest future

[15] USACE 2008 Mitigation Rule, https://www.sac.usace.army.mil/Portals/43/docs/regulatory/Final_Mitigation_Rule.pdf

enhancement of these wetlands particularly since per FAA guidelines, wetlands within airports are not those which should be targeted to enhancement or restoration.

9. Financial Assurances

9.1 Financial Statement

TNHAA and The New HVN, LLC will provide sufficient financial assurance to achieve successful execution of this Plan and sufficient long-term protection of the mitigation areas pending further agency discussion and review of this Draft Plan. Details regarding this will be provided in the final Plan submittal.

9.2 Long Term Site Protection

Within 90 days of the date this permit is issued and prior to initiation of permitted work in aquatic resources, the permittee shall submit to the USACE and CT DEEP a draft of the deed restriction. Within 30 days of the date the USACE and CT DEEP approves this draft document in writing, the permittee shall execute and record it with the Registry of Deeds for the City of New Haven, the Town of East Haven and the State of Connecticut. A copy of the executed and recorded document will then be sent to the USACE and CT DEEP within 120 days of the date the Corps approves it. The deed restriction shall enable the site or sites to be protected in perpetuity from any future development and provide for access by the USACE and CT DEEP for compliance verification. For preservation as part of compensation, the deed restriction shall expressly allow for the creation, restoration, remediation and monitoring activities required by this permit on the site or sites. It shall prohibit all other filling, clearing and other disturbances (including vehicle access) on these sites except for activities explicitly authorized by the USACE and CT DEEP in these approved documents.

10. References & Literature Cited

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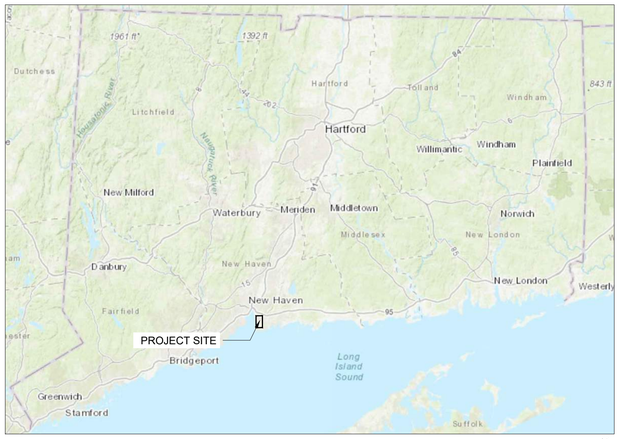
Appendix A- Tidal Wetland Design

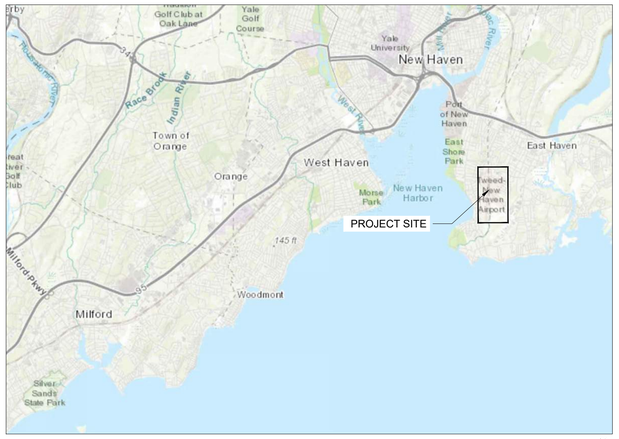
TWEED NEW HAVEN AIRPORT
NEW HAVEN, CONNECTICUT

TIDAL WETLAND DESIGN
APRIL 2025

CT LOCATION



REGIONAL LOCATION



PROJECT LOCATION



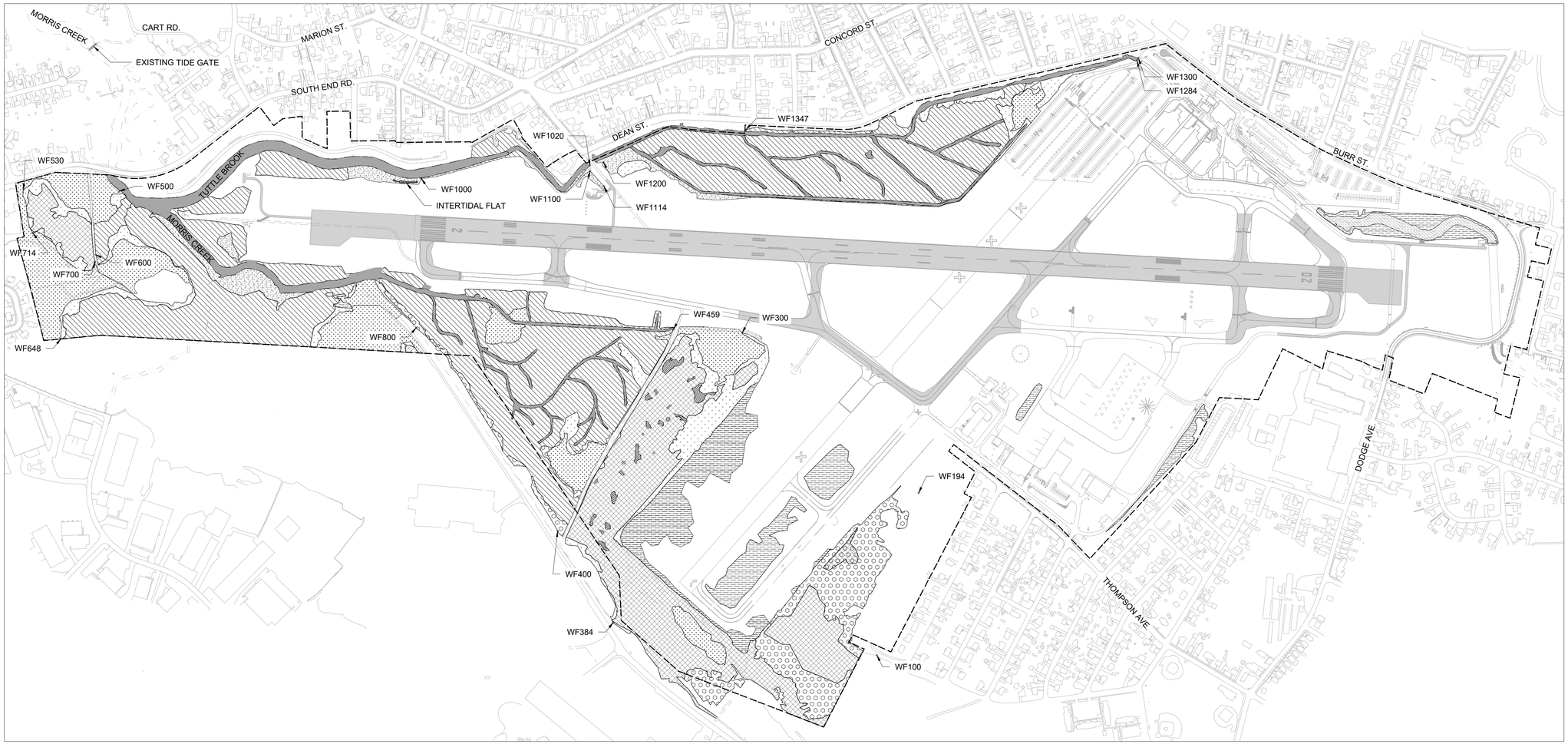
SHEET LIST	
SHEET NUMBER	**SHEET TITLE**
G-100	COVER
V-100	EXISTING CONDITIONS PLAN
C-100	REGULATED RESOURCE IMPACT AREA
C-101	REGULATED RESOURCE IMPACT AREA - DETAILS 1
C-102	REGULATED RESOURCE IMPACT AREA - DETAILS 2
C-103	REGULATED RESOURCE IMPACT AREA - DETAILS 3
C-104	REGULATED RESOURCE IMPACT AREA - DETAILS 4
C-105	REGULATED RESOURCE IMPACT AREA - DETAILS 5
C-106	REGULATED RESOURCE IMPACT AREA - DETAILS 6
C-200	REMOVALS PLAN - CREATION AREAS
L-100	LAYOUT PLAN
L-110	LAYOUT PLAN - ENHANCEMENT AREAS KEY MAP
L-111	LAYOUT PLAN - ENHANCEMENT AREAS ENLARGEMENT 1
L-112	LAYOUT PLAN - ENHANCEMENT AREAS ENLARGEMENT 2
L-113	LAYOUT PLAN - ENHANCEMENT AREAS ENLARGEMENT 3
L-120	LAYOUT PLAN - CREATION AREAS OVERVIEW PLAN

SHEET LIST	
SHEET NUMBER	**SHEET TITLE**
L-121	LAYOUT PLAN - CREATION AREAS ENLARGEMENT 1
L-122	LAYOUT PLAN - CREATION AREAS ENLARGEMENT 2
L-123	LAYOUT PLAN - CREATION AREAS ENLARGEMENT 3
L-130	PLANTING PLAN - CREATION AREAS KEY MAP
L-131	PLANTING PLAN - CREATION AREAS ENLARGEMENT 1
L-132	PLANTING PLAN - CREATION AREAS ENLARGEMENT 2
L-133	PLANTING PLAN - CREATION AREAS ENLARGEMENT 3
L-200	MATERIALS PLAN - CREATION AREAS
L-300	SECTIONS 1 - ENHANCEMENT AREAS
L-301	SECTIONS 1 - CREATION AREAS
L-500	DETAILS 1 - ENHANCEMENT AREAS
L-501	DETAILS 2 - ENHANCEMENT AREAS
L-502	DETAILS 3 - ENHANCEMENT AREAS
L-503	DETAILS 4 - ENHANCEMENT AREAS
L-510	DETAILS 1 - CREATION AREAS
L-511	DETAILS 2 - CREATION AREAS

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

ECOLOGICAL ENGINEER:
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
AN ENGINEERING ENTITY OF
EDESIGN DYNAMICS
247 WEST 35TH ST., 10 FL NORTH
NEW YORK, NY 10001



GENERAL NOTES

1. EXISTING AREAS OF FRESHWATER INLAND WETLAND HABITAT AND EXISTING AREAS OF TIDAL WETLAND HABITAT ARE SHOWN ACCORDING TO THE JANUARY 2022 WETLAND DELINEATION REPORT PROVIDED BY FHI STUDIO; 2024 WETLAND DELINEATION REPORT FOR TWEED NEW HAVEN AIRPORT PROVIDED BY MCCUE ENVIRONMENTAL; AND THE NATIONAL WETLANDS INVENTORY INFORMATION (ACCESSED OCTOBER 2024) FOR THE TWEED NEW HAVEN AIRPORT.
2. EXISTING AREAS OF *PHRAGMITES AUSTRALIS* ARE SHOWN ACCORDING TO 2024 WETLAND DELINEATION REPORT FOR TWEED NEW HAVEN AIRPORT PROVIDED BY MCCUE ENVIRONMENTAL.

LEGEND

0' 175' 350' 700'

N

PROPERTY LINE

WETLAND FLAG LOCATION — WF###

COWARDIN ET AL. WETLAND CLASSIFICATION AREAS:

- E1UBLx = ESTUARINE (E), SUBTIDAL (1), UNCONSOLIDATED BOTTOM (UB), SUBTIDAL (L) EXCAVATED (X) **INCLUDES TIDAL CREEKS AND CHANNELS**
- E2EM1Pd = ESTUARINE (E), INTERTIDAL (2), EMERGENT PERSISTENT (EM1), IRREGULARLY FLOODED (P), PARTIALLY DRAINED/DITCHED (D)
- E2EM1/5Pd = ESTUARİNE (E), INTERTİDAL (2), EMERGENT PERSİSTENT (EM1), PHRAGMİTES AUSTRALİS (5), IRREGULARLY FLOODED (P), PARTİALLY DRAİNED/DİTCHED (D)
- PUB = PALUSTRINE (P), UNCONSOLIDATED BOTTOM (UB)
- PEM = PALUSTRINE (P), EMERGENT (EM)
- PEM1/5F = PALUSTRİNE (P), EMERGENT PERSİSTENT (EM1), PHRAGMİTES AUSTRALİS (5), SEMİ PERMANENTLY FLOODED (F)
- PFO = PALUSTRINE (P), FORESTED (FO)
- PSS = PALUSTRINE (P), SCRUB-SHRUB (SS)
- R2UB2/4 = RIVERINE (R), LOWER PERENNIAL (2), UNCONSOLIDATED BOTTOM (UB), SAND (2), ORGANIC (4)
- **INTERTIDAL FLAT**
- **UPLAND ISLANDS**

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

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SUBMISSION:

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REV	DATE	ISSUE

SEAL

SHEET NAME
EXISTING CONDITIONS PLAN

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 350'

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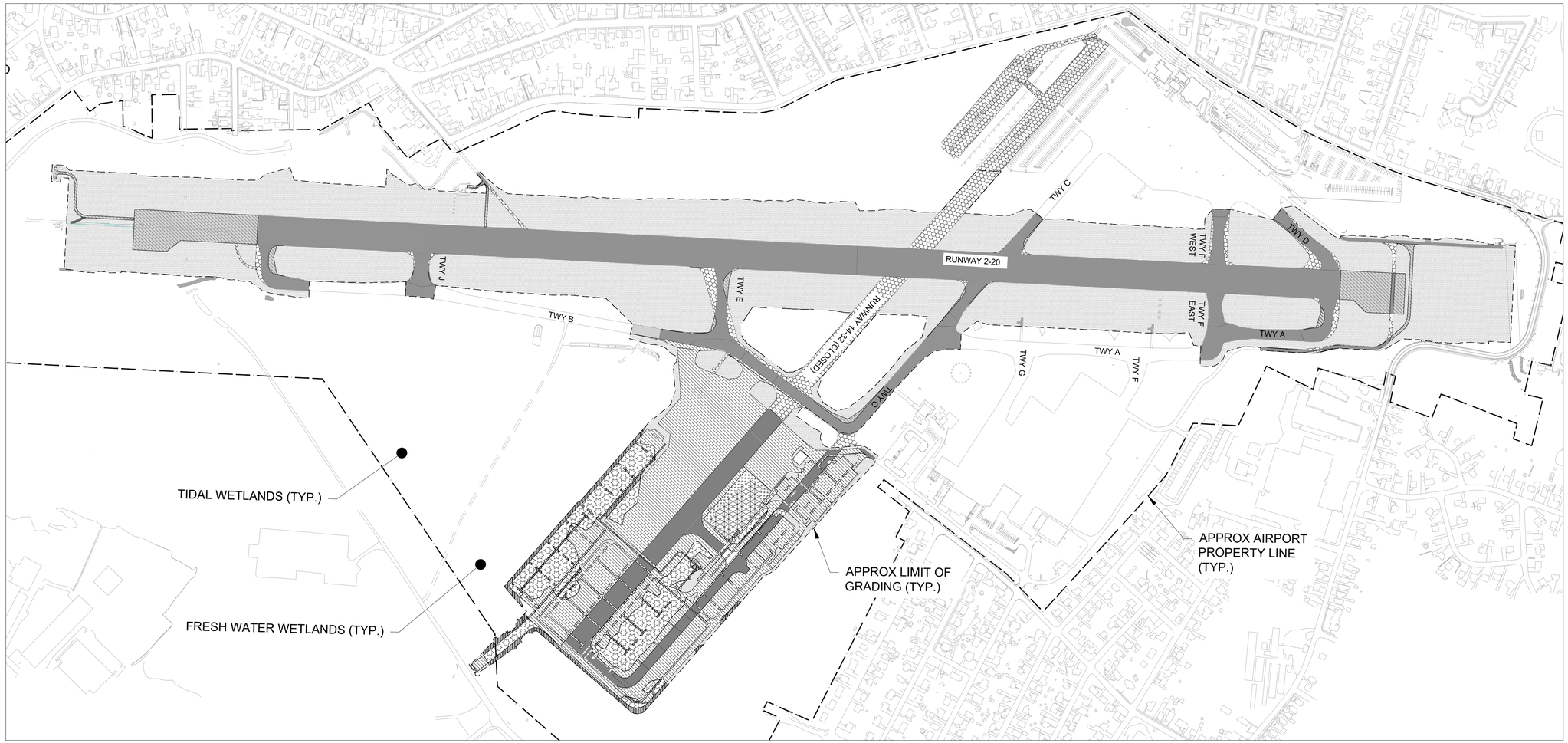
SHEET



0' 175' 300' 600'

N

DESCRIPTION	AREA (SF)	AREA (ACRES)
PAVEMENT TO PAVEMENT	1,446,568 SF	33.20 AC
TURF TO TURF	3,094,040 SF	71.0 AC
TURF TO PAVEMENT	1,073,598 SF	24.65 AC
TURF TO ROOFTOP	15,912 SF	0.37 AC
PAVEMENT TO TURF	414,388 SF	9.51 AC
WETLAND TO PAVEMENT	290,075 SF	6.66 AC
WETLAND TO ROOFTOP	45,265 SF	1.04 AC
WETLAND TO TURF	70,196 SF	1.62 AC
NET CHANGE IN IMPERVIOUS	1,010,462 SF	23.20 AC
NET CHANGE IN WETLANDS	(405,536) SF	(9.31) AC

LEGEND

PROPERTY LINE

APPROX. LIMIT OF GRADING

TURF TO TURF

PAVEMENT TO PAVEMENT

TURF TO PAVEMENT

WETLAND TO PAVEMENT

TURF TO ROOFTOP

WETLAND TO ROOFTOP

PAVEMENT TO TURF

WETLAND TO TURF

TWEED NEW HAVEN AIRPORT

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SEAL

SHEET NAME
REGULATED RESOURCE IMPACT AREA

DATE | DRAWN BY | CHECKED BY

FORMAT ANSI D | SCALE 1" = 300'

SHEET NO. C-100 | SHEET

	CTDEEP									
	PEM	PEM	PSS	PSS	PFO	PFO	PEM (PHRAGMITES)	PEM (PHRAGMITES)	TOTAL	TOTAL
DESCRIPTION	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)
WETLAND TO PAVEMENT	276,465 SF	6.35 AC	402 SF	0.01 AC	0 SF	0.00 AC	12,815 SF	0.29 AC	289,682SF	6.65 AC
WETLAND TO ROOFTOP	45,418 SF	1.04 AC	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	45,418 SF	1.04 AC
WETLAND TO TURF	58,957 SF	1.35 AC	160 SF	0.01 AC	221 SF	0.01 AC	11,080 SF	0.25 AC	70,418 SF	1.62 AC
TOTALS	380,840 SF	8.74 AC	562 SF	0.02 AC	221 SF	0.01 AC	23,895 SF	0.54 AC	405,518 SF	9.31 AC

	ACOE									
	PEM	PEM	PSS	PSS	PFO	PFO	PEM (PHRAGMITES)	PEM (PHRAGMITES)	TOTAL	TOTAL
DESCRIPTION	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)
WETLAND TO PAVEMENT	163,042 SF	3.74 AC	402 SF	0.01 AC	0 SF	0.00 AC	12,815 SF	0.29 AC	176,259 SF	4.05 AC
WETLAND TO ROOFTOP	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	0.00 SF	0.00 AC
WETLAND TO TURF	52,050 SF	1.19 AC	160 SF	0.01 AC	221 SF	0.01 AC	11,080 SF	0.25 AC	63,511 SF	1.46 AC
TOTALS	215,092 SF	4.94 AC	562 SF	0.01 AC	221 SF	0.01 AC	23,895 SF	0.55 AC	239,770 SF	5.50 AC
	USACE– PEM IMPACTS FROM WETLAND 6 ONLY, WETLANDS 4 AND 5 ARE NON–JURISDICTIONAL									

FRESH WATER WETLANDS (TYP.)

TEMPORARY IMPACT AREAS								
	PEM	PEM	PSS	PSS	PEM (PHRAGMITES)	PEM (PHRAGMITES)	TOTAL	TOTAL
DESCRIPTION	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)	AREA (SF)	AREA (ACRES)
TEMPORARY IMPACTS	670	0.02	194.00	0.01	10,777	0.25	11,641	0.27

TURF TO TURF
TURF TO ROOFTOP
PAVEMENT TO PAVEMENT
WETLAND TO PAVEMENT
TURF TO PAVEMENT
PAVEMENT TO TURF
WETLAND TO TURF
WETLAND TO ROOFTOP
TEMPORARY IMPACTS

0' 40' 80' 160'

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

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REV	DATE	ISSUE

SEAL

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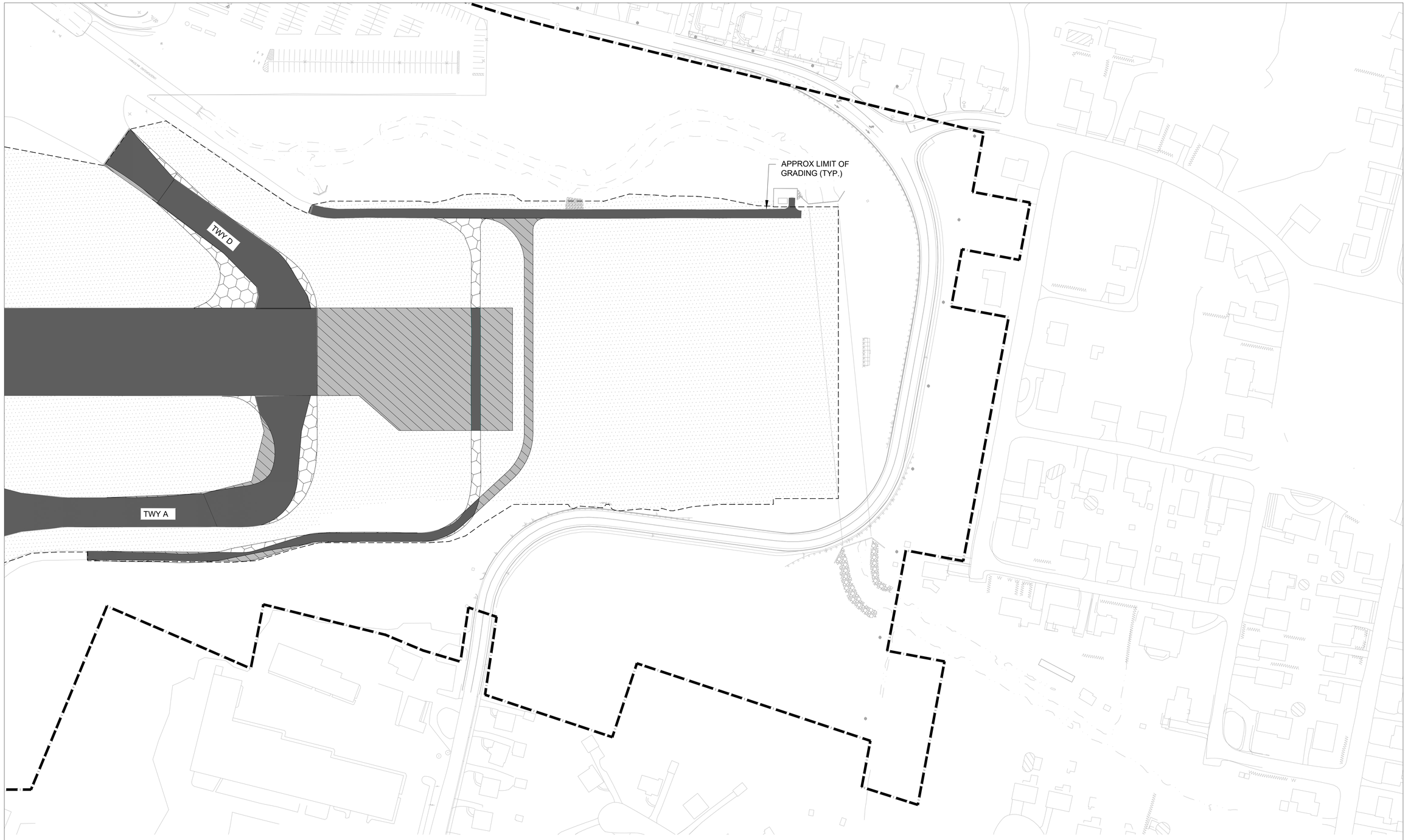

NO WETLAND IMPACT

TURF TO TURF
TURF TO ROOFTOP
PAVEMENT TO PAVEMENT
WETLAND TO PAVEMENT
TEMPORARY IMPACTS
TURF TO PAVEMENT
PAVEMENT TO TURF
WETLAND TO TURF
WETLAND TO ROOFTOP

0' 40' 80' 160'

N

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REV	DATE	ISSUE

SEAL

SHEET NAME
REGULATED RESOURCE IMPACT AREA - DETAILS 2

DATE | DRAWN BY | CHECKED BY

FORMAT: ANSI D | SCALE: 1" = 80'

SHEET NO.: C-102 | SHEET

APPROX LIMIT OF GRADING (TYP.)

RUNWAY 2-20

TWY C

TWY C

TWY C

TWY F WEST

TWY F EAST

TWY G

TWY A

TWY F

NO WETLAND IMPACT

TURF TO TURF

TURF TO PAVEMENT

TURF TO ROOFTOP

PAVEMENT TO TURF

PAVEMENT TO PAVEMENT

WETLAND TO TURF

WETLAND TO PAVEMENT

WETLAND TO ROOFTOP

TEMPORARY IMPACTS

0' 175' 350' 700'

N

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

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NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

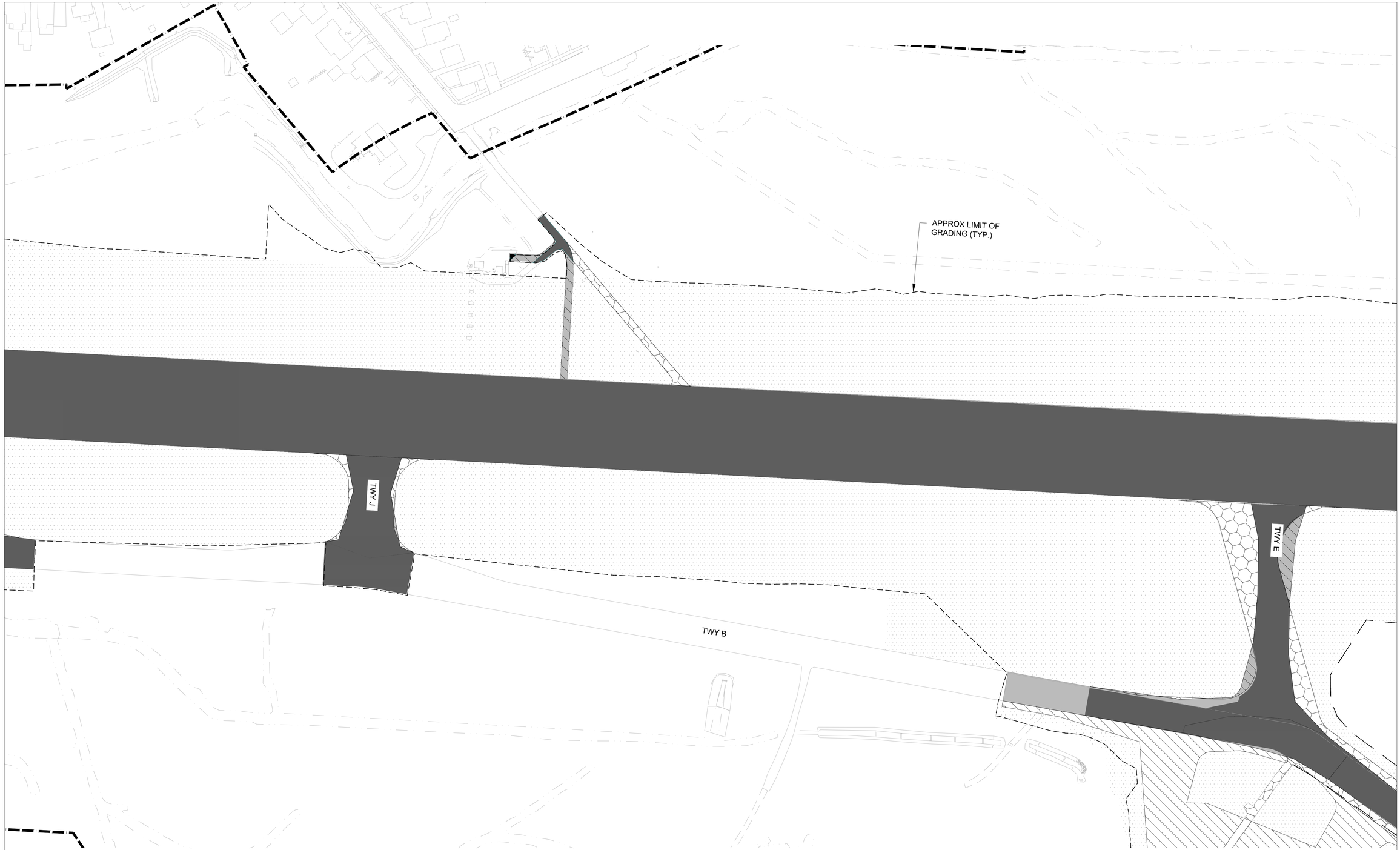
SEAL

SHEET NAME
REGULATED RESOURCE IMPACT AREA - DETAILS 3

DATE | DRAWN BY | CHECKED BY

FORMAT: ANSI D | SCALE: 1" = 80'

SHEET NO.: C-103 | SHEET



NO WETLAND IMPACT

TURF TO TURF
TURF TO ROOFTOP
PAVEMENT TO PAVEMENT
WETLAND TO PAVEMENT
TEMPORARY IMPACTS
TURF TO PAVEMENT
PAVEMENT TO TURF
WETLAND TO TURF
WETLAND TO ROOFTOP

0' 175' 350' 700'

N

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

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MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
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NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

SEAL

SHEET NAME
REGULATED RESOURCE IMPACT AREA - DETAILS 4

DATE | DRAWN BY | CHECKED BY

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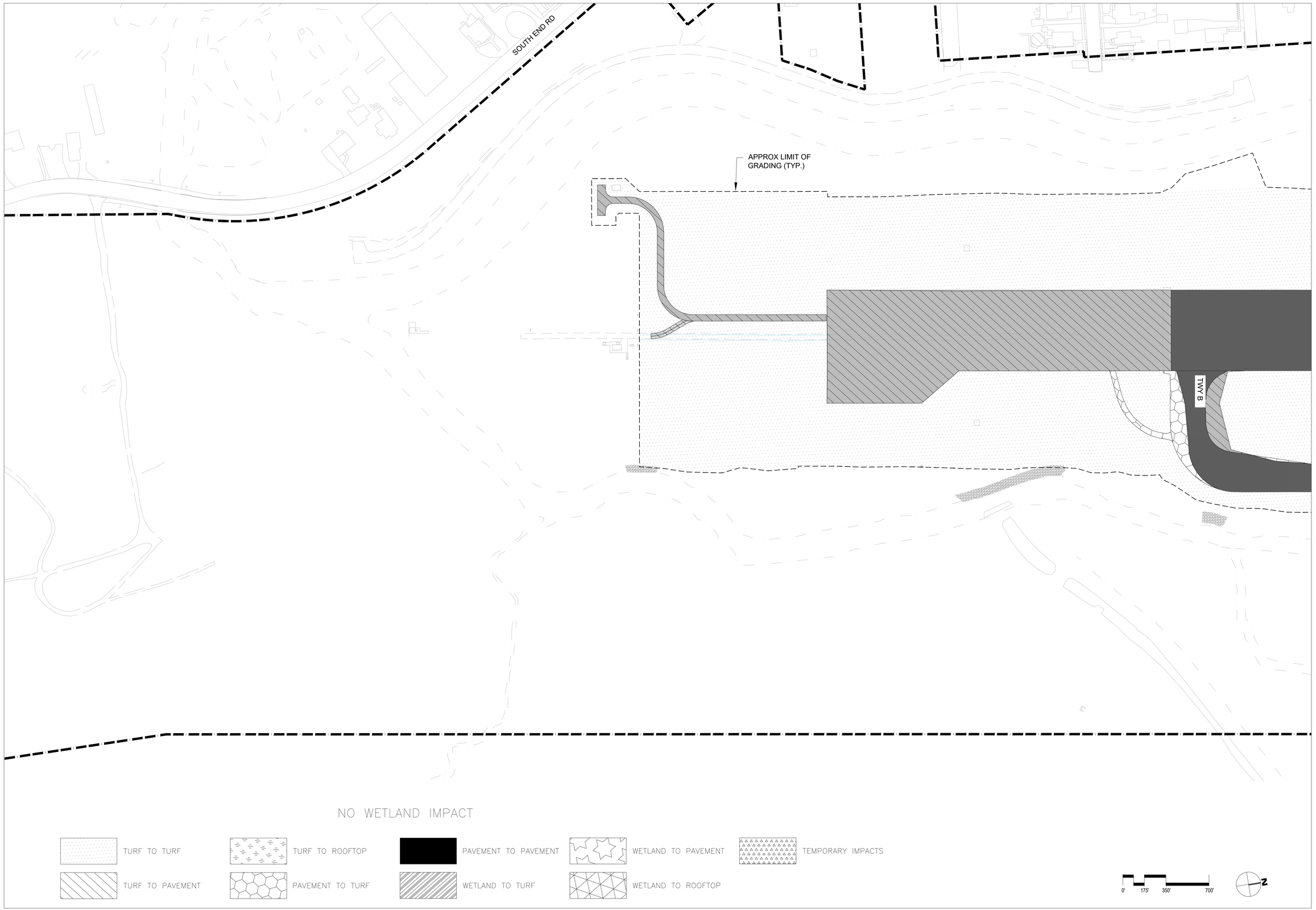

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

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HOYLE TANNER

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ENGINEERING ENTITY OF:

eDESIGN DYNAMICS
247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

SEAL

SHEET NAME
REGULATED RESOURCE IMPACT AREA - DETAILS 5

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 350'

SHEET NO.
C-105

SHEET



TEMPORARY IMPACT AREAS		
	OPEN WATER	OPEN WATER
DESCRIPTION	AREA (SF)	AREA (ACRES)
TEMPORARY IMPACTS	421	0.01

NO WETLAND IMPACT

TURF TO TURF
TURF TO ROOFTOP
PAVEMENT TO PAVEMENT
WETLAND TO PAVEMENT
TEMPORARY IMPACTS
TURF TO PAVEMENT
PAVEMENT TO TURF
WETLAND TO TURF
WETLAND TO ROOFTOP

0' 40' 80' 160'

N

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
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NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

SEAL

SHEET NAME
REGULATED RESOURCE IMPACT AREA - DETAILS 6

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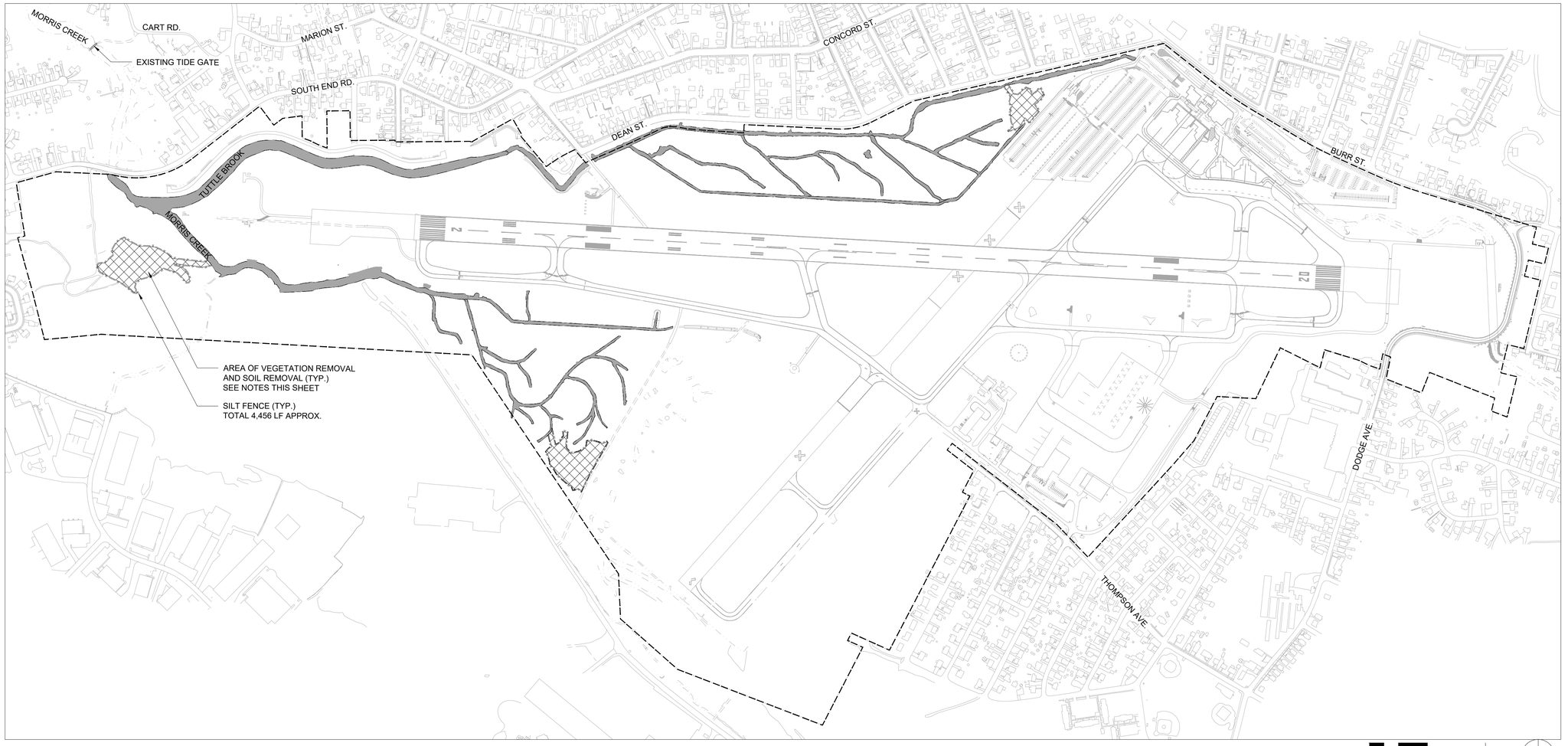


REMOVALS NOTES:

1. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CHECK AND VERIFY ALL SITE CONDITIONS PRIOR TO COMMENCING WORK. ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THE DRAWINGS AND ACTUAL FIELD CONDITIONS SHOULD BE BROUGHT TO THE ATTENTION OF THE ENGINEER IN WRITING, PRIOR TO THE COMMENCEMENT OF WORK.
2. THE EXISTENCE AND LOCATION OF EACH UNDERGROUND UTILITY IS NOT GUARANTEED AND UNDOCUMENTED CONDITIONS MAY EXIST. THE CONTRACTOR SHALL COORDINATE WITH THE APPROPRIATE DEPARTMENTS OF THE STATE OF CONNECTICUT FOR LOCATIONS OF UTILITIES NOT SHOWN ON THE BASE PLAN DRAWING INCLUDING, BUT NOT LIMITED TO, HIGH VOLTAGE ELECTRIC, ABANDONED STEAM LINES, ABANDONED WATER LINES, TELEPHONE, CABLES, ETC. STAKE OUT LOCATION OF ALL UTILITIES PRIOR TO COMMENCEMENT OF WORK. ANY UTILITY THAT IS DAMAGED DURING CONSTRUCTION ACTIVITIES SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
3. THE CONTRACTOR MUST INSTALL EROSION AND SEDIMENT CONTROL MEASURES BEFORE THE START OF ANY REMOVAL ACTIVITIES AND MAINTAIN THEM UNTIL COMPLETION OF GRADING AND PLANTING OPERATIONS UNLESS OTHERWISE SPECIFIED.
   a. AN EXISTING FENCE AROUND THE PERIMETER OF THE AIRPORT SHALL SERVE AS THE SITE CONSTRUCTION FENCE.
   b. EXISTING ACCESS ROADS SHALL SERVE AS THE CONSTRUCTION ACCESS ROAD. THE FINAL CONSTRUCTION ACCESS ROUTE SHALL BE ESTABLISHED ON SITE AND APPROVED BY THE ENGINEER PRIOR TO THE CONTRACTOR COMMENCING WORK.
4. THE CONTRACTOR SHALL EXCAVATE TO AN ELEVATION OF APPROXIMATELY 1.00 FEET NAVD88 WITH THE SANDY PLANTING MEDIUM BEING PLACED TO AN ELEVATION OF APPROXIMATELY 2.00 FEET NAVD88 TO ACHIEVE TARGET ELEVATIONS FOR LOW MARSH VEGETATION. THE CONTRACTOR SHALL REMOVE ALL EXCAVATED MATERIAL FROM THE SITE AND LEGALLY DISPOSE OF AT A CT DEEP APPROVED FACILITY.
5. THE CONTRACTOR SHALL PROPERLY DISPOSE OF ALL DEBRIS FROM REMOVALS AT THE CONTRACTOR'S EXPENSE. ALL MATERIAL GENERATED BY REMOVALS PRESCRIBED IN THE CONSTRUCTION DRAWINGS SHALL BE HAULED FROM THE SITE AND DISPOSED OF AT A CT DEEP APPROVED FACILITY.
6. THE CONTRACTOR SHALL REMOVE AND DISPOSE OF ANY HAZARDOUS MATERIALS IN ACCORDANCE WITH LOCAL REGULATIONS AND AUTHORITIES HAVING JURISDICTION.
7. ALL AREAS OF THE SITE UTILIZED BY THE CONTRACTOR FOR TEMPORARY FACILITIES AND STAGING SHALL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER.
8. STAGING AREA TO BE DESIGNATED PRIOR TO MOBILIZATION AND TO BE APPROVED BY THE ENGINEER.
9. MATERIAL, EQUIPMENT, OR VEHICLES SHALL NOT BE STOCKPILED OR PARKED WITHIN THE DRIPLINE OF ANY TREE.
10. THE CONTRACTOR SHALL TAKE EXTREME CARE TO PREVENT ANY DISRUPTIONS TO THE AIRPORT'S OPERATIONS AND SHALL ABIDE BY ALL APPLICABLE LOCAL, STATE, AND FEDERAL RULES AND REGULATIONS FOR WORKING WITHIN THE PROPERTY.

LEGEND

- PROPERTY LINE
- SILT FENCE WITH STRAW BALE DIKE
- VEGETATION REMOVAL AND SOIL REMOVAL
- EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

ECOLOGICAL ENGINEER
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
ENGINEERING ENTITY OF:
eDESIGN DYNAMICS
247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

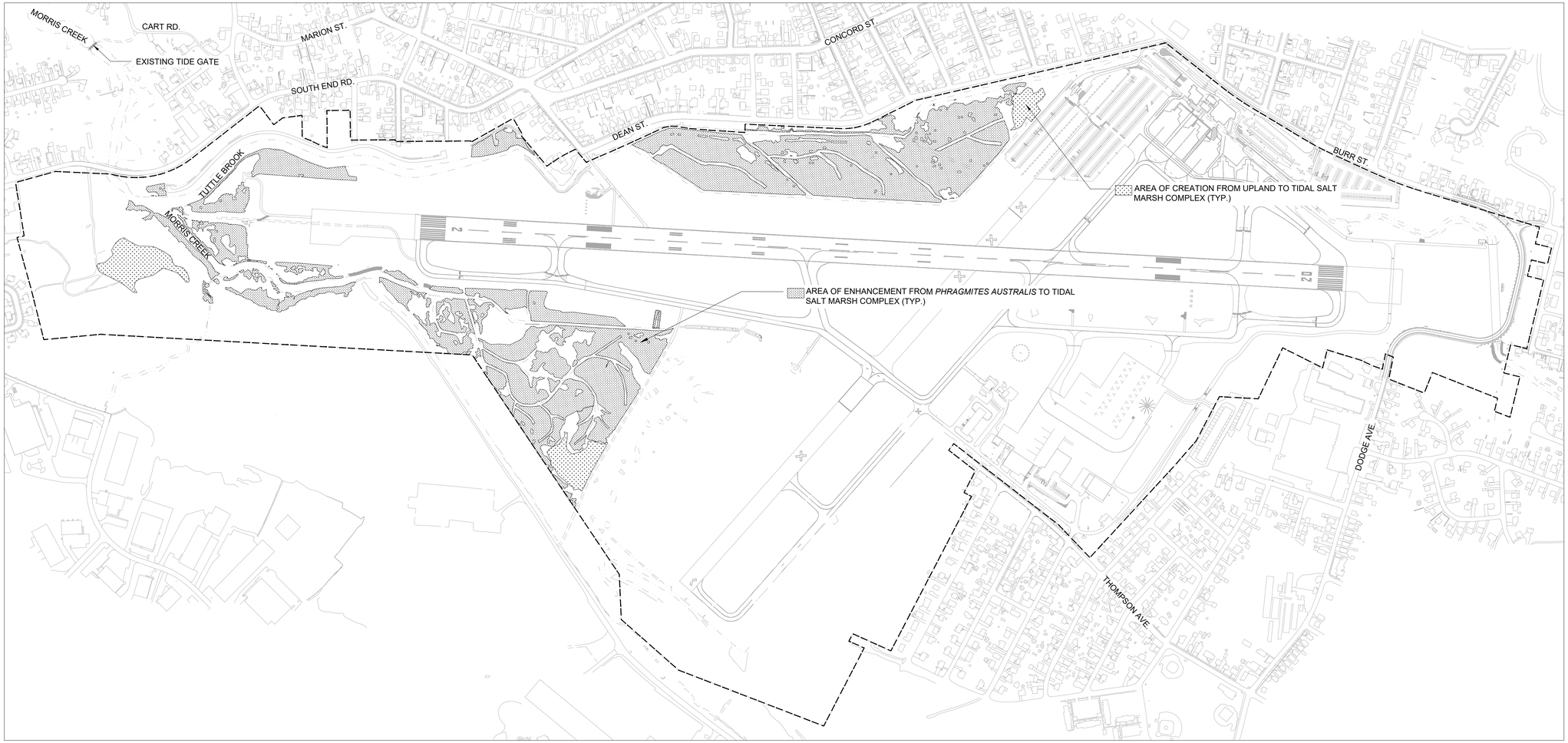
SEAL

SHEET NAME
REMOVALS PLAN - CREATION AREAS

DATE | DRAWN BY | CHECKED BY

FORMAT: ANSI D | SCALE: 1" = 350'

SHEET NO.: C-200 | SHEET



LEGEND

PROPERTY LINE

AREA OF ENHANCEMENT FROM *PHRAGMITES AUSTRALIS* TO TIDAL SALT MARSH COMPLEX

AREA OF CREATION FROM UPLAND TO TIDAL SALT MARSH COMPLEX (TYP.)

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

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eDESIGN DYNAMICS
247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

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REV	DATE	ISSUE

SEAL

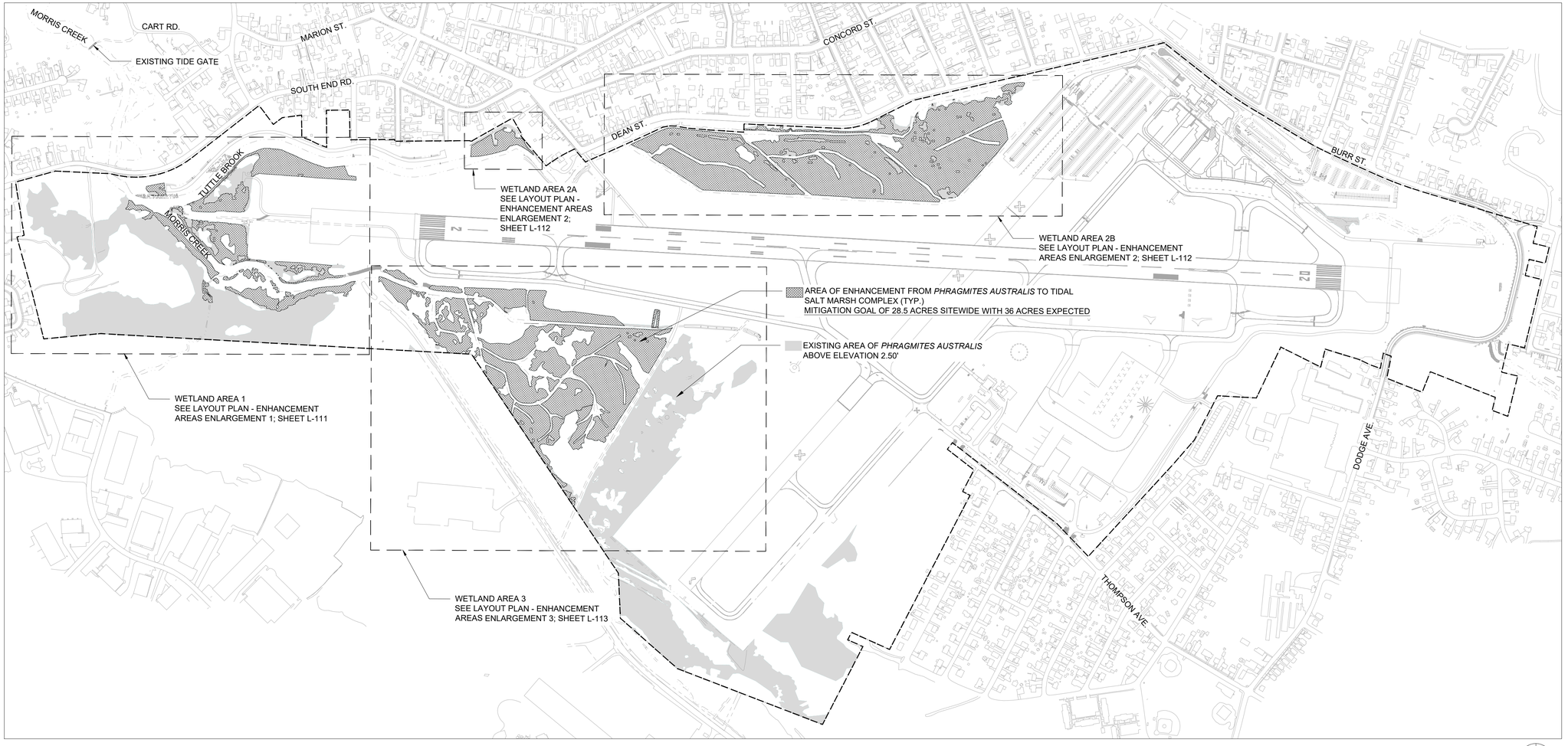
SHEET NAME

LAYOUT PLAN

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 350'

SHEET NO.	SHEET
L-100	



GENERAL NOTES

1. THE DEPTH AND DURATION OF THE TIDAL WATER INUNDATION WILL BE INCREASED WITHIN THE EXISTING *PHRAGMITES*-DOMINATED MARSH AREAS BY MODIFICATIONS TO THE TIDE GATE SOP IN ORDER TO CONVERT *PHRAGMITES* TO SALT MARSH COMPLEX . THE MITIGATION PROJECT GOAL IS TO ACHIEVE AN ENHANCEMENT AREA OF 28.5 ACRES OF TIDAL SALT MARSH COMPLEX. A TOTAL OF 36 ACRES OF RESTORED TIDAL SALT MARSH COMPLEX IS EXPECTED.
2. ELEVATION OF 2.5 FT NAVD88 IS DERIVED FROM MULTIPLE FIELD TOPOGRAPHIC SURVEYS, DRONE COLLECTED LIDAR DATA, AND ANALYSIS OF TIDAL ELEVATION DATA COLLECTED THROUGHOUT SEVERAL WETLAND LOCATIONS ACROSS THE AIRPORT SITE. REFER TO THE MITIGATION PLAN FOR FURTHER INFORMATION ON THE TIDAL MONITORING ANALYSIS. THE MAXIMUM INUNDATION ELEVATION SHALL BE 2.5 FT NAVD88 TO AVOID FLOODING THE AIRPORT RUNWAY SAFETY AREAS AND ADJACENT PROPERTIES.

LEGEND

PROPERTY LINE

AREA OF ENHANCEMENT BELOW ELEVATION 2.50' FROM *PHRAGMITES AUSTRALIS* TO TIDAL SALT MARSH COMPLEX

EXISTING AREA OF *PHRAGMITES AUSTRALIS* ABOVE ELEVATION 2.50'

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

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NEW YORK, NY 10001

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REV	DATE	ISSUE

SEAL

SHEET NAME

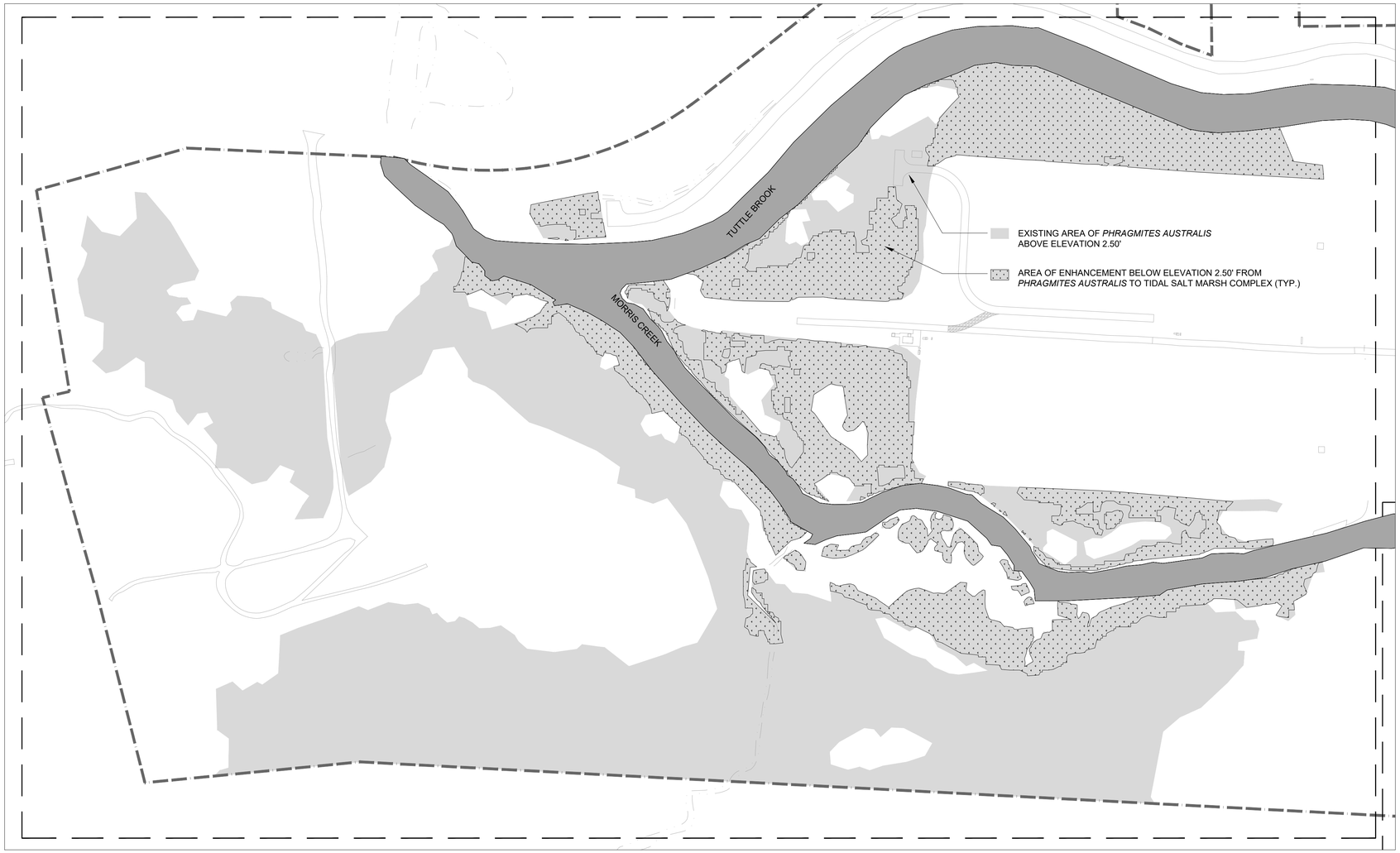
LAYOUT PLAN - ENHANCEMENT AREAS KEY MAP

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 350'

SHEET NO. L-110

SHEET



WETLAND AREA 1

LEGEND

PROPERTY LINE

AREA OF ENHANCEMENT BELOW ELEVATION 2.50' FROM *PHRAGMITES AUSTRALIS* TO TIDAL SALT MARSH COMPLEX

EXISTING AREA OF *PHRAGMITES AUSTRALIS* ABOVE ELEVATION 2.50'

EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
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NEW YORK, NY 10001

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REV	DATE	ISSUE

SEAL

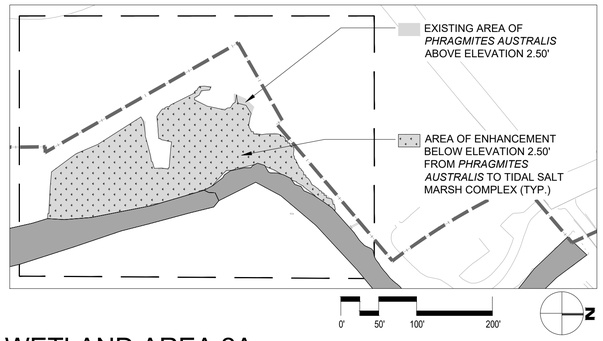
SHEET NAME
LAYOUT PLAN - ENHANCEMENT AREAS ENLARGEMENT 1

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 100'

SHEET NO.
L-111

SHEET



WETLAND AREA 2A



WETLAND AREA 2B

LEGEND

PROPERTY LINE

AREA OF ENHANCEMENT BELOW ELEVATION 2.50' FROM *PHRAGMITES AUSTRALIS* TO TIDAL SALT MARSH COMPLEX

EXISTING AREA OF *PHRAGMITES AUSTRALIS* ABOVE ELEVATION 2.50'

EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

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HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

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REV	DATE	ISSUE

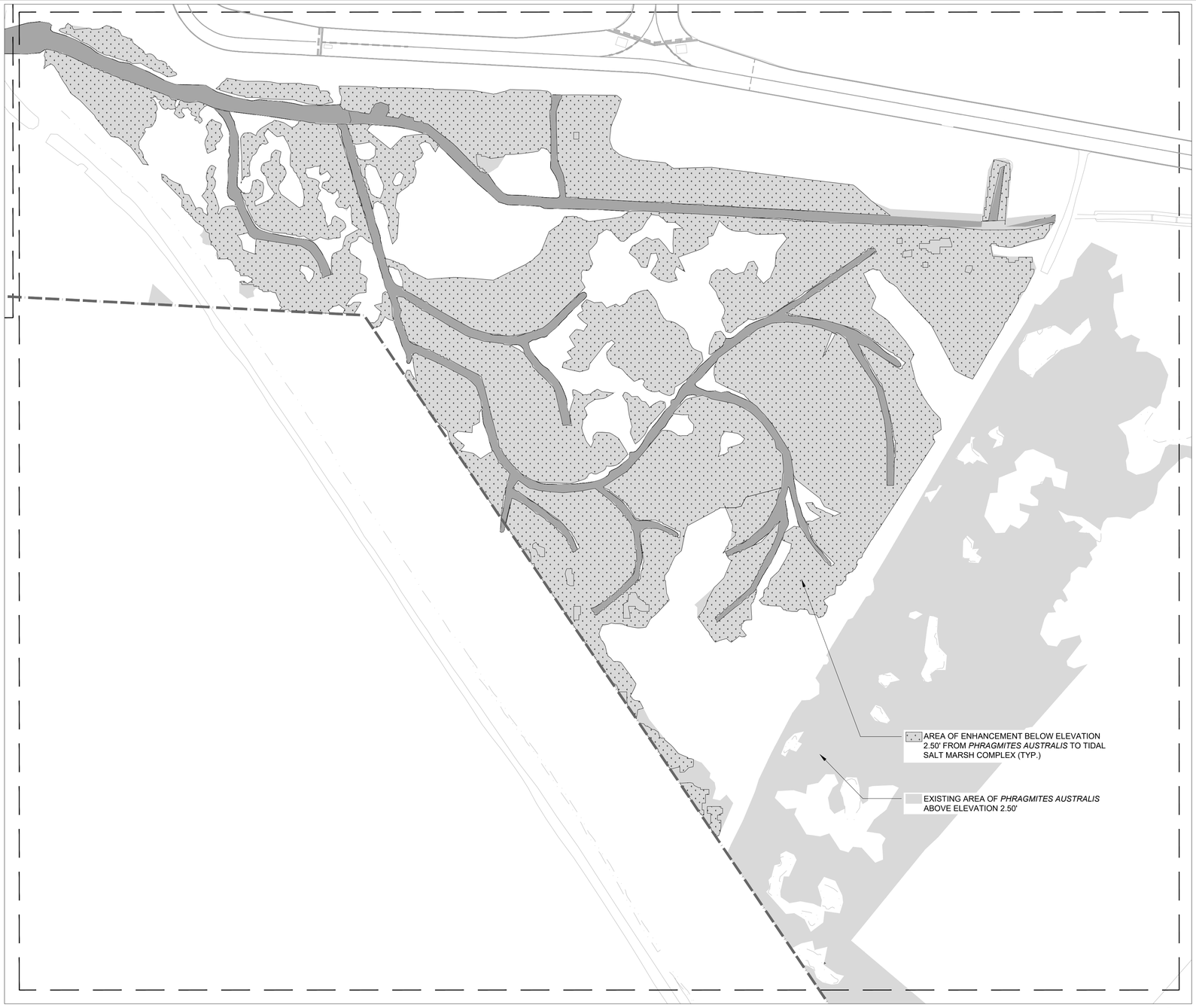
SEAL

SHEET NAME
LAYOUT PLAN - ENHANCEMENT AREAS ENLARGEMENT 2

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 100'

SHEET NO.	SHEET
L-112	



WETLAND AREA 3

LEGEND

PROPERTY LINE

AREA OF ENHANCEMENT BELOW ELEVATION 2.50' FROM *PHRAGMITES AUSTRALIS* TO TIDAL SALT MARSH COMPLEX

EXISTING AREA OF *PHRAGMITES AUSTRALIS* ABOVE ELEVATION 2.50'

EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

ECOLOGICAL ENGINEER
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
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eDESIGN DYNAMICS
247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

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REV	DATE	ISSUE

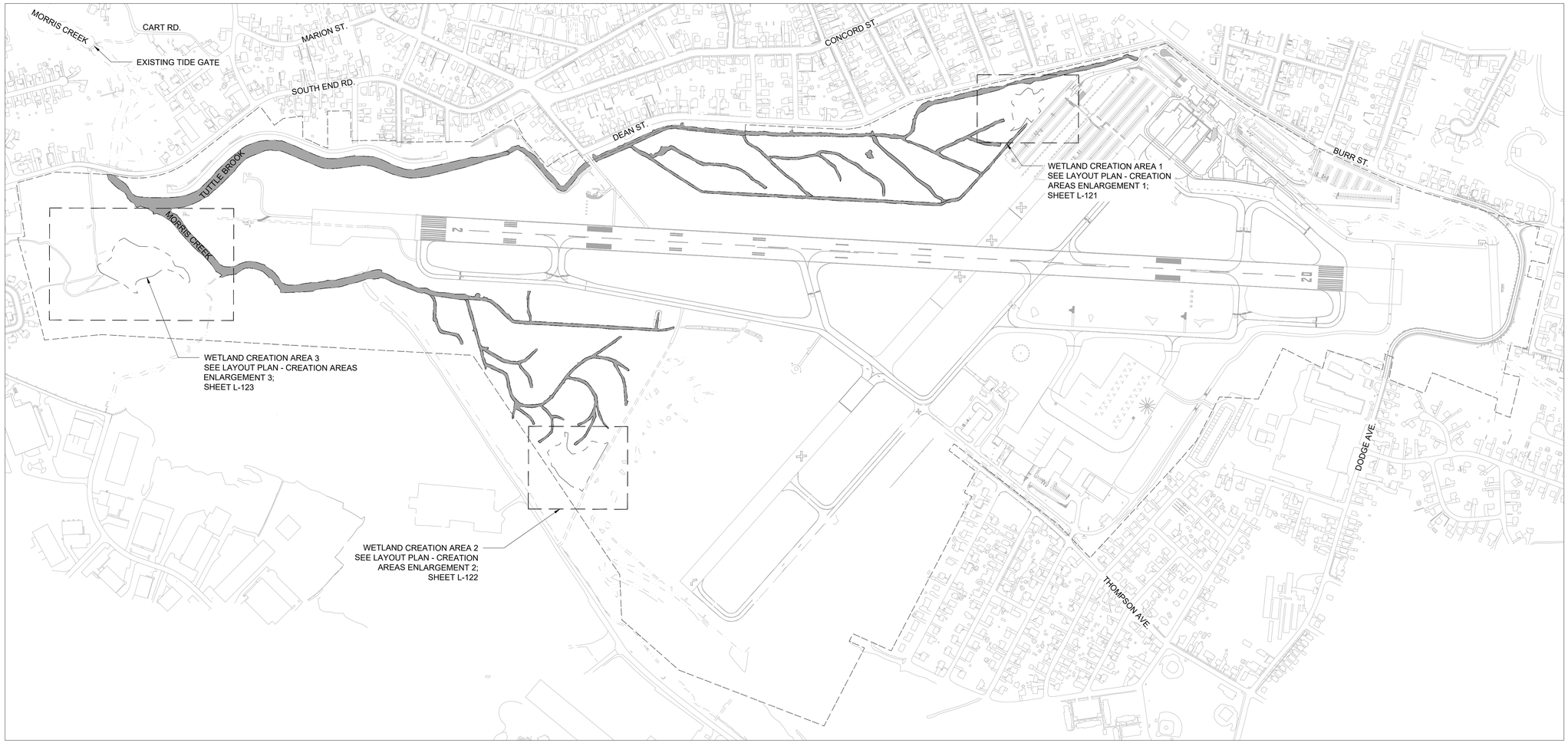
SEAL

SHEET NAME
LAYOUT PLAN - RESTORATION AREAS ENLARGEMENT 3

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 100'

SHEET NO. L-113



LAYOUT AND GRADING NOTES

1. ALL ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM, 1988 (NAVD 88).
2. NO CLEARING, EXCAVATION, GRADING, OR PLANTING SHALL BEGIN UNTIL ALL EROSION AND SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED.
3. THE CONTRACTOR SHALL PREVENT THE DEPOSITION OF MATERIALS ONTO ANY PUBLIC ROADWAY. ANY MATERIALS INADVERTENTLY DEPOSITED ONTO PUBLIC ROADWAYS SHALL BE REMOVED IMMEDIATELY.
4. THE CONTRACTOR SHALL VERIFY ALL EXISTING GRADES IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
5. THE GRADING AND PLACEMENT OF THE SANDY PLANTING MEDIUM SHALL OCCUR IN TANDEM WITH PLANTING ACTIVITIES AT THE SITE.
6. UPON COMPLETION OF CONSTRUCTION, ALL ACCESS ROADS AND STAGING AREAS USED DURING EXCAVATION AND GRADING WILL BE RETURNED TO THEIR PRE-CONSTRUCTION CONDITIONS. ANY TEMPORARY INFRASTRUCTURE INSTALLED FOR CONSTRUCTION ACCESS WILL BE REMOVED, AND DISTURBED AREAS OUTSIDE OF THE CREATED MARSH FOOTPRINT WILL BE STABILIZED AS NECESSARY.

LEGEND

PROPERTY LINE

WETLAND CREATION AREA

EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
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NEW YORK, NY 10001

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REV	DATE	ISSUE

SEAL

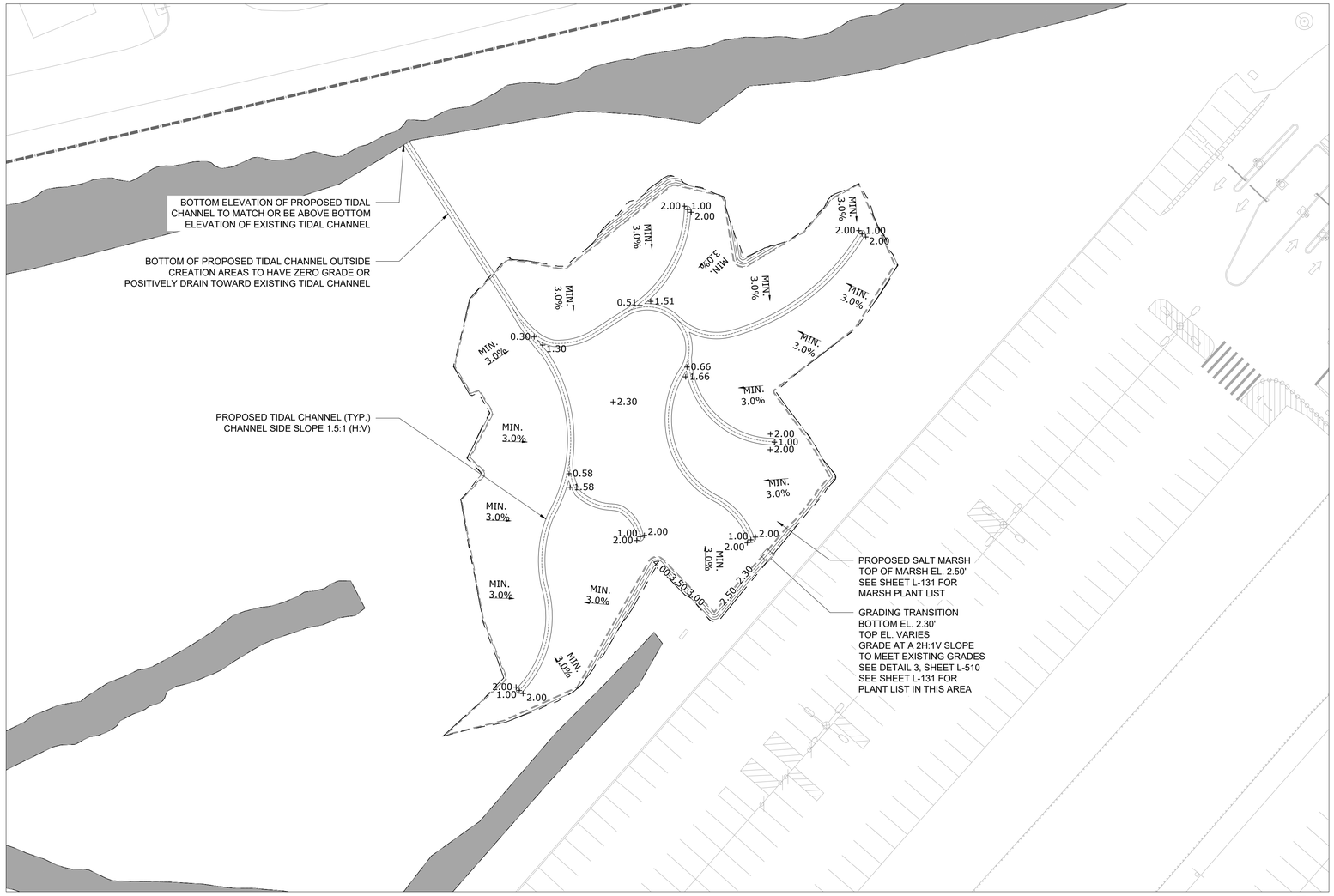
SHEET NAME

LAYOUT PLAN - CREATION AREAS KEY MAP

DATE | DRAWN BY | CHECKED BY

FORMAT **ANSI D** | SCALE 1" = 350' | SHEET

SHEET NO. L-120



WETLAND CREATION AREA 1

LEGEND

- PROPERTY LINE
- WETLAND CREATION AREA
- PROPOSED SPOT ELEVATION +2.00
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED TIDAL CHANNEL
- EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

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MANCHESTER, NH 03101

ECOLOGICAL ENGINEER
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ENGINEERING ENTITY OF:
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NEW YORK, NY 10001

SUBMISSION:

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REV	DATE	ISSUE

SEAL

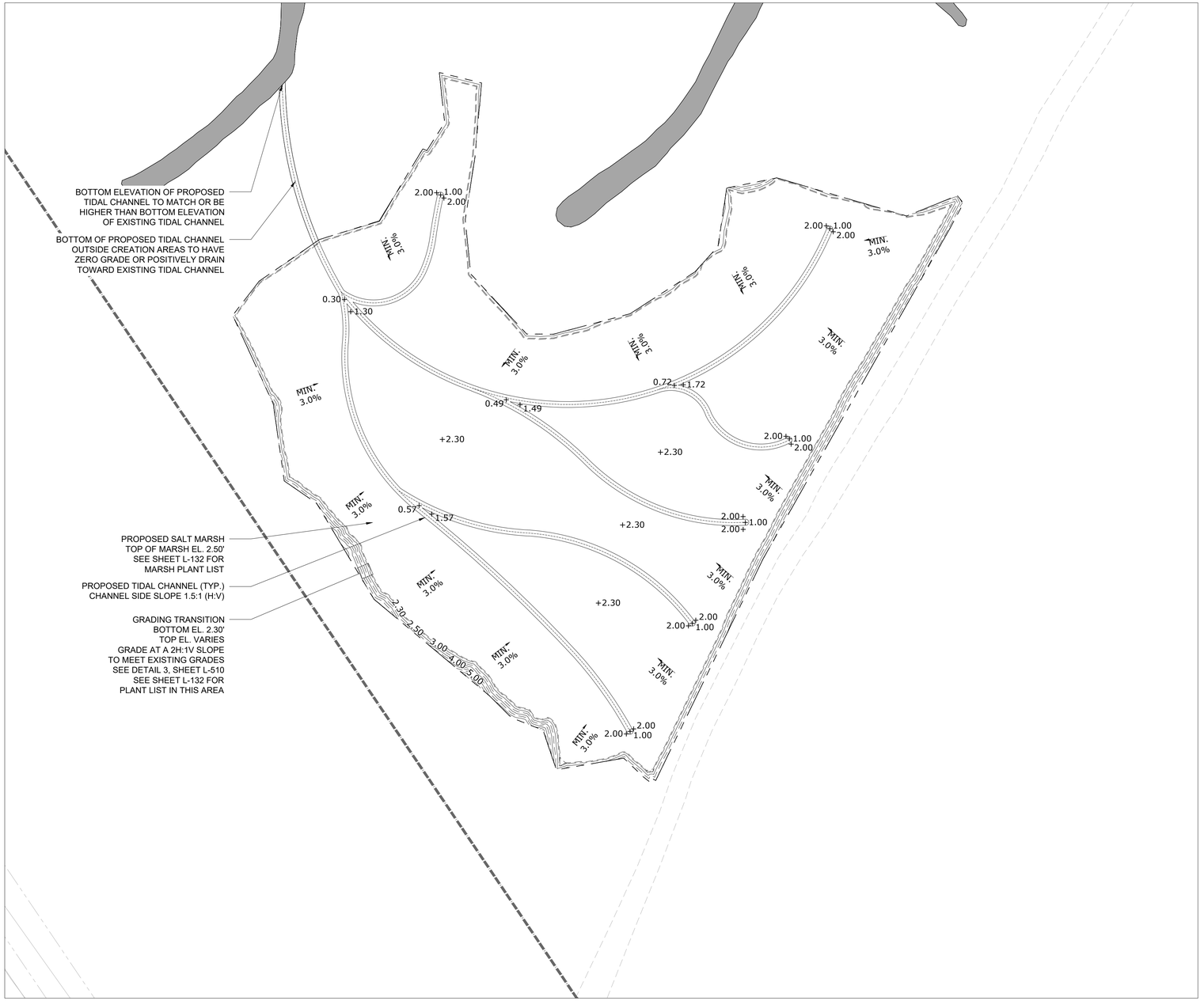
SHEET NAME

LAYOUT PLAN - CREATION AREAS ENLARGEMENT 1

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 30'

SHEET NO. L-121



WETLAND CREATION AREA 2

LEGEND

- PROPERTY LINE
- WETLAND CREATION AREA
- PROPOSED SPOT ELEVATION +2.00
- PROPOSED MAJOR CONTOUR
- PROPOSED MINOR CONTOUR
- PROPOSED TIDAL CHANNEL
- EXISTING TIDAL CHANNEL (TYP.)

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

ECOLOGICAL ENGINEER
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
ENGINEERING ENTITY OF:
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REV	DATE	ISSUE

SEAL

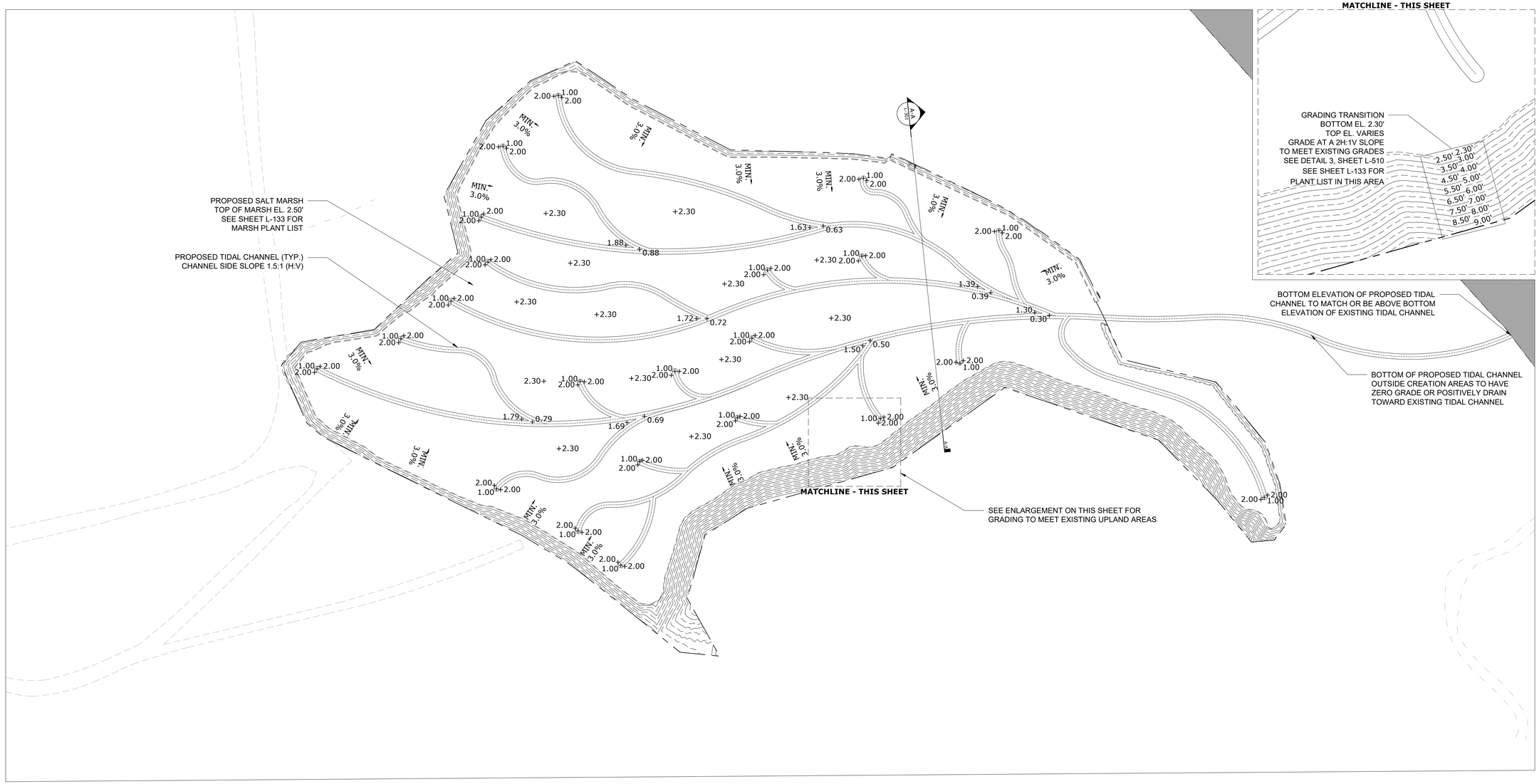
SHEET NAME

LAYOUT PLAN - CREATION AREAS ENLARGEMENT 2

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 30'

SHEET NO. L-122



WETLAND CREATION AREA 3

LEGEND

PROPERTY LINE		PROPOSED MAJOR CONTOUR	
WETLAND CREATION AREA		PROPOSED MINOR CONTOUR	
PROPOSED SPOT ELEVATION	+2.00	PROPOSED TIDAL CHANNEL	
		EXISTING TIDAL CHANNEL (TYP.)	

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101
HOYLE TANNER

ECOLOGICAL ENGINEER
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
ENGINEERING ENTITY OF:
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247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

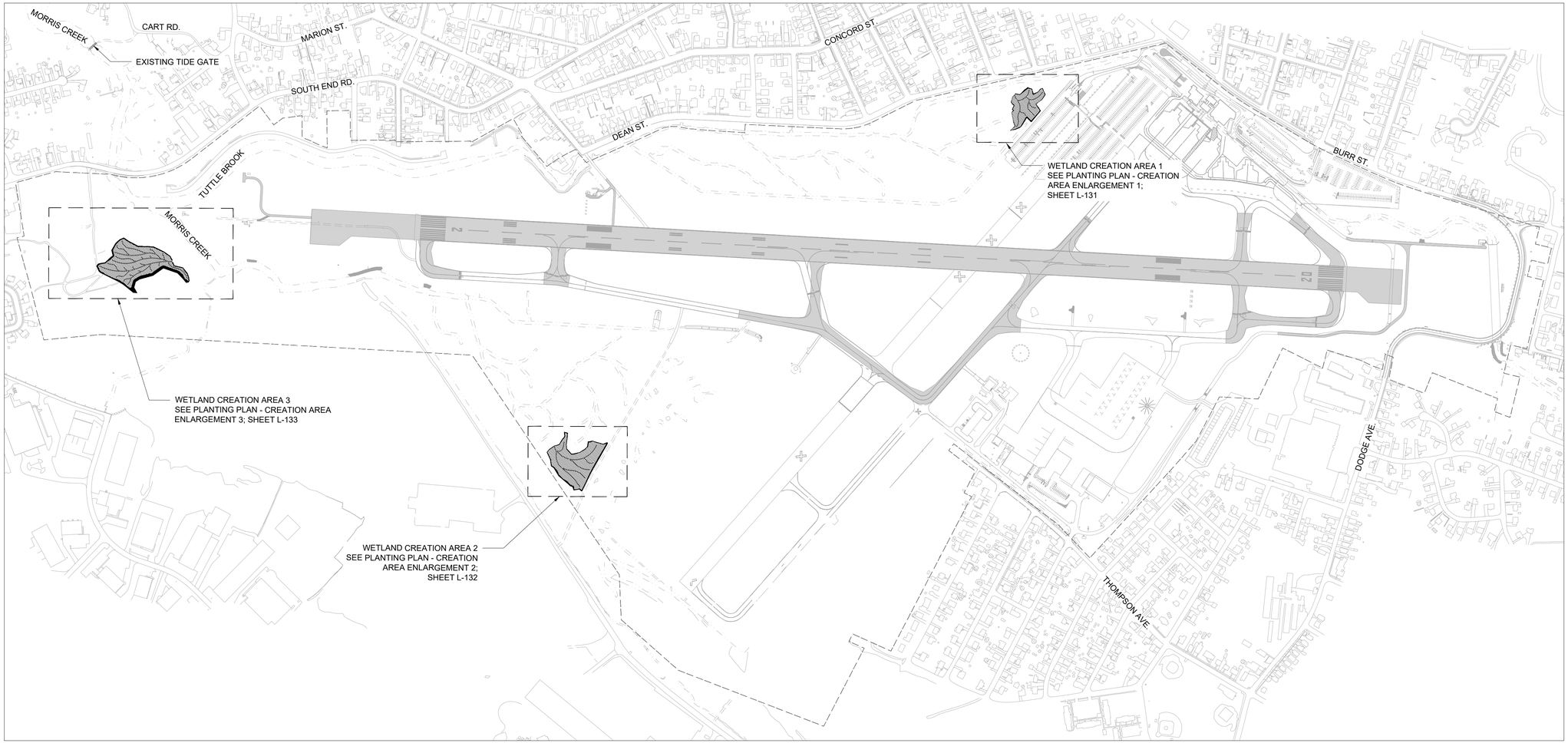
SEAL

SHEET NAME
LAYOUT PLAN - CREATION AREAS ENLARGEMENT 3

DATE | DRAWN BY | CHECKED BY

FORMAT: ANSI D | SCALE: 1" = 30'

SHEET NO.: L-123 | SHEET



LEGEND

PROPERTY LINE

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
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MANCHESTER, NH 03101

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ENGINEERING ENTITY OF:

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NEW YORK, NY 10001

SUBMISSION:

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REV	DATE	ISSUE

SEAL

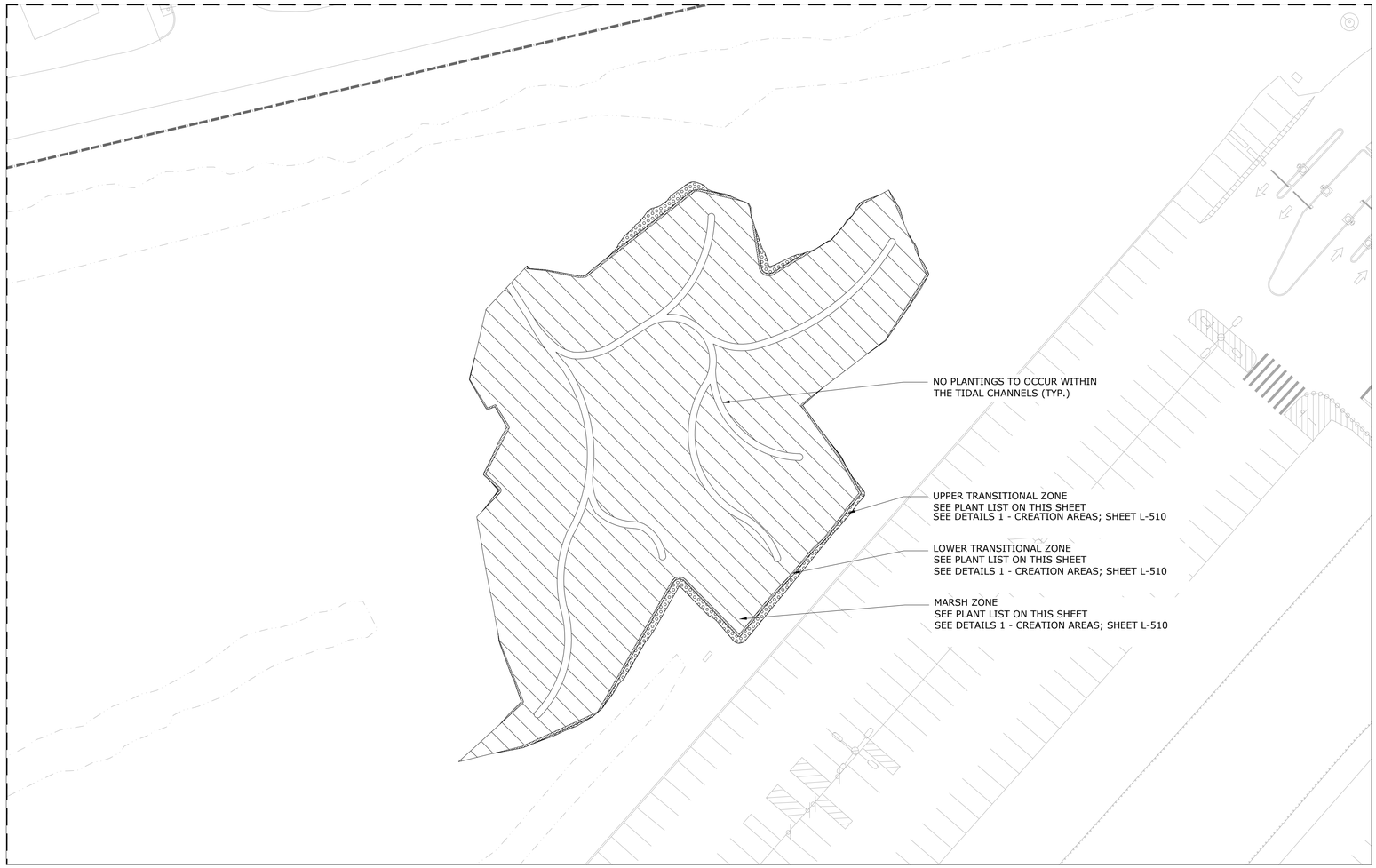
SHEET NAME

PLANTING PLAN - CREATION AREAS KEY MAP

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE
ANSI D	1" = 350'

SHEET NO.	SHEET
L-130	



PLANTING PLAN - CREATION AREA ENLARGEMENT 1

PLANT LIST

PLANTING ZONE	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING*	QUANTITY	KEY
MARSH ZONE < 2.5 FEET NAVD88	*SPARTINA ALTERNIFLORA*	SMOOTH CORDGRASS	2" PLUG	18" O.C.	14,018	
LOWER TRANSITIONAL ZONE 2.5 FEET - 3.0 FEET NAVD88	*BACCHARIS HALIMIFOLIA* *DISTICHLIS SPICATA* *IVA FRUTESCENS* *PANICUM VIRGATUM* *SPARTINA ALTERNIFLORA* *SPARTINA PATENS* *SOLIDAGO SEMPERVIRENS*	GROUNDSEL TREE SPIKE SALTGRASS HIGH-TIDE BUSH SWITCHGRASS SMOOTH CORDGRASS SALTMEADOW CORDGRASS SEASIDE GOLDENROD	#1 CONTAINER 2" PLUG #1 CONTAINER 2" PLUG 2" PLUG 2" PLUG 2" PLUG	5 LF O.C. 18" O.C. 5 LF O.C. 18" O.C. 18" O.C. 18" O.C. 18" O.C.	50 44 50 59 59 89 44	
UPPER TRANSITIONAL ZONE > 3.0 FEET NAVD88	*ANDROPOGON GERARDII* *BACCHARIS HALIMIFOLIA* *MYRICA PENSYLVANICA* *PANICUM VIRGATUM* *RHUS AROMATICA* *RHUS GLABRA* *SCHIZACHYRIUM SCOPARIUM* *SORGHASTRUM NUTANS*	BIG BLUESTEM GROUNDSEL TREE BAYBERRY SWITCHGRASS FRAGRANT SUMAC SMOOTH SUMAC LITTLE BLUESTEM YELLOW GRASS	2" PLUG #1 CONTAINER #1 CONTAINER 2" PLUG #1 CONTAINER #1 CONTAINER 2" PLUG 2" PLUG	18" O.C. 5 LF O.C. 5 LF O.C. 18" O.C. 5 LF O.C. 5 LF O.C. 18" O.C. 18" O.C.	90 13 13 90 13 13 90 90	

**GIVEN THE LINEAR LAYOUT OF THE LOWER TRANSITIONAL AND UPPER TRANSITIONAL PLANTING ZONES, CONTRACTOR TO INSTALL THE #1 CONTAINER SHRUBS APPROXIMATELY EVERY 5 LINEAR FEET (LF) ON CENTER (O.C.).*

0' 15' 30' 60'

N

LEGEND

PROPERTY LINE

TWEED NEW HAVEN AIRPORT

155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

HOYLE TANNER

ECOLOGICAL ENGINEER
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
ENGINEERING ENTITY OF:

eDESIGN DYNAMICS
247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

SEAL

SHEET NAME

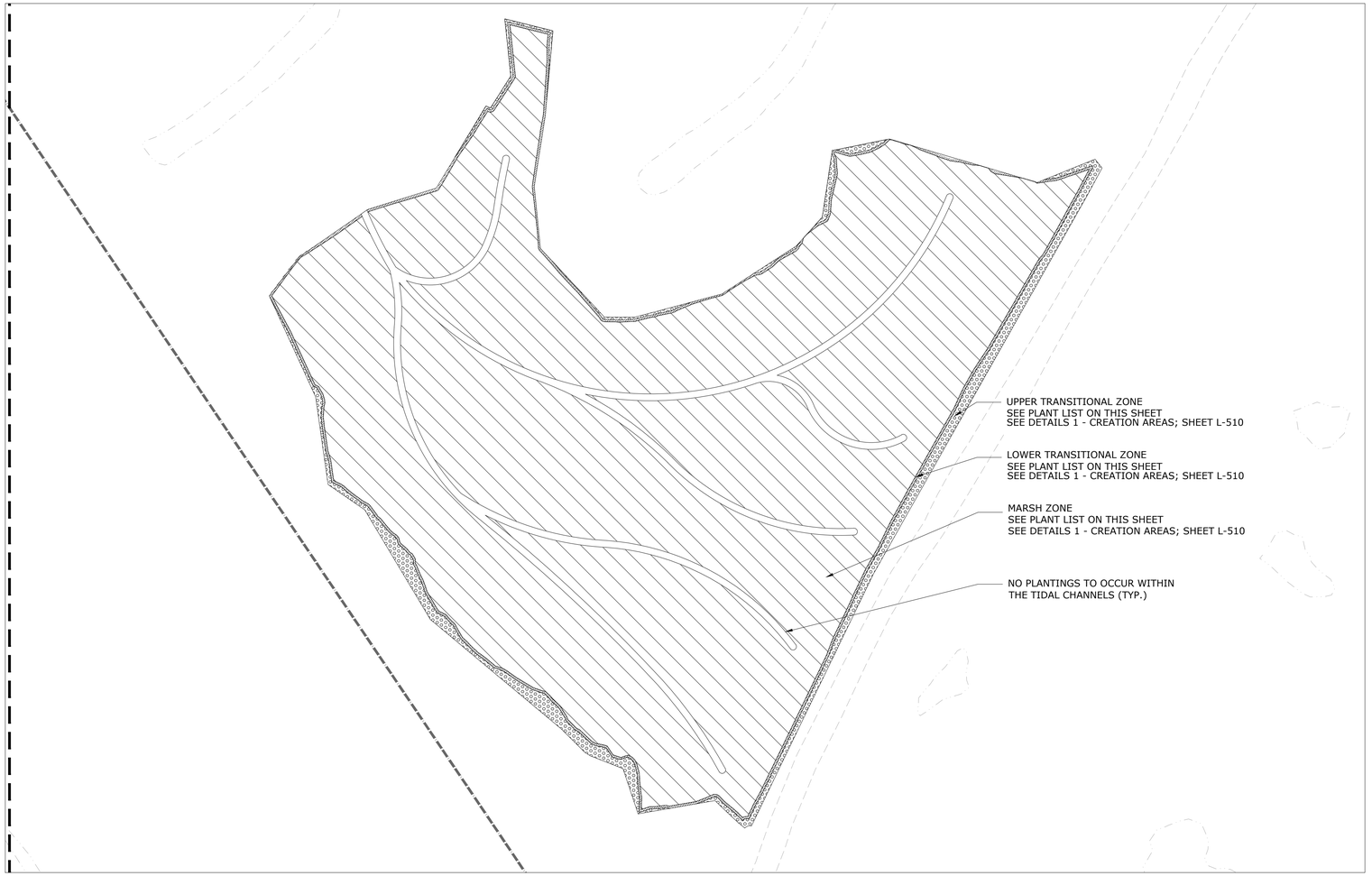
PLANTING PLAN - CREATION AREA ENLARGEMENT 1

DATE	DRAWN BY	CHECKED BY

FORMAT	SCALE	
ANSI D	1" = 30'	

SHEET NO: L-131

SHEET



0' 15' 30' 60'

N

LEGEND

PROPERTY LINE

PLANTING PLAN - CREATION AREA ENLARGEMENT 2

PLANT LIST

PLANTING ZONE	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING*	QUANTITY	KEY
MARSH ZONE < 2.5 FEET NAVD88	*SPARTINA ALTERNIFLORA*	SMOOTH CORDGRASS	2" PLUG	18" O.C.	27,461	
LOWER TRANSITIONAL ZONE 2.5 FEET - 3.0 FEET NAVD88	*BACCHARIS HALIMIFOLIA* *DISTICHLIS SPICATA* *IVA FRUTESCENS* *PANICUM VIRGATUM* *SPARTINA ALTERNIFLORA* *SPARTINA PATENS* *SOLIDAGO SEMPERVIRENS*	GROUNDSEL TREE SPIKE SALTGRASS HIGH-TIDE BUSH SWITCHGRASS SMOOTH CORDGRASS SALTMEADOW CORDGRASS SEASIDE GOLDENROD	#1 CONTAINER 2" PLUG #1 CONTAINER 2" PLUG 2" PLUG 2" PLUG 2" PLUG	5 LF O.C. 18" O.C. 5 LF O.C. 18" O.C. 18" O.C. 18" O.C. 18" O.C.	113 93 113 124 124 187 93	
UPPER TRANSITIONAL ZONE > 3.0 FEET NAVD88	*ANDROPOGON GERARDII* *BACCHARIS HALIMIFOLIA* *MYRICA PENSYLVANICA* *PANICUM VIRGATUM* *RHUS AROMATICA* *RHUS GLABRA* *SCHIZACHYRIUM SCOPARIUM* *SORGHASTRUM NUTANS*	BIG BLUESTEM GROUNDSEL TREE BAYBERRY SWITCHGRASS FRAGRANT SUMAC SMOOTH SUMAC LITTLE BLUESTEM YELLOW GRASS	2" PLUG #1 CONTAINER #1 CONTAINER 2" PLUG #1 CONTAINER #1 CONTAINER 2" PLUG 2" PLUG	18" O.C. 5 LF O.C. 5 LF O.C. 18" O.C. 5 LF O.C. 5 LF O.C. 18" O.C. 18" O.C.	301 32 32 301 32 32 301 301	

**GIVEN THE LINEAR LAYOUT OF THE LOWER TRANSITIONAL AND UPPER TRANSITIONAL PLANTING ZONES, CONTRACTOR TO INSTALL THE #1 CONTAINER SHRUBS APPROXIMATELY EVERY 5 LINEAR FEET (LF) ON CENTER (O.C.).*

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
HOYLE TANNER
150 DOW STREET
MANCHESTER, NH 03101

ECOLOGICAL ENGINEER
MONTALTO & ROTHSTEIN ENGINEERING, D.P.C.
ENGINEERING ENTITY OF:
eDESIGN DYNAMICS
247 WEST 35TH ST, 10 NORTH
NEW YORK, NY 10001

SUBMISSION:

NOT FOR CONSTRUCTION

REV	DATE	ISSUE

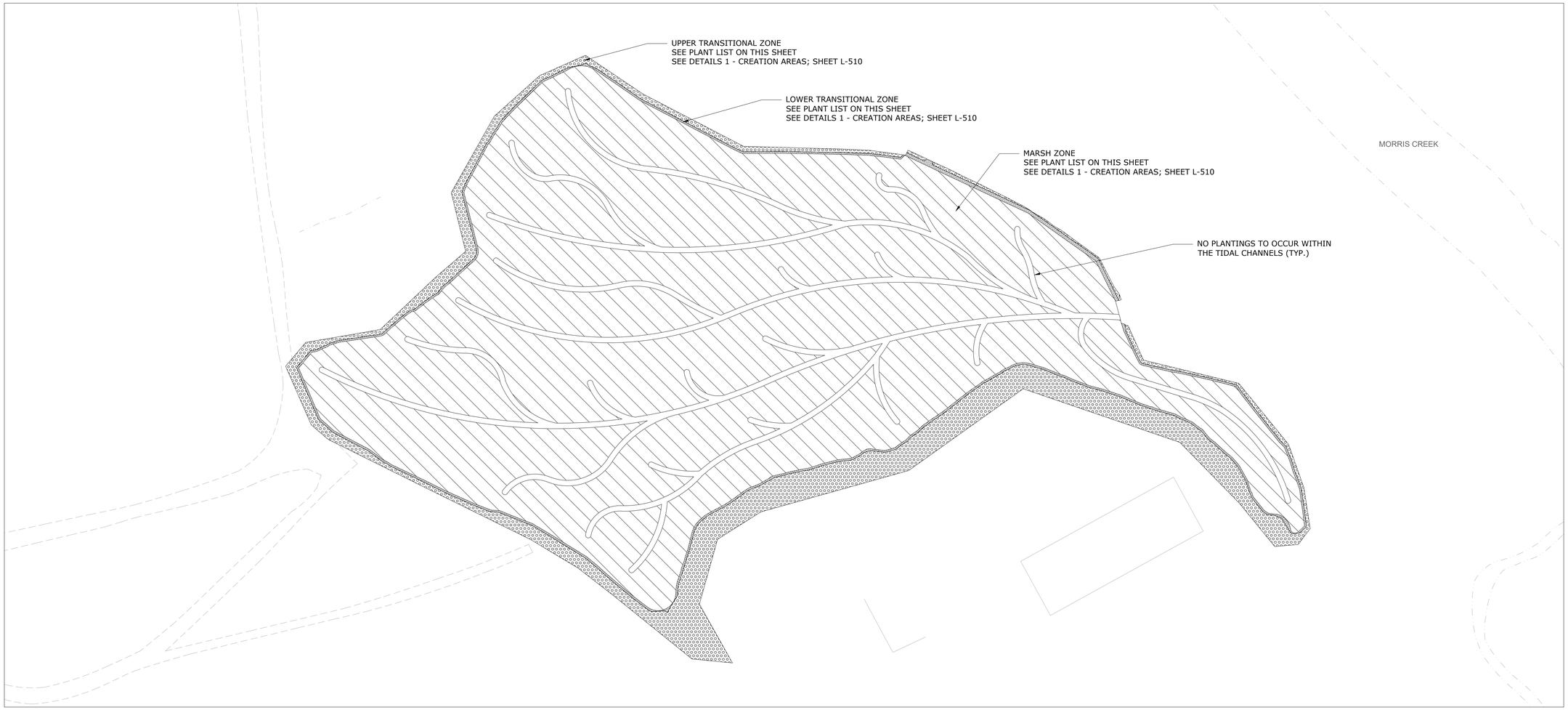
SEAL

SHEET NAME
PLANTING PLAN - CREATION AREA ENLARGEMENT 2

DATE | DRAWN BY | CHECKED BY

FORMAT ANSI D | SCALE 1" = 30'

SHEET NO: L-132 | SHEET



PLANTING PLAN - CREATION AREA ENLARGEMENT 3

PLANT LIST

PLANTING ZONE	SCIENTIFIC NAME	COMMON NAME	SIZE	SPACING*	QUANTITY	KEY
MARSH ZONE < 2.5 FEET NAVD88	*SPARTINA ALTERNIFLORA*	SMOOTH CORDGRASS	2" PLUG	18" O.C.	32,927	
LOWER TRANSITIONAL ZONE 2.5 FEET - 3.0 FEET NAVD88	*BACCHARIS HALIMIFOLIA* *DISTICHLIS SPICATA* *IVA FRUTESCENS* *PANICUM VIRGATUM* *SPARTINA ALTERNIFLORA* *SPARTINA PATENS* *SOLIDAGO SEMPERVIRENS*	GROUNDSEL TREE SPIKE SALTGRASS HIGH-TIDE BUSH SWITCHGRASS SMOOTH CORDGRASS SALTMEADOW CORDGRASS SEASIDE GOLDENROD	#1 CONTAINER 2" PLUG #1 CONTAINER 2" PLUG 2" PLUG 2" PLUG 2" PLUG	5 LF O.C. 18" O.C. 5 LF O.C. 18" O.C. 18" O.C. 18" O.C. 18" O.C.	141 46 141 62 62 93 46	
UPPER TRANSITIONAL ZONE > 3.0 FEET NAVD88	*ANDROPOGON GERARDII* *BACCHARIS HALIMIFOLIA* *MYRICA PENSYLVANICA* *PANICUM VIRGATUM* *RHUS AROMATICA* *RHUS GLABRA* *SCHIZACHYRIUM SCOPARIUM* *SORGHASTRUM NUTANS*	BIG BLUESTEM GROUNDSEL TREE BAYBERRY SWITCHGRASS FRAGRANT SUMAC SMOOTH SUMAC LITTLE BLUESTEM YELLOW GRASS	2" PLUG #1 CONTAINER #1 CONTAINER 2" PLUG #1 CONTAINER #1 CONTAINER 2" PLUG 2" PLUG	18" O.C. 5 LF O.C. 5 LF O.C. 18" O.C. 5 LF O.C. 5 LF O.C. 18" O.C. 18" O.C.	1,196 69 69 1,196 69 69 1,196 1,196	

**GIVEN THE LINEAR LAYOUT OF THE LOWER TRANSITIONAL AND UPPER TRANSITIONAL PLANTING ZONES, CONTRACTOR TO INSTALL THE #1 CONTAINER SHRUBS APPROXIMATELY EVERY 5 LINEAR FEET (LF) ON CENTER (O.C.).*

0' 15' 30' 60'

N

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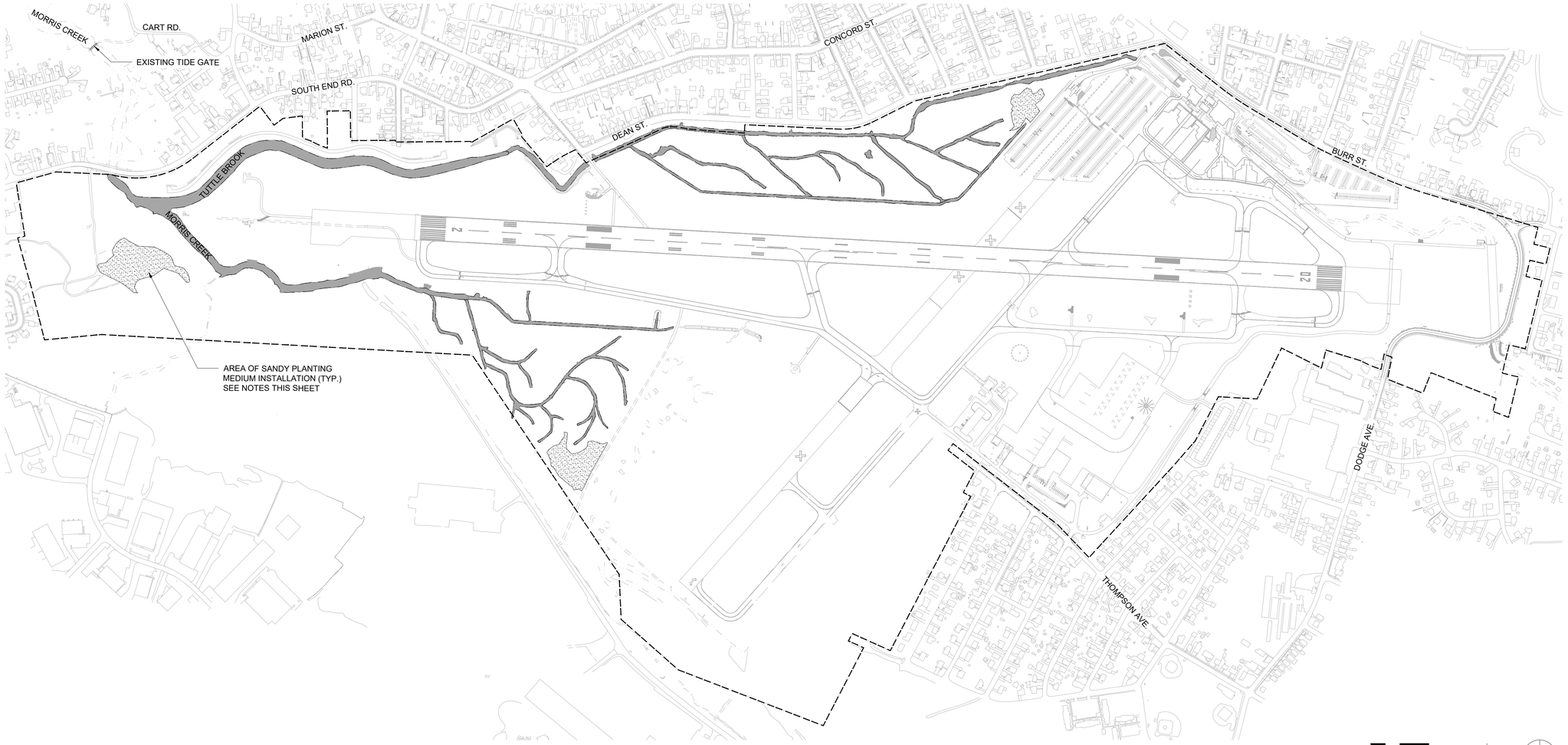
SHEET NAME
PLANTING PLAN - CREATION AREA ENLARGEMENT 3

DATE	DRAWN BY	CHECKED BY

FORMAT ANSI D | SCALE 1" = 30'

SHEET NO. L-133 | SHEET



MATERIALS NOTES:

1. THE CONTRACTOR SHALL VERIFY ALL EXISTING SITE CONDITIONS. ANY DISCREPANCIES BETWEEN INFORMATION SHOWN ON THE DRAWINGS AND ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

SANDY PLANTING MEDIUM NOTES:

1. THE CONTRACTOR SHALL FURNISH AND INSTALL A SANDY PLANTING MEDIUM THAT IS A DOMINANTLY SANDY SOIL WITH LOW PH, LOW ORGANIC MATTER CONTENT AND NUTRIENT LEVELS, AND LOW PERCENTAGE OF FINES. THE CONTRACTOR SHALL EXCAVATE TO AN ELEVATION OF APPROXIMATELY 1.0 FEET NAVD88 WITH THE SANDY PLANTING MEDIUM BEING PLACED AT AN ELEVATION OF APPROXIMATELY 2.0 FEET NAVD88 TO ACHIEVE TARGET ELEVATIONS FOR LOW MARSH VEGETATION.
2. THE SANDY PLANTING MEDIUM SHALL BE FREE OF CONSTRUCTION AND DEMOLITION (C&D) RUBBLE OF ANY KIND, INCLUDING CONCRETE, STONE, BRICK, TIMBER, COAL CINDERS, TAR RESIDUES, INCINERATOR ASH, GYPSUM, REFUSE, HARD CLODS, ROOTS, WEEDS AND WEED SEEDS, WOODY VEGETATION, STIFF CLAY, HARD PAN, SODS, LIME, CEMENT, SLAG, TARRED PAPER, BOARDS, CHIPS, STICKS, BOULDERS, HARMFUL CHEMICALS, OR OTHER ADVERSE MATERIAL TOXIC TO ANY VEGETATION USED ON THIS PROJECT.
3. THE GRADATION OF THE SANDY PLANTING MEDIUM SHALL BE DETERMINED BY A LABORATORY USING THE METHODS OF THE USDA SOIL SURVEY LABORATORY METHODS MANUAL (NO. 42, NOVEMBER 2004). SEE TABLE 1 ON THIS SHEET FOR GRADATION OF THE SANDY PLANTING MEDIUM AS DETERMINED BY USDA CLASSIFICATIONS.
4. SOIL ORGANIC MATTER CONTENT REQUIREMENTS: THE ORGANIC CONTENT SHALL BE LESS THAN 1% AS DETERMINED BY A LABORATORY USING THE LOSS OF IGNITION (LOI) METHOD.
5. SOIL PH REQUIREMENTS: THE PH VALUE OF SANDY PLANTING MEDIUM SHALL BE 5.0 - 6.8 AS DETERMINED BY AN APPROVED LABORATORY USING SOIL PH (WATER (1:1, V/V) PROCEDURES.
   a. AN ACID-PRODUCING SOIL TEST IS REQUIRED TO DETERMINE THE POTENTIAL FOR DECREASES IN SOIL PH AFTER OXIDATION. THE PH VALUE OF THE SOLUTION SHALL BE GREATER THAN 4.5 AS DETERMINED BY AN APPROVED LABORATORY USING THE ACID-PRODUCING (IRON SULFIDE) TEST CONDUCTED IN ACCORDANCE WITH THE METHODOLOGIES UTILIZED BY THE NORTHEAST COORDINATING COMMITTEE ON SOIL TESTING, NEC-67.
6. SOIL NUTRIENT REQUIREMENTS: THE VALUE FOR KJELDAHL NITROGEN SHALL BE AS OUTLINED BELOW AS DETERMINED BY AN APPROVED LABORATORY USING THE METHODOLOGIES OF THE "NORTHEAST COORDINATING COMMITTEE ON SOIL TESTING, NEC-67".
   a. KJELDAHL N: ACCEPTABLE RANGE IS 0.05% TO 0.10% (WITH NITRATE (NO_3) FORM OF NITROGEN NOT TO EXCEED 8 PPM).
   b. THE VALUE FOR MACRO- (P, K) AND MICRO-NUTRIENTS (MG, CA, MN, ZN, CU AND B) SHALL BE AS OUTLINED BELOW AS DETERMINED BY AN APPROVED LABORATORY USING THE PROCEDURES AS DESCRIBED IN THE *SOIL TESTING PROCEDURES FOR THE NORTHEASTERN UNITED STATES, 2ND EDITION, NORTHEAST REGIONAL PUBLICATION, AGRICULTURAL EXPERIMENT STATION, UNIVERSITY OF DELAWARE*, BULLETIN #493, 12/95.

P	ACCEPTABLE RANGE IS 10 LBS/ACRE TO 20 LBS/ACRE	K	ACCEPTABLE RANGE IS 30 LBS/ACRE TO 100 LBS/ACRE	CA	ACCEPTABLE RANGE IS 300 LBS/ACRE TO 2000 LBS/ACRE
MG	ACCEPTABLE RANGE IS 200 LBS/ACRE TO 300 LBS/ACRE	K+CA+MG	NOT GREATER THAN 2000 LBS/ACRE*	MN	ACCEPTABLE RANGE IS 2 PPM TO 10 PPM
B	ACCEPTABLE RANGE IS 0.8 PPM TO 2.3 PPM	CU	ACCEPTABLE RANGE IS 0.1 PPM TO 0.5 PPM	Z	ACCETABLE RANGE IS 1 PPM TO 4 PPM
% ORGANIC	<1% (BY LOSS ON IGNITION SOIL TESTING PROCEDURE)				

**TO ACCOUNT FOR SOIL VARIABILITY, SMALL DEVIATIONS WITHIN INDIVIDUAL POTASSIUM (K), CALCIUM (CA), AND MAGNESIUM (MG) LIMITS ARE PERMITTED PROVIDED THE TOTAL FOR THESE THREE NUTRIENTS DOES NOT EXCEED 2,000 LBS/ACRE. A 15% EXCEEDANCE LIMIT OF UP TO 2,300 LBS/ACRE OF THE TOTAL OF ALL 2,500 CY INTERVAL SOIL TESTS REQUIRED MAY BE PERMITTED. FOR EXAMPLE, IF A TOTAL OF 86 (2,500 CY INTERVAL) SOIL TESTS ARE REQUIRED, A MAXIMUM OF 13 (2,500 CY INTERVAL) COULD HAVE A TOTAL FOR K, CA, AND MG OF UP TO 2,300 LBS/ACRE.*

7. LABORATORY TESTING: THE CONTRACTOR SHALL FURNISH A CERTIFIED REPORT PERFORMED BY AN APPROVED LABORATORY SHOWING THE ANALYSIS OF REPRESENTATIVE SAMPLES OF THE SANDY PLANTING MEDIUM WHICH THEY PROPOSE TO USE. ALL SAMPLES ARE TO BE DELIVERED TO THE LABORATORY, AND THE PRICE BID SHALL INCLUDE INSPECTION AND LABORATORY CHARGES. SAMPLE RESULTS SHALL BE SUBMITTED 48 HOURS PRIOR TO THE DELIVERY OF SANDY PLANTING MEDIUM.
8. NO SOIL SHALL BE DELIVERED UNTIL THE APPROVAL OF SAMPLES, BUT SUCH APPROVAL SHALL NOT CONSTITUTE FINAL ACCEPTANCE. THE ENGINEER RESERVES THE RIGHT TO REJECT ON OR AFTER DELIVERY ANY MATERIAL THAT DOES NOT, IN THEIR OPINION, MEET THESE SPECIFICATIONS.

LEGEND

PROPERTY LINE

SANDY PLANTING MEDIUM

EXISTING TIDAL CHANNEL (TYP.)

TABLE 1: GRADATION REQUIREMENTS FOR SANDY PLANTING MEDIUM

PARTICLE CLASS SIZE	PASSING SIEVE NO.	RANGE IN PERCENT PASSING
		ASTM F 1632-03
GRAVEL	4	98-100
FINE GRAVEL	10	85-100
VERY COARSE SAND	18	80-95
COARSE SAND	35	55-80
MEDIUM SAND	60	10-40
FINE SAND	140	8-15
VERY FINE SAND	270	1-2
SILT		<1
CLAY		<1
CHEMICAL		
ORGANIC MATTER	ASTM F 1647-02a	<1
pH	1:1 WATER	5.0-6.8
EC	1:1 PASTE	1.5 dS/m

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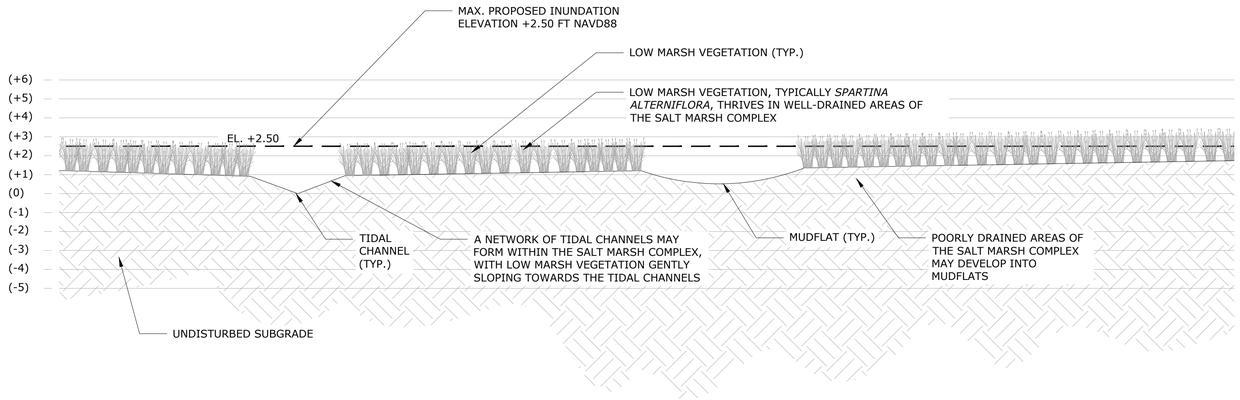
SHEET NAME

MATERIALS PLAN

DATE | DRAWN BY | CHECKED BY

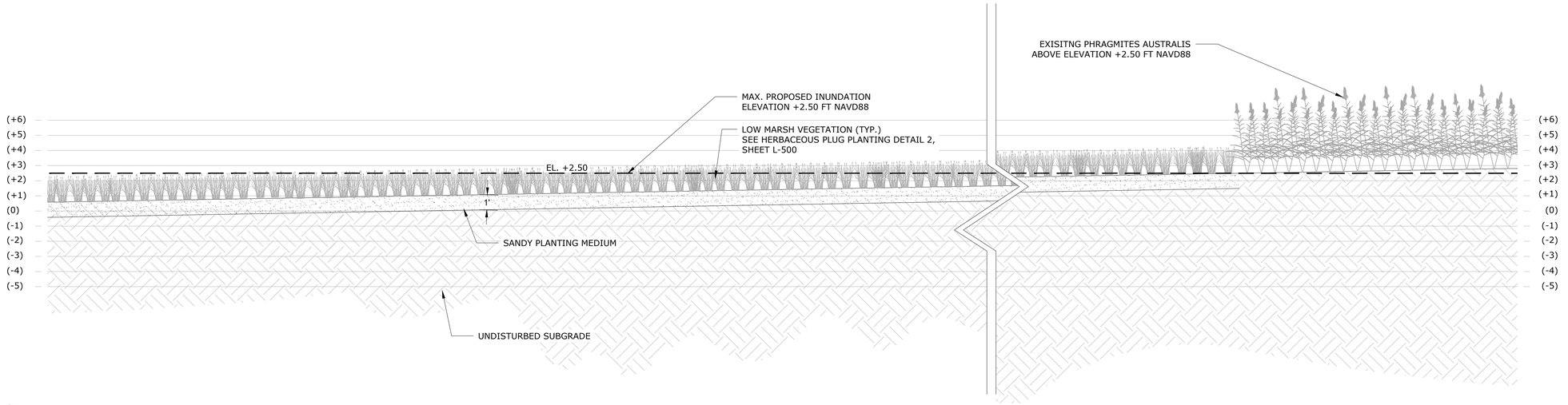
FORMAT: ANSI D | SCALE: 1" = 350'

SHEET NO.: L-200 | SHEET



1 REPRESENTATIVE ENHANCEMENT SECTION OF CONVERSION OF *PHRAGMITES* TO TIDAL SALT MARSH COMPLEX

SCALE: 1" = 4' - 0"



2 REPRESENTATIVE ENHANCEMENT SECTION OF CONVERSION OF *PHRAGMITES* TO TIDAL SALT MARSH COMPLEX WITH THE FULL IMPLEMENTATION OF THE ADAPTIVE MANAGEMENT PLAN

SCALE: 1" = 4' - 0"

THE ENHANCED TIDAL SALT MARSH COMPLEX WITH EXCAVATION, PLACEMENT OF CLEAN SAND, AND PLANTING WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.

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SECTIONS 1 - ENHANCEMENT AREAS

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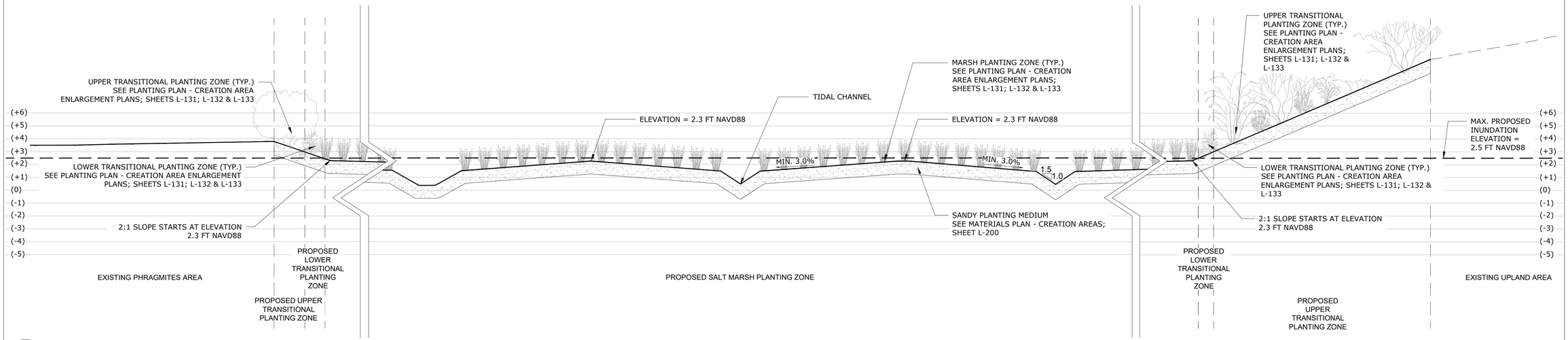

1 SECTION A-A

SCALE: 1" = 4' - 0"

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SECTIONS 1 - CREATION AREAS

DATE | DRAWN BY | CHECKED BY

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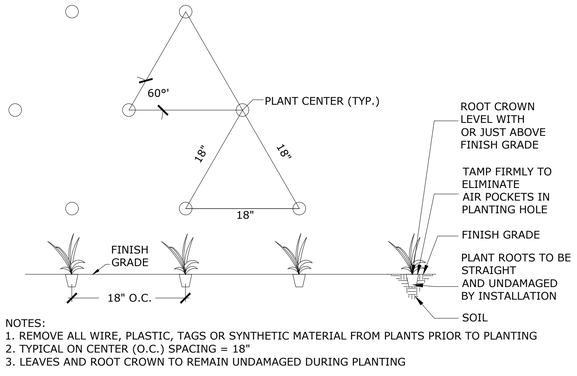
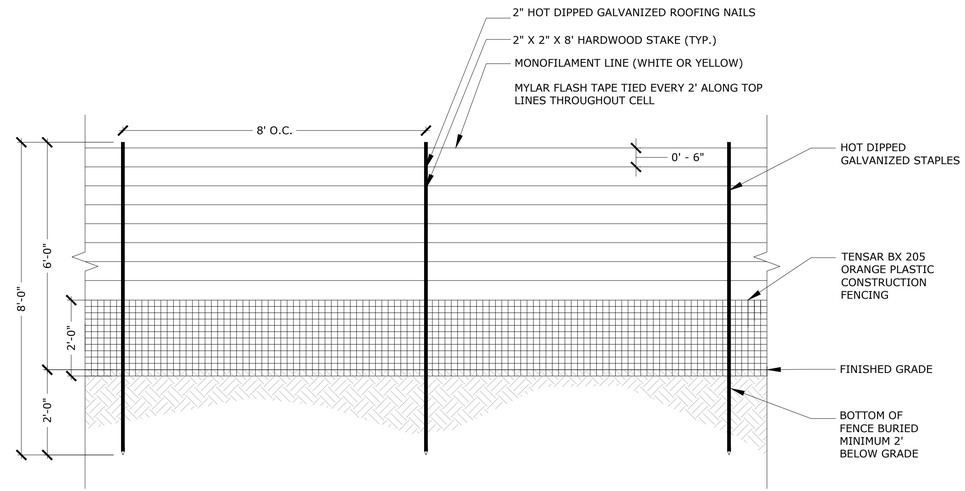


NOTES:
1. REMOVE ALL WIRE, PLASTIC, TAGS OR SYNTHETIC MATERIAL FROM PLANTS PRIOR TO PLANTING
2. TYPICAL ON CENTER (O.C.) SPACING = 18"
3. LEAVES AND ROOT CROWN TO REMAIN UNDAMAGED DURING PLANTING

1 HERBACEOUS PLUG PLANTING

SCALE: 1" = 1' - 0"

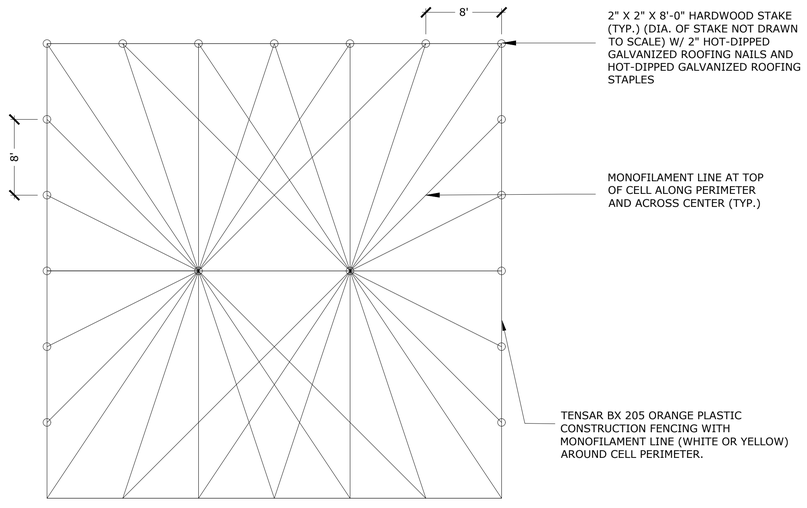
HERBACEOUS PLUG PLANTING WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.



2 WATERFOWL BARRIER - SECTION

SCALE: 1" = 2' - 0"

WATERFOWL BARRIER WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.



3 WATERFOWL BARRIER - DIAGRAMMATIC PLAN

SCALE: 1/8" = 1' - 0"

WATERFOWL BARRIER WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.

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SHEET NAME

DETAILS 1 - ENHANCEMENT AREAS

DATE	DRAWN BY	CHECKED BY

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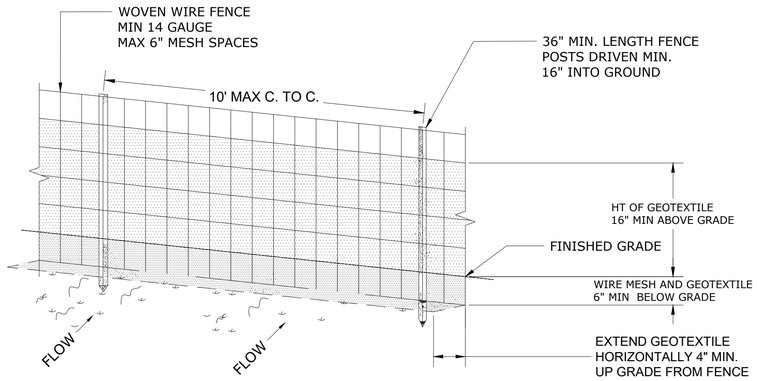
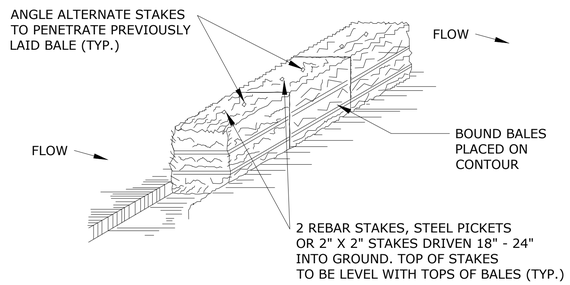
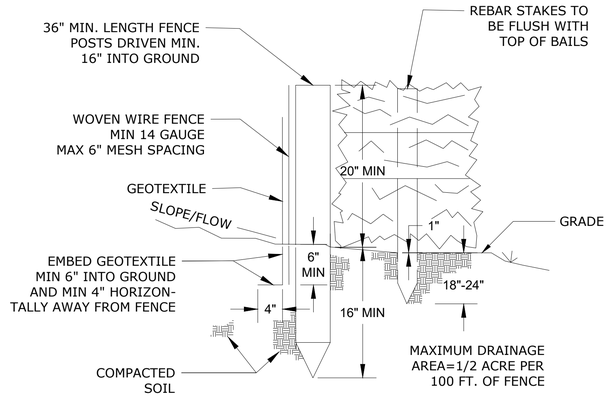


SILT FENCE PERSPECTIVE VIEW



STRAW BALE ANCHORING DETAIL

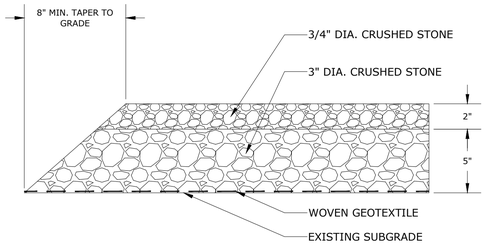


COMBINED SILT FENCE & STRAW BALE PROFILE

1 COMBINED SILT FENCE WITH STRAW BALE DIKE DETAILS

NOT TO SCALE

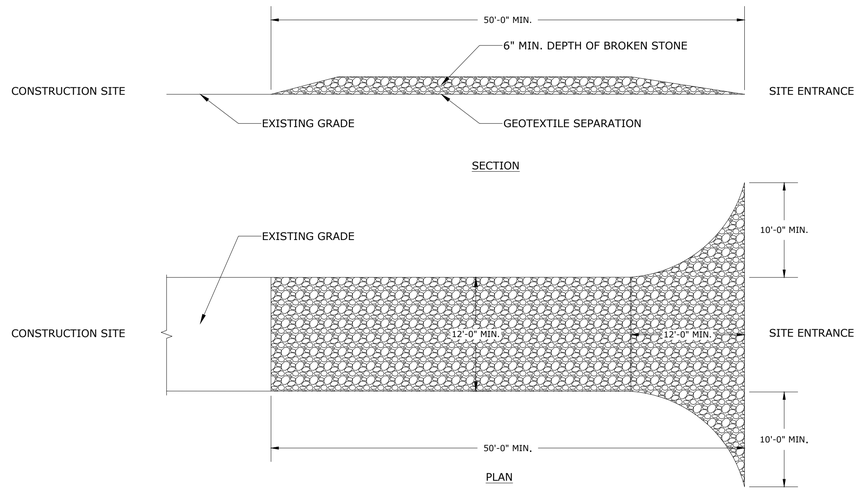
THE COMBINED SILT FENCE WITH STRAW BALE DIKE WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.



2 TEMPORARY TRACKING PAD & STAGING AREA

SCALE: 2'-0" = 1'-0"

THE TEMPORARY TRACKING PAD & STAGING AREA WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.



3 TEMPORARY STABILIZED CONSTRUCTION ENTRANCE

SCALE: 1 1/2" = 1'-0"

THE TEMPORARY STABILIZED CONSTRUCTION ENTRANCE WILL ONLY BE IMPLEMENTED IF DEEMED NECESSARY ACCORDING TO THE PHASED ADAPTIVE MANAGEMENT PLAN OUTLINED IN THE MITIGATION PLAN.

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DETAILS 2 - ENHANCEMENT AREAS

DATE	DRAWN BY	CHECKED BY

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GENERAL NOTES:

G–1. GENERAL NOTES SHALL APPLY TO ALL DRAWINGS PREPARED BY HOYLE, TANNER & ASSOCIATES (HTA) AND THE WORK THEY CONVEY.

G–2. ALL WORK SHALL CONFORM TO ALL FEDERAL, STATE AND LOCAL CODES, REGULATIONS AND STANDARDS, THE MORE STRINGENT SHALL GOVERN.

G–3. THE GENERAL CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS AND COORDINATION OF OTHER TRADES.

G–4. THESE DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. CARE OF ADJACENT PROPERTIES DURING CONSTRUCTION AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS REGARDING SITE SAFETY SHALL SOLELY BE THE CONTRACTORS RESPONSIBILITY.

G–5. ALL DIMENSIONS, ELEVATIONS AND CONDITIONS MUST BE VERIFIED BY THE GENERAL CONTRACTOR OR RESPONSIBLE TRADES PRIOR TO COMMENCING WITH THE WORK, FABRICATION OR ORDERING MATERIALS. DO NOT SCALE DRAWINGS, USE DIMENSIONS SHOWN.

G–6. ANY DISCREPANCIES BETWEEN THESE DRAWINGS AND AS–BUILT CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY, BEFORE PROCEEDING WITH THE WORK.

G–7. THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING THEIR OWN DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.

G–8. ALL APPLICABLE UTILITY DEPARTMENTS AND COMPANIES SHALL BE NOTIFIED BEFORE EXCAVATION IS STARTED. UTILITIES WITHIN 50 FEET OF AN EXCAVATION SHALL BE MARKED IN THE FIELD.

G–9. HOYLE, TANNER & ASSOCIATES, INC. WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS THAT ARISE DUE TO THE FAILURE OF THE CONTRACTOR:

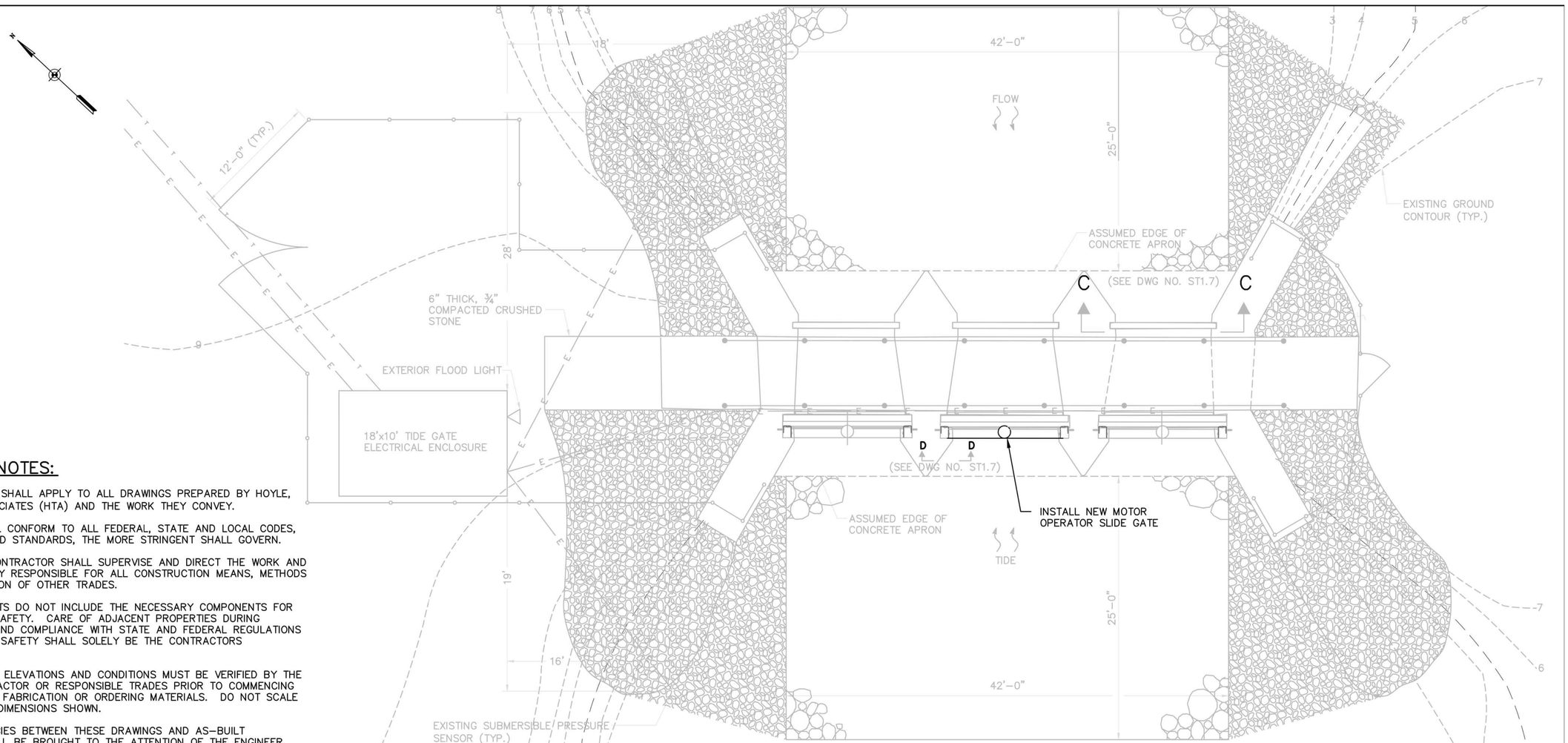
- —TO FOLLOW THESE DRAWINGS AND SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY.
- —TO NOTIFY HTA OF ANY DISCREPANCIES, ERRORS, OMISSIONS OR CONFLICTS AND OBTAIN THEIR GUIDANCE TO RESOLVE.

G–10. DESIGN CRITERIA

A. DESIGN STANDARD: 2021 INTERNATIONAL BUILDING CODE

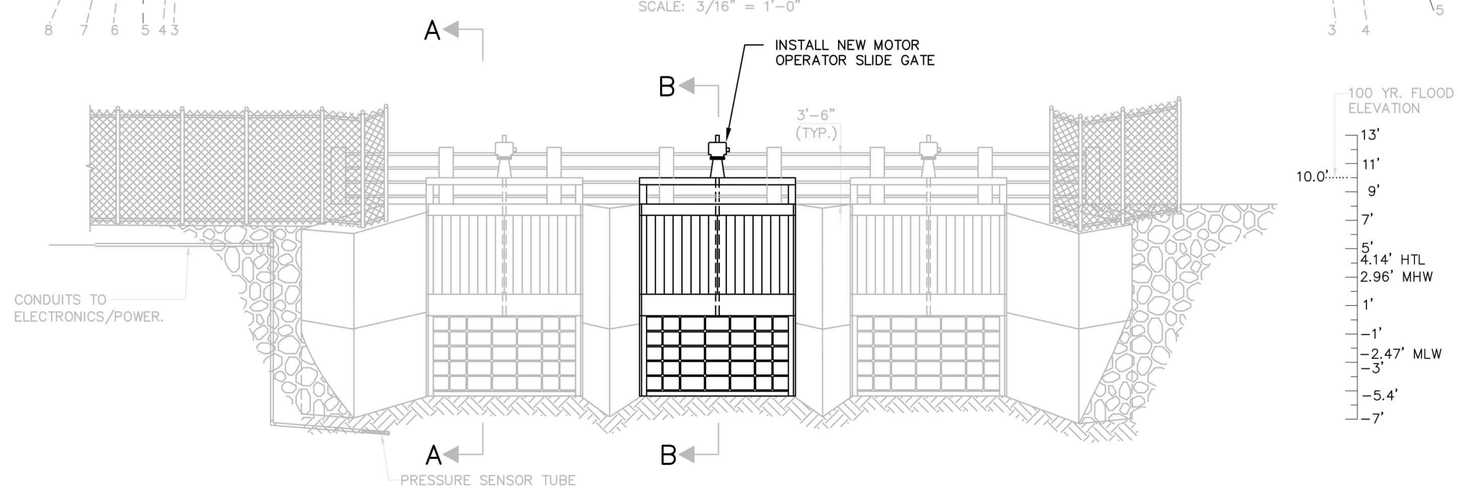
B. MOTOR DEAD LOAD: 500 LBS.

C. AASHTO ICE LOADING.



TIDE GATES–PLAN VIEW

SCALE: 3/16" = 1'–0"



TIDE GATES–OCEAN SIDE–ELEVATION VIEW

SCALE: 3/16" = 1'–0"

TWEED NEW HAVEN AIRPORT
155 BURR STREET
NEW HAVEN, CT 06512

APPLICANT
TWEED NEW HAVEN AIRPORT AUTHORITY

LEAD CONSULTANT
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MANCHESTER, NH 03101

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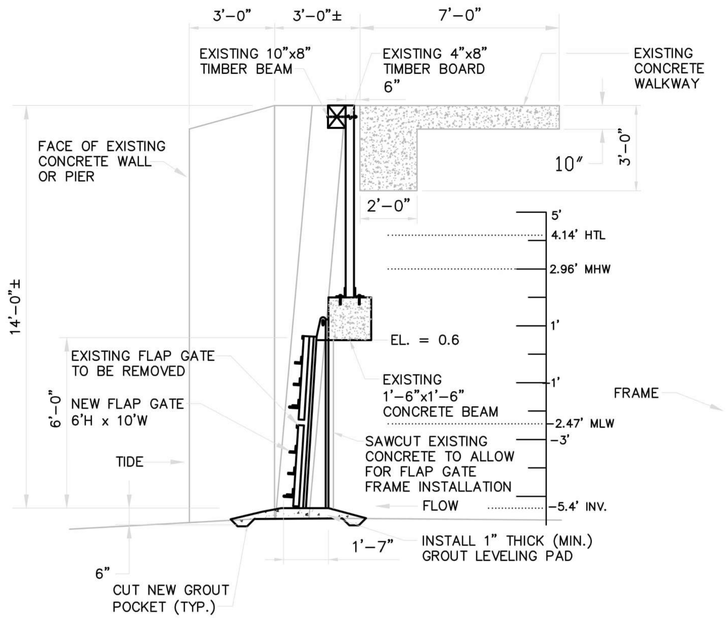

EXISTING FLAP GATE SECTION

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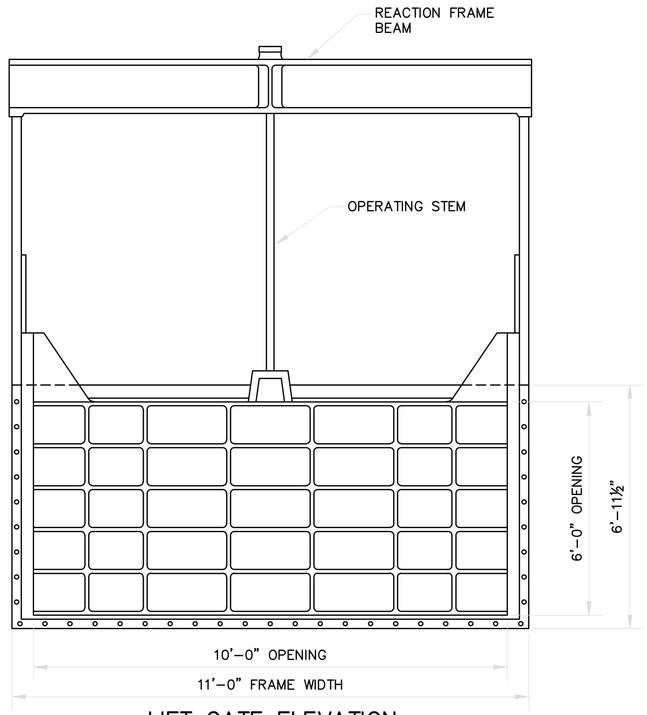
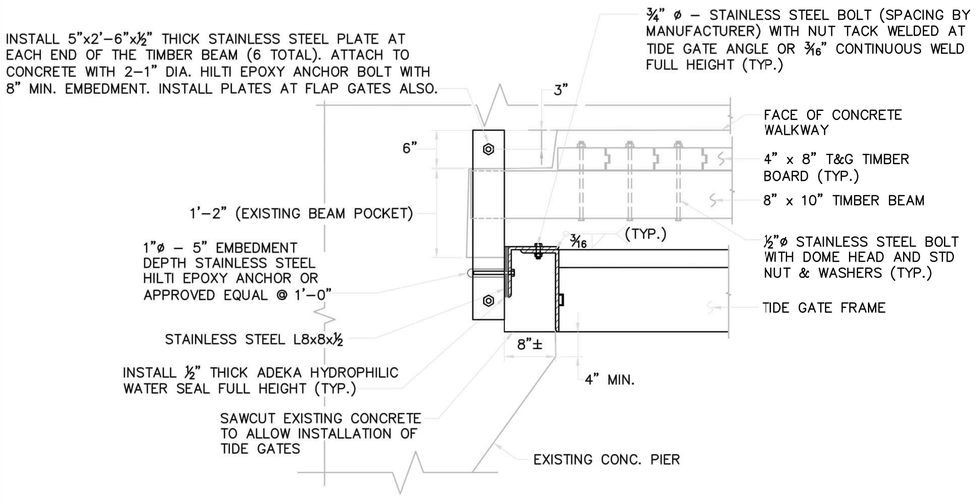


LIFT GATE ELEVATION

NOT TO SCALE

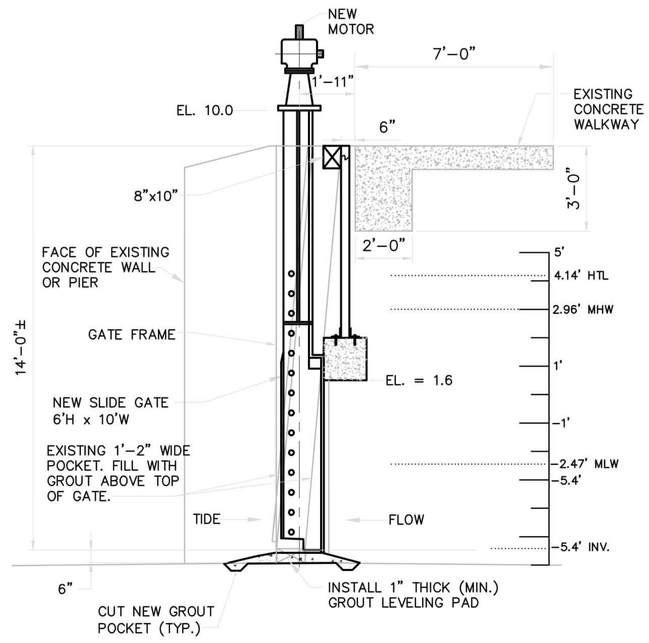
LIFT/FLAP GATE NOTES:

1. THE LIFT GATE AND FLAP GATE SHOWN ARE BASED UPON THE 'GLYDASEAL GATES' AND 'FLAP VALUE' PRODUCTS MANUFACTURED BY THE RODNEY HUNT COMPANY OF ORANGE, MA (978544–2511) AND ARE ACCEPTABLE FOR THIS PROJECT. THE CONTRACTOR MAY SUBMIT PRODUCTS FROM THIS MANUFACTURER OR ANY OTHER THAT MEETS THE SPECIFICATIONS AND DESIGN INTENT AND GEOMETRY SHOWN HERE.
2. THE LIFT GATE AND FLAP GATE MANUFACTURER SHALL BE RESPONSIBLE FOR DESIGNING THE GATE, FRAME AND ALL CONNECTIONS OF THE TIDE GATE FRAME TO CONCRETE SURFACES.



SLIDE GATE FRAME CONNECTION DETAIL (PLAN VIEW)

SCALE: 1" = 1'–0"



PROPOSED SLIDE GATE SECTION

SCALE: 3/8"=1'–0"

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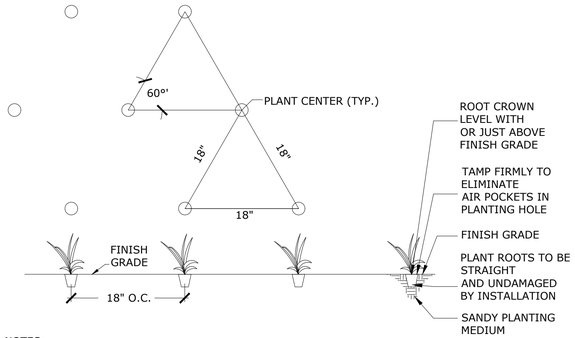

NOTES:
1. REMOVE ALL WIRE, PLASTIC, TAGS OR SYNTHETIC MATERIAL FROM PLANTS PRIOR TO PLANTING
2. TYPICAL ON CENTER (O.C.) SPACING = 18"
3. LEAVES AND ROOT CROWN TO REMAIN UNDAMAGED DURING PLANTING

1 HERBACEOUS PLUG PLANTING
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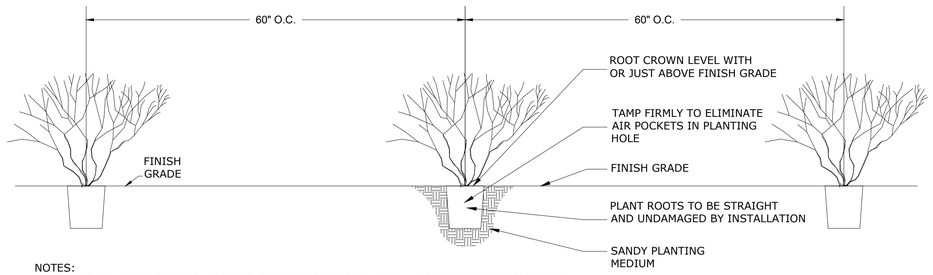

NOTES:
1. REMOVE ALL WIRE, PLASTIC, TAGS OR SYNTHETIC MATERIAL FROM PLANTS PRIOR TO PLANTING
2. TYPICAL ON CENTER (O.C.) SPACING = 60"
3. LEAVES AND ROOT CROWN TO REMAIN UNDAMAGED DURING PLANTING

2 SMALL CONTAINER PLANTING
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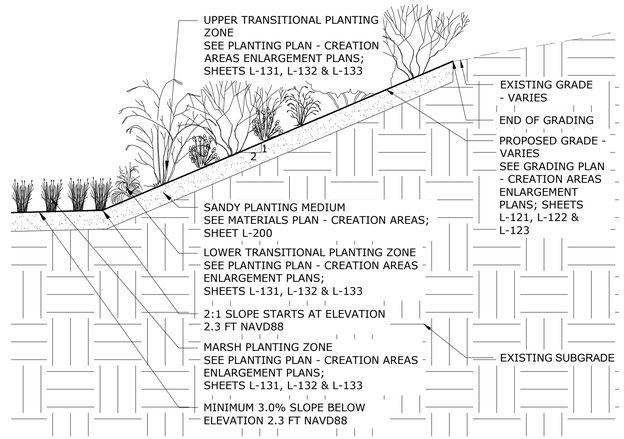

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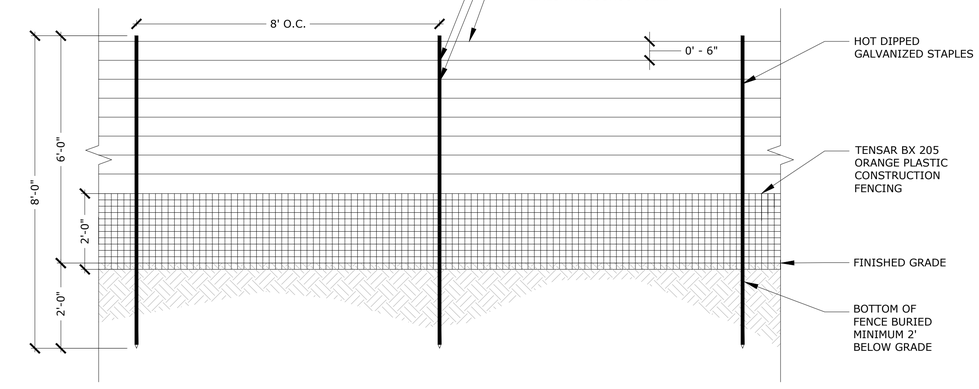

4 WATERFOWL BARRIER - SECTION
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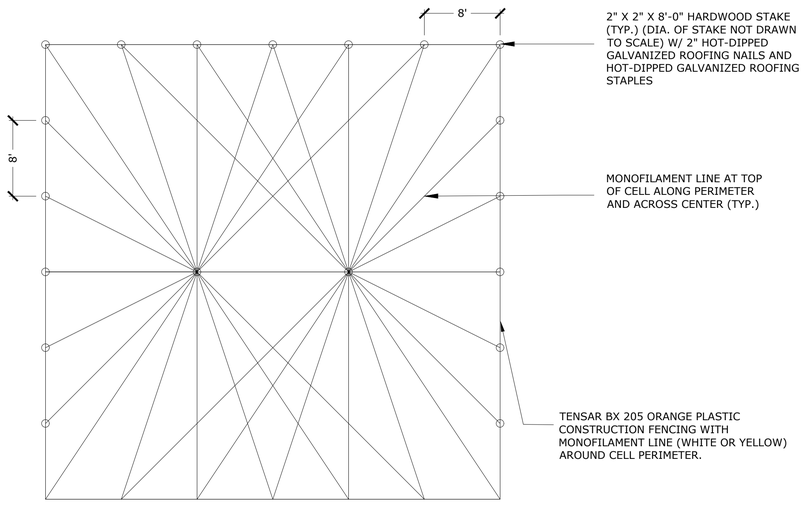

5 WATERFOWL BARRIER - DIAGRAMMATIC PLAN
SCALE: 1/8" = 1' - 0"

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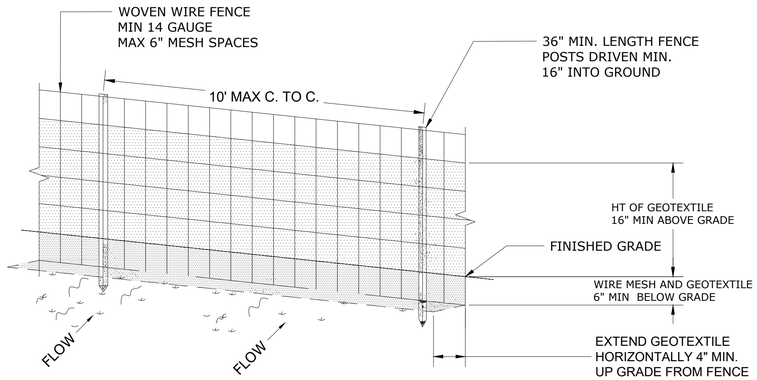
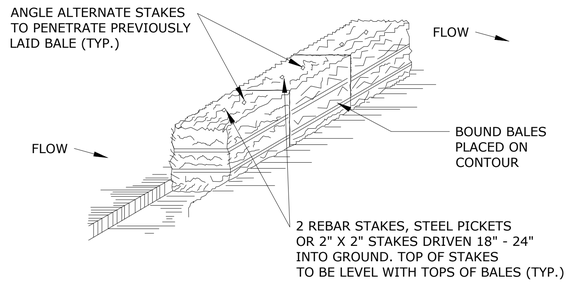
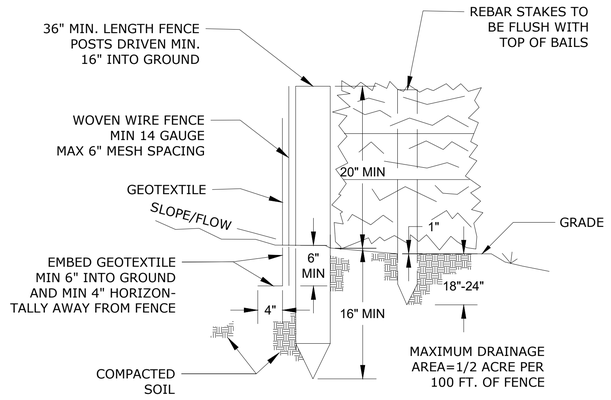


SILT FENCE PERSPECTIVE VIEW



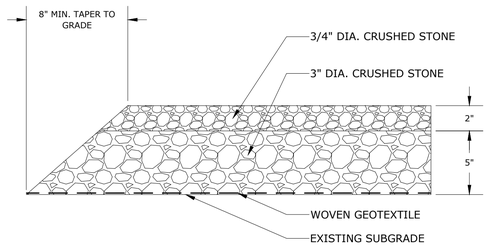
STRAW BALE ANCHORING DETAIL



COMBINED SILT FENCE & STRAW BALE PROFILE

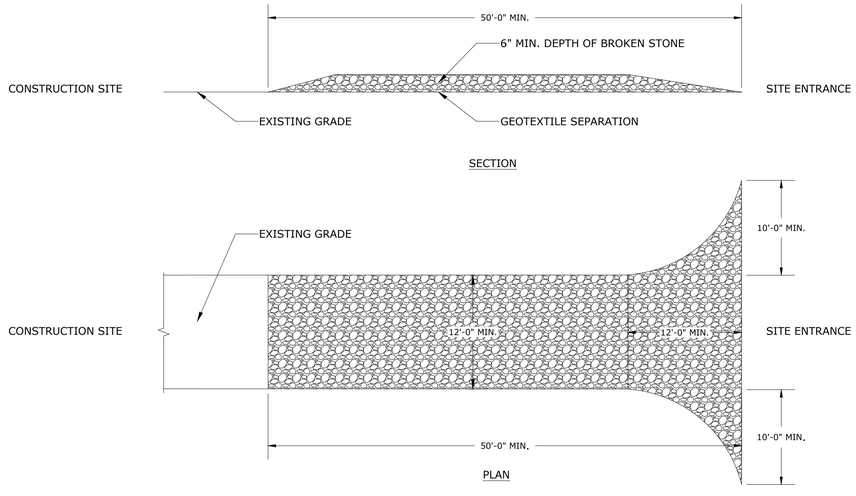
1 COMBINED SILT FENCE WITH STRAW BALE DIKE DETAILS

NOT TO SCALE



2 TEMPORARY TRACKING PAD & STAGING AREA

SCALE: 2'-0" = 1'-0"



3 TEMPORARY STABILIZED CONSTRUCTION ENTRANCE

SCALE: 1 1/2" = 1'-0"

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Appendix B1- FHI Studio Wetland Delineation Report

Wetland Delineation Report

Master Plan Implementation Projects

Tweed New Haven Airport
New Haven/East Haven, Connecticut

January 2022

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NRCS MAPPED AND OBSERVED SOILS 8
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Appendix B USACE Wetland Function and Value Assessment Forms
Appendix C USACE Wetland Documentation Dataforms
Appendix D Photographs

INTRODUCTION

Tweed New Haven Regional Airport (the "Airport") is a public airport located in the City of New Haven and Town of East Haven, CT, owned and operated by the City of New Haven (see **Figure 1, Overview Map** and **Figure 2, USGS Map** in **Appendix A**). The property is located along the New Haven-East Haven town-line with Long Island Sound approximately ¾-mile to the south, New Haven Harbor ¼ mile to the west, and Morris Cove approximately ¼-mile to the southwest. The Airport has two asphalt runways, Runway 2-20 which is approximately 5,200 feet long by approximately 150 feet wide oriented north-south, and Runway 14-32 (currently not in use) which is approximately 3,600 feet long by 100 feet wide with a northwest – southeast orientation.

According to field observations and a review of recent aerial photographs of the area, the Airport is set within a mixed residential, commercial, and industrial area. To the west of the Airport (between Dean Street and Townsend Avenue), land use is mostly residential whereas to the east (along Proto Drive and Commerce Street), it is mostly industrial. There is undeveloped land (wetlands) to the south of Runway 2-20 and to the southeast of the HVN property boundary.

Taxiways, aprons, parking lots and access driveways comprise the other paved areas on the airport property. Buildings include a terminal building and hangars housing planes and offices for private air carriers and other airport related businesses along with airport maintenance and operations structures including a fire and rescue building. Areas interior to and surrounding the runways and taxiways are comprised of mowed/maintained grasslands. Along the southwestern, southern, and southeastern perimeter of the airport are extensive vegetated tidal wetland systems with constructed channels and areas of open water. Inland wetlands occur at the northwestern, northern, northeastern, and eastern edges of the runway and taxiway areas. Some of the inland wetland areas appear to have been constructed as drainage features as they do not appear on United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) or CT Department of Energy and Environmental Protection (CTDEEP) wetland mapping. Previous wetland delineations by others did not identity wetland resources within these infield areas (ie where Wetlands 4 and 5 and a portion of Wetland 6 were delineated under this field survey). Wetlands 4 and 5 may be viewed by the USACE as isolated and thus may not be subject to USACE jurisdiction. A request for a jurisdictional determination is recommended for these wetlands.

HVN proposes multiple projects to continue advancing the Airport Master Plan Update, including the development of a new terminal area and a runway extension. The Tweed New Haven Airport Authority is preparing an Environmental Assessment for the project in accordance with the National Environmental Policy Act (NEPA) to implement elements of its Airport Master Plan. The wetland and watercourse delineation will be used to inform the NEPA process and permitting requirements.

METHODOLOGY

Historically impacted inland wetlands (some presumably man-made and offering limited functions and values) and one tidal wetland were delineated by FHI Studio soil scientists within the project areas in accordance with State and federal definitions and guidelines.

Tidal wetland limits were delineated in accordance with the State of Connecticut General Statutes (CGS) Section 22a-29 (Tidal Wetlands). Tidal wetlands are "…those areas which border on or lie beneath tidal waters, such as, but not limited to banks, bogs, salt marsh, swamps, meadows, flats, or other lowlands subject to tidal action, including those areas now or formerly connected to tidal waters, and whose surface is at or below an elevation of one foot above local extreme high water; and upon which may grow or be capable of growing…" tidal vegetation.

In 2012, the Connecticut General Assembly passed Public Act No. 12-101, which included a revision to the State's regulatory jurisdiction under CGS Section 22a-359. This revision changed the regulatory jurisdiction limit from the "high tide line" to the area up to and including the elevation of the "coastal jurisdiction line" (CJL) as determined for the State's major tidal waterbodies. The CJL is not delineated in the field, but is a set elevation for each municipality. It also states under CGS Section 22a-359, "For any tidal, coastal or navigable waters of the state located upstream of a tide gate, weir, or other device that modifies the flow of tidal waters, the coastal jurisdiction line for such tidal, coastal or navigable waters shall be the elevation of mean high water as found at the downstream location of such device".

Under CGS Section 22a-39 the identification of Connecticut-regulated inland wetlands is determined by the limit of any of the soil types designated as poorly drained, very poorly drained, alluvial, or floodplain by the National Cooperative Soils Survey, of the Natural Resources Conservation Service (NRCS) of the United States Department of Agriculture (USDA) (§22a-38-15) that are not subject to CGS Section 22a-29 as defined above. NRCS soil surveys were consulted to compare observed soil types to those mapped in the project area. The *Field Indicators for Identifying Hydric Soils in New England Version 4* (2018) and *Field Indicators of Hydric Soils in the United States, Version 8.2* (2018) were used to identify hydric soils, which include both poorly and very poorly drained soils.

Identification of watercourses, as regulated by Connecticut, was based upon the definitions contained in Section 22a-38 of Chapter 440 of the Connecticut General Statutes of Connecticut; including the following hydrological systems under the term "watercourse": rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, vernal or intermittent, public or private.

The Ordinary High Water (OHW) mark as defined by the USACE for the purposes of the Clean Water Act (CWA) lateral jurisdiction at 33 CFR 328.3€ is the "line on the shore established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, destruction of terrestrial

vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas". The OHW mark was flagged with sequentially labeled blue flagging and is considered the lateral extent of Federal jurisdiction over non-tidal Waters of the United States (US) in the absence of adjacent wetlands.

Federal wetlands, both tidal and inland, were delineated based on the United States Army Corps of Engineers (USACE) 1987 *Wetland Delineation Manual* and the USACE 2012 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region – Version 2.0*. Federal wetland boundaries were determined by the presence of dominant hydrophytic vegetation, presence of hydric soils, and evidence of wetland hydrology. In tidally influenced areas, the USACE regulates up to the high tide line (HTL) elevation. USACE Wetland Determination Data Forms were not completed for tidal resource delineations, since the wetlands are tidal, and jurisdiction is defined by the HTL elevation. USACE Field Documentation Forms for the delineated inland wetlands are provided in **Appendix C**.

The limit of the wetland delineation fieldwork was confined to distinct project areas where activities are likely to be proposed at the Airport (see Figures 1 and 2). Field work was conducted over several site visits conducted between August and October 2021. The wetland/upland boundary was marked in the field using consecutively numbered flags, and the locations of the flags were recorded by FHI Studio using a GPS unit capable of achieving sub-meter accuracy (note that FHI Studio is not a licensed surveyor) and subsequently located and documented by a licensed land surveyor. Wetland functions and values were documented in accordance with the USACE *Highway Methodology Supplement* (1999) guidelines (see **Appendix B**). Photographs were taken at representative locations in the wetlands and are included in **Appendix D**.

RESULTS

Seven wetland systems were delineated in the field, numbered 1 to 7 from north to south, within the areas of investigation (see **Figure 3, Wetland Map** in **Appendix A**). Wetlands 1 – 6 are inland wetlands. Wetland 7 is a tidal wetland - a good portion of which, within the project area, has been subject to past alterations and disturbance related to the relocation of Morris Creek sometime prior to 2010. A tide gate is located southwest of Wetland 7, which likely regulates the amount of tidal flow to wetlands upstream of the tide gate.

All wetlands lie within the Southcentral Coast Major Basin No. 5, regional basin 50 and subregional basin 5000 and drain ultimately to Long Island Sound via Morris Creek. Wetland System No. 1 drains west to Tuttle Creek (a tributary of Morris Creek) in Local Basin Number 5000-45 (CT Environmental Conditions Online, Advanced Viewer, 2021). Wetland 7 and a portion of the southwestern limits of Wetland 6 drains to this same basin series. Wetlands 2-5 and a majority of Wetland 6 drain to the east and southeast to Morris Creek in Local Basin Number 5000-46 (CT Environmental Conditions Online, Advanced Viewer, 2021). The confluence of these two drainages lies immediately south of the Airport. The CJL elevation for New Haven is 4.6 feet

NAVD88, while that of East Haven is 4.5 feet NAVD88. According to information provided in an Environmental Assessment for the Taxiway and Drainage Improvement Project, "the CJL for the wetland within the Tweed Airport boundary above the tide gate on Morris Creek is 3.5' NGVD. All wetlands below this elevation for the purpose of the project are considered tidal, and they are therefore under the jurisdiction of CTDEEP.

General descriptions of these seven wetlands are provided below, with additional detailed information for each wetland in **Table 1**.

Wetland 1 is located at the northwestern limit of the airport. It contains a reach of Tuttle Brook and associated bordering vegetated wetlands. The reach of Tuttle Brook originates at a double box culvert (through which Tuttle Brook is conveyed underneath Dodge Avenue) and extends approximately 1,200 linear feet southerly downstream before entering another double box culvert underneath a service road to the airport that is accessed off Dodge Avenue in New Haven. The reach of Tuttle Brook within the project area is best classified as a Riverine Lower Perennial Watercourse characterized by an unconsolidated bottom dominated by sand and organic matter substrate(R2UB2/4). Only the northern-most reach of Tuttle Brook was delineated within the airport boundary. OHW flags were hung in the field to demarcate the limits of Tuttle Brook. The bordering vegetated wetlands along Tuttle Brook consists largely of stands of palustrine emergent persistent vegetation (e.g., Broad-leaved Cattail and Common Reed *Phragmites australis*-dominated stands - PEM1/5. Woody shrubs consisting primarily of American Black Elderberry and an alder sp., occur sporadically.

Wetland 2 is located at the northeastern limit of the airport in the area between the General Aviation Parking and the East Ramp. It consists of a palustrine forested, broad-leaved deciduous, seasonally flooded/saturated, and ditched wetland system (PFO1Ed) with a small palustrine emergent *Phragmites australis*-dominated inclusion that appears to be permanently flooded (PEM5H). Characteristic vegetation includes Red Maple, Black Gum, and Pin Oak in the tree layer, Northern Spicebush and Sweet Pepperbush in the shrub layer. *Phragmites* flanks most of the ditched portion of the wetland in the herbaceous layer.

Wetland 3 is located adjacent to the mowed areas between the Air Traffic Control Tower and the East Ramp's tarmac. It consists of a palustrine emergent, nonpersistent, intermittently flooded/saturated (PEM2J) wetland that collects sheet flow runoff and direct precipitation. It is characterized by Soft Rush, Water Purslane, Broom Sedge, a spike rush sp., and various other rushes, sedges, and hydrophytic grasses (incl. the state-threatened *Paspalum laeve*).

Wetland 4 is a shallow drainage area located north of Runway 32 which forms its southwestern boundary. It is bounded by Taxiway C on the northeast side, and Taxiway H on the southwest side. Wetland 4 consists of a palustrine emergent, nonpersistent, intermittently flooded/saturated (PEM2J) wetland. It is dominated by various species of hydrophytic plant species such as Soft Rush, Straw-colored Sedge, Curly Dock, Calico Aster, and the state-threatened Field Beadgrass. This wetland receives sheet flow runoff from the surrounding

impervious runways and tarmacs. A catch basin serves as the outlet that regulates the surface water level of the wetland when it receives collected stormflows. Based upon its morphology and drainage structures, it appears that this wetland has formed within a drainage area that was constructed with the adjacent Runway 14/32 and Taxiways Band C were built. While it is a routinely mowed lawn, since Runway 14/32 has not been used for years, routine maintenance of the basin has waned which may have allowed for the development of hydrophytic plant community. A suspected high groundwater table in this area may support these hydrophytes. Functions and values are low for this wetland.

Wetland 5 is a similar shallow drainage area bounded by Taxiway C on the northeast and southeast sides, Taxiway H on the northwest side and former Runway 32 on the southwest side. It consists of a palustrine emergent, nonpersistent, intermittently flooded (PEM2J) wetland that also collects sheet flow runoff and direct precipitation. Hydrophytic vegetation observed within this wetland included the following: Soft Rush, Strawcolored Flatsedge, Field Beadgrass, Long-leaved Redtop Panicgrass, Rough Barnyardgrass, Spike Rush, Sharp-fruit Rush, Marsh Seedbox, Swamp Smartweed, Common Threesquare, Yellow Bristlegrass, and Calico aster. A catch basin serves as the outlet that regulates the surface water level of the wetland when it receives stormflows. Based upon its morphology and drainage structures, it appears that this wetland may have also formed within a drainage area that was constructed with the adjacent Runway 14/32 and Taxiways Band C were built, similar to Wetland 4. Similarly, while it is a routinely mowed lawn, since Runway 14/32 has not been used for years, routine maintenance of the basin has waned which may have allowed for the development of a hydrophytic plant community. During field work, high levels of standing water were observed in this catch basin, which may indicate high groundwater levels in this area. Functions and values are low for this wetland.

Although a contiguous wetland system, Wetland 6 is characterized by two different wetland types. Wetland 6A consists of palustrine emergent wetlands within a mowed lawn airfield. Wetland 6B consists of a palustrine forested broad-leaved deciduous, seasonally saturated, wetland (PFO1E), and bordering palustrine emergent wetlands (PEM2) containing non-persistent, persistent and Phragmites-dominated subclasses. An upper reach of Morris Creek bisects the PFO portion of this wetland east of Taxiway C and Runway 32. Sheet flow runoff from the adjacent runways and taxiways and direct precipitation contribute to the hydrology of this wetland, however portions of the wetland are transected by permanently flooded / excavated channels lending evidence of a suspected high groundwater elevation. Seasonal flooding along Morris Creek also likely contributes to the sustaining hydrology of the wetland. Red Maple dominates the PFO portion, while *Phragmites* has significant cover in the PEM portion. Other hydrophytes noted included the following: Northern Spicebush, Highbush Blueberry, Winterberry, Northern Arrowwood, Sweet Pepperbush, Common Reed, Purple Loosestrife, Steeplebush, Spotted Joe Pye-weed, Flat-top Goldenrod, Boneset, and Spike Rush east of Taxiway C (Wetland 6B). To the west of the former runway 14/32 within the mowed portion of the RSA (Wetland 6A), the wetland is dominated by Field Beadgrass, Spike Rush, Brownish Beakrush, and

Yellow Bristlegrass. Functions and values are low for the 6A portion of the wetland due to its maintained nature. Functions and values are slightly higher for the 6B portion of the wetland.

Wetland 7 consists of an estuarine intertidal emergent persistent / *Phragmites*-dominated system (E2EM1/5) bordering estuarine subtidal creeks (Morris Creek and Tuttle Brook) with unconsolidated bottoms and irregularly flooded tidal regimes E1UBL. The tidally influenced dominant vegetation of this wetland includes *Phragmites australis* (an invasive plant species) and several halophytic grasses (e.g., *Spartina alterniflora, Spartina patens, Distichlis spicata,* etc.). The wetland is bordered by a zone of *Baccharis halimifolia* shrubs.

The wetland ID/flagging sequence, wetland type, soil type and characteristic vegetation of each of the seven delineated wetlands is summarized in **Table 1**. Additionally, the United States Fish and Wildlife Service (USFWS), National Wetland Inventory (NWI) map is provided as **Figure 4 in Appendix A**, and the United States Department of Agriculture's Natural Resource Conservation Service (NRCS) Soils Map is provided as **Figure 5 in Appendix A.** Most of the project area is located within the 100-year floodplain limits. The Federal Emergency Management Agency (FEMA) floodplain map is provided as **Figure 6** in **Appendix A**.

NRCS MAPPED AND OBSERVED SOILS

The mapped NRCS soils and observed soils on, and in the vicinity of, the study area are depicted by their soil number on **Figure 5** in **Appendix A**. The mapped NRCS soils and observed soils within the study area are listed in **Table 2** along with their drainage class and NRCS official soil series description.

CONCLUSION

Six of the seven wetlands (Wetland Nos. 1 through 6) delineated among the various project areas on the site are considered inland wetlands and watercourses and were delineated accordingly. The state and federal jurisdictional limits of these six wetlands are coincident. One wetland system (Wetland No. 7) is subject to tidal influence and contains one or more species of tidal wetland vegetation. Thus, Wetland No. 7 is considered a tidal wetland in accordance with the State of Connecticut definition and, as such, is regulated under CGS Section 22a-29 (Tidal Wetlands). These tidal wetlands are also regulated by the USACE. Wetland 1, Wetland 7, and a portion of Wetland 6 drain to the south to Tuttle Brook, a tributary to Morris Creek, which in turn drains to Long Island Sound south of Morris Cove in New Haven, CT. Wetland 3 appears to be an isolated wetland with no apparent direct hydrologic connection to other site wetlands unless it connects through a submerged culvert that was not readily observable at the time of our delineation. Wetlands 4, 5 and a portion of Wetland 6 drain to the southeast – either directly (i.e., via excavated channel) or indirectly (via groundwater discharge) – to an extensive interspersed wetland transected by Morris Creek. In regards to Wetlands 3, 4, and 5, which are

presumed to be constructed drainage areas, one or more of these wetlands may be viewed by the USACE as isolated and thus may not be subject to USACE jurisdiction. A request for a jurisdictional determination is recommended for these wetlands.

Table 1: Wetlands Within the Limit of Wetland Delineation Fieldwork

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
Wetland 1 (OHWA1-A33; OHWB1-B11; E1-E48)	R2UB2/4 and PEM1/5	A relocated reach of Tuttle Brook flanked by bordering vegetated wetland dominated by emergent persistent vegetation.	Walpole (Poorly Drained) and Scarboro (Very Poorly Drained)	Sediment/Toxicant Retention Nutrient Removal Production Export	*Sambucus nigra* (FACW) *Alnus sp.* *Phragmites australis* (FACW) *Typha latifolia* (OBL) *Onoclea sensibilis* (FACW)
Wetland 2 (H1-H32)	PFO1Ed and PEM5H	Red Maple swamp adjacent to an excavated channel that drains easterly and is flanked by stands of Phragmites	Walpole (Poorly drained) and Aquents (poorly drained fill materials)	Sediment/Toxicant Retention Nutrient Removal	*Acer rubrum* (FAC) *Nyssa sylvatica* (FAC) *Quercus palustris* (FACW) *Clethra alnifolia* (FAC) *Lindera benzoin* (FACW) *Vaccinium corymbosum* (FACW) *Phragmites australis* (FACW)
Wetland 3 (B1-B14)	PEM2J	Shallow basin dominated by gramminoids	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Juncus effusus* (OBL) *Juncus tenuis* (FAC) ***Paspalum laeve* (FAC)** *Symphyotrichum lateriflorum* (FAC) *Ludwigia palustris* (OBL)
Wetland 4 (F1-F20)	PEM2J	Routinely mowed lawn area bounded by Taxiway C on the northeast side, and Taxiway H on the southeast side. Low depression with	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Juncus effusus* (OBL) *Cyperus strigosus* (FACW) *Rumex crispus* (FAC) ***Paspalum laeve* (FAC)** *Symphyotrichum lateriflorum*

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
		suspected high groundwater table.			(FAC)
Wetland 5 (G1-G48)	PEM2J	Routinely mowed lawn area bounded by Taxiway C on the northeast and southeast sides, Taxiway H on the northwest side and former Runway 32 on the southwest side. Low depression with high groundwater table.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention Production Export	*Juncus effusus* (OBL) *Cyperus strigosus* (FACW) ***Paspalum laeve* (FAC)** *Coleataenia longifolia* ssp. *longifolia* (FACW) *Echinochloa muricata* (OBL) *Eleocharis obtusa* (OBL) *Juncus acuminatus* (OBL) *Ludwigia palustris* (OBL) *Persicaria hydropiperoides* (OBL) *Schoenoplectus pungens var. pungens* (OBL) *Setaria pumila* ssp. *pumila* (FAC) *Symphyotrichum lateriflorum* (FAC)
Wetland 6 (A1-A121; D1-D50; D51-D62 & D63 to D-88)	PFO1E PEM2	Forested and scrub-shrub wetland (6B portion) and bordering mowed lawn area (6A portion) transected by permanently flooded excavated channel. Low depressions with apparent high groundwater table in mowed areas.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Acer rubrum* (FAC) *Lindera benzoin* (FACW) *Vaccinium corymbosum* (FACW) *Ilex verticillata* (FACW) *Viburnum dentatum* (FAC) *Clethra alnifolia* (FAC) *Phragmites australis* (FACW)

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
					Lythrum salicaria (OBL) *Spiraea tomentosa* (FACW) *Euthrochium maculatum* (OBL) *Juncus effusus* (OBL) ***Paspalum laeve* (FAC)** *Euthamia caroliniana* (FAC) *Eupatorium perfoliatum* (FACW) *Rhynchospora capitellata* (OBL) *Setaria pumila* ssp. *pumila* (FAC) *Cyperus strigosus* (FACW)
Wetland 7 (C1-C104)	E2EM1/5 P and E1UBL	The majority of this wetland system consists of a *Phragmites australis*-dominated tidal wetland bordered by a zone of *Baccharis halimifolia* landward.	Aquents (poorly drained fill materials)	Floodflow Alteration Fish and Shellfish Habitat Wildlife Habitat Uniqueness/Heritage	*Phragmites australis* (FACW) *Spartina alterniflora* (OBL) *Spartina patens* (FACW) *Distichlis spicata* (FACW) *Juncus gerardii* (OBL) *Baccharis halimifolia* (FACW) *Iva frutescens* (FACW)

Notes:

(a) Wetland Type (Cowardin, et. al., 1979 and Federal Geographic Data Committee, 2013)
R3UB2/4 – Riverine lower perennial unconsolidated bottom (sand/mud) watercourse
PFO1E – Palustrine Forested Broad-leaved Deciduous seasonally flooded/saturated wetland
PEM5H – Palustrine Emergent *Phragmites australis*-dominated permanently flooded wetland
PEM2 – Palustrine Emergent, non-persistent wetland
PEM2J – Palustrine Emergent, non-persistent intermittently-flooded wetland
E2EM1/5P – Estuarine intertidal emergent, persistent/*Phragmites australis*, irregularly flooded wetland

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
		E1UBL – Estuarine subtidal, unconsolidated bottom, subtidal deepwater habitat (b) Wetland Indicator Status: OBL (Obligate): Almost always occur in wetland FACW (Facultative Wetland): Usually occur in wetland, but may occur in non-wetland FAC (Facultative): Occur in wetland or non-wetland **Bold text** = State listed plant species			

Table 2: NRCS Mapped Soils in the Vicinity of the Project Area

Soil ID	Soil Name	Drainage Class	Official NRCS Soil Series Description
24	Deerfield Loamy Sand	Moderately well-drained	Soils belonging to the Deerfield series consists of loamy sands of glaciofluvial deposits. They are derived from acidic crystalline rocks such as granite, gneiss, and schist. They are recognized as farmland soils of statewide importance.
37	Manchester gravelly sandy loam	Excessively-drained	The soils of the Manchester series consists of gravelly sandy loam that originated from glaciofluvial deposits. They are derived from acidic red sandstone, shale, and conglomerate bedrocks. They are recognized as farmland soils of statewide importance.
98	Westbrook mucky peat	Very poorly drained	The Westbrook series consists of very deep soils formed in organic deposits over loamy mineral material. They are in tidal marshes subject to inundation by salt water twice daily.
306	Udorthents-Urban Land complex	Well drained	This complex consists of soils that have been disturbed by cutting or filling, and areas that are covered by buildings and pavement.
308	Udorthents, smoothed	Moderately well drained	Udorthents, smoothed, consists of areas from which soil material has been excavated, and nearby areas in which this material has been deposited. The original soil material is generally excessively drained to moderately well drained, and ranges from nearly level to very steep.
	Aquents (un-mapped)	Poorly to very poorly drained	Aquents are soils formed in human transported material or on excavated (cut) landscapes. They typically exist as smaller units within Udorthent soil materials.

The larger wetland complexes that are not within the maintained areas around the runways form important habitat systems and wildlife corridors that provide resources for various fish and wildlife species known to occur in tidal marshes and tidal creeks. The tidal wetlands within the maintained areas around the runways provide limited habitat for various wildlife species of conservation concern. *Paspalum laeve*, a characteristic wetland plant of the herbaceous layer in multiple PEM wetlands on the site, is listed in the State of Connecticut Endangered Species Act as Threatened. A "Threatened" designation is given to plants that have been documented by research and scientific inventory to occur at only six to nine locations in the state. Field Beadgrass is primarily restricted to sites within CT's coastal zone such as Old Lyme, East Haddam, Groton

(W. Moorhead, personal communication), in undisclosed sites in New Haven County (Magee and Ahles, 1999); and in a similar biogeographic zone in NY (e.g., on Fisher's Island and in various municipalities of Long Island, based upon FHI's review of New York State Museum specimen labels). The density and distribution of this species on the Airport has not yet been determined. It is recommended that these metrics be completed during the permitting stage of the project.

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Appendix A - Figures





Legend

- Areas of Wetland Investigation
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

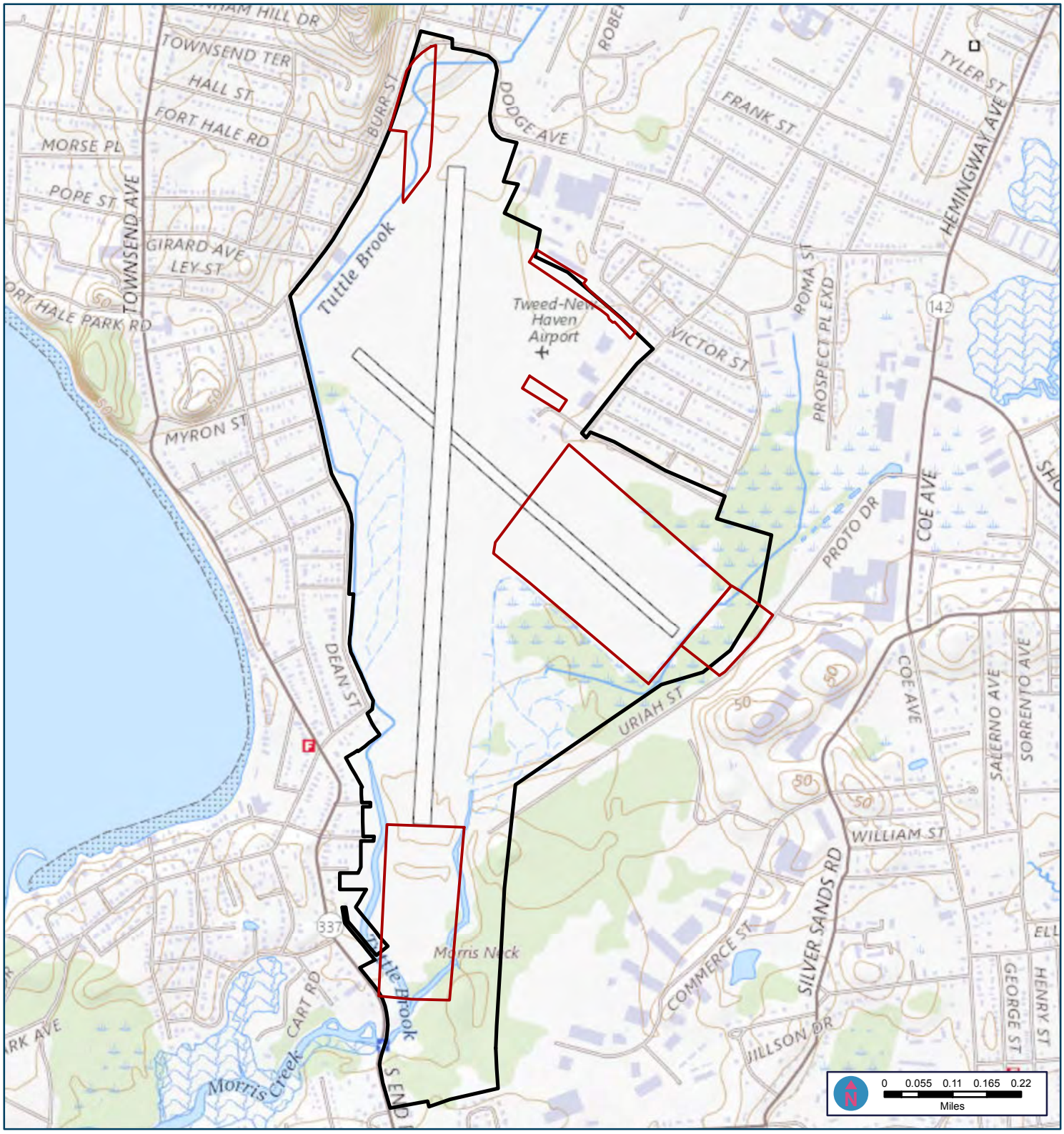
Figure 1

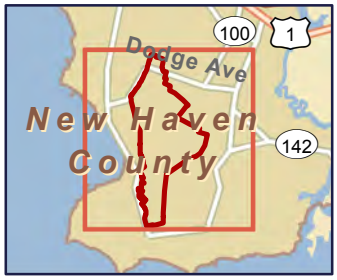
Overview Map

Map Produced 11/29/2021

Data Source: USGS The National Map 2021

FHI studio





Legend

- Areas of Wetland Investigation
- Tweed Airport Property

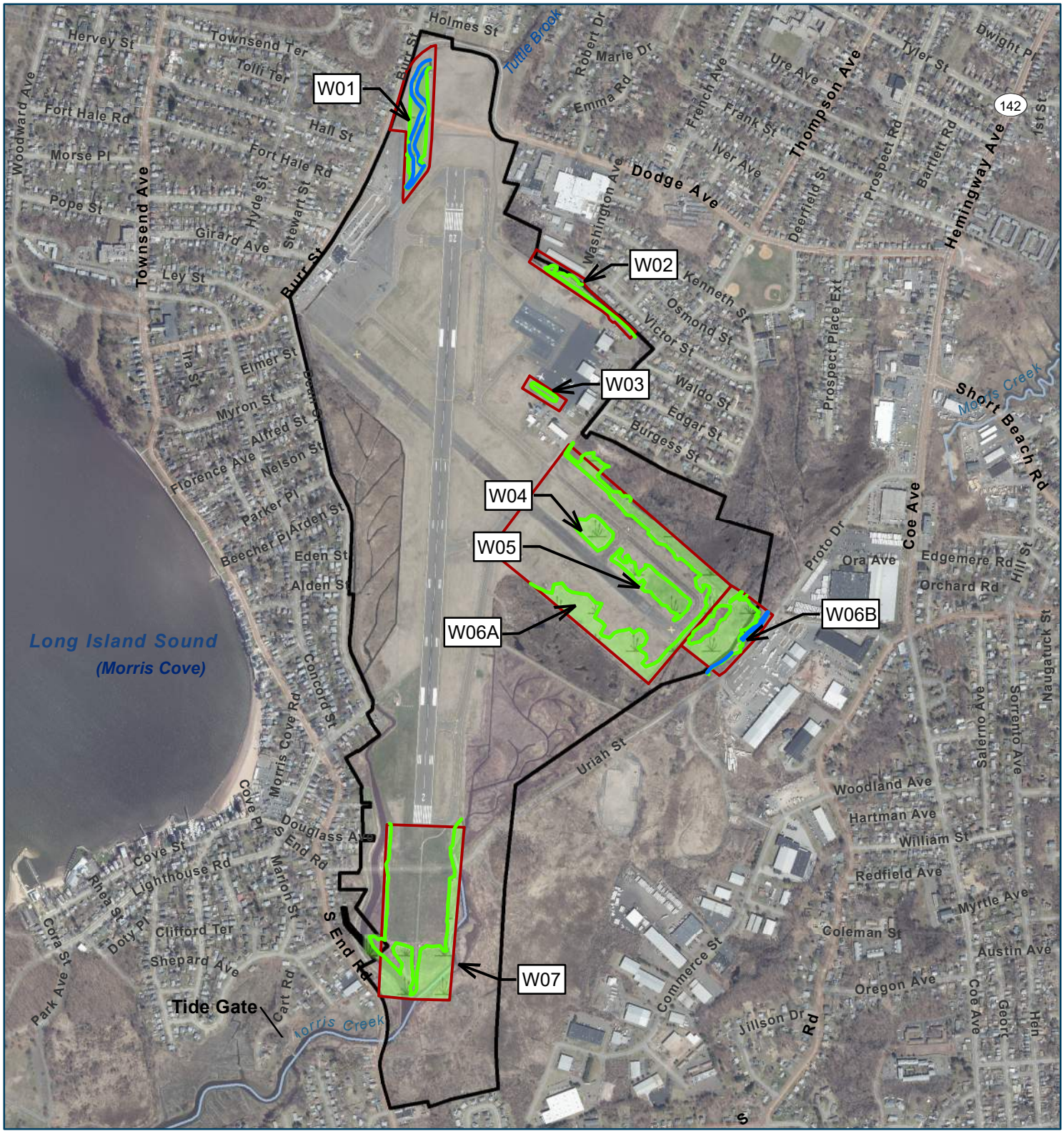
Tweed New Haven Airport

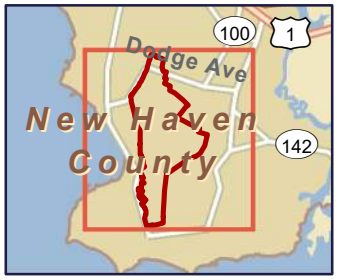
Wetland and Watercourse Delineation

Figure 2

Map Produced 11/29/2021
Data Source: USGS The National Map 2021

USGS Map





Legend

- Delineated Wetland
- Delineated Ordinary High Water (OHW)
- Areas of Wetland Investigation
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

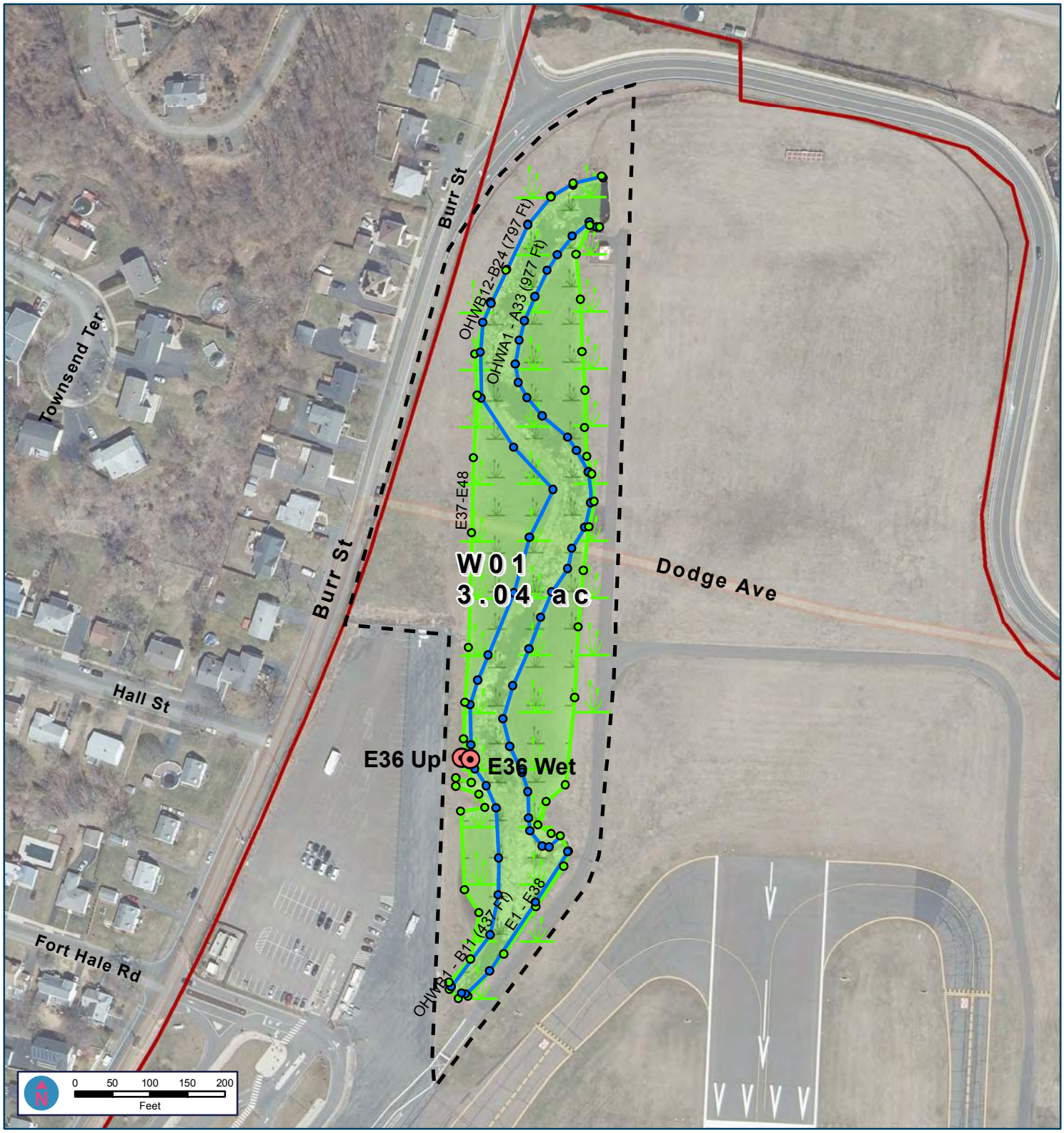
Figure 3A

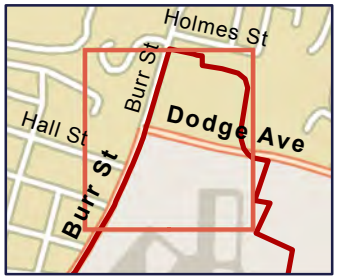
Map Produced 11/30/2021

Data Source: CTECO 2019 Aerial, ESRI, FHI Studio 2021

Wetland Field Delineation Sketch Map

FHI studio





Legend

- Wetland Transect Plot Location
- Ordinary High Water (OHW) Field Flag Location
- Wetland Field Flag Location
- Delineated Ordinary High Water (OHW) Line
- Limits of Wetland Investigation Area
- Field Delineated Wetland 2021
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

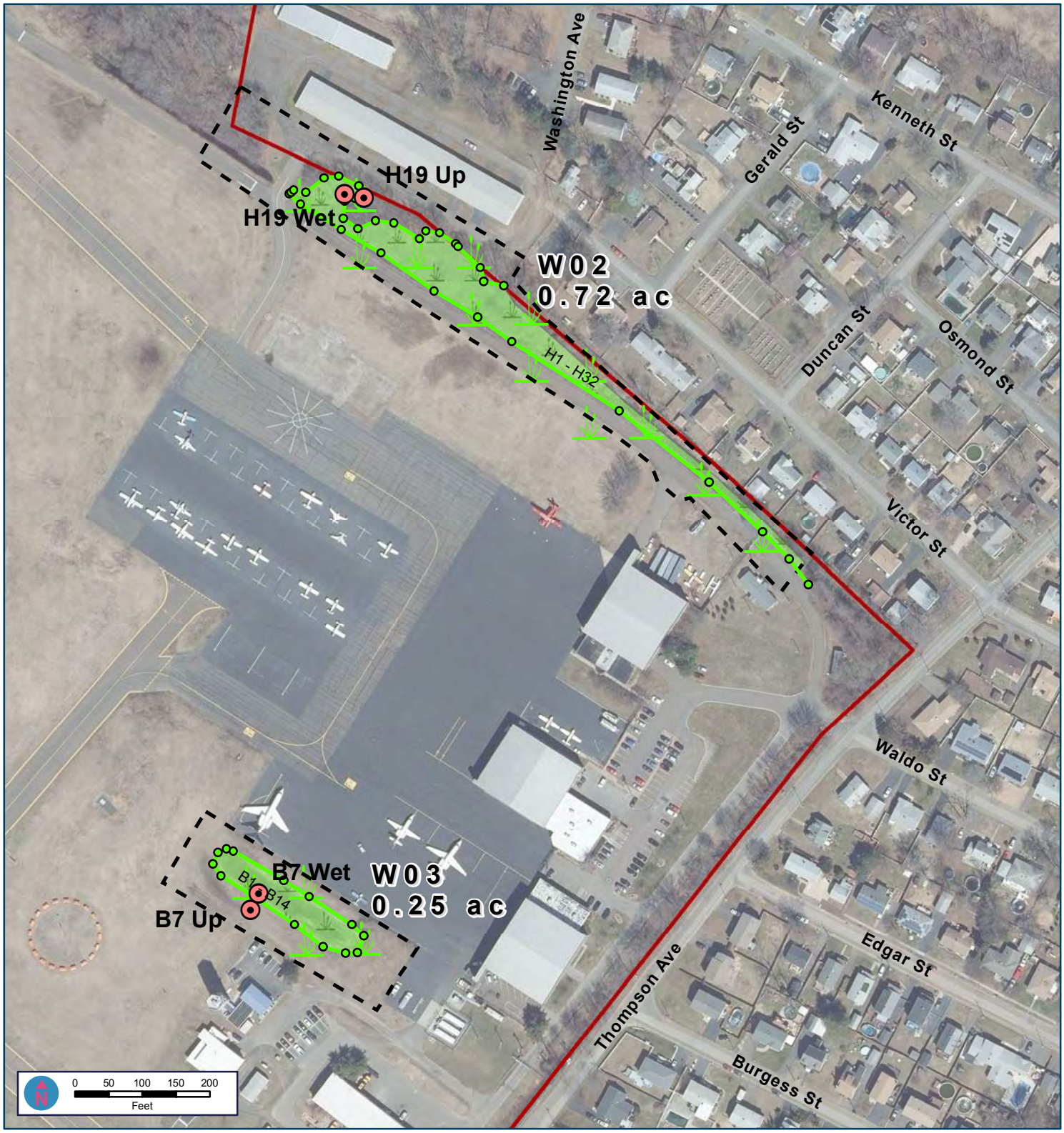
Figure 3b

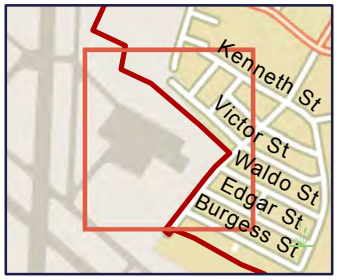
Detailed Field Delineated Wetland Sketch Map

Map Produced 12/8/2021

Data Source: CTECO 2019 Aerial, FHI Studio 2021

FHI studio





Legend

- Wetland Transect Plot Location
- Ordinary High Water (OHW) Field Flag Location
- Wetland Field Flag Location
- Delineated Ordinary High Water (OHW) Line
- Limits of Wetland Investigation Area
- Field Delineated Wetland 2021
- Tweed Airport Property

Tweed New Haven Airport

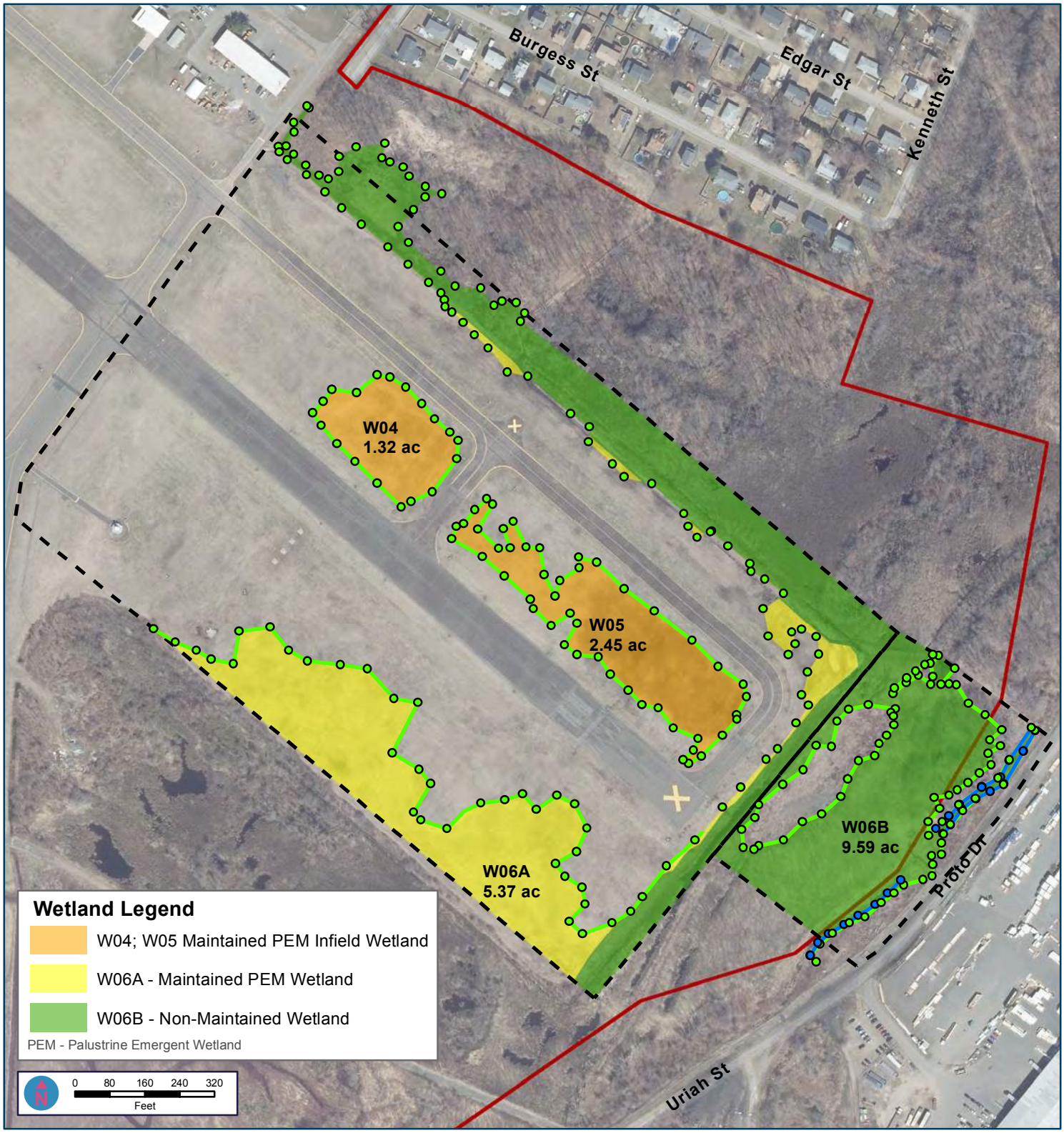
Wetland and Watercourse Delineation

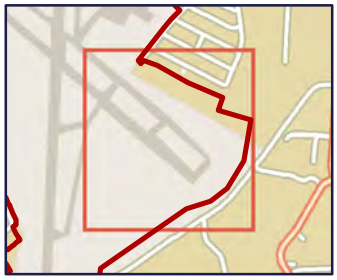
Figure 3c

Detailed Field Delineated Wetland Sketch Map

Map Produced 12/8/2021

Data Source: CTECO 2019 Aerial, FHI Studio 2021





Legend

- Tweed Airport Property
- Limits of Wetland Investigation Area
- Wetland Field Flag Location
- Ordinary High Water (OHW) Field Flag Location
- Delineated Wetland Line
- Delineated Ordinary High Water (OHW) Line

Tweed New Haven Airport

Wetland and Watercourse Delineation

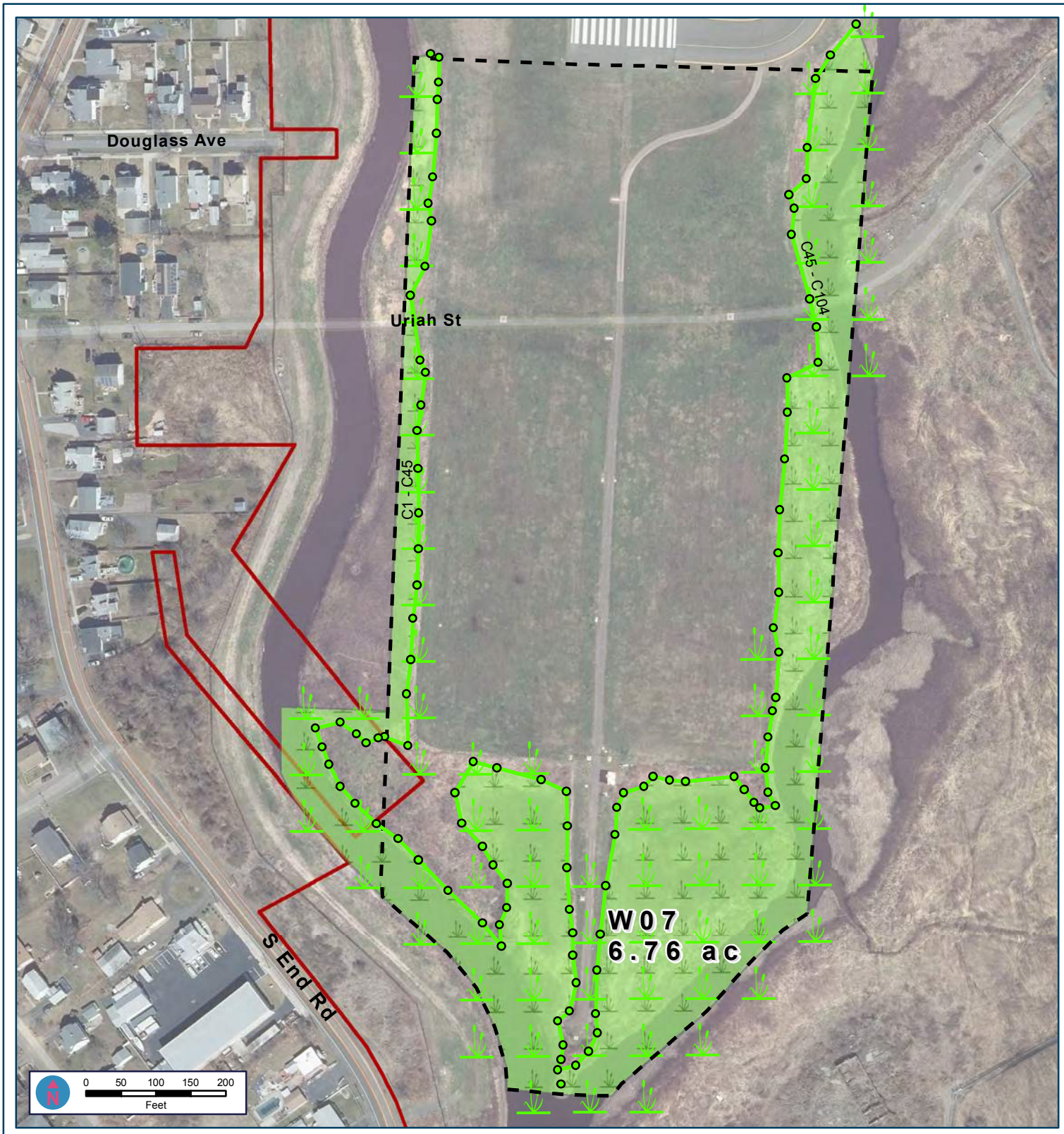
Figure 3d

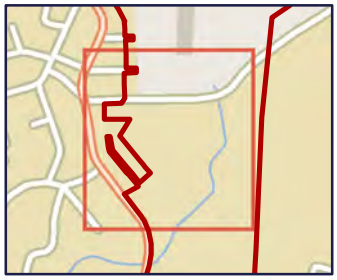
Detailed Field Delineated Wetland Sketch Map

Map Produced 1/5/2022

Data Source: CTECO 2019 Aerial, FHI Studio 2021

FHI studio





Legend

- Wetland Transect Plot Location
- Ordinary High Water (OHW) Field Flag Location
- Wetland Field Flag Location
- Delineated Ordinary High Water (OHW) Line
- Limits of Wetland Investigation Area
- Field Delineated Wetland 2021
- Tweed Airport Property

Tweed New Haven Airport

Wetland and Watercourse Delineation

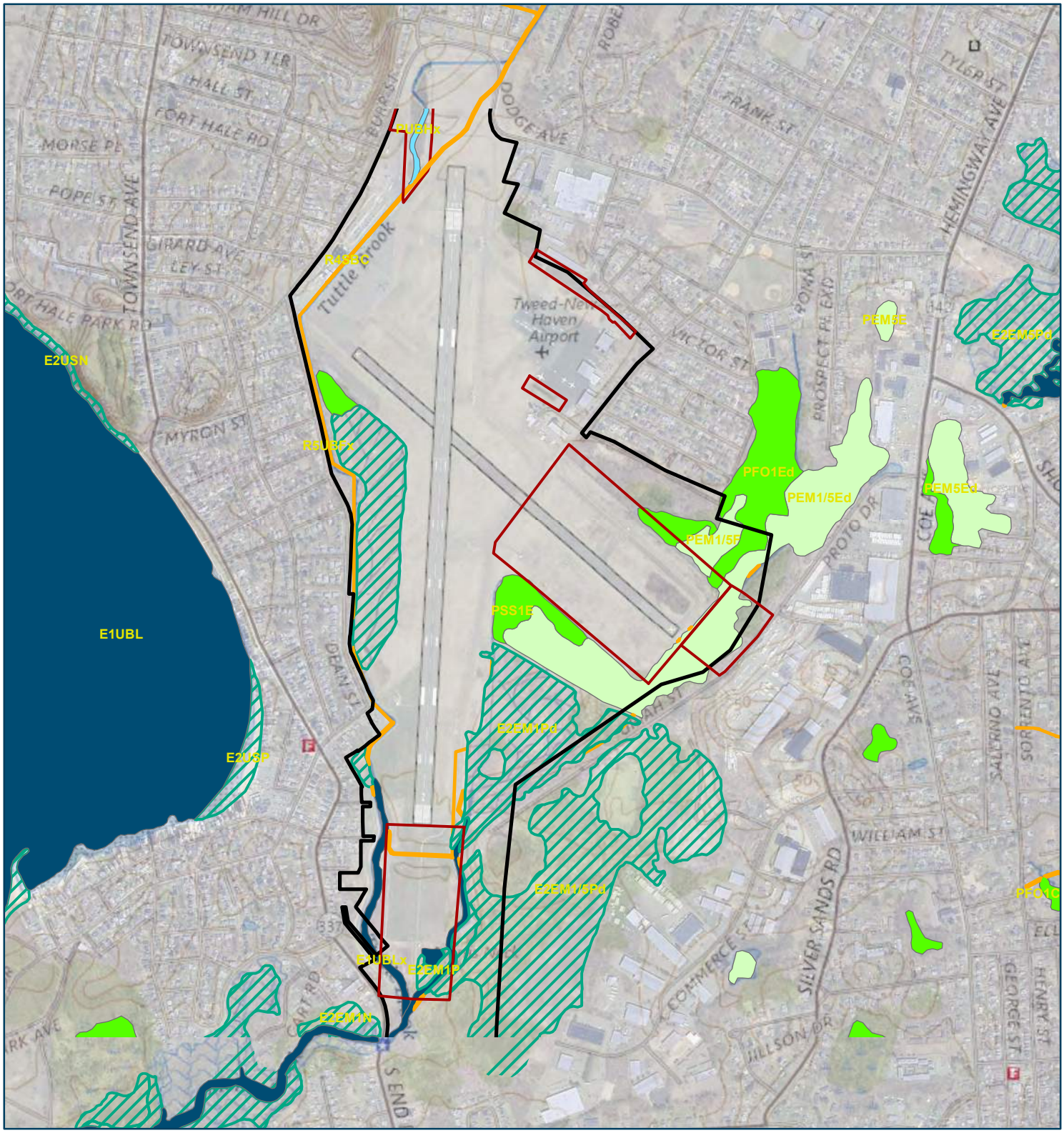
Figure 3e

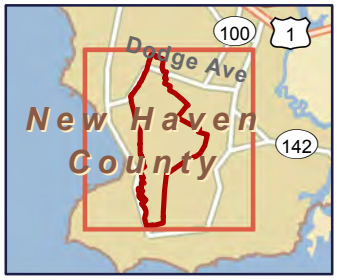
Detailed Field Delineated Wetland Sketch Map

Map Produced 12/8/2021

Data Source: CTECO 2019 Aerial, FHI Studio 2021

FHI studio





Map Produced 12/1/2021
Data Source: USFWS NWI

Legend

- Tweed Airport Property
- Areas of Wetland Investigation
- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Riverine

Tweed New Haven Airport

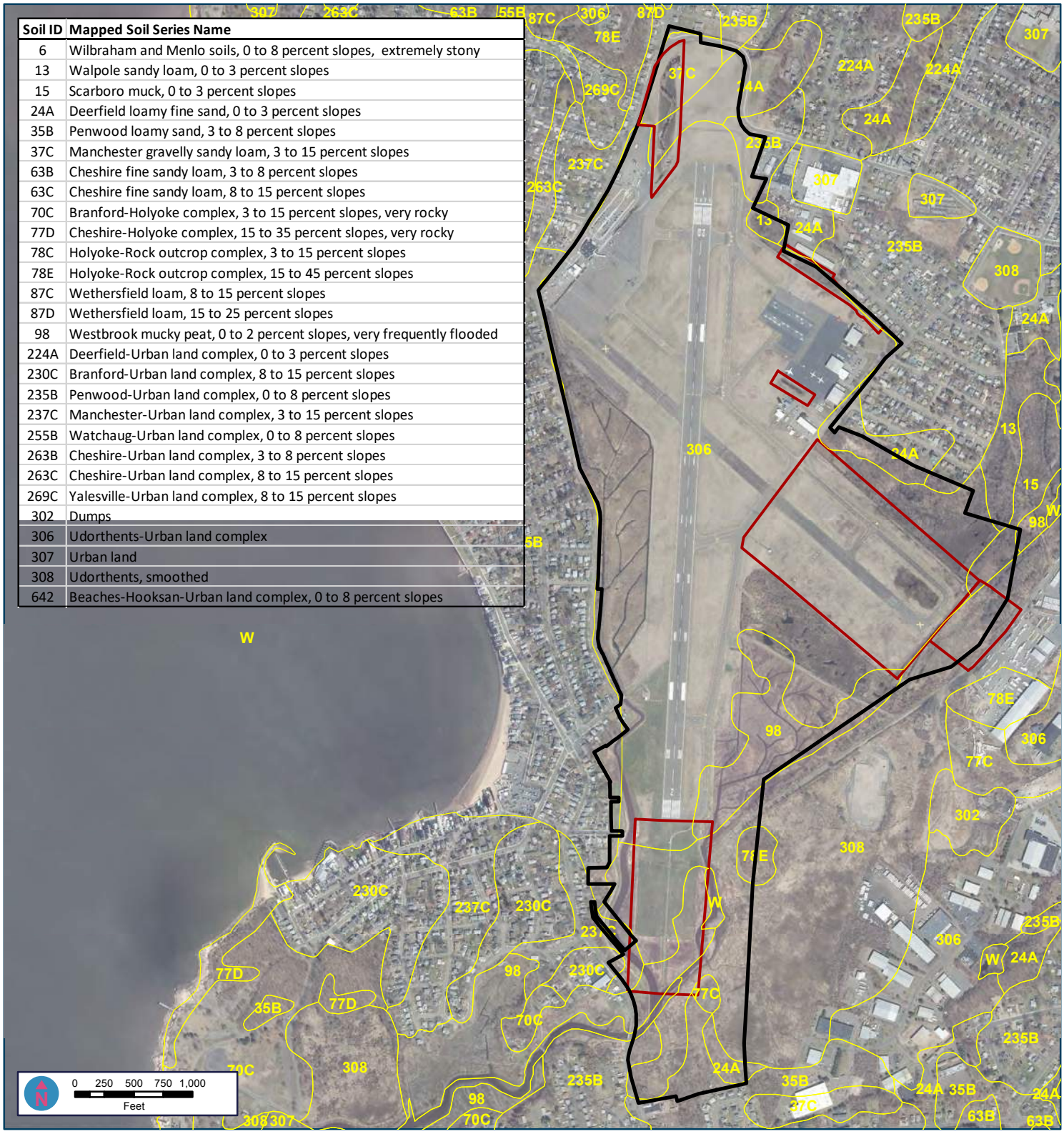
Wetland and Watercourse Delineation

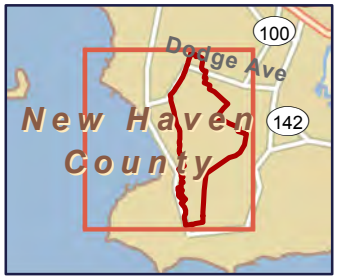
Figure 4

USFWS NWI Map

FHI studio

Soil ID	Mapped Soil Series Name
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony
13	Walpole sandy loam, 0 to 3 percent slopes
15	Scarboro muck, 0 to 3 percent slopes
24A	Deerfield loamy fine sand, 0 to 3 percent slopes
35B	Penwood loamy sand, 3 to 8 percent slopes
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes
63B	Cheshire fine sandy loam, 3 to 8 percent slopes
63C	Cheshire fine sandy loam, 8 to 15 percent slopes
70C	Branford-Holyoke complex, 3 to 15 percent slopes, very rocky
77D	Cheshire-Holyoke complex, 15 to 35 percent slopes, very rocky
78C	Holyoke-Rock outcrop complex, 3 to 15 percent slopes
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes
87C	Wethersfield loam, 8 to 15 percent slopes
87D	Wethersfield loam, 15 to 25 percent slopes
98	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded
224A	Deerfield-Urban land complex, 0 to 3 percent slopes
230C	Branford-Urban land complex, 8 to 15 percent slopes
235B	Penwood-Urban land complex, 0 to 8 percent slopes
237C	Manchester-Urban land complex, 3 to 15 percent slopes
255B	Watchaug-Urban land complex, 0 to 8 percent slopes
263B	Cheshire-Urban land complex, 3 to 8 percent slopes
263C	Cheshire-Urban land complex, 8 to 15 percent slopes
269C	Yalesville-Urban land complex, 8 to 15 percent slopes
302	Dumps
306	Udorthents-Urban land complex
307	Urban land
308	Udorthents, smoothed
642	Beaches-Hooksan-Urban land complex, 0 to 8 percent slopes





Legend

- Areas of Wetland Investigation
- Tweed Airport Property
- NRCS Mapped Soil Unit

Tweed New Haven Airport

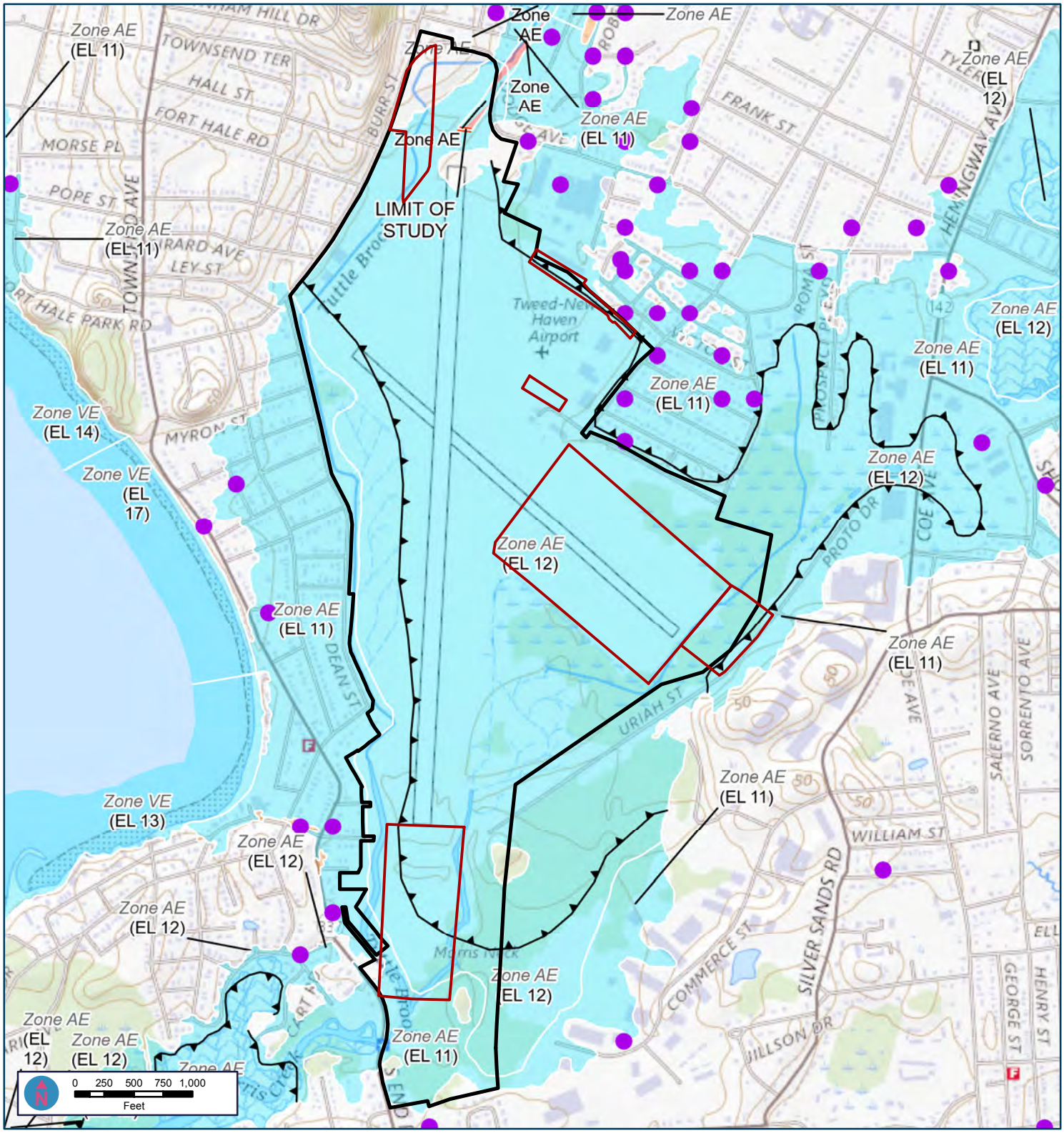
Wetland and Watercourse Delineation

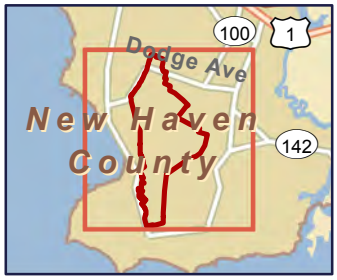
Figure 5

Map Produced 12/1/2021

Data Source: USDA NRCS Soils Mapping 2021

NRCS Soils Series





Map Produced 12/1/2021
Data Source: FEMA

Legend

- Tweed Airport Property
- Areas of Wetland Investigation

Flood Hazard Zones

- 1% Annual Chance Flood Hazard
- Regulatory Floodway
- Special Floodway
- Effective
- LOMAs
- Limit of Moderate Wave Action

Tweed New Haven Airport

Wetland and Watercourse Delineation

Figure 6

FEMA Flood Zones

FHI studio

Appendix B - USACE Wetland Functions and Values Assessment Forms

Wetland Function-Value Evaluation Form

Total area of wetland 3.04ac Human made? Modified Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use Airport Runway Safety Area (Lawn) Distance to nearest roadway or other development 80'

Dominant wetland systems present R3UB2/3 Contiguous undeveloped buffer zone present no

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? Middle

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. W01

Latitude 41.27177811 Longitude -72.88867746

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,7,15		watercourse shows clear evidence of OHW; GW Q sustains base flow
Floodflow Alteration	○	◉	4,5,7,9,10,11,13,16,18		
Fish and Shellfish Habitat	○	◉	4,10,14,16,17		
Sediment/Toxicant Retention	◉	○	1,2,3,4,10,15,16	X	1= road sands; 10=Tuttle Brook (a perennial watercourse)
Nutrient Removal	○	◉	3,4,5,6,7,8,9,10,11	X	4=lawn fertilizer from upstream residences
Production Export	○	◉	1,2,4,7,9,10,11,12,13	X	
Sediment/Shoreline Stabilization	○	◉	1,,2,3,4,5,7,9,12,13,15		1=sedimentation from lateral culvert outlets
Wildlife Habitat	○	◉	7,8,11,13,15,16,17,18		19,20
Recreation	○	◉	12		
Educational/Scientific Value	○	◉	8,9,14		
Uniqueness/Heritage	○	◉	1,7,8,9,11,12,13,17,19		22,24,28 (Paspalum laeve - CT Threatened)
Visual Quality/Aesthetics	○	◉	2,6,9		
ES Endangered Species Habitat	○	◉	1		1 = Paspalum laeve - CT Threatened
Other	◉	○			carbon sequestration

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.72ac Human made? Modified Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use residential, commercial (Hangars), access rd Distance to nearest roadway or other development adjacent

Dominant wetland systems present PFO1E & PEM 1/5 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? middle

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. W02

Latitude 41.26904653 Longitude -72.88417179

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,7,15		
Floodflow Alteration	◉	○	3,4,5,6,7,8,9,10,11		
Fish and Shellfish Habitat	○	◉	4,10,14,16?,17		
Sediment/Toxicant Retention	◉	○	1,2,3,4,8,10,12	X	
Nutrient Removal	◉	○	2,3,4,5,6,7,8,9,10,11	X	13 , 14
Production Export	◉	○	1,2,4,7,9,10,11,12,13		
Sediment/Shoreline Stabilization	◉	○	1,2,3,4,5,6,7,9,12,13		15
Wildlife Habitat	○	◉	7,8,11,13,16,18,19,20		
Recreation	○	◉			wetland is not accessible to the public
Educational/Scientific Value	○	◉	1,8,14		
Uniqueness/Heritage	○	◉	1,5,7,8,9,13,14,17,22		
Visual Quality/Aesthetics	○	◉	2		
ES Endangered Species Habitat	○	◉	1		
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.25ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use East Ramp, ATC, OPS, parking Distance to nearest roadway or other development 30'

Dominant wetland systems present PEM2 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. W03

Latitude 41.26619678 Longitude -72.88465694

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	○	◉	4,5,8		
Floodflow Alteration	◉	○	3,4,6,7,8?,9,11		4=East Ramp, 7=ponded water
Fish and Shellfish Habitat	○	◉			wetland not associated with a watercourse
Sediment/Toxicant Retention	◉	○	1,2,3,5,7,9	X	
Nutrient Removal	◉	○	2,3,4?,5,7,9,10,11		
Production Export	○	◉	2,7,9		
Sediment/Shoreline Stabilization	○	◉	2,3,5,10,12,13,15		
Wildlife Habitat	◉	○	7,11,16,19		limited suitability for most vertebrate taxon
Recreation	○	◉			no public access available
Educational/Scientific Value	○	◉	1,14		no public access available
Uniqueness/Heritage	◉	○	1,5,15,24,28		Paspalum laeve
Visual Quality/Aesthetics	○	◉	2,6,9,12		
ES Endangered Species Habitat	○	◉	1		1= Paspalum laeve
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 1.3ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use Taxiway & Runway Distance to nearest roadway or other development adjacent

Dominant wetland systems present PEM2 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 4

Latitude 41.26247437 Longitude -72.88275629

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,9,10,15		10=drop inlet catchbasin regulates the maximum heightof impounded water
Floodflow Alteration	◉	○	3,4,5,6,7,8,9,10,12,15		15=drop inlet catchbasin regulates the maximum heightof impounded water
Fish and Shellfish Habitat	○	◉			wetland not directly associated with a Watercourse
Sediment/Toxicant Retention	◉	○	2,3,4,5,7,9	X	
Nutrient Removal	◉	○	2,3,5,7,9,10,11		
Production Export	◉	○	1,2,4,9,10,12,13		
Sediment/Shoreline Stabilization	○	◉	2,5,15		
Wildlife Habitat	◉	○	7,8,9,10,11,12,13,16		18,19,20,21; 8=smartweeds, 11=shallow marsh
Recreation	○	◉			wetland is not accessible or visible to the public
Educational/Scientific Value	○	◉	1,14		
Uniqueness/Heritage	○	◉	1,5,8,12,13,17,19,24		28; 24=Paspalum laeve (CT-Threatened)
Visual Quality/Aesthetics	○	◉	2,4,6		
ES Endangered Species Habitat	◉	○	1		1=Paspalum laeve (CT-Threatened)
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 2.45ac Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use Taxiway, Runway Distance to nearest roadway or other development adjacent

Dominant wetland systems present PEM2 Contiguous undeveloped buffer zone present N

Is the wetland a separate hydraulic system? Y If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 5

Latitude 41.26108729 Longitude -72.88005655

Prepared by: AJZ Date 11-9-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,8,9,10,15		9=drop inlet catchbasin recharge
Floodflow Alteration	◉	○	3,4,5,6,7,8,9,10,15,18		4=runways, taxiways,tarmac,parking; 7=ponded water; 15=drop inlet catchbasin
Fish and Shellfish Habitat	○	◉			wetland not directly associated with a watercourse
Sediment/Toxicant Retention	◉	○	1,2,3,4,5,7,9	X	4=organic soils
Nutrient Removal	◉	○	2,3,4,5,7,8,9,10,11		2=openwater habitat; 7=organic soils; 9=emergent covert type
Production Export	◉	○	1,2,4,7,9,10,12,13	X	1=e.g.,smartweeds, woolgrass; 4=waterfowl & shorebirds; 10=drop inlet catchbasin
Sediment/Shoreline Stabilization	○	◉	2,5,15		
Wildlife Habitat	◉	○	7,8,11,13,16,18,19,20		8=smartweed, 16=obligate hydrophytes, 19=abundant odonata and mosquito larvae
Recreation	○	◉			area not accessible to the public
Educational/Scientific Value	○	◉	1,14		1=Paspalum laeve
Uniqueness/Heritage	◉	○	1,5,8,12,13,17,19,24		24 & 28=Paspalum laeve
Visual Quality/Aesthetics	○	◉	2,4,6		
ES Endangered Species Habitat	◉	○	1		1=Paspalum laeve
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 14.95ac Human made? N Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use Taxiway C, closed RW32 Distance to nearest roadway or other development adjacent

Dominant wetland systems present PFO1E/ PEM 1/5 Contiguous undeveloped buffer zone present

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? Lower Middle

How many tributaries contribute to the wetland? unknown Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 6

Latitude 41.26058504 Longitude -72.88216529

Prepared by: AJZ Date 11-9-2021

Wetland Impact:
Type YBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	◉	○	4,8,10,15		
Floodflow Alteration	○	◉	4,6,7,9,10		
Fish and Shellfish Habitat	○	◉			wetland not directly associated with a watercourse
Sediment/Toxicant Retention	◉	○	2,4,7,9	X	
Nutrient Removal	◉	○	11,3,5,7,8,9,10,11		9=emergent cover type
Production Export	◉	○	1,4,9,12		
Sediment/Shoreline Stabilization	○	◉	2,5,15		
Wildlife Habitat	◉	○	7,11,16,18,20,21,22		11=wet meadow
Recreation	○	◉			
Educational/Scientific Value	○	◉	1,14		1=Paspalum laeve
Uniqueness/Heritage	◉	○	1,5,8,12,13,17,19,24		24&28=Paspalum laeve
Visual Quality/Aesthetics	○	◉	2,4,6		
ES Endangered Species Habitat	◉	○			1=Paspalum laeve
Other	○	◉			

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 8.4ac Human made? N Is wetland part of a wildlife corridor? Y or a "habitat island"?

Adjacent land use Runway Distance to nearest roadway or other development 250'

Dominant wetland systems present PEM 1/5d Contiguous undeveloped buffer zone present

Is the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? lower

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. Wetland 7

Latitude 41.252328 Longitude -72.888514

Prepared by: AJZ Date 11-11-21

Wetland Impact:
Type TBD Area TBD

Evaluation based on:
Office X Field X

Corps manual wetland delineation completed? Y X N

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	○	◉	4,7		7=Morris and Tuttle Creeks
Floodflow Alteration	◉	○	4,5,9,10,11,12,13,18	X	13=Morris and Tuttle Creeks
Fish and Shellfish Habitat	◉	○	1,2,3,4	X	
Sediment/Toxicant Retention	◉	○	1,2,3,4,5,8,10,15,16		1=road sands; 2=vehicle fluids, 10=Morris and Tuttle Creeks
Nutrient Removal	◉	○	2,3,4,5,6,7,8,9,10,11		14; 4=residential lawns
Production Export	◉	○	1,2,4,5,6,7,9,10,11,12		13; 5=e.g. Osprey; 9=abundance
Sediment/Shoreline Stabilization	◉	○	1,2,3,4,6,7,9,12,13,15		3&4=road sands; 12=vegetation borders watercourse; 15=Phragmites stands
Wildlife Habitat	◉	○	6,7,8,11,13,16,18,19,	X	21,22,23; 8=e.g., Vitis, Toxicodendron, Paspalum, etc.; 16=waterbirds, hydrophytes; 23=wetland subject to a mitigation project implemented to enhance biodiversity
Recreation	○	◉	7		
Educational/Scientific Value	○	◉	1,5,14		
Uniqueness/Heritage	◉	○	1,4,5,7,12,13,15,24,27	X	28
Visual Quality/Aesthetics	◉	○	2,4,6,8		
ES Endangered Species Habitat	◉	○	1		1= Great Egret, Paspalum laeve (both CT-Threatened)
Other	◉	○			coastal resiliency; Carbon sequestration

Notes:

* Refer to backup list of numbered considerations.

Appendix C - USACE Wetland Documentation Dataforms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: New Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: E36U

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR or MLRA): LRR R Lat: -41.27178354 Long: -72.88871735 Datum:

Soil Map Unit Name: Deerfield Loamy fine sand NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	**Yes**	**No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Much of the upland vegetation was mowed;.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: E36U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Plantago lanceolata*	38	Yes	FACU
2. *Hypochaeris radicata*	20	Yes	FACU
3. *Andropogon gerardii*	5	No	FACU
4. *Schizachyrium scoparium*	5	No	FACU
5. *Lotus corniculatus*	5	No	FACU
6. *Trifolium pratense*	3	No	FACU
7. *Artemisia vulgaris*	3	No	UPL
8. *Paspalum setaceum*	3	No	FACU
9.			
10.			
11.			
12.			
	82 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	79	x 4 =	316
UPL species	3	x 5 =	15
Column Totals:	82 (A)		331 (B)
Prevalence Index = B/A =			4.04

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: E36U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	7.5YR 2.5/1						Sandy	
8-12	5YR 4/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: New Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: E36W

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): river terrace Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.27177811 Long: -72.88867746 Datum:

Soil Map Unit Name: Deerfield Loamy fine sand NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil N, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 6
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: E36W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Symphyotrichum lateriflorum*	50	Yes	FAC
2. *Juncus effusus*	12	Yes	OBL
3. *Carex stricta*	12	Yes	OBL
4. *Typha latifolia*	10	No	OBL
5. *Thalictrum thalictroides*	10	No	FACU
6. *Rumex crispus*	8	No	FAC
7. *Rubus hispidus*	5	No	FACW
8. *Dichanthelium clandestinum*	3	No	FACW
9. *Lythrum salicaria*	3	No	OBL
10.			
11.			
12.			
	113 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	37	x 1 =	37
FACW species	8	x 2 =	16
FAC species	58	x 3 =	174
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	113 (A)		267 (B)

Prevalence Index = B/A = 2.36

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: E36W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					Sandy	
3-7	5YR 3/1	80	2.5YR 3/6	20	C	M	Sandy	Prominent redox concentrations
7-12	5YR 4/1	70	5YR 4/6	30	C	M		Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ? Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: H19U

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): bottomland Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26903380 Long: -72.88407083 Datum:

Soil Map Unit Name: Udorthents - Urban Land Complex NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes 0	No	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
much of area recently inundated with stormwater

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches): 0	
Water Table Present?	Yes X	No	Depth (inches): 0	
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0	**Wetland Hydrology Present?** **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Recent rainfall had resulted in localized inundation of the adjacent wetland

VEGETATION – Use scientific names of plants. Sampling Point: H19U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	50	Yes	FAC
2. *Quercus palustris*	20	Yes	FACW
3. *Nyssa sylvatica*	10	No	FAC
4.			
5.			
6.			
7.			
	80	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Clethra alnifolia*	50	Yes	FAC
2. *Vaccinium corymbosum*	15	No	FACW
3. *Kalmia latifolia*	10	No	FACU
4. *Betula populifolia*	8	No	FAC
5.			
6.			
7.			
	83	=Total Cover	
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Smilax rotundifolia*	20	Yes	FAC
2.			
3.			
4.			
	20	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	35	x 2 =	70
FAC species	138	x 3 =	414
FACU species	10	x 4 =	40
UPL species	0	x 5 =	0
Column Totals:	183 (A)		524 (B)

Prevalence Index = B/A = 2.86

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: H19U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1						Sandy	
3-12	7.5YR 4/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: H19W

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): bottomland Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26904653 Long: -72.88417179 Datum:

Soil Map Unit Name: Udorthents - Urban Land Complex NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X	**No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	1
Water Table Present?	Yes X	No	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: H19W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	75	Yes	FAC
2. *Quercus palustris*	15	No	FACW
3. *Nyssa sylvatica*	10	No	FAC
4.			
5.			
6.			
7.			
	100	=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1. *Clethra alnifolia*	15	Yes	FAC
2. *Vaccinium corymbosum*	10	Yes	FACW
3. *Viburnum dentatum*	5	No	FAC
4.			
5.			
6.			
7.			
	30	=Total Cover	
Herb Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		=Total Cover	
Woody Vine Stratum (Plot size:)			
1. *Smilax rotundifolia*	5	Yes	FAC
2.			
3.			
4.			
	5	=Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	25	x 2 =	50
FAC species	110	x 3 =	330
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	135 (A)		380 (B)

Prevalence Index = B/A = 2.81

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: H19W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					Mucky Sand	
3-12	7.5YR 4/2	85	5YR 3/4	15	C	M	Sandy	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ? Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: B7U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26613223 Long: -72.88470274 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: B7U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Paspalum setaceum*	35	Yes	FACU
2. *Digitaria sanguinalis*	15	Yes	FACU
3. *Dichanthelium*	8	No	
4. *Hypochaeris radicata*	5	No	FACU
5. *Symphyotrichum lateriflorum*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	68 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	5	x 3 =	15
FACU species	55	x 4 =	220
UPL species	0	x 5 =	0
Column Totals:	60 (A)		235 (B)
Prevalence Index = B/A =			3.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: B7U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1						Sandy	
3-11	7.5YR 3/2						Sandy	
11-15	7.5YR 3/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: B7W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26619678 Long: -72.88465694 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X	**No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	6
Water Table Present?	Yes X	No	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: B7W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus effusus*	50	Yes	OBL
2. *Hydrophilic grasses*	40	Yes	
3. *Paspalum laeve*	5	No	FAC
4. *Symphyotrichum lateriflorum*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	100 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	50	x 1 =	50
FACW species	0	x 2 =	0
FAC species	10	x 3 =	30
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	60 (A)		80 (B)

Prevalence Index = B/A = 1.33

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: B7W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 2.5/1						Loamy/Clayey	
6-12	7.5YR 3/3	90	10YR 5/1	10	D	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: F19U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26242650 Long: -72.88275548 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No N	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No N	**within a Wetland?**	**Yes**	**No** N
Wetland Hydrology Present?	Yes	No N	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No x	Depth (inches):
Water Table Present?	Yes	No x	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No x	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: F19U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Unidentified grass*	40	Yes	
2. *Paspalum laeve*	30	Yes	FAC
3. *Krigia biflora*	20	No	FACU
4. *Plantago lanceolata*	10	No	FACU
5. *Paspalum setaceum*	5	No	FACU
6. *Symphyotrichum lateriflorum*	5	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	110 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	70 (A)		245 (B)
Prevalence Index = B/A =			3.50

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: F19U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 2.5/2	100					Sandy	
12-14	7.5YR 2.5/2	90	7.5YR 4/6	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven / New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: F19W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26247437 Long: -72.88275629 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area augmented with historical fill material?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- X Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 8
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 5

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Topgraphic depression. Outlet controlled by drop inlet elevation?

VEGETATION – Use scientific names of plants.

Sampling Point: F19W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Cyperus strigosus*	35	Yes	FACW
2. *Carex scoparia*	15	Yes	FACW
3. *Juncus effusus*	10	No	OBL
4. *Paspalum laeve*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	65 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	10	x 1 =	10
FACW species	50	x 2 =	100
FAC species	5	x 3 =	15
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	65 (A)		125 (B)

Prevalence Index = B/A = 1.92

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: F19W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	7.5YR 3/2	100					Sandy	
5-13	7.5YR 3/2	90	7.5YR 4/6	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven (HVN) Airport City/County: East Haven / New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: G8U

Investigator(s): AJZ/JJW Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.261087 Long: -72.879992 Datum:

Soil Map Unit Name: Udorthents NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Much of the upland vegetation was mowed; soils are udorthents

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: G8U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. *Rosa multiflora*	5	Yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	5 =Total Cover		
Herb Stratum (Plot size:)			
1. *Plantago lanceolata*	30	Yes	FACU
2. *Trifolium pratense*	10	Yes	FACU
3. *Potentilla argentea*	10	Yes	FACU
4. *Taraxacum officinale*	5	No	FACU
5. *Achillea millefolium*	3	No	FACU
6. *Hypochaeris radicata*	3	No	FACU
7. *Paspalum setaceum*	3	No	FACU
8.			
9.			
10.			
11.			
12.			
	64 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	69	x 4 =	276
UPL species	0	x 5 =	0
Column Totals:	69 (A)		276 (B)
Prevalence Index = B/A =			4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: G8U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-7	10YR 3/2	100					Sandy	
7-13	5YR 3/3	60	10YR 3/2	40	C	M	Sandy	Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

This data form is revised from Northcentral and Northeast Regional Supplement Version 2.0 to reflect the NRCS Field Indicators of Hydric Soils version 7.0 March 2013 Errata. (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051293.docx)

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed (HVN) City/County: East Haven/New Haven Sampling Date: 10-8-21

Applicant/Owner: City of New Haven State: CT Sampling Point: G8W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): basin Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26108729 Long: -72.88005655 Datum:

Soil Map Unit Name: Udorthents NWI classification: PEM

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area mapped as udorthents = graded and smoothed?

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- X Water Marks (B1)
- Sediment Deposits (B2)
- X Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- Iron Deposits (B5)
- X Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- X Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- X Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes X	No	Depth (inches): 1
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: G8W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus acuminatus*	60	Yes	OBL
2. *Ludwigia palustris*	20	No	OBL
3. *Setaria pumila*	10	No	FAC
4. *Juncus effusus*	5	No	OBL
5. *Persicaria hydropiperoides*	5	No	OBL
6. *Paspalum laeve*	3	No	FAC
7.			
8.			
9.			
10.			
11.			
12.			
	103 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	90	x 1 =	90
FACW species	0	x 2 =	0
FAC species	13	x 3 =	39
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	103 (A)		129 (B)
Prevalence Index = B/A =			1.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

_X_ 2 - Dominance Test is >50%

_X_ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: G8W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1	100					Sandy	
3-12	7.5YR 3/2	90	2.5YR 4/6	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: A100U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.260675 Long: -72.882200 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**		
Hydric Soil Present?	Yes	No X	**within a Wetland?**	**Yes**	**No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)
Area contains historical fill material. Located in Wetland 6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- Surface Water (A1)
- High Water Table (A2)
- Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A100U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Hypochaeris radicata*	25	Yes	FACU
2. *Plantago lanceolata*	20	Yes	FACU
3. *Schizachyrium scoparium*	15	Yes	FACU
4. *Rubus flagellaris*	5	No	FACU
5. *Potentilla argentea*	5	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	70 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	70	x 4 =	280
UPL species	0	x 5 =	0
Column Totals:	70 (A)		280 (B)

Prevalence Index = B/A = 4.00

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: A100U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	7.5YR 2.5/1						Sandy	
3-8	5YR 3/3						Sandy	
8-13	5YR 4/4						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

V

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: Eversource State: CT Sampling Point: A100W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): concave Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 42.26058504 Long: -72.88216529 Datum:

Soil Map Unit Name: Udorthents NWI classification: PEM2J

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**
Hydric Soil Present?	Yes X	No	**within a Wetland?** **Yes** X **No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area subjected to potential filling; vegetation subjected to routine mowing, hydrology altered via ditching, culverting and tide gates. Plot within Wetland 6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- X FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):	
Water Table Present?	Yes X	No	Depth (inches):	4
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: A100W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Juncus effusus*	60	Yes	OBL
2. *unidentified grass*	40	Yes	
3. *Symphyotrichum lateriflorum*	10	No	FAC
4. *Paspalum laeve*	5	No	FAC
5. *Viola lanceolata*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	120 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
3.			
4.			
	=Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	65	x 1 =	65
FACW species	0	x 2 =	0
FAC species	15	x 3 =	45
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	80 (A)		110 (B)
Prevalence Index = B/A =			1.38

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: A100W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	5YR 2.5/1						Mucky Sand	
5-13	5YR 3/1	90	5YR 3/4	10	C	M	Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ? Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: D84U

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26093228 Long: -72.87935581 Datum:

Soil Map Unit Name: Udorthents NWI classification: n/a

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes	No X	**Is the Sampled Area**
Hydric Soil Present?	Yes	No X	**within a Wetland?** **Yes** **No** X
Wetland Hydrology Present?	Yes	No X	If yes, optional Wetland Site ID:

Remarks: (Explain alternative procedures here or in a separate report.)
Area appeared to be augmented with historical fill material

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes	No X	Depth (inches):
Water Table Present?	Yes	No X	Depth (inches):
Saturation Present? (includes capillary fringe)	Yes	No X	Depth (inches):

Wetland Hydrology Present? **Yes** **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants. Sampling Point: D84U

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1. *Rubus allegheniensis*	35	Yes	FACU
2. *Rhus typhina*	20	Yes	UPL
3. *Elaeagnus umbellata*			UPL
4.			
5.			
6.			
7.			
	55 =Total Cover		
Herb Stratum (Plot size:)			
1. *Phragmites australis*	50	Yes	FACW
2. *Solidago rugosa*	8	No	FAC
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	58 =Total Cover		
Woody Vine Stratum (Plot size:)			
1. *Lonicera japonica*	65	Yes	FACU
2. *Celastrus orbiculatus*	15	No	UPL
3. *Vitis riparia*	15	No	FAC
4.			
	95 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	50	x 2 =	100
FAC species	23	x 3 =	69
FACU species	100	x 4 =	400
UPL species	35	x 5 =	175
Column Totals:	208 (A)		744 (B)
Prevalence Index = B/A =			3.58

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: D84U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5YR 4/3						Sandy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport (HVN) City/County: East Haven/New Haven Sampling Date: 10-29-21

Applicant/Owner: City of New Haven State: CT Sampling Point: D84W

Investigator(s): Anthony Zemba; Josh Weiss Section, Township, Range:

Landform (hillside, terrace, etc.): Local relief (concave, convex, none): convex Slope (%):

Subregion (LRR or MLRA): LRR R Lat: 41.26094363 Long: -72.87939637 Datum:

Soil Map Unit Name: NWI classification: PEM1/5

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation Y, Soil Y, or Hydrology Y significantly disturbed? Are "Normal Circumstances" present? Yes No X

Are Vegetation N, Soil Y, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No	**Is the Sampled Area**		
Hydric Soil Present?	Yes X	No	**within a Wetland?**	**Yes** X	**No**
Wetland Hydrology Present?	Yes X	No	If yes, optional Wetland Site ID:		

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- High Water Table (A2)
- X Saturation (A3)
- Water Marks (B1)
- Sediment Deposits (B2)
- Drift Deposits (B3)
- Algal Mat or Crust (B4)
- Iron Deposits (B5)
- Inundation Visible on Aerial Imagery (B7)
- Sparsely Vegetated Concave Surface (B8)
- Water-Stained Leaves (B9)
- Aquatic Fauna (B13)
- Marl Deposits (B15)
- Hydrogen Sulfide Odor (C1)
- Oxidized Rhizospheres on Living Roots (C3)
- Presence of Reduced Iron (C4)
- Recent Iron Reduction in Tilled Soils (C6)
- Thin Muck Surface (C7)
- Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- Surface Soil Cracks (B6)
- Drainage Patterns (B10)
- Moss Trim Lines (B16)
- Dry-Season Water Table (C2)
- Crayfish Burrows (C8)
- Saturation Visible on Aerial Imagery (C9)
- Stunted or Stressed Plants (D1)
- Geomorphic Position (D2)
- Shallow Aquitard (D3)
- Microtopographic Relief (D4)
- FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No	Depth (inches):	2
Water Table Present?	Yes	No X	Depth (inches):	0
Saturation Present? (includes capillary fringe)	Yes X	No	Depth (inches):	0

Wetland Hydrology Present? **Yes** X **No**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: D84W

Tree Stratum (Plot size:)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size:)			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
	=Total Cover		
Herb Stratum (Plot size:)			
1. *Phragmites australis*	90	Yes	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	90 =Total Cover		
Woody Vine Stratum (Plot size:)			
1. *Vitis riparia*	15	Yes	FAC
2. *Lonicera japonica*	15	Yes	FACU
3. *Celastrus orbiculatus*	15	Yes	UPL
4.			
	45 =Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	90	x 2 =	180
FAC species	15	x 3 =	45
FACU species	15	x 4 =	60
UPL species	15	x 5 =	75
Column Totals:	135 (A)		360 (B)

Prevalence Index = B/A = 2.67

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

X 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: D84W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/2						Mucky Sand	
4-12	10YR 3/2	70	10YR 4/2	20	D	M		
			10YR 3/3	10	C	M		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- X Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ? Stripped Matrix (S6)
- ___ Dark Surface (S7)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ High Chroma Sands (S11) (**LRR K, L)**
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Marl (F10) (**LRR K, L**)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

V

Appendix D – Photographs

APPENDIX D: PHOTOGRAPHS



Wetland 1 – PEM Portion Bordering Tuttle Brook


Wetland 2 – PFO1E



Wetland 3 - Looking North from the Grassy Area between the Air Traffic Control Tower and the East Ramp.



Wetland 4 - Looking north from Taxiway H



Wetland 5 - Looking Northwest from Taxiway C



Wetland 6 – PFO1E portion



Wetland 7 Along Tuttle Brook (West of the Runway 2 Approach)



Wetland 7 – Phragmites-dominated Marsh on Either Side of Runway 2 Approach

Appendix B2- McCue Environmental Wetland Delineation Report

McCUE ENVIRONMENTAL, LLC
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CONSULTING AND WETLAND PERMITTING SERVICES
(401) 595-4276

December 12, 2024

Robert Furey
Senior Vice President/Division Manager, Northeast Aviation Services
Hoyle Tanner
150 Dow Street
Manchester, NH 03101

Subject: Wetland Delineation Report for Tweed New Haven Regional Airport
Runway Extension and Terminal Expansion
New Haven and East Haven, Connecticut

I. INTRODUCTION

This letter presents my findings regarding wetlands investigation at the Tweed New Haven Regional Airport in New Haven and East Haven, Connecticut (Figures 1 & 2). The purpose of this work was to field delineate all wetland edges in those areas being assessed for mitigation, which are the eastern, western and southern portions of the property, and property owned by Town Fair Tire, south of Uriah Street. This report is submitted to Hoyle, Tanner & Associates, Inc. for the proposed new terminal and runway extension project to accommodate existing and growing aircraft operations and passenger volumes.

McCue Environmental, LLC (McCue) conducted the site reconnaissance for wetlands on April 24, April 25, May 2, June 10, June 20, November 1 and 18, 2024. At these times, McCue delineated several areas of wetlands within the subject areas. Web Soil Survey available online at http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx, the Connecticut DEEP Geographic Information System (CTGIS) data and the National Wetlands Inventory (NWI) mapper (fws.gov/program/national-wetlands-inventory/wetlands-mapper) were consulted as a part of this effort. Figures 2A through 2F show the delineated wetlands at 1" = 300' and 1' = 400'scales, and mapped wetland types.

NWI mapping was used as a baseline by McCue Environmental with field observations editing, where needed. A combination of aerial photograph review and interpretation, and field observations were used in identifying habitat changes where lines were not laid. It should be noted that areas well interior of each delineated wetland were not accessed directly, therefore, smaller areas of differing subtypes may be present.

RELEVANT SITE HSTORY

The emergence of an airport in New Haven began in 1922 when mayor David E. Fitzgerald initiated the purchase of 220 acres of land situated on the New Haven-East Haven municipal boundary in a rural area of the community. In 1929, a ground-breaking ceremony occurred and on September 29, 1931, New Haven Municipal Airport celebrated its opening day. There has been intermittent scheduled commercial air service at HVN as early as 1934 when passenger and

mail flights were operated by American Airlines. The Airport is a non-hub, commercial service primary airport located in the both the City of New Haven and Town of East Haven, New Haven County, Connecticut approximately three miles southeast of the central business district of New Haven. The Airport has one paved asphalt runway: Runway 2-20, which is 5,600 feet long by 150 feet wide. Runway 14-32 is not eligible for federal funding as a crosswind runway and will remain closed permanently. Runway 2-20 has two partial parallel taxiways, one supporting each runway end. The Airport has an Airport Traffic Control Tower (ATCT) that provides guidance to the Airport and the Airport's airspace. HVN occupies approximately 437 acres of and. Presently, airlines operate out of the Airport terminal building. This building, originally constructed as a conventional hangar, was built in 1930 and then converted into the terminal building in 1995.

II. METHODOLOGY

These delineations were done in accordance with the Connecticut Department of Energy and Environmental Protection (DEEP) Inland Wetlands and Watercourses Act (Connecticut General Statutes Sections 22a-36 through 22a-45), and the US Army Corps of Engineers Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2), January 2012. A hand Dutch auger was used in observing soil profiles, and data collected included characteristics of soil horizons, soil color using a Munsell soil color chart, and documentation of site features such as topography, hydrology and vegetation types and density.

The wetland functional assessments were performed using the US Army Corps of Engineers Highway Methodology Workbook and associated Wetland Function-Value Evaluation Form.

III. RESULTS

PROJECT AREAS

(please note there is no WF-200 series flagging)

Tweed New Haven Regional Airport North Area Delineations (Figure 2A and P-1)

The identified wetland, represented by flag series WF100 – WF194, is a wooded swamp in the areas of the delineation; there are common reed (*Phragmites australis*, further referred to as *Phragmites*) dominated areas well interior of the flagged wetland edge. Vegetation observed in the delineated wetlands include red maple (*Acer rubrum*), green ash (*Fraxinus pennsylvanica*), highbush blueberry (*Vaccinium corymbosum*), sweet pepperbush (*Clethra alnifolia*), multiflora rose, royal fern (*Osmunda regalis*), cinnamon fern (*Osmundastrum cinnamomeum*), skunk cabbage (*Symplocarpus foetidus*), sphagnum moss (*Sphagnum* sp.) and common greenbrier (*Smilax rotundifolia*).

The area of upland is forest habitat. Vegetation observed includes red maple, Norway maple (*Acer platanoides*), red oak (*Quercus rubra*), black cherry (*Prunus serotina*), sassafras trees and saplings (*Sassafras albidum*), Russian olive (*Elaeagnus angustifolia*), multiflora rose, privet (*Ligustrum vulgare*), eastern burning bush (*Euonymus atropurpureus*), Japanese honeysuckle

(*Lonicera japonica*), Canada mayflower (*Maianthemum canadense*), poison ivy (*Toxicodendron radicans*), garlic mustard (*Alliaria petiolate*) and Asiatic bittersweet (*Celastrus orbiculatus*).

The NWI mapper classifies the swamp as PFO1E: Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). As noted, there are areas of *Phragmites* dominated marsh habitat well interior of the wetland, which are mapped as PEM1/5F: Palustrine (P), Emergent persistent (EM1), Phragmites australis (5), Semi permanently Flooded (F). These map classifications would be consistent with the McCue site investigations, however, based on the detailed delineation, the PFO1E extent is broader than what is shown on the NWI Mapper as it coincides with the actual field delineation.

Tweed New Haven Regional Airport Central Area Delineations (Figure 2B and P-2)

North of Pig Farm Road

The identified wetland north of Pig Farm Road is represented by flag series WF300 – WF384. This wetland consists of several classifications, including a very dense *Phragmites* community. The delineated edge is mostly adjacent to areas of prior disturbances, including a former storage ground and Pig Farm Road. Vegetation observed in the delineated wetland includes red maple (*Acer rubrum*), black gum (*Nyssa sylvatica*), white birch (*Betula papyrifera*), arrowwood (*Viburnum dentatum*), pussy willow (*Salix discolor*), swamp azalea (*Rhododendron viscosum*), multiflora rose, *Phragmites*, common greenbrier and fox grape (*Vitis labrusca*).

As noted, the area of upland generally consists of disturbed areas associated with former and current airport operations. Vegetation in the upland areas include big-tooth aspen (*Populus grandidentata*), black locust (*Robinia pseudoacacia*), privet, multiflora rose, glossy buckthorn (*Frangula alnus*), staghorn sumac (*Rhus typhina*), poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier and garlic mustard.

The NWI mapper classifies the portion of the wetland along flags WF300 to Pig Farm Road as PSS1E: Palustrine (P), Scrub-Shrub (SS), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). The common reed dominated area of the wetland north of Pig Farm Road is classified as PEM1/5F: Palustrine (P), Emergent persistent (EM1), Phragmites australis (5), Semi permanently Flooded (F). These classifications would be consistent with the McCue site investigations; however, it should be noted that the NWI mapper erroneously includes the upland area west of flags WF300 to Pig Farm Road as the scrub-shrub classification.

Additionally, there are areas I have mapped separately from what the NWI mapper depicts. These are the areas of open water within the *Phragmites* dominated area, and the portion of the wetland that occurs in the maintained area south of the east terminal runway. The open water areas are classified as PUBH: Palustrine (P), Unconsolidated Bottom (UB), Permanently Flooded (H), and the maintained wetland area as PEM1E: Palustrine (P), Emergent (EM), persistent (1), Seasonally Flooded/Saturated (E).

South of Pig Farm Road

The identified wetland south of Pig Farm Road is represented by flag series WF400 – WF459. This wetland also consists of several classifications, including a very dense *Phragmites* community. Again, the delineated edge is entirely adjacent to areas of prior disturbances,

including a former storage ground and Pig Farm Road. Vegetation observed in the delineated wetland includes black gum, arrowwood, highbush blueberry, multiflora rose, *Phragmites*, common greenbrier and fox grape.

Vegetation in the upland areas include blackberry (*Rubus allegheniensis*), black locust, multiflora rose, arrowwood, sassafras, staghorn sumac, poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier, fox grape, goldenrod species and a dense stand of Japanese knotweed (*Reynoutria japonica*).

The NWI mapper primarily only maps the wetland area south of Pig Farm Road as E2EM1Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Irregularly Flooded (P), Partially Drained/Ditched (d). In performing the field delineations, McCue observed two additional classifications that are depicted on Figure 2B: narrow bands of PFO1E: Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E), and areas of PSS1E: Palustrine (P), Scrub-Shrub (SS), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). It is also noted that the mapped E2EM1Pd should also have the *Phragmites* qualifier (5) as much of this area is dominated by *Phragmites.*

In addition, in interior portions of the E2EM1Pd area, there are created channels that have been classified here as E1UBLx: Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x). It is noted that these water areas were mapped based on the CAD data from the prior restoration project and that these channels (e.g. Ordinary High Water (OHW) or Mean High Water (MHW)) were not field delineated.

Tweed New Haven Regional Airport: Uriah Street Area and Town Fair Tire Delineations (Figure 2C and P-3)

The identified wetland in this area has been represented by flag series WF800 – WF941. This wetland consists of several classifications, including a very dense *Phragmites* community. The beginning of the WF-800 series is the southern portion of the WF-400 series wetland complex. Vegetation observed in the delineated wetlands include red maple, gray birch (*Betula populifolia*), black gum, pussy willow, arrowwood, elderberry (*Sambucus canadensis*), black raspberry, multiflora rose, *Phragmites*, water purslane (*Ludwigia palustris*), lurid sedge (*Carex lurida*), Canada rush (*Juncus canadensis*), swamp milkweed (*Asclepias incarnata*), soft rush (*Juncus effusus*), several goldenrod species, common greenbrier and fox grape (*Vitis labrusca*).

The upland area consists primarily of previously disturbed areas and a large upland forested area. Vegetation in the upland areas include big-tooth aspen, trembling aspen (*Populus tremuloides*), black locust, red oak, privet, multiflora rose, glossy buckthorn, staghorn sumac, ragweed (*Ambrosia artemisiifolia*), poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier and garlic mustard.

The NWI mapper classifies the entire flagged wetland series as E2EM1/5Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d). Based on my observations in the field, I further mapped additional and separate classifications from what the NWI mapper depicts, including areas of PFO, PSS, and PEM (freshwater). It is also the opinion of McCue that the dense Phragmites area on the

Town Fair Tire property is likely not affected by tidal water regimes; therefore, this area of Phragmites is mapped as PEM.

Tweed New Haven Regional Airport South Area Delineations (Figure 2D and P-4)

The identified wetland in this area has been represented by flag series WF500 – WF530, WF600 – WF648 and WF700 – WF714. This wetland consists of several classifications: see the NWI mapper section below and Figure 2D. Vegetation observed in each corresponding classification is very consistent with the vegetation listed in this report. The more dominant species observed in each classification includes *Phragmites* in the E2EM and PEM Phrag type; pussy willow, alder (*Alnus incana*) and red maple in the PSS type; and various freshwater emergent species in the PEM type, including soft rush, goldenrod species, jewelweed (*Impatiens capensis*) and sensitive fern (*Onoclea sensibilis*).

The upland areas consist primarily of dense scrub-shrub habitat. The upland area in the vicinity of the WF-600 series consists of a former stone and mortar structure on an area that includes exposed ledge. Vegetation in the upland areas include trembling aspen, black locust, red oak, privet, multiflora rose, glossy buckthorn, staghorn sumac, Russian olive, black raspberry, ragweed, poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier and garlic mustard.

The NWI mapper classifies some of this area as both E2EM1/5Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d) and E2EM5/1P: Estuarine (E), Intertidal (2), Emergent (EM), Phragmites australis (5), Persistent (1), Irregularly Flooded (P).

Based on the McCue observations in the field, areas of PSS and PEM (freshwater) are further mapped. It is the opinion of McCue that these PSS and PEM areas are not likely not affected by tidal water regimes, in addition to the PEM Phrag area that is mapped south of the airport fence. Further salinity testing results may affect the opined mapped areas.

In addition, the tidal channel classified here as E1UBLx: Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x), again based on the CAD data from the prior restoration project and field observations. However, the OHM and/or MHW were not specifically field delineated.

Tweed Airport West Area Delineations (Figures 2E & 2F, and P-5 & P-6)

The identified wetland in this location is represented by flag series WF1000 – WF1020, WF1100 – WF1114, WF1200 – WF1284 and WF1300 – WF1347. This wetland area consists of several classifications, including a very dense *Phragmites* community. The delineated edge is entirely adjacent to areas of prior disturbances, including maintained airport grounds and steep, previously excavated banks or fill slopes. Vegetation observed in the WF1000, 1200 and 1300 series delineated wetlands include black gum, arrowwood, highbush blueberry, multiflora rose, *Phragmites*, common greenbrier, seaside goldenrod (*Solidago sempervirens*), Asiatic bittersweet and fox grape. The WF-1100 series wetland and the areas along the WF1200-series that are mapped as E2EM contain hightide bush (*Iva frutescens*), saltmeadow cordgrass (*Spartina*

patens), saltwater cordgrass (*Spartina alterniflora*) (at the channel banks), panic grass (*Panicum* sp.) and seaside goldenrod.

Vegetation in the upland areas include black oak (*Quercus velutina*), gray birch, barberry (*Berberis thunbergii*), blackberry, black locust, multiflora rose, tree-of-heaven, staghorn sumac, poison ivy, Japanese honeysuckle, Asiatic bittersweet, common greenbrier, fox grape, goldenrod species, Japanese knotweed and mugwort.

The NWI mapper classifies the following wetland classifications in this delineated area: E2EM1/5Pd: Estuarine (E), Intertidal (2), Emergent persistent (EM1), Phragmites australis (5), Irregularly Flooded (P), Partially Drained/Ditched (d), and PFO1E: Palustrine (P), Forested (FO), Broad-leaved Deciduous (1), seasonally flooded/saturated flooded (E). In addition, the main channel east of Dean Street is classified as Riverine (R), Unknown Perennial (5), Unconsolidated Bottom (UB), Semipermanently Flooded (F), Excavated (x). Field observations during the delineation effort confirmed tidal influence north of the classified E1UBLx: Estuarine (E), Subtidal (1), Unconsolidated Bottom (UB), Subtidal (L) excavated (x) that is mapped west of the terminus of runway 2. The channels north of this classified area have therefore been classified as E1UBLx and mapped based on the CAD data from the prior restoration project; the channels (e.g. Ordinary High Water (OHW) or Mean High Water (MHW)) were not field delineated.

Additionally, one additional type has been mapped than what the NWI mapper depicts. This area is consistent with the areas delineated with the WF-1100 series and the area of approximate flag numbers WF1200 through WF1220 and is classified as E2EM1P: Estuarine (E), Intertidal (2), Emergent (EM), Persistent (1), Irregularly flooded (P); more saltwater species were present in these areas.

SOILS (Figure 3)

Multiple, detailed soil profiles were not investigated throughout the entire project area extent; however, random plots were examined throughout the wetland delineation process and wetland delineation data forms are provided. The Web Soil Survey (State of Connecticut, Western Part (CT601)) was reviewed; it is my opinion that the Web Soil Survey is generally consistent with the wetland delineations, however, some observations are noted below. The following is a list of the delineated wetland flag series and soils mapped within each area; the full Web Soil Survey map and descriptions are found in Appendix E:

WF100 – WF194:
Hydric soils: Walpole sandy loam (13) and Westbrook mucky peat (99)

Adjacent upland soils: Deerfield loamy fine sand (24A) and Udorthents-Urban Land Complex (306)

WF300 – WF384:
Hydric soils: Westbrook mucky peat (99)

Adjacent upland soils: Udorthents-Urban Land Complex (306); this soil series is mapped too broadly into the delineated wetland in the area east of flags WF300 – WF340 and south of the runway

WF400 – WF459:
Hydric soils: Westbrook mucky peat (99) (tidally influenced in interior sections)

Adjacent upland soils: Udorthents-Urban Land Complex (306) and Udorthents, smoothed (308)

WF500 – WF530, WF600 – WF648, WF700 – WF714:
Hydric soils: Sulfaquents (947); the majority of these delineations are mapped as non-hydric soils (see below). In the opinion of McCue, soils underlying the delineated wetlands most closely resemble the Westbrook mucky peat (99)

Adjacent upland soils: Deerfield loamy fine sand (24A), Penwood loamy sand (35B), Cheshire-Holyoke complex (77C), Penwood-Urban Land Complex (235B) and Udorthents, smoothed (308)

WF800/WF900:
Hydric soils: Sulfaquents (947); in the opinion of McCue, the Sulfaquents should be mapped to the delineated wetlands edge

Adjacent upland soils: Holyoke rock-outcrop complex (78E) and Udorthents, smoothed (308)

WF1000, WF1100, WF1200 and WF1300 series:
Hydric soils: Westbrook mucky peat (99) and Gales Ferry silt loam, intertidal (917)

Adjacent upland soils: Udorthents-Urban Land Complex (306)

The delineations were performed by Joseph P. McCue, PWS, whose qualifications include over 28 years' experience in the practice of wetland science, is a Professional Soil Scientist with the Society of Soil Scientists of Southern New England (SSSSNE), and a Professional Wetland Scientist (#2010) certified by the Society of Wetland Scientists (SWS).

Please note that the information provided herein represents the best professional judgment of McCue Environmental, LLC, and should not be construed to represent the finding of any regulatory agency.

Thank you for the opportunity to work with you on this project. Please contact me at (401) 595-4276 if you have any questions regarding this work, or if you require additional information.

Sincerely yours,
MCCUE ENVIRONMENTAL, LLC



Joseph P. McCue, PWS
President
Principal Environmental Scientist

Appendix A:

Figure 1:	Site Location (USGS Topographic Map)
Figure 2:	Overall Site Location (Aerial Photograph)
Figures 2A – 2F:	Delineation Areas (1" = 300' or 1" = 400' scale)
Figure 3:	Soils

Appendix B:
ACOE Wetland Edge Delineation Data Forms

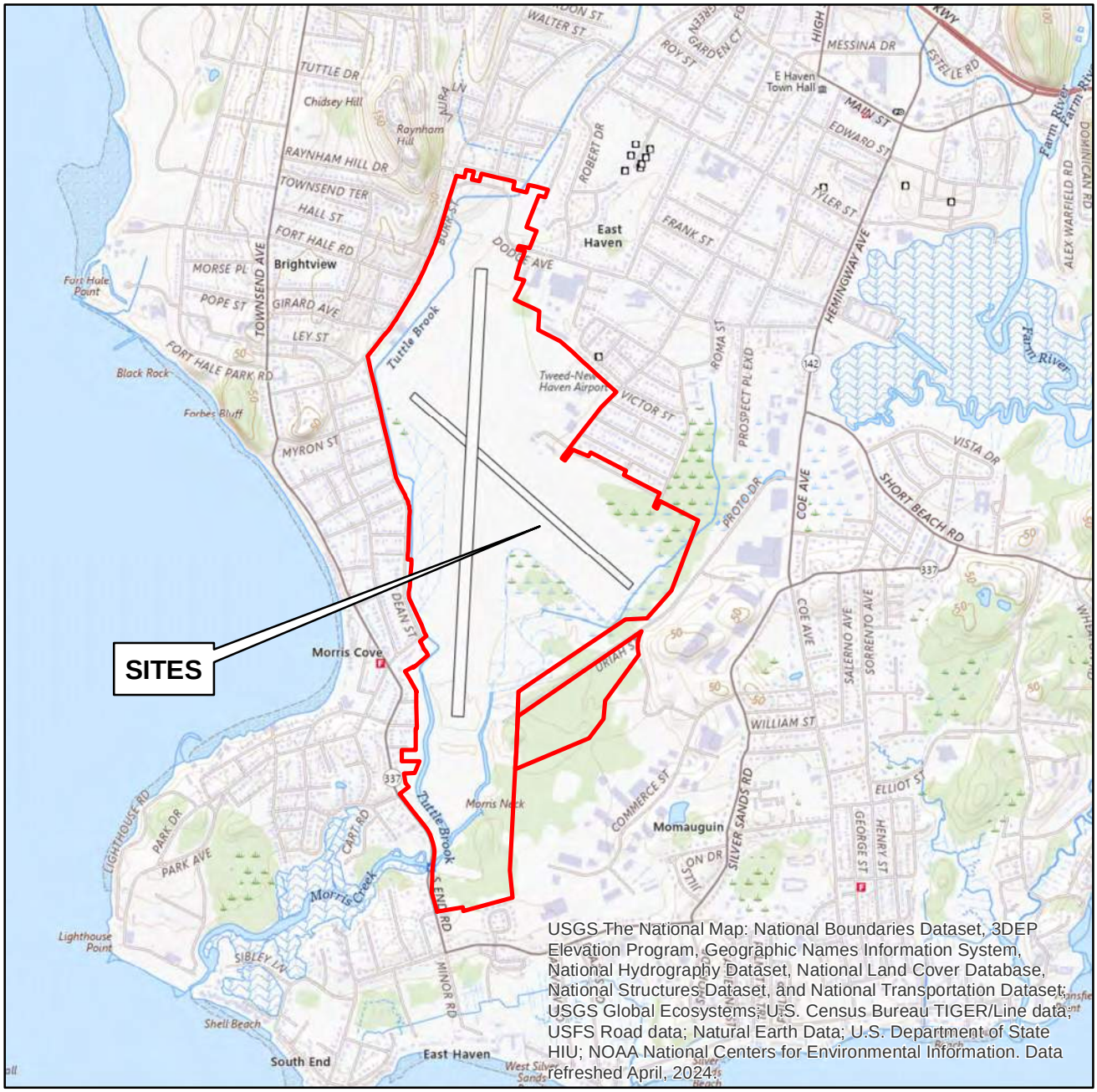
Appendix C:
Photo Sheets: Figures P1 – P6

Appendix D:
ACOE Wetland Function-Value Evaluation Forms

Appendix E:
Web Soil Survey Map and Soil Descriptions

APPENDIX A

Figure 1:	Site Location (USGS Topographic Map)
Figure 2:	Overall Site Location (Aerial Photograph)
Figures 2A – 2F:	Delineation Areas (1” = 300’ & 1” = 400’ scales)
Figure 3:	Soils



Source: 2024 USGS Topographic Map

Approximate Location of:

Property Boundaries

N
W E
S

0 1,000 2,000 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

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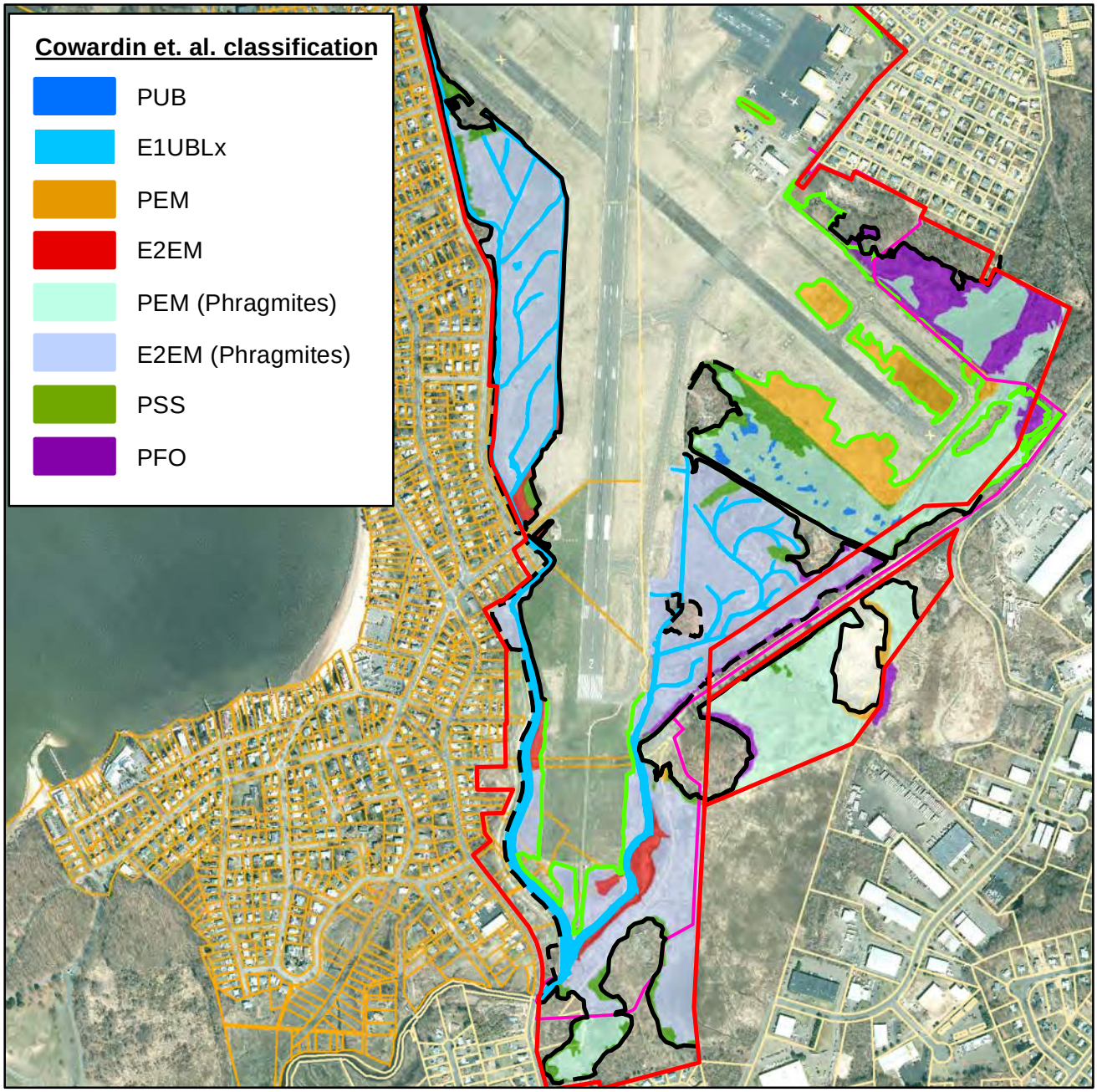
SITE LOCATION

Project No. 240308

Figure 1



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 500 1,000 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

OVERALL DELINEATIONS and WETLAND CLASSIFICATIONS

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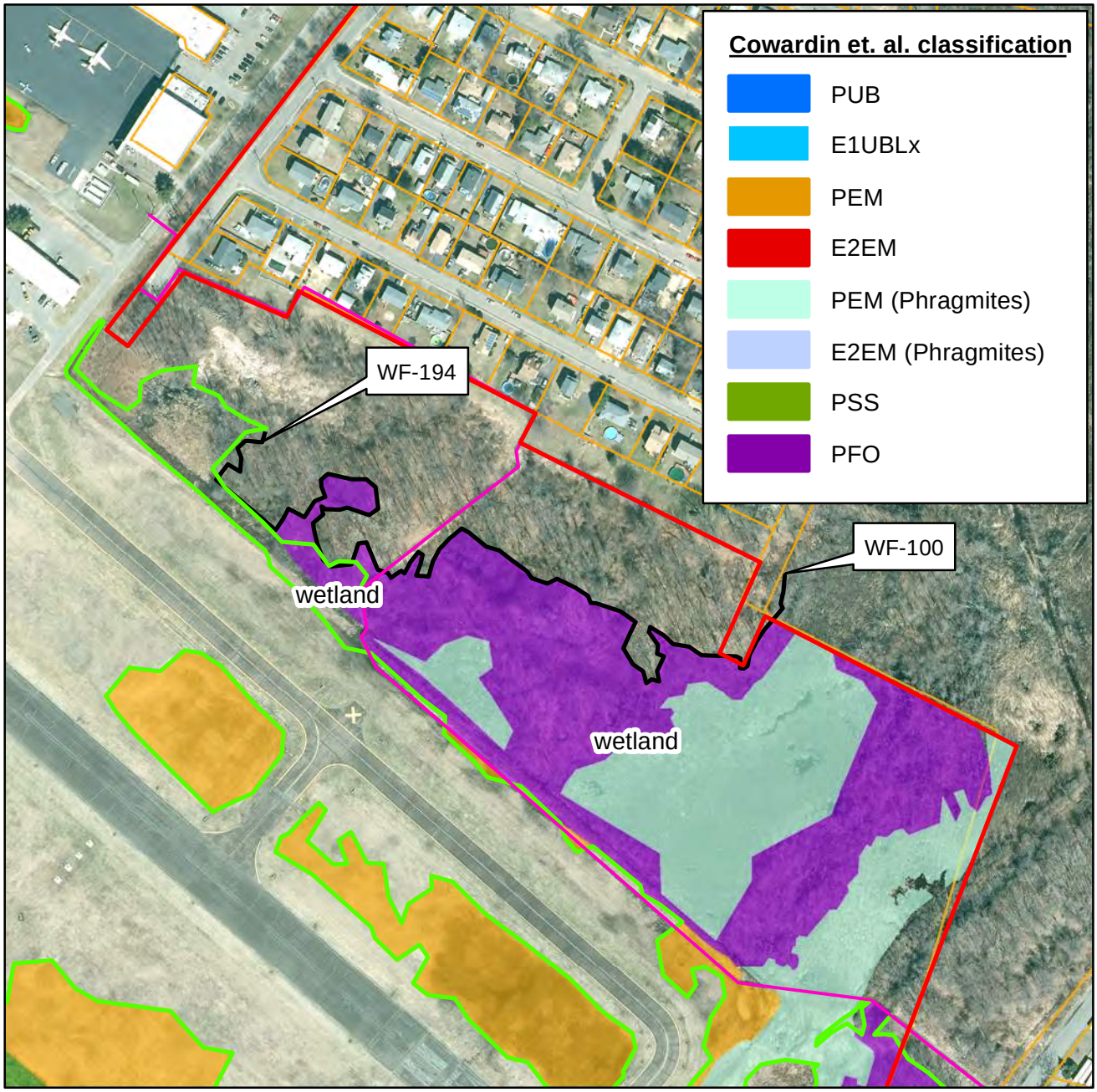
Project No. 240308

Figure 2



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

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New Haven & East Haven, CT

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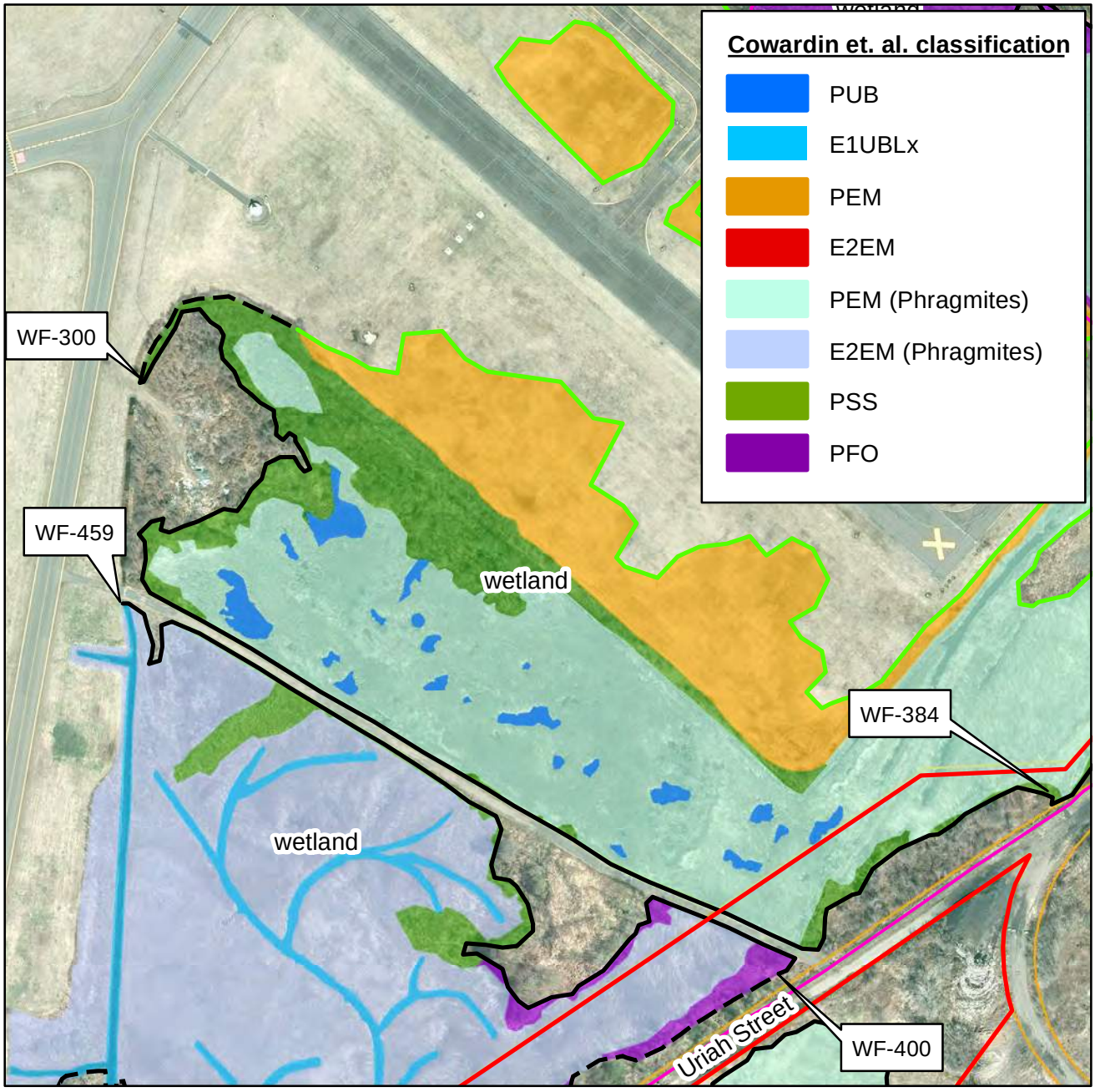
NORTH AREA DELINEATIONS

Project No. 240308

Figure 2A



Source: CT Eco 2019 Imagery

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

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New Haven & East Haven, CT

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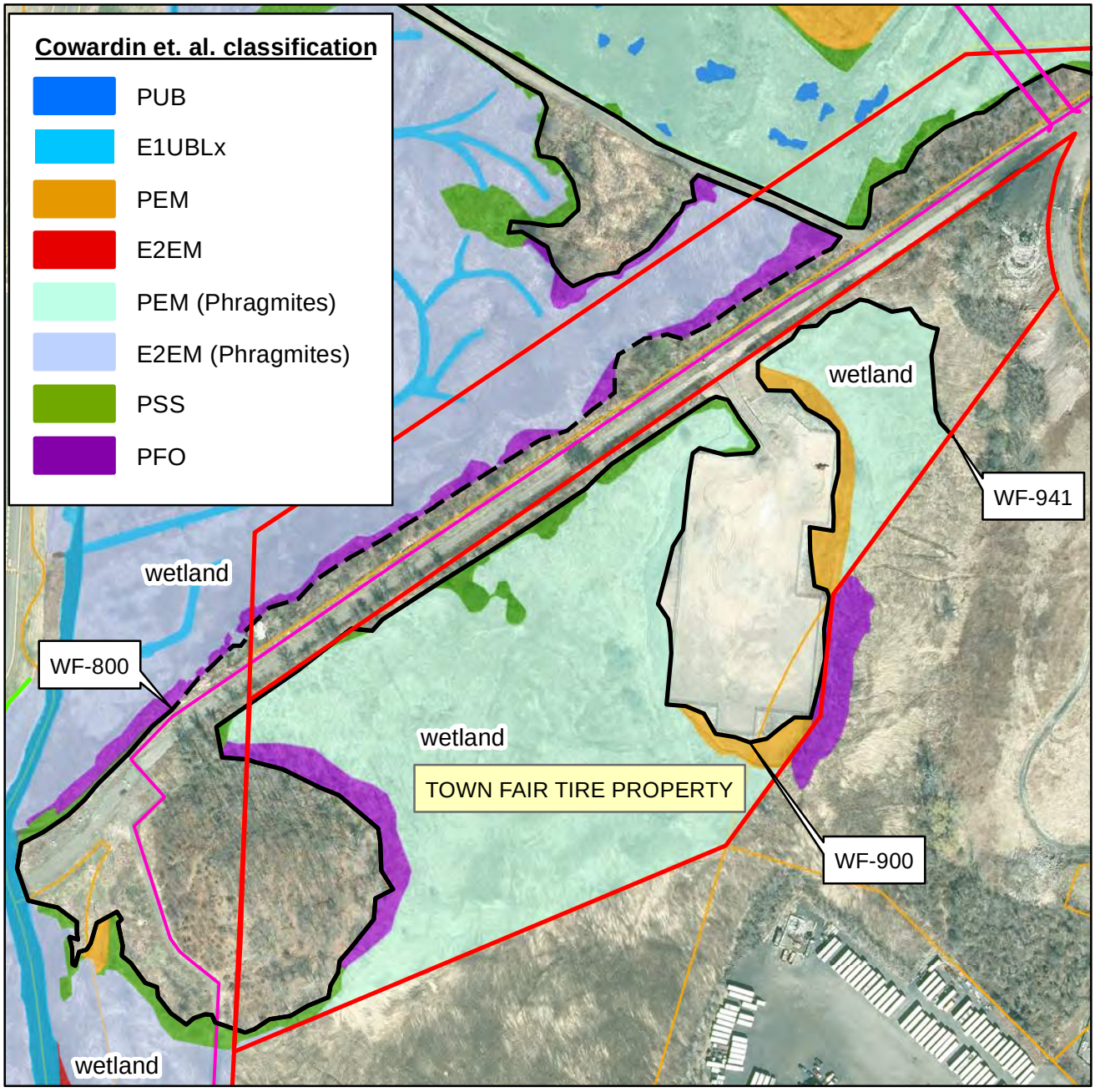
CENTRAL AREA DELINEATIONS

Project No. 240308

Figure 2B



Source: CT Eco 2019 Imagery

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

URIAH STREET AREA AND TOWN FAIR TIRE DELINEATIONS

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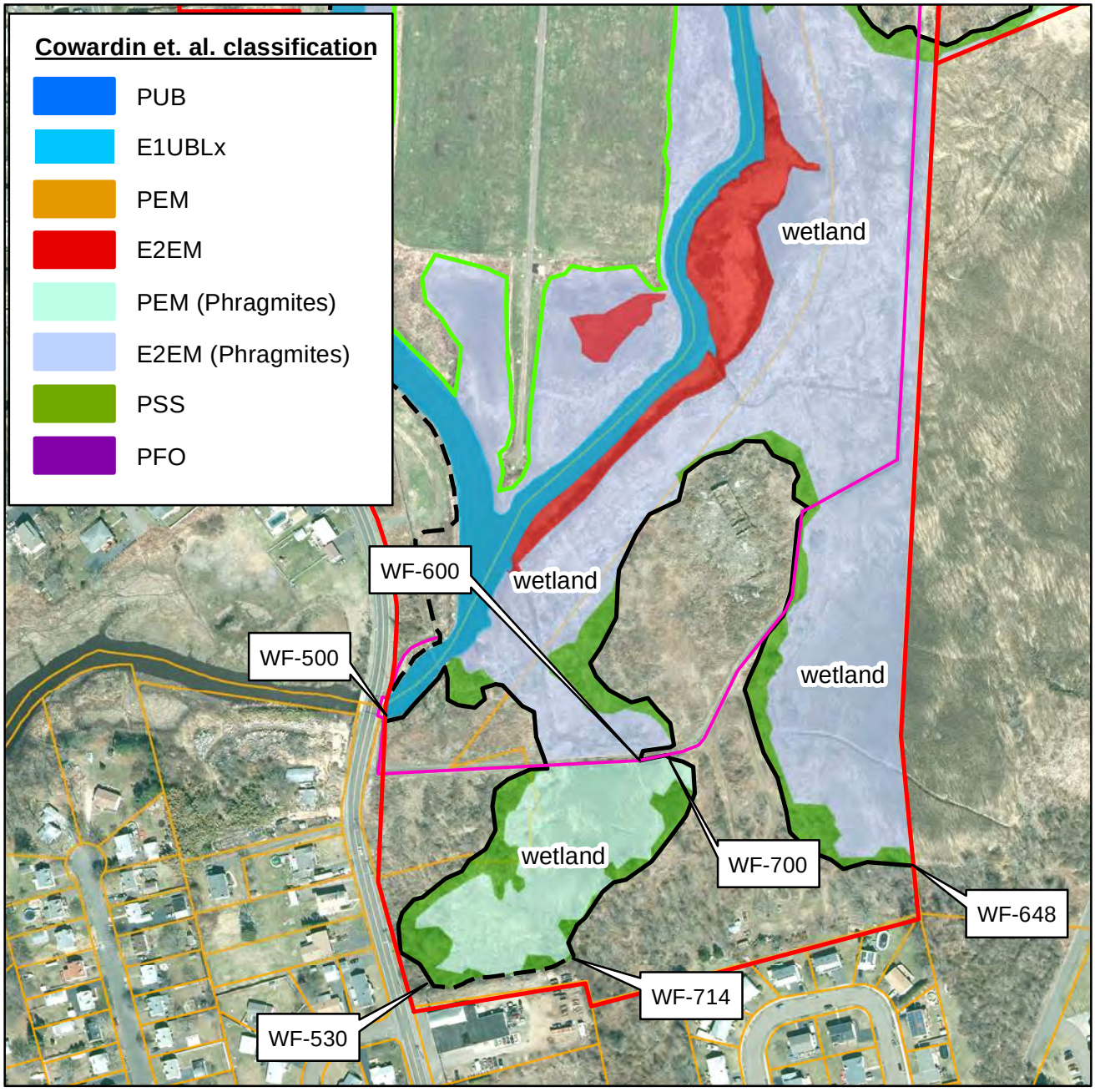
Figure 2C



Source: CT Eco 2019 Imagery

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 150 300 Feet

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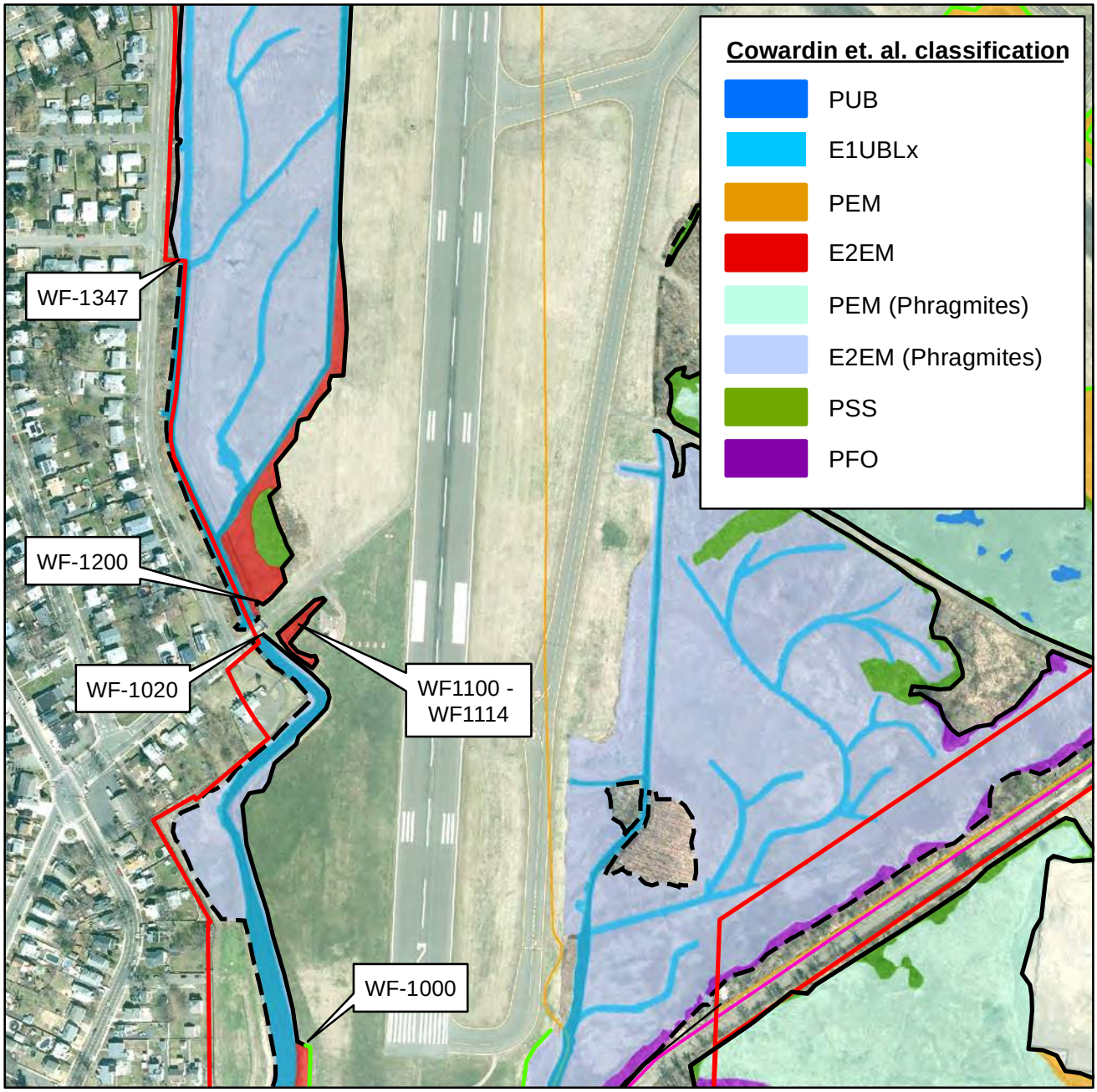
SOUTH AREA DELINEATIONS

Project No. 240308

Figure 2D



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 200 400 Feet

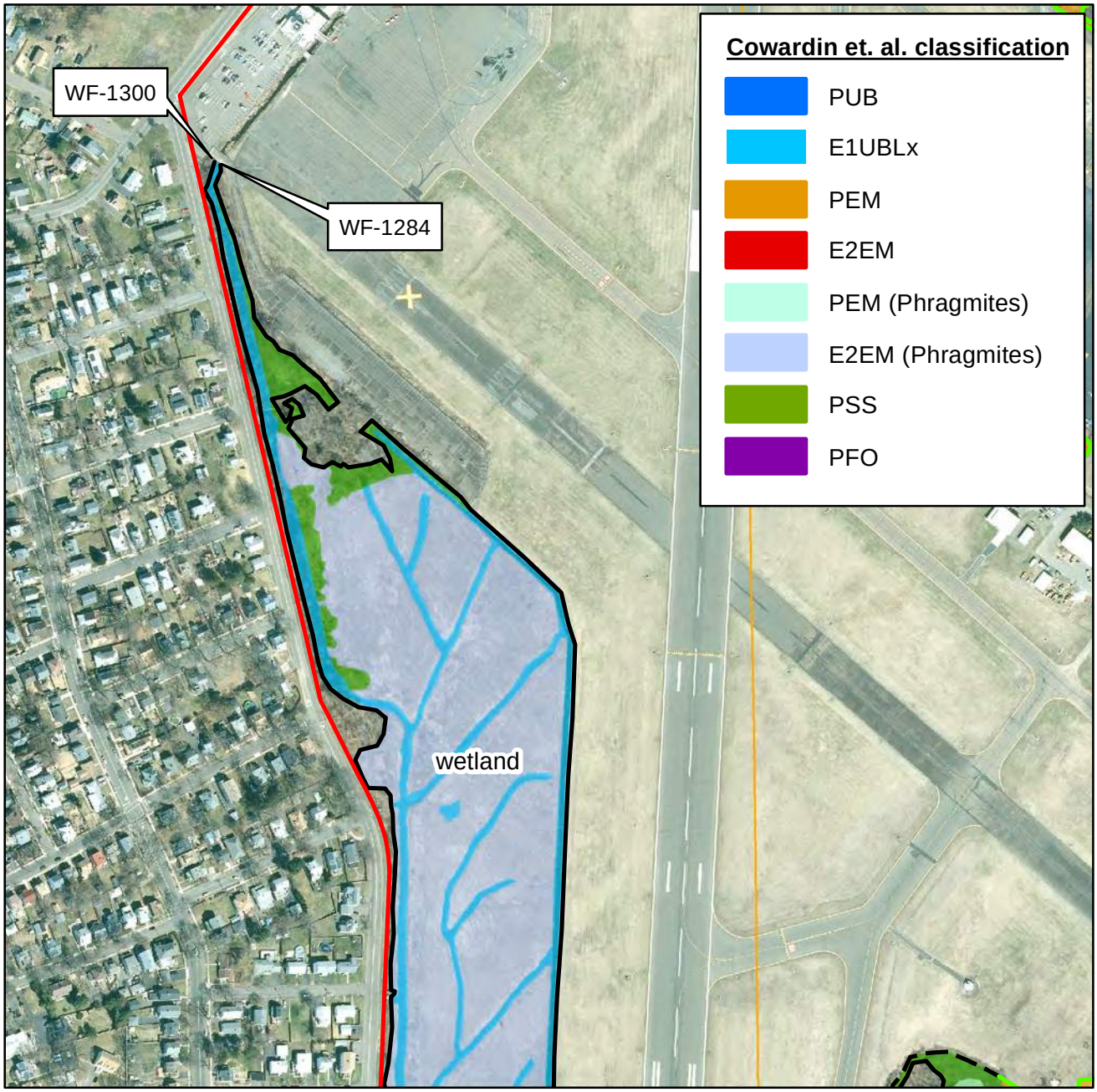
Tweed New Haven Regional Airport
New Haven & East Haven, CT

WEST AREA DELINEATIONS (SOUTH)

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

Project No. 240308

Figure 2E



Source: CT Eco 2019 Imagery; DEEP GIS data

Approximate Location of:

- Property Boundaries
- East Haven Parcels
- New Haven Parcels
- Airport Fence

- Delineated Wetlands (McCue Env.)
- Approx Wetlands (not delineated)
- Previously Delineated Wetlands by others

N W E S

0 200 400 Feet

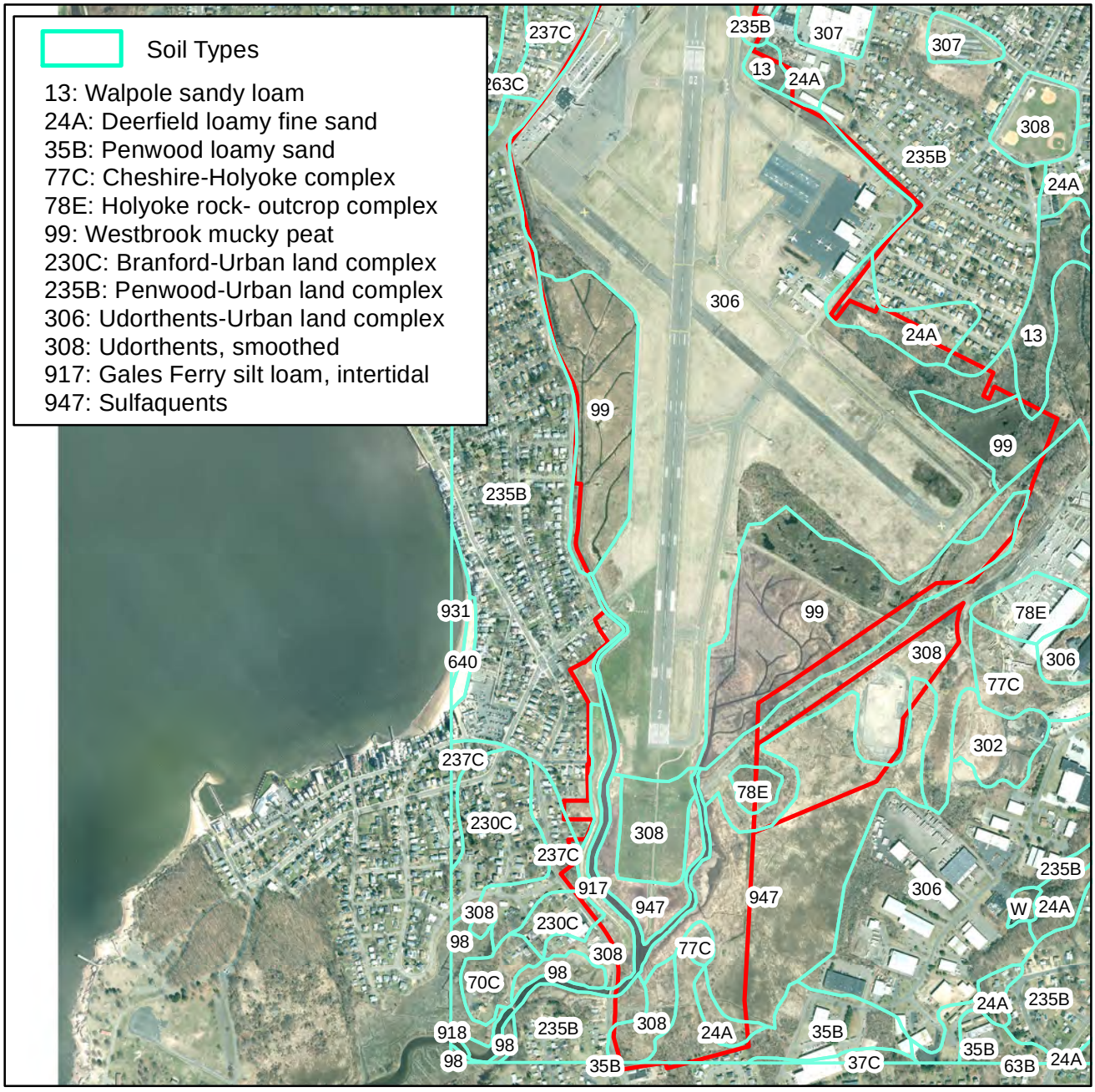
Tweed New Haven Regional Airport
New Haven & East Haven, CT

WEST AREA DELINEATIONS (NORTH)

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

Project No. 240308

Figure 2F



Source: CT Eco 2019 Imagery

Approximate Location of:

Property Boundaries

N
W E
S

0 600 1,200 Feet

Tweed New Haven Regional Airport
New Haven & East Haven, CT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SOILS

Project No. 240308

Figure 3

APPENDIX B

ACOE Wetland Edge Delineation Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF175wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Forested area shallow slope Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2641 Long: -72.8818 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: Not mapped, but PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

See Remarks in the Soil section

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ✓ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches):	to 6" deep
Water Table Present?	Yes ✓	No _____	Depth (inches):	_____
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches):	_____

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF175wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Acer rubrum*	98	Y	FAC
2. *Populus grandidentata*	10.5	N	FACU
3.			
4.			
5.			
6.			
7.			
	108.5	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. *Acer rubrum*	98	Y	FAC
2. *Vaccinium corymbosum*	3	N	FACW
3.			
4.			
5.			
6.			
7.			
		= Total Cover	

Herb Stratum (Plot size: 5')			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
		= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	5
FAC species	196	x 3 =	588
FACU species	10.5	x 4 =	42
UPL species	0	x 5 =	0
Column Totals:	209.5 (A)		635 (B)

Prevalence Index = B/A = 3.03

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF175wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 3	7.5YR 2/1	100					SL	
3 - 20	7.5YR 4/6	90	7.5YR 5/3	10			LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ✓ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

This is a shallow depression that drains southward to the primary wetland area. Soils in this specific location may not make hydric soil criteria, however, it is this biologists' opinion that this area should be considered wetland because up to 6" of standing water was present, Acer rubrum dominates the wetland, buttressed tree roots are present with other water marks, and green frogs were observed in the wetland.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF175upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Forested area shallow slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2641 Long: -72.8817 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF175upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Quercus velutina*	38	Y	UPL
2. *Populus grandidentata*	38	Y	FACU
3. *Betula lenta*	20.5	Y	FACU
4. *Sassafras albidum*	3	N	FACU
5.			
6.			
7.			
	99.5	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. *Prunus serotina*	85.5	Y	FACU
2. *Viburnum dentatum*	10.5	N	FAC
3. *Euonymus atropurpureus*	3	N	FACU
4. *Elaeagnus angustifolia*	3	N	FACU
5.			
6.			
7.			
	102	= Total Cover	

Herb Stratum (Plot size: 5')			
1. *Maianthemum canadense*	20.5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20.5	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. *Smilax rotundifolia*	3	Y	FAC
2. *Lonicera japonica*	3	Y	FACU
3.			
4.			
		= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 14.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	13.5	x 3 =	40.5
FACU species	176.5	x 4 =	706
UPL species	38	x 5 =	190
Column Totals:	228 (A)		936.5 (B)

Prevalence Index = B/A = 4.11

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF175upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 3	10YR 2/1	100					SL	
3 - 8	10YR 3/2	100					SL	
8 - 19	7.5YR 4/6	100					SL	
19 -22+	7.5YR 5/6	100					GSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF336wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Forested area shallow slope Local relief (concave, convex, none): concave Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2607 Long: -72.8855 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: Not mapped, but PFO1E

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ✓ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ✓ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No _____	Depth (inches): _____	
Water Table Present?	Yes ✓	No _____	Depth (inches): 10"	
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"	**Wetland Hydrology Present?** Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF336wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Nyssa sylvatica*	38	Y	FAC
2. *Betula papyrifera*	38	Y	FACU
3.			
4.			
5.			
6.			
7.			
	76	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Viburnum dentatum*	38	Y	FAC
2. *Rhododendron viscosum*	10.5	Y	FACW
3.			
4.			
5.			
6.			
7.			
	48.5	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	20.5	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	20.5	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. *Vitis labrusca*	3	Y	FACU
2.			
3.			
4.			
	3	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	31	x 2 =	62
FAC species	76	x 3 =	228
FACU species	41	x 4 =	164
UPL species	0	x 5 =	0
Column Totals:	148 (A)		454 (B)

Prevalence Index = B/A = 3.08

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF336wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 9	7.5YR 2.5/1	100					SL	
9 - 20	7.5YR 3/3	80	7.5YR 4/2	10	D	M	LS	
			7.5YR 3/1	10	D	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ✓ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/24/2024

Applicant/Owner: _____ State: CT Sampling Point: WF336upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Base of fill slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2607 Long: -72.8856 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances; soil plot is near the base of a fill slope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF336upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus grandidentata*	38	Y	FACU
2. *Robinia pseudoacacia*	10.5	Y	FACU
3.			
4.			
5.			
6.			
7.			
	48.5	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rosa multiflora*	20.5	Y	FACU
2. *Ligustrum vulgare*	20.5	Y	FACU
3.			
4.			
5.			
6.			
7.			
	41	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Alliara petiolata*	3	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	3	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	3	Y	FACU
2.			
3.			
4.			
	3	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	95.5	x 4 =	382
UPL species	0	x 5 =	0
Column Totals:	95.5 (A)		382 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF336upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 6	7.5YR 3/2	100					SL	
6 - 18	7.5YR 3/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/25/2024

Applicant/Owner: _____ State: CT Sampling Point: WF435wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.259 Long: -72.8836 Datum: CT State Plane

Soil Map Unit Name: mapped as Udorthents-Urban Land Complex (306), but Westbrook (98) NWI classification: E2EM1Pd

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

The specific location of this data plot is mapped as Udorthents-Urban Land Complex, but the soil was observed to be characteristic of the Westbrook mucky peat (98) of which the remainder of this marsh complex is mapped as.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF435wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Sapling/Shrub Stratum (Plot size: 15')			
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		

Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	98	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98 = Total Cover		

Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	98	x 2 =	196
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	98 (A)		196 (B)

Prevalence Index = B/A = 2.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF435wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 20	7.5YR 3/1	100					hemic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ✓ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

The specific location of this data plot is mapped as Udorthents-Urban Land Complex, but the soil was observed to be characteristic of the Westbrook mucky peat (98) of which the remainder of this marsh complex is mapped as.

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 4/25/2024

Applicant/Owner: _____ State: CT Sampling Point: WF435upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): small terrace, shrub dom. Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.259 Long: -72.8835 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and tree species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF435upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rosa multiflora*	38	Y	FACU
2. *Rubus allegheniensis*	20.5	Y	FACU
3. *Viburnum dentatum*	3	N	FAC
4. *Sassafras albidum*	1	N	FACU
5.			
6.			
7.			
	62.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago/Euthamia sp. (goldenrod species)*	10.5	Y	var.
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	98	Y	FACU
2. *Vitis labrusca*	3	N	FACU
3.			
4.			
	101 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	160.5	x 4 =	642
UPL species	0	x 5 =	0
Column Totals:	163.5 (A)		642 (B)

Prevalence Index = B/A = 3.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF435upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 8	7.5YR 3/2	100					SL	
8 - 18	7.5YR 3/3	100					SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: State: CT Sampling Point: WF605wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range:

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2509 Long: -72.8875 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

This flag series is also associated with the WF-500 and WF-700 series edges.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): _____
Water Table Present?	Yes ✓	No _____	Depth (inches): 8"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 12"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Standing water observed in interior sections.

VEGETATION – Use scientific names of plants.

Sampling Point: WF605wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Viburnum dentatum*	38	Y	FAC
2. *Rosa multiflora*	3	N	FACU
3. *Rubus allegheniensis*	3	N	FACU
4.			
5.			
6.			
7.			
	44 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago/Euthamia sp. (goldenrod sp.)*	98	Y	var.
2. *Phragmites australis*	20.5	N	FACW
3. *Juncus effusus*	3	N	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	121.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *None*			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	20.5	x 2 =	41
FAC species	38	x 3 =	114
FACU species	6	x 4 =	24
UPL species	0	x 5 =	0
Column Totals:	67.5 (A)		182 (B)

Prevalence Index = B/A = 2.69

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF605wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 3	2.5Y 3/1	100					VFSL	
3 - 20	gley2 5/10B	80	10YR 5/8	10	C	M	VFSL	
			7.5YR 4/6	10	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: _____ State: CT Sampling Point: WF605upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): scrub-shrub, slight slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2509 Long: -72.8874 Datum: CT State Plane

Soil Map Unit Name: Udorthents-Urban Land Complex (306) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and tree species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF605upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rosa multiflora*	38	Y	FACU
2. *Rubus allegheniensis*	20.5	Y	FACU
3. *Viburnum dentatum*	3	N	FAC
4. *Sassafras albidum*	1	N	FACU
5.			
6.			
7.			
	62.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago/Euthamia sp. (goldenrod species)*	10.5	Y	var.
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	98	Y	FACU
2. *Vitis labrusca*	3	N	FACU
3.			
4.			
	101 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	3	x 3 =	9
FACU species	160.5	x 4 =	642
UPL species	0	x 5 =	0
Column Totals:	163.5 (A)		642 (B)

Prevalence Index = B/A = 3.93

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF605upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 4	7.5YR 2.5/3	100					SL	
4 - 9	7.5YR 3/3	100					SL	
9 - 20	7.5YR 3/4	97	7.5YR 4/3	3	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: State: CT Sampling Point: WF706wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range:

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2502 Long: -72.8876 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

This flag series is also associated with the WF-500 and WF-700 series edges.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF706wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Salix discolor*	38	Y	FACW
2. *Rosa multiflora*	3	N	FACU
3.			
4.			
5.			
6.			
7.			
	41 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	98	Y	FACW
2. *Onoclea sensibilis*	3	N	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	101 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Lonicera japonica*	63	Y	FACU
2.			
3.			
4.			
	63 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	139	x 2 =	278
FAC species	0	x 3 =	0
FACU species	66	x 4 =	264
UPL species	0	x 5 =	0
Column Totals:	205 (A)		542 (B)

Prevalence Index = B/A = 2.64

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF706wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 12	7.5YR 2/2	100					SL	root rhizospheres
12 - 20	7.5YR 3/1	90	7.5YR 3/2	10	C	M	LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 5/2/2024

Applicant/Owner: _____ State: CT Sampling Point: WF706upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): scrub-shrub, slight slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2502 Long: -72.8875 Datum: CT State Plane

Soil Map Unit Name: Penwood loamy sand, 3 - 8% slopes (35B) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and tree species.
This flag series is also associated with the WF-500 and WF-700 series edges.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF706upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Salix discolor*	20.5	Y	FACU
2. *Ligustrum vulgare*	20.5	Y	FACU
3. *Rhus typhina*	10.5	Y	UPL
4.			
5.			
6.			
7.			
	51.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Ambrosia artimisiifolia*	98	Y	FACU
2. *Alliaria petiolata*	3	N	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	101 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. *Vitis labrusca*	38	Y	FACU
2.			
3.			
4.			
	38 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	180	x 4 =	720
UPL species	10.5	x 5 =	52.5
Column Totals:	190.5 (A)		772.5 (B)

Prevalence Index = B/A = 4.05

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF706upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 4	7.5YR 2.5/3	100					SL	
4 - 9	7.5YR 3/3	100					SL	
9 - 20	7.5YR 3/4	97	7.5YR 4/3	3	C	M	SL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/10/2024

Applicant/Owner: _____ State: CT Sampling Point: WF814wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2549 Long: -72.8868 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes ✓	No _____	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 0"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF814wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	98	Y	FACW
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	98 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	98	x 2 =	196
FAC species	0	x 3 =	0
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	98 (A)		196 (B)

Prevalence Index = B/A = 2

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF814wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0 - 12	7.5YR 2/2	100					SL	root rhizospheres
12 - 18	7.5YR 3/2	90	7.5YR 5/1	10	C	M	LS	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/10/2024

Applicant/Owner: _____ State: CT Sampling Point: WF814upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): scrub-shrub, slight slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.255 Long: -72.8867 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and sapling species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF814upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rhus typhina*	98	Y	UPL
2. *Rubus allegheniensis*	3	Y	FACU
3.			
4.			
5.			
6.			
7.			
	101 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Pteridium aquilinum*	85.5	Y	FACU
2. *Euthamia graminifolia*	85.5	Y	FAC
3. *Solidago sp*	85.5	Y	var.
4. *Phragmites australis*	3	N	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	259.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	3	x 2 =	6
FAC species	85.5	x 3 =	256.5
FACU species	88.5	x 4 =	354
UPL species	98	x 5 =	490
Column Totals:	275 (A)		1106.5 (B)

Prevalence Index = B/A = 4.02

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF814upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0 - 10	7.5YR 2.5/3	100					SL	
10 - 14	7.5YR 3/4	100					SL	
14 - 20	7.5YR 3/3	90	7.5YR 5/2	3	D	M	SL	
			7.5YR 5/3	3	D	M		
			7.5YR 3/4	4	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/20/2024

Applicant/Owner: _____ State: CT Sampling Point: WF888wet

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): Phrag. dom. marsh Local relief (concave, convex, none): flat Slope (%): 0%

Subregion (LRR or MLRA): LRR R Lat: 41.2568 Long: -72.8828 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: E2EM1/5Pd

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No _____	**Is the Sampled Area within a Wetland?** Yes ✓ No _____
Hydric Soil Present?	Yes ✓	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes ✓	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ✓ Surface Water (A1)
- ✓ High Water Table (A2)
- ✓ Saturation (A3)
- ✓ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ✓ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): 0"
Water Table Present?	Yes ✓	No _____	Depth (inches): 14"
Saturation Present? (includes capillary fringe)	Yes ✓	No _____	Depth (inches): 14"

Wetland Hydrology Present? Yes ✓ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF888wet

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. None			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Herb Stratum (Plot size: 5')			
1. *Phragmites australis*	63	Y	FACW
2. *Solidago rugosa*	63	Y	FAC
3. *Euthamia graminifolia*	38	Y	FAC
4. *Impatiens capensis*	20.5	N	FACW
5. *Eutrochium purpureum*	3	N	FAC
6. *Scirpus cyperinus*	3	N	OBL
7.			
8.			
9.			
10.			
11.			
12.			
	190.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	3	x 1 =	3
FACW species	83.5	x 2 =	167
FAC species	104	x 3 =	312
FACU species	0	x 4 =	0
UPL species	0	x 5 =	0
Column Totals:	187.5 (A)		479 (B)

Prevalence Index = B/A = 2.55

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✓ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF888wet

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0 - 11	2.5Y 2.5/1	90	2.5Y 5/2	3	D	M	SL	
			2.5Y 4/2	3	D	M		
			2.5Y 5/6	4	C	M		
11 - 18	2.5Y 6/2	90	2.5Y 5/2	3	D	M	SL	
			2.5Y 4/2	3	D	M		
			2.5Y 4/3	2	D	M		
			2.5Y 5/6	2	C	M		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ✓ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: Tweed New Haven Airport City/County: New Haven & East Haven Sampling Date: 6/20/2024

Applicant/Owner: _____ State: CT Sampling Point: WF888upl

Investigator(s): J. McCue (McCue Environmental, LLC) Section, Township, Range: _____

Landform (hillslope, terrace, etc.): fill slope Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR or MLRA): LRR R Lat: 41.2567 Long: -72.8827 Datum: CT State Plane

Soil Map Unit Name: Udorthents smoothed (308) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No ✓

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

This is an area subject to prior disturbances which have established with shrub and sapling species.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No ✓	Depth (inches): _____
Water Table Present?	Yes _____	No ✓	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No ✓	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: WF888upl

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *None*			
2.			
3.			
4.			
5.			
6.			
7.			
	= Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Rubus allegheniensis*	85.5	Y	FACU
2.			
3.			
4.			
5.			
6.			
7.			
	85.5 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago rugosa*	85.5	Y	FAC
2. *Ambrosia artemisiifolia*	63	Y	FACU
3. *Reynoutria japonica*	3	N	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	151.5 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
3.			
4.			
	= Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	85.5	x 3 =	256.5
FACU species	151.5	x 4 =	606
UPL species	0	x 5 =	0
Column Totals:	237 (A)		862.5 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

✓ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than or equal to 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ___ No ✓

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: WF888upl

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
see below								

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains.

[2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Unable to obtain soil data due to fill edge.

APPENDIX C

Photo Sheets: Figures P1 – P6



Southeast view of wetland at Flag WF-114. Note the PFO and PEM (phragmites) classifications (Photo taken 4/24/2024)



Southwest view of wetland at flag WF-176 (Photo taken 4/24/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | FIGURE P-1



EAST VIEW OF WETLAND AT FLAG WF-316. NOTE THE PFO AND PEM (PHRAGMITES) CLASSIFICATIONS (PHOTO TAKEN 4/25/2024)



SOUTH VIEW OF WETLAND AT FLAG WF-419 (PHOTO TAKEN 4/25/2024)

TWEED NEW HAVEN AIRPORT, NEW HAVEN & EAST HAVEN, CONNECTICUT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SITE PHOTOGRAPHS

PROJECT # 240308 | FIGURE P-2



EAST VIEW OF WETLAND AT FLAG WF-316. NOTE THE PEM AND PEM (PHRAGMITES) CLASSIFICATIONS (PHOTO TAKEN 6/10/2024)



SOUTHWEST VIEW OF WETLAND AT FLAG WF-888, AT ACOE DATA FORM PLOT LOCATION (PHOTO TAKEN 6/20/2024)

TWEED NEW HAVEN AIRPORT, NEW HAVEN & EAST HAVEN, CONNECTICUT

McCUE ENVIRONMENTAL, LLC
CONSULTING & WETLAND PERMITTING SERVICES
(401) 595-4276

SITE PHOTOGRAPHS

PROJECT # 240308 | FIGURE P-3



Northwest view of wetland at Flag WF-709
(Photo taken 5/2/2024)



North view of wetland Airport and Town Fair Tire area from top of the stone structure at the WF-600 series, showing dense Phragmites (Photo taken 5/2/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | FIGURE P-4



Southwest view of WF-1100 series wetland
(Photo taken 11/1/2024)



East view of WF-1100 wetland
(Photo taken 11/1/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | Figure P-5



North view of WF-1200 series wetland near flag WF-1221
(Photo taken 11/1/2024)



South view of Watersourse at flag WF-1317, Photo shows woody vegetated banks, but dominant Phragmites beyond
(Photo taken 11/18/2024)

Tweed New Haven Airport, New Haven & East Haven, Connecticut

McCue Environmental, LLC
Consulting & Wetland Permitting Services
(401) 595-4276

SITE PHOTOGRAPHS

Project # 240308 | Figure P-6

APPENDIX D

ACOE Wetland Function-Value Evaluation Forms

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *270 ft. North*

Dominant wetland systems present *PFO1E* Contiguous undeveloped buffer zone present *Yes*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF100 - WF194*

Latitude *41.2633* Longitude *-72.8804*

Prepared by: *McCue* Date *4/24/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	✓		*1 (very few), 2, 4, 5, 7, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 15, 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*2, 4, 8, 14, 15, 16*		*(Freshwater)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13*	✓	*Rationale cont.: 14, 16*
Nutrient Removal	✓		*1, 3, 5, 6, 7, 8, 9, 10, 11, 12*	✓	*Rationale cont.: 13, 14*
Production Export		✓	*1, 2, 4, 5, 7*		
Sediment/Shoreline Stabilization	✓		*7, 9, 12, 13, 14, 15*		
Wildlife Habitat	✓		*1, 3, 4, 6, 7, 8, 11, 13, 14*	✓	*Rationale cont.: 15, 16, 17, 19, 20, 21*
Recreation		✓	*5, 12*		*(6 unknown); Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 4, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 5, 7, 10, 16, 19, 27*		
Visual Quality/Aesthetics		✓	*7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *120' Southeast*

Dominant wetland systems present *PEM1/5F* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF300 - WF384*

Latitude *41.26* Longitude *-72.8836*

Prepared by: *McCue* Date *4/24/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	✓		*1 (very few), 2, 4, 5, 7, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 15, 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*2, 4, 5, 8, 14, 15, 16*		*(Freshwater)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13*	✓	*Rationale cont.: 14, 16*
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11, 12*	✓	*Rationale cont.: 13, 14*
Production Export		✓	*1, 2, 4, 5, 7*		
Sediment/Shoreline Stabilization	✓		*7, 9, 12, 13, 14, 15*		
Wildlife Habitat	✓		*1, 3, 6, 7, 8, 11, 13*	✓	*Rationale cont.: 16, 17, 18, 19, 20, 21*
Recreation		✓	*5, 12*		*(6 unknown) ;Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 4, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 4, 5, 7, 16, 19, 27*		
Visual Quality/Aesthetics		✓	*7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *21 ac.* Human made? *part.* Is wetland part of a wildlife corridor? *yes* or a "habitat island"? _____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *70' Southeast*

Dominant wetland systems present *E2EM1Pd* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF400 - 459/WF800 - 809*

Latitude *41.2583* Longitude *-72.885*

Prepared by: *McCue* Date *6/10/24*

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N _____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 14, 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*1, 2, 4*		*(Marine)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8,*	✓	
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 6, 7, 13*		
Sediment/Shoreline Stabilization	✓		*7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 11, 12, 13, 16, 17*	✓	*Rationale cont.: 18, 19, 20, 21*
Recreation		✓	*5, 9, 12*		*(6 unknown); Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 4, 5, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 4, 5, 16, 27*		
Visual Quality/Aesthetics		✓	*7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *340' west*

Dominant wetland systems present *E2EM1Pd, EM1/5F & PSS* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland?_____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF500-515 & WF600 - 648*

Latitude *41.2512* Longitude *-72.8882*

Prepared by: *McCue* Date *4/25/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*Freshwater: no qualifiers*		*Marine: 1, 2, 4*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8*	✓	
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 7, 13*		
Sediment/Shoreline Stabilization	✓		*3, 7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 9, 10, 11, 12, 13, 14*	✓	*Rationale cont.: 15, 16, 17, 18, 19, 20, 21*
Recreation		✓	*5, 9, 10, 12*		*(6 unknown); Not suitable: Airport restricted or private property*
Educational/Scientific Value		✓	*2, 3, 4, 5, 8, 9, 14*		*Not suitable: Airport restricted property or private property*
Uniqueness/Heritage		✓	*1, 4, 5, 8, 19, 27*		
Visual Quality/Aesthetics		✓	*2, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *3 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *15 - 340' west*

Dominant wetland systems present *PEM1/5F & PSS* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland?_____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF516 -530 & WF700 - 714*

Latitude *41.2503* Longitude *-72.8881*

Prepared by: *McCue* Date *4/25/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat		✓	*Freshwater: no qualifiers*		*(Freshwater)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8*	✓	
Nutrient Removal	✓		*1, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 7*		
Sediment/Shoreline Stabilization		✓	*3, 9, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 10, 11, 13, 14*	✓	*Rationale cont.: 15, 16, 17, 18, 19, 20, 21*
Recreation		✓	*5, 9, 10, 12*		*(6 unknown); Not suitable: Airport restricted or private property*
Educational/Scientific Value		✓	*2, 3, 4, 5, 8, 9, 14*		*Not suitable: Airport restricted property or private property*
Uniqueness/Heritage		✓	*1, 5, 8, 19, 27*		
Visual Quality/Aesthetics		✓	*2, 7, 8, 9, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *>50 ac.* Human made?_____ Is wetland part of a wildlife corridor? *yes* or a "habitat island"?_____

Adjacent land use *Dense residential, commercial and industrial* Distance to nearest roadway or other development *70' Northwest*

Dominant wetland systems present *E2EM1Pd & PEM1/5F* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland?_____ Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF810 - WF941*

Latitude *41.2559* Longitude *-72.884*

Prepared by: *McCue* Date *6/20/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5, 15*	✓	*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*Freshwater: non qualifiers*		*Marine: 1, 2, 4,*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8*	✓	
Nutrient Removal	✓		*1, 2, 3, 5, 6, 7, 8, 9, 10, 11*	✓	
Production Export		✓	*1, 2, 4, 5, 6, 7, 13*		
Sediment/Shoreline Stabilization	✓		*3, 7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*3, 6, 7, 8, 11, 12, 13, 16, 17*	✓	*Rationale cont.: 18, 19, 20, 21*
Recreation		✓	*5, 10, 12*		*(6 unknown); Not suitable: Airport restricted or private property*
Educational/Scientific Value		✓	*2, 4, 5, 8, 9, 14*		*Not suitable: Airport restricted property or private property*
Uniqueness/Heritage		✓	*1, 3, 4, 5, 8, 27*		
Visual Quality/Aesthetics		✓	*2, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes:

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *0.14 ac.* Human made? *part.* Is wetland part of a wildlife corridor? *no* or a "habitat island"?_____

Adjacent land use *Airport* Distance to nearest roadway or other development *80' NW*

Dominant wetland systems present *E2EM1P* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *Yes* If not, where does the wetland lie in the drainage basin?_____

How many tributaries contribute to the wetland? *0* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF1100 - 1114*

Latitude *41.259* Longitude *-72.8893*

Prepared by: *McCue* Date *11/18/24*

Wetland Impact:
Type_____ Area_____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N_____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 4, 5*		*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓	✓	*4, 5, 6, 7, 9, 11, 13, 15*	✓	*Small wetland area, provides limited floodflow alteration*
Fish and Shellfish Habitat		✓	*1*		
Sediment/Toxicant Retention		✓	*1, 2*		
Nutrient Removal	✓		*3, 4, 9, 10*		
Production Export		✓			
Sediment/Shoreline Stabilization		✓	*3, 5*		
Wildlife Habitat		✓	*7*		
Recreation		✓			*Not suitable: Airport restricted property*
Educational/Scientific Value		✓			*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1*		
Visual Quality/Aesthetics		✓			
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes: *This wetand noted as a separet system, however, a culvert dors provide a hydraulic connectivity to the WF1000 series.*

* Refer to backup list of numbered considerations.

File Name

McCue Environmental, LLC
Lafayette Mill, 650 Ten Rod Road
North Kingstown, RI 02852

Wetland Function-Value Evaluation Form

Total area of wetland *~28 ac.* Human made? *part.* Is wetland part of a wildlife corridor? *yes* or a "habitat island"? _____

Adjacent land use *Dense residential, airport, commercial* Distance to nearest roadway or other development *30' west*

Dominant wetland systems present *E2EM1/5Pd* Contiguous undeveloped buffer zone present *No*

Is the wetland a separate hydraulic system? *No* If not, where does the wetland lie in the drainage basin? *Lower portion*

How many tributaries contribute to the wetland? *1* Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. *WF1000, 1200 & 1300*

Latitude *41.2626* Longitude *-72.8896*

Prepared by: *McCue* Date *11/18/24*

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office ✓ Field ✓

Corps manual wetland delineation completed? Y ✓ N _____

Function/Value	Suitability Y	Suitability N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge		✓	*1 (very few), 2, 5, 7, 15*		*pr.well: https://portal.ct.gov/dph/drinking-water/dws/public-water-supply-map*
Floodflow Alteration	✓		*1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 13*	✓	*Rationale cont.: 17, 18 (12 unknown)*
Fish and Shellfish Habitat	✓		*1 (very few), 2, 4*		*(Marine) (5 unknown)*
Sediment/Toxicant Retention	✓		*2, 3, 4, 5, 6, 7, 8, 10, 14, 16*	✓	
Nutrient Removal	✓		*1, 3, 5, 6, 7, 8, 9, 10, 11, 12*	✓	*Rationale cont.:14*
Production Export		✓	*1, 2, 4, 5, 6, 7, 10, 13*		
Sediment/Shoreline Stabilization	✓		*4, 6, 7, 9, 10, 12, 13, 15*		
Wildlife Habitat	✓		*6, 7, 8, 11, 12, 13, 16, 17*	✓	*Rationale cont.: 18, 19, 20, 21*
Recreation		✓	*5, 9, 12*		*(6 unknown); Not suitable: Airport restricted property*
Educational/Scientific Value		✓	*2, 5, 14*		*Not suitable: Airport restricted property*
Uniqueness/Heritage		✓	*1, 3, 5, 7, 12, 16, 19, 22, 27*		
Visual Quality/Aesthetics		✓	*1, 2, 7, 8, 11*		
ES Endangered Species Habitat	✓				*unknown occurrences; CT NDDB Areas map depicts a polygon over airport*
Other					

Notes: *This wetland system is subject to tidal inundation*

* Refer to backup list of numbered considerations.

File Name

APPENDIX E

Web Soil Survey Map and Soil Descriptionss

Soil Map—State of Connecticut, Western Part
(Tweed New Haven Regional Airport)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut, Western Part
Survey Area Data: Version 2, Aug 30, 2024

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	2.0	0.2%
13	Walpole sandy loam, 0 to 3 percent slopes	22.2	1.9%
24A	Deerfield loamy fine sand, 0 to 3 percent slopes	61.5	5.2%
35B	Penwood loamy sand, 3 to 8 percent slopes	27.1	2.3%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	9.0	0.8%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	0.5	0.0%
63B	Cheshire fine sandy loam, 3 to 8 percent slopes	0.1	0.0%
70C	Branford-Holyoke complex, 3 to 15 percent slopes, very rocky	5.0	0.4%
77C	Cheshire-Holyoke complex, 3 to 15 percent slopes, very rocky	19.1	1.6%
78C	Holyoke-Rock outcrop complex, 3 to 15 percent slopes	3.4	0.3%
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes	16.6	1.4%
87C	Wethersfield loam, 8 to 15 percent slopes	1.6	0.1%
87D	Wethersfield loam, 15 to 25 percent slopes	0.0	0.0%
98	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	7.5	0.6%
99	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded, low halinity	95.2	8.0%
224A	Deerfield-Urban land complex, 0 to 3 percent slopes	30.6	2.6%
230C	Branford-Urban land complex, 8 to 15 percent slopes	18.4	1.5%
235B	Penwood-Urban land complex, 0 to 8 percent slopes	276.9	23.2%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
237C	Manchester-Urban land complex, 3 to 15 percent slopes	26.7	2.2%
255B	Watchaug-Urban land complex, 0 to 8 percent slopes	4.5	0.4%
263B	Cheshire-Urban land complex, 3 to 8 percent slopes	18.4	1.5%
263C	Cheshire-Urban land complex, 8 to 15 percent slopes	17.9	1.5%
269C	Yalesville-Urban land complex, 8 to 15 percent slopes	5.5	0.5%
302	Dumps	7.8	0.7%
306	Udorthents-Urban land complex	326.8	27.4%
307	Urban land	36.9	3.1%
308	Udorthents, smoothed	79.4	6.7%
640	Beaches, sand-Hooksan complex, 0 to 8 percent slopes	1.5	0.1%
917	Gales Ferry silt loam, intertidal	8.0	0.7%
918	Gales Ferry silt loam, subtidal	0.3	0.0%
931	Anguilla sand, subtidal	2.3	0.2%
947	Sulfaquents, 0 to 2 percent slopes, very frequently flooded	57.0	4.8%
W	Water	1.1	0.1%
Totals for Area of Interest		**1,191.0**	**100.0%**

Appendix C- Regulatory Communication

Appendix C
Regulatory Communication

Date	Entity	Communication Summary
Feb 27, 2024	Hoyle Tanner Associates (HTA)	Follow-up meeting request with CT DEEP to clarify grassland and wetland mitigation requirements, with discussions on existing grassland and a bird survey proposal.
Feb 13, 2024 (meeting) + Feb 21, 2024 (follow-up email from the Feb 13 meeting)	HTA & Connecticut Department of Energy & Environmental Protection CT DEEP	Meeting held to discuss runway extension, terminal relocation, energy permits, and DEEP's 3:1 wetland mitigation ratio requirements. Feb 21 email highlights: - LWRD stated that enhancements of tidal wetlands could be used toward mitigation of inland wetland impacts. Regarding wetland impacts, DEEP requires a 3:1 mitigation ratio.
Jan 31, 2024	CT DEEP	Pre-application meeting scheduled for February 13, with CT DEEP's request for a draft mitigation plan to review in advance.
Jan 16, 2024	HTA	Initial request for pre-application meeting to discuss wetland, floodplain/FEMA, and stormwater permits.
May 17, 2024	CT DEEP to HTA	CT DEEP letter to HTA requesting additional information on the NDDB. Includes lists of state-listed plant and grassland bird species documented to occur within the vicinity of the airport.
September 26, 2024	CT DEEP	The Natural Diversity Database (NDDB) query results for the proposed project activities were received from the Connecticut Department of Energy and Environmental Protection (DEEP) on September 26, 2024 (dated September 24, 2024).
October 10, 2024	USACE to HTA	Letter from the Regulatory Program/Division of USACE to HTA that details an Approved Jurisdictional Determination (AJD) conducted by the U.S. Army Corps of Engineers for a site at Tweed New Haven Airport, Connecticut. It identifies jurisdictional waters (Wetland 6) under Section 404 of the Clean Water Act, along with non-jurisdictional wetlands (Wetlands 4 and 5).
November 18, 2024	CT DEEP	Communication from CT DEEP Fisheries Division on presence of NDDB review species non presence on the Morris Creek watershed.
November 25, 2024	HTA, eDesign Dynamics, CT DEEP, FAA, Avports	Monthly meeting notes with relevant permitting agency staff regarding permits for the projects.
February 18, 2025	USACE to HTA	USACE provides initial feedback on the draft mitigation plan, emphasizing the need to evaluate all mitigation options per the 2008 Mitigation Rule hierarchy and to clarify the plan's terminology, performance standards, legal site protection,

		adaptive management triggers, financial assurances, and reliance on tide gate infrastructure.
February 21, 2025	CT DEEP to HTA	CT DEEP confirms that the proposed 28.5 acres of tidal wetland enhancement can be applied at a 5:1 ratio to mitigate for 5.7 acres of inland wetland impact, while the remaining 3.8 acres of impact must be addressed through 1:1 tidal wetland creation, resulting in a net gain of wetland area. CT DEEP also provides technical and regulatory feedback on salinity conditions, tide gate management, mapping requirements, and long-term site protection.

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Tuesday, February 27, 2024 7:37 AM
To: Fontanella, Camille <Camille.Fontanella@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; Jacobson, Susan <Susan.Jacobson@ct.gov>; Missell, Danielle <Danielle.Missell@ct.gov>
Cc: Meade Hopkins <mhopkins@avports.com>; Michael Jones <mjones@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Barnum, Sarah <SBarnum@bscgroup.com>; Joe McCue <mccueenvironment@gmail.com>; Rasmus Agerskov <ragerskov@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Milne, Beatriz <Beatriz.Milne@ct.gov>
Subject: FW: [External] RE: Pre-application Meeting Request : Tweed New Haven Airport Runway Extension and East Terminal Project

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Camille- we would like to discuss further and clarify the expectations for mitigation for grassland habitat and wetlands- can we have a meeting this week or next with the relevant participants to address this?

Specifically:

1. We have reviewed the existing grassland habitat on site and do not think the proposed impacts will result in a loss of functional grassland habitat that would reduce the grassland on the airport below the 23 acres required by the permit in 2007.
2. We are proposing a grassland bird survey to occur this spring and summer to document bird use.
3. The existing grasslands are mowed per the vegetation plan agreed to by FAA and CTDEEP, and includes wetlands as currently delineated. We believe the wet grassland areas are not functional grassland habitat and would offer a revised version of existing grassland on airport to date with regard to the need for identifying and creating functional off-site mitigation.
4. Wetland mitigation work continues and we would like to review the CTDEEP mitigation requirements based on the 3:1 ratio in terms of offering on-site restoration of tidal wetlands for inland wetland impacts.

Thank you-

Kimberly Peace

Vice President - Senior Environmental Coordinator at Hoyle Tanner

T: 603-460-5205 ° • **C**: 603-716-3343

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From: Milne, Beatriz <Beatriz.Milne@ct.gov> **On Behalf Of** DEEP OPPD
Sent: Wednesday, February 21, 2024 6:06 PM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>; Meade Hopkins <mhopkins@avports.com>; Michael Jones <mjones@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Joe McCue <mccueenvironment@gmail.com>
Cc: DEEP OPPD <DEEP.OPPD@ct.gov>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Bilyard, Jessica <Jessica.Bilyard@ct.gov>; Milne, Beatriz <Beatriz.Milne@ct.gov>; Thompson, Brian <Brian.Thompson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; Jacobson, Susan <Susan.Jacobson@ct.gov>; Missell, Danielle <Danielle.Missell@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Blum, Robin <Robin.Blum@ct.gov>; Hammerling, Eric <Eric.Hammerling@ct.gov>; Brunza, Linda <Linda.Brunza@ct.gov>; Riese, Frederick <Frederick.Riese@ct.gov>;

DiDomenico, Jordan <Jordan.DiDomenico@ct.gov>; Schain, Brendan <Brendan.Schain@ct.gov>; Dickson, Audra <Audra.Dickson@ct.gov>; Abbott, Karen <Karen.Abbott@ct.gov>; Gaughran, Laura <Laura.Gaughran@ct.gov>; Dinh, Brian <Brian.Dinh@ct.gov>; Stone, Chris <Chris.Stone@ct.gov>; Stevens, Graham <Graham.Stevens@ct.gov>; Babbidge, Tracy <Tracy.Babbidge@ct.gov>; Farrell, Paul <Paul.Farrell@ct.gov>; Trumble, Mason <Mason.Trumble@ct.gov>; Perry, Jennifer <Jennifer.Perry@ct.gov>; Decker, Annie <Annie.Decker@ct.gov>; Huang, Sarah <Sarah.Huang@ct.gov>; Kevin.R.Kotelly@usace.army.mil
Subject: RE: [External] RE: Pre-application Meeting Request : Tweed New Haven Airport Runway Extension and East Terminal Project

It was a pleasure to meet with you regarding your current state of the proposed activity. Thank you to all who attended.

The applicant's main goal for this meeting was to re-address the items concerning the runway extensions to the north and south and the Terminal re-location (East Terminal) at the TWEED New Haven Airport
site in more detail than previously discussed with CTDEEP staff during the EA process. The applicant is developing permit applications for wetland, floodplain/FEMA and stormwater impacts and would like assistance in submitting those in a timely manner. Also
for discussion, was the renewable sources of solar energy generation and geothermal wells proposed to be used on site. The permitting requirements for a solar array and geothermal energy use were discussed briefly. The location and design of the potential
solar arrays and geothermal system are currently in preliminary design stages only and were not included in the EA.

Based upon the information presented at the meeting, a summary of the permitting requirements is as follows:

Land and Water Resources Division (LWRD): your contacts are Jeff Caiola, Brian Thompson, Sue Jacobson and Danielle Missell.

- The applicant posed a few questions regarding submittal of permit applications:
    - Can the existing authorizations be amended to include this proposed activity? *No, the existing Structures, Dredging & Fill and Tidal Wetland authorization includes a permit condition that states that the applicant must submit a new application for any additional impacts that may be created.*
    - The CTDEEP permits issued to date have been to the Tweed New Haven Regional Airport Authority (TNHAA), as recorded in our department database.
    - It was recommended to submit CTDEEP applications first before United States Army Corps of Engineers (USACE) submittal. The CTDEEP applications may take 9 - 12 months to process.
    - The project will need an USACE Individual 404 permit and a state 401 WQC.
    - DEEP will publish a public notice of its tentative decision to approve a permit application to receive public comment. DEEP will also hold an informal meeting or formal administrative hearing (if needed). For more info, see the **Public Participation (DEP-FS-005) Factsheet.**
    - It was recommended that the applicant have a conversation with the municipalities on any local permitting requirements.

- Can TNHAA submit permit application before Mitigation Plans completed? *No, the application should include a draft mitigation plan. DEEP will not publish a Notice of Tentative Determination without an approved wetland mitigation plan.*
    - LWRD stated that enhancements of tidal wetlands could be used toward mitigation of inland wetland impacts.
- Can upland work begin before other licenses are issued for wetlands impact? *No, 22 acres of grassland may have regulatory requirements- wetland impact and mitigation plans must be reviewed and approved.*

- Applicant has indicated 9.3 acres of wetland impacts. DEEP requires a 3:1 mitigation ratio. USACE requires in lieu fee, which may be discounted to account for state mitigation. Jared Fritz is the PM for USACE.
- Applicant stated that the grasslands plantings proposed to be used for mitigation purposes may conflict with FAA rules of safety along the runways. *LWRD has offered to have additional meetings on mitigation and permit compliance.*
- USACE is having a 3rd party consultant review the proposed wetland impacts. Status will be checked on this review.
- Applicant requested new evaluation of wetlands jurisdiction from USACE; will need to apply for the WOTUS jurisdiction re-evaluation.
- Floodway – The project should be designed to be consistent with the National Flood Insurance Program requirements.
- Floodplains – since the airport acts as a bowl to collect and store floodwaters, measures to mitigate the loss of any floodwater storage must be evaluated.
- FEMA – LWRD stated they would assist the applicant review FEMA requirements that may be imposed.
- Additional questions posed concerning Floodways/Floodplains:
    - Assumption Zone AE, no increase to BFE +1 ft, no CLOMR-if needed, can permit condition approval? *No, CLOMR cannot be a condition of the permit. If a CLOMR is required it must be received prior to TWEED submitting an application. Further TWEED must clearly demonstrate that there will be no adverse increases in flood heights from the proposed development.*
    - Does THNAA have to address zero net fill requirements from City of New Haven and Town of East Haven? *No, the project is located within a coastal flood hazard area, flood storage compensation is not required.*

Stormwater Program: your contact is Chris Stone.

- For disturbance of land, over 5 acres but less than 15 acres, regardless of phasing, the applicant would need to register under DEEP's stormwater construction general permit as a locally exempt project at least 60 days before beginning construction (if disturbance is greater than 15 acres the registration would need to be submitted at least 90 days before beginning construction). The applicant will need to submit their registration through ezFile. Refer to the following link for instructions. https://portal.ct.gov/DEEP/Water-Regulating-and-Discharges/Stormwater/Construction-Stormwater-GP.
- The applicant may submit this registration at any time but note that if CTDEEP or CT Siting Council requirements alter your design, the registration for the construction stormwater

general permit would need to be modified and would result in re-starting the timeline for registration.
- Please refer to the Stormwater Quality Manual, and the Connecticut Guidelines for Soil Erosion and Sediment Control, to address specific details. Note that the Water Quantity Retention Volume has been increased to 1.3 inches of rainfall.

Natural Diversity Database: your contact is Robin Blum.

- Note that for the permits required above, a final determination from our NDDB Program will be required to be submitted with the applications/registrations, since there are known occurrences of state or federally-listed species within the impact area of the project site. The request for review to the NDDB Program should be submitted through our new eNDDB portal.
    - Here are the links for eNDDB submissions:
        - Account setup - https://filings.deep.ct.gov/DEEPPortal/Account/About
        - NDDB webpage - https://portal.ct.gov/DEEP/NDDB/Requests-for-NDDB-Environmental-Reviews
        - eNDDB FAQs - https://portal.ct.gov/DEEP/NDDB/NDDB-Frequently-Asked-Questions
        - Maps - https://portal.ct.gov/DEEP/NDDB/Natural-Diversity-Data-Base-Maps
- At this time, review work may take up to 10 weeks; however, if further survey work is needed during a certain time of year, the process can take longer overall.

Environmental Review: your contacts are Fred Riese and Eric Hammerling.

- Projects generating over 1 MW of energy, where any energy generated will be connected to the grid, will need to be reviewed by the CT Siting Council. If the energy is used solely for internal use at the TNHAA (no connection to the grid), then there is no need for this part of the proposal to be reviewed by the CT Siting Council.

Innovative Partnerships and Planning (IPP) - Concierge: your contact is Camille Fontanella.

- IPP Concierge can continue to provide assistance to the applicant before and during permit application submittal through permit processing to ensure application submittal timeliness and effective communication on permit application statuses.
- The applicant indicated plans to submit permit applications in June, with permit issuance in December. Processing time for the LWRD permits will take longer than the 6-months proposed. We can work with you to assemble complete applications to optimize processing time.

Please contact us if you have further questions. I have copied everyone who was in attendance at the meeting.

Meanwhile, if you could help us improve our pre-application process, we would appreciate it! Please complete the attached quick follow-up survey!

Thank you!

Beatriz Milne, P.E.

Office of Innovative Partnerships and Planning

Commissioner's Office

Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127

p: 860-424-3844 | beatriz.milne@ct.gov

Connecticut
Department of Energy &
Environmental Protection

Conserving, improving, and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

| portal.ct.gov/DEEP

-----Original Appointment-----
From: Milne, Beatriz **On Behalf Of** DEEP OPPD
Sent: Wednesday, January 31, 2024 11:45 AM

To: DEEP OPPD; 'Peace, Kimberly R.'; Meade Hopkins; Michael Jones; Furey, Robert M.; Gonzalez, Nils E.; Fontanella, Camille; Caiola, Jeff; Jacobson, Susan; Missell, Danielle; Blum, Robin; Riese, Frederick; Brunza, Linda; DiDomenico, Jordan; Stone, Chris; Dinh, Brian; Kevin.R.Kotelly@usace.army.mil
Cc: Stevens, Graham; Dickson, Jenny; Decker, Annie; Hammerling, Eric; Babbidge, Tracy; Farrell, Paul; Thompson, Brian; Schain, Brendan; Trumble, Mason; Perry, Jennifer; Dickson, Audra; Huang, Sarah; Milne, Beatriz; Joe McCue; Coon, Deb L.; Bilyard, Jessica; Abbott, Karen; Gaughran, Laura
Subject: [External] RE: Pre-application Meeting Request : Tweed New Haven Airport Runway Extension and East Terminal Project
When: Tuesday, February 13, 2024 9:00 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Look forward to meeting on Tuesday, February 13th at 9 am.

Concerning wetland and flood plain impacts, please send us a proposed mitigation plan as soon as possible so we can review in advance of the meeting and provide comments.

Thank you!

Microsoft Teams meeting

Join on your computer, mobile app or room device

Click here to join the meeting

Meeting ID: 230 639 476 806
Passcode: Z7LTSk

Download Teams | Join on the web

Learn More | Meeting options

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Monday, January 22, 2024 1:24 PM
To: DEEP OPPD <DEEP.OPPD@ct.gov>; Missell, Danielle <Danielle.Missell@ct.gov>
Cc: Fontanella, Camille <Camille.Fontanella@ct.gov>; Meade Hopkins <mhopkins@avports.com>; Michael Jones <mjones@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>
Subject: RE: [External] RE: Pre-application Meeting Request : Tweed New Haven Airport Runway Extension and East Terminal Project

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Beatriz- the intent of the pre-app meeting is to address the items in more detail that have been previously discussed with CTDEEP staff during the EA process as we move into developing permit applications. Our main goal for this meeting is to progress on submitting the wetland, floodplain/FEMA and stormwater permits in a timely manner- if there is tie in with the energy permitting then we will be prepared to address that at the meeting also. We included them in the form for completeness of the project.

The permitting requirements for a solar array and geothermal energy use that are being reviewed by the applicant, which were not included in the EA, could be discussed as well if there is time and the meeting is conducive to that. Should we need to schedule a separate meeting with the specific staff relative to these items, I would be happy to work directly with them if you provide contacts.

I have attached additional information regarding the location and design of the potential solar arrays and geothermal system- these are currently in preliminary design stages only.

Please let me know if you need further information or have any other questions, thank you.

Kimberly Peace

Vice President - Senior Environmental Coordinator at Hoyle Tanner

T: 603-460-5205 ° • **C**: 603-716-3343

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From: Milne, Beatriz <Beatriz.Milne@ct.gov> **On Behalf Of** DEEP OPPD
Sent: Monday, January 22, 2024 9:37 AM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>
Cc: Fontanella, Camille <Camille.Fontanella@ct.gov>; Meade Hopkins <mhopkins@avports.com>; Michael Jones <mjones@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>
Subject: [External] RE: Pre-application Meeting Request : Tweed New Haven Airport Runway Extension and East Terminal Project

Good Morning,

On reviewing your questionnaire, in preparation for your pre-application meeting, we have a few questions to be sure we have the applicable permitting staff attending this meeting.

There have been several meetings with DEEP on the airport's renovations including the runway extension and the East Terminal project as outlined in the questionnaire submittal.

Is this new request for a pre-application meeting solely concerning the generation and storage of energy of 2 MW?

If so, can you provide more detail concerning the energy portion of this project? Please include a site plan, showing the energy sources and details of how they are proposed to be placed on site. You mention geothermal wells but there is no

other mention of other energy sources to use and store. Once we have more details on your request, we can schedule a meeting with the applicable permitting staff.

Thank you,

Beatriz Milne, P.E.

Office of Innovative Partnerships and Planning

Commissioner's Office

Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127

p: 860-424-3844 | beatriz.milne@ct.gov

Connecticut
Department of Energy &
Environmental Protection

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Ensuring a clean, affordable, reliable, and sustainable energy supply.

| portal.ct.gov/DEEP

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Tuesday, January 16, 2024 3:01 PM
To: DEEP OPPD <DEEP.OPPD@ct.gov>; Missell, Danielle <Danielle.Missell@ct.gov>
Cc: Meade Hopkins <mhopkins@avports.com>; Michael Jones <mjones@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>
Subject: Pre-application Meeting Request : Tweed New Haven Airport Runway Extension and East Terminal Project

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hello, please see the attached for a request to schedule a pre-application meeting for this very important project, thank you.

HOYLE TANNER

Kimberly Peace

Vice President - Senior Environmental Coordinator at Hoyle Tanner

kpeace@hoyletanner.com

T: 603-460-5205 ° • **C**: 603-716-3343

Hoyle Tanner • 150 Dow Street Manchester, NH 03101 • hoyletanner.com

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May 17, 2024

Deb Coon
Hoyle, Tanner and Associates
150 Dow Street
Manchester, NH 03101

NDDB Request Additional Information
Project: Tweed New Haven Airport Runway Extension and Terminal Expansion
Filing ID 107828

Dear Ms. Coon,

As described in the NDDB review application, this project will involve the rehabilitation and extension of Runway 2-20, and the construction of a new east side passenger terminal and associated runways, parking lots, aprons and taxiways.

The following species have been documented within the vicinity of the work to be conducted:

Plants

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  - Habitat: Coastal grasslands; airports; open-canopy trailsides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  - Blooms June – July.
- Saltpond grass (*Leptochloa fusca ssp. fascicularis*) – State Endangered
  - Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  - Blooms and fruits August – November.
- Field paspalum (*Paspalum laeve*) – State Threatened
  - Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial Grassland/Outcrop; Grassland Subtype: Coastal Grassland.
  - Fruits August – October.
- Two-flowered Cynthia (*Krigia biflora*) – State Threatened
  - Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.

    - Blooms Jun.
- Hoary plantain (*Plantago virginica*) – State Special Concern
    - Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidc Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest.
    - Blooms/fruits May – June. Spring and early summer ephemeral, typically disappearing by late June.

State listed plant species surveys of the site should be performed by a qualified botanist or plant ecologist when these target plant species are identifiable. You may want your botanist to contact the NDDB program directly for more information regarding known plant locations. The report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs, and photographs of any state listed plant species found.
3. Descriptions of the identifying characters of the target listed species.
4. List of component species within the survey area (including scientific binomials).
5. Data regarding population numbers and/or area occupied by state listed plant species.
6. Detailed maps of the area surveyed including the survey route and locations of state listed species.
7. Habitat descriptions of the area surveyed.
8. Survey results and all observed state listed plant species must reported to the NDDB Program using an NDDB form at: https://portal.ct.gov/DEEP/Endangered-Species/Contributing-Data
9. If state listed plants are found within the project area or immediately adjacent to the project area, the report should include a conservation/protection plan with the following elements:
    a. Anticipated impacts to these state-listed species from this project.
    b. Any planned mitigation or management practices that will be employed to protect, avoid, and/or mitigate impacts to state listed plant species.
10. A Statement, CV or Resume of the botanist's or plant ecologist's qualifications to work with these species. Please ensure that your botanist or plant ecologist holds appropriate scientific collector's permit for this work.

Grassland Birds

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Horned lark (*Eremophila alpestris*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern

The Project is expected to impact 5.6 acres of grassland habitat.

NDDB received an application to review this project in 2022 (NDDB Preliminary Assessment 202201593). Our preliminary assessment letter included information for the above-referenced grassland bird species, including general recommendations for managing grassland birds at airports and noted that field surveys are

recommended. The preliminary assessment also instructed that the airport should comply with any pre-existing mitigation plans prepared to protect grassland birds on the property. NDDB did not receive any communication in response to the Preliminary Assessment and closed that review on March 3, 2023.

NDDB was provided a copy of the *Grassland Bird Habitat Conceptual Plan*, dated April 8, 2024; this document was prepared to address prior permitting requirements for grassland habitat within the airport boundary, document existing grassland habitat, and to propose a study of bird use and functionality of existing grassland habitat at the airport. Through review of this plan, NDDB concluded that changes to conditions outlined in the original 2008 *Grassland Management Plan* had been made in 2009 and 2011; specifically, beginning in 2009, the mowing regime agreed to in that plan was no longer being followed. NDDB provided comments responsive to this *Grassland Bird Habitat Conceptual Plan* via email on April 25, 2024.

Following the meeting between DEEP staff and Tweed-New Haven Airport representatives on April 29th, 2024, it was made clear that there is no remaining suitable grassland habitat on the property due to the mowing regime adopted in 2009. NDDB has been informed that the changes were implemented in response to airport hazard assessment and are not likely to be revised.

The *Grassland Bird Habitat Conceptual Plan* proposes to conduct grassland bird survey studies in order to understand grassland habitat conditions and use of the property. As NDDB has indicated via email comments and during subsequent meetings, NDDB welcomes this survey work as a valuable source of information, and we concur with the survey protocols proposed. However, survey work and information gathering alone does not constitute mitigation for loss of habitat resulting from project activities.

We have included the protection measures here as a reference in the event that it is deemed possible to allow habitat to regenerate on the property in the future. Barring that, these guidelines can be used as a starting point in the development of an off-site mitigation plan, as it seems unlikely that negative impacts to listed grassland bird species neither have been nor will be able to be minimized on the airport property. Since impacts to grassland birds have already been committed and earlier plan mowing regimes are not able to be implemented, **off-site mitigation should be pursued**.

Grassland Bird Protection Measures

The horned lark, grasshopper sparrow, Savannah sparrow, bobolink and eastern meadowlark are considered to be grassland-obligate birds. They require open fields to breed, nest and forage in. Habitats preferred by these species include large grasslands, agricultural fields, and airports. The breeding season for these birds is approximately from late April through August. It is during this period that they are most susceptible to disturbances in their feeding and nesting habitat.

To avoid impact to these species:

- Land disturbance activities including digging, ground clearing, heavy machinery driving staging, or ground trampling that will occur more than 100 feet into a grassland parcel or cut across parcels of grassland in a way that fragments grassland habitat patches should be done when grassland birds are not breeding. Breeding primarily takes place between April 15- August 15.
- Conducting land disturbance activities outside of the breeding season will avoid impact to the individuals.
- **Conduct project work between August 16- April 14.**

- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species including:
  - Little bluestem (*Schizachyrium scoparium*)- "Aldous" or "Cimarron"
  - Big bluestem (*Andropogon gerardii*)- "Niagra"
  - Indiangrass (*Sorghastrum nutans*) - "Rumsey"
  - Switchgrass (*Panicum virgatum*) - "Blackwell", "Shelter", or "Cave in Rock"
  - Bermudagrass (*Cynodon dactylon*) - "Quickstand"
- Seed mix ratios are variable, however for Connecticut a minimum of 60% little bluestem is preferred. Big bluestem is an acceptable alternative to little bluestem for the dominant species in the chosen mix. When one of the bluestems is the dominant species the other grass species listed may be mixed in any ratio desired. Of these species, Bermudagrass is the least favored and should be used in the lowest percentage.

If work cannot occur between months of August 16-April 14:

- The proposed construction staging area and associated vehicles and equipment should be restricted to existing paved areas as much as possible.
- Beginning April 1- through duration of project: All grassy areas within a 50-foot buffer of planned work remain continuously mowed as short as possible to avoid attracting nesting birds into work zones.
- If vehicle access is required to cross grassy areas outside of work zones, designated paths and areas should be marked and kept mowed beginning April 1. Do not drive outside of designated work areas into grassy habitat, nesting birds will be crushed.
- Identify locations on the property where grassland habitat will remain un-mowed between April 15 - August 30 to mitigate for lost habitat during construction. These areas must provide adequate conditions for upland grassland habitat. Provide a map detailing these grassland mitigation areas to Robin Blum (robin.blum@ct.gov).
- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species as described above.

Your request has been assigned the following number: **107828; please include this number on all correspondence regarding this request**.
Responsive information should be sent to:

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm St. 6th Floor
Hartford, CT 06106-5127
or submitted via email to: robin.blum@ct.gov

Please note that if the necessary information is not received by May 20, 2025, we will be unable to provide a determination. Materials already submitted will not be retained or returned. You will need to initiate a new review request by submitting a new and complete *Request for Natural Diversity Database (NDDB) State Listed Species Review* via DEEP's ezFile Portal. For more information and guidance on submitting a request for a Natural Diversity Data Base review visit our website. Feel free to contact me if you have further questions.

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm Street
Hartford, CT 06106-5127
(860) 424-4137
Robin.blum@ct.gov

From:	Blum, Robin
To:	Peace, Kimberly R.; Caiola, Jeff; Jacobson, Susan; Missell, Danielle
Cc:	DEEP Nddbrequest; Moorhead, William; Toledo, Anna; Coon, Deb L.; Dickson, Jenny; Michael Jones; Meade Hopkins; Furey, Robert M.; Gonzalez, Nils E.; Fontanella, Camille
Subject:	RE: [External] NDDB Filing 117005 Tweed - tide gate management - request additional information
Date:	Thursday, October 3, 2024 3:30:36 PM
Attachments:	image008.png image009.png image010.png image011.png image012.png image013.png image014.png

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Hi Kim,

In response to your comments below:

- *the project was proposed in the NDDB request for review as mitigation site review, not tide gate alteration- this change seems to indicate that the proposed actions are being viewed as a stand-alone project which is not the case- the tide gate alteration is an important part of the Runway and Terminal Project compensatory mitigation*

  NDDB referenced tide gate management in our correspondence to differentiate activities addressed in this review from activities addressed in the Runway and Terminal project. This was intended to provide specificity for permit analysts and any other folks that will review our letters as part of permit application package or other reviews. Moving forward, when we issue a Final Determination, we can utilize the larger project name and include narrative statements to make that distinction.
- Plant surveys in impact areas – I brought our Monday discussion to Bill; he agreed that it is an acceptable preliminary approach to have your consulting botanist assess the on-the-ground conditions in the impact areas which can be utilized to determine next steps. Your botanist should determine if suitable habitat is present and prepare a description of those findings. If suitable habitat exists, include an assessment of whether or not proposed activities will impact target species, and, if so, any measures that can be taken to prevent impacts. Having that information will help us decide if further survey work is appropriate and necessary. Let us know if you would like to discuss further; it might be beneficial for your botanist to communicate with Bill on the finer details.

Please let me know if you have any questions.

Robin

Robin Blum
Supervising Wildlife Biologist
Bureau of Natural Resources, Wildlife Division
Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
p: 860.424.4137 | **m:** 860.876.9202 | robin.blum@ct.gov

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From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Thursday, September 26, 2024 4:08 PM
To: Caiola, Jeff <Jeff.Caiola@ct.gov>; Jacobson, Susan <Susan.Jacobson@ct.gov>; Missell, Danielle <Danielle.Missell@ct.gov>
Cc: DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Moorhead, William <William.Moorhead@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>; Coon, Deb L. <dcoon@hoyletanner.com>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Blum, Robin <Robin.Blum@ct.gov>; Michael Jones <mjones@avports.com>; Meade Hopkins <mhopkins@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Fontanella, Camille <Camille.Fontanella@ct.gov>
Subject: RE: [External] NDDB Filing 117005 Tweed - tide gate management - request additional information

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Jeff, Susan and Danielle- I am forwarding this to you to keep everyone in the loop on this information that we received this morning. I want to first note that the project was proposed in the NDDB request for review as mitigation site review, not tide gate alteration- this change seems to indicate that the proposed actions are being viewed as a stand-alone project which is not the case- the tide gate alteration is an important part of the Runway and Terminal Project compensatory mitigation.

We believe that the review that was completed should be revised in light of the fact that the proposed alteration of the tidal regime is for *salt marsh restoration* that is proposed to happen in a gradual manner by primarily tidal flow manipulation. The proposed mitigation design will allow the impacted areas of the marsh to restore over time based on alteration to the hydrologic regime rather than with intensive physical methods. Because of this, we believe that the populations of listed species, including plants, birds and fish, if within the affected areas, would have time to shift as needed, making surveys unnecessary.

We recognize you are waiting on more details to be provided in the Mitigation Plan and we anticipate providing it in a Draft form to CTDEEP within the next few weeks for review and comment.

A majority of the tidal marshes are *Phragmites* monocultures, making surveys within these areas difficult, time-consuming and questionably feasible. Additionally, surveys for most of the plant species listed cannot be completed in 2024 as the identification window has passed or almost passed, which means we would have to complete field surveys, if required, in 2025.

This will have a negative impact on the schedule for permitting and construction for the project.

Surveys for the state-listed grassland birds have already occurred at the airport with only Savannah sparrow as being identified as using these areas. We appreciate your acknowledgement that impacts to grassland birds are being mitigated for as part of the Runway and Terminal project, which the tide gate alteration is an important component of, and we will continue discussions with you regarding that mitigation- keeping that moving forward is currently dependent on response to the questions provided in my email of September 6 that we were told would be provided this week, which we have not yet received.

We will include review of this information as an agenda item for Monday's meeting as we believe that resolving these concerns will be crucial to the overall project schedule, however I suspect we will need to have additional meetings to focus specifically on this in the future.

Thank you-

Kimberly Peace
Vice President - Senior Environmental Coordinator at Hoyle Tanner
T: 603-460-5205 ° • **C**: 603-716-3343

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From: Blum, Robin <Robin.Blum@ct.gov>
Sent: Thursday, September 26, 2024 10:48 AM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>; Coon, Deb L. <dcoon@hoyletanner.com>
Cc: DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Moorhead, William <William.Moorhead@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>
Subject: [External] NDDB Filing 117005 Tweed - tide gate management - request additional information

Hello Kim and Deb,
Attached please find our Request for Additional Information regarding the proposed tide gate management project at Tweed Airport, New Haven.
Please let me know if you have any questions.
Thanks,
Robin

Robin Blum
Supervising Wildlife Biologist
Bureau of Natural Resources, Wildlife Division
Connecticut Department of Energy & Environmental Protection
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Connecticut
Department of Energy &
Environmental Protection

Conserving, improving, and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

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September 24, 2024

Deb Coon
Hoyle, Tanner, and Associates
150 Dow Street
Manchester, NH 03101

Project: Tweed New Haven Runway Extension and Terminal Expansion – Tide Gate Alteration
NDDB 202408268 Request for Additional Information
Filing ID: 117005
Expiration date: September 24, 2025

Dear Deb Coon,

We have received and reviewed the materials submitted pursuant to a Natural Diversity Data Base review request for Tide Gate Alteration at Tweed Airport, New Haven project. According to our records, populations of State listed species have been documented in the vicinity of the project area.

Plants:

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  Habitat: Coastal grasslands; airports; open-canopy trail sides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  Blooms: June, July
- Salt pond grass (*Leptochloa fusca ssp. Fascicularis*) – State Endangered
  Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  Blooms and fruits August - November
- Field paspalum (*Paspalum laeve*) - State Threatened
  Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial grassland/Outcrop, Grassland Subtype; Coastal Grassland.
  Fruits August – October
- Swamp lousewort (*Pedicularis lanceolata*) – State Threatened
  Habitat: Moist fields, swamp edges, wet ground, wet meadows, open swamps, stream edges, fresh tidal wetlands.
  Blooms mid-August, September
- Two-flowered cynthia *(Krigia biflora*) - State Threatened
  Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.
  Blooms June
- Hoary plantain (*Plantago virginica*) – State Special Concern

Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidc Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest. Blooms/fruits May-June. Spring and early summer ephemeral, typically disappearing by late June.

- New England blazing star (*Liatris novae-angliae*) – State Special Concern
  Habitat: Sandplains, dry fields, sandy sea beaches, rock outcrops, sandy or rocky roadsides.
  Blooms Aug, September

State listed plant species surveys of the site should be performed by a qualified botanist or plant ecologist when these target plant species are identifiable. You may want your botanist to contact the NDDB program directly for more information regarding known plant locations. The report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs, and photographs of any state listed plant species found.
3. Descriptions of the identifying characters of the target listed species.
4. List of component species within the survey area (including scientific binomials).
5. Data regarding population numbers and/or area occupied by state listed plant species.
6. Detailed maps of the area surveyed including the survey route and locations of state listed species.
7. Habitat descriptions of the area surveyed.
8. Survey results and all observed state listed plant species must reported to the NDDB Program using an NDDB form at: https://portal.ct.gov/DEEP/Endangered-Species/Contributing-Data
9. If state listed plants are found within the project area or immediately adjacent to the project area, the report should include a conservation/protection plan with the following elements:
   a. Anticipated impacts to these state-listed species from this project.
   b. Any planned mitigation or management practices that will be employed to protect, avoid, and/or mitigate impacts to state listed plant species.
10. A Statement, CV or Resume of the botanist's or plant ecologist's qualifications to work with these species. Please ensure that your botanist or plant ecologist holds appropriate scientific collector's permit for this work.

Please send the survey report to deep.nddbrequest@ct.gov and robin.blum@ct.gov. Please note that incomplete reports may be rejected.

Fish:

- Sand tiger shark (*Carcharias taurus*) – State Special Concern
- Atlantic seasnail (*Liparis atlanticus*) – State Special Concern
- Radiated shanny (*Ulvaria subbifurcata*) – State Special Concern

Contact a DEEP Fisheries Biologist for more information regarding potential impacts to listed fish species. You may need to submit a fisheries consultation form.

Birds:

In Connecticut, grasslands are among the most threatened and rare habitats. There are seven species of breeding grassland birds and that require grasslands as their primary habitat that are state listed in Connecticut. Most of Connecticut's grasslands would revert to forest without active management. Increasing development pressures on Connecticut's most important grassland habitats, exacerbates this loss of habitat

through natural succession. Traffic and construction in suitable habitat should be avoided during sensitive timeframes.

Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
Most sensitive to disturbance: May 1- August 30. This species will benefit from protection and management of large patches of grassland of 30 acres or more.

Eastern meadowlark (*Sturnella magna*) – State Threatened
Most sensitive to disturbance between May 1- August 15. This species will benefit from protection and management of large patches of grassland of 15 acres or more.

Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern
Most sensitive to disturbance between April 1- August 30. This species will benefit from protection and management of large patches of grassland of 10 acres or more.

Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
Most sensitive to disturbance between May 1- August 30.
This species will benefit from protection and management of large patches of grassland of 5 acres or more.

NDDB program staff is currently working with Tweed Airport and consultants regarding proposed actions to address impacts to grassland birds under the auspices of the Runway Extension and Terminal Expansion project. Any potential negative impacts to listed grassland bird species from the proposed Tide Gate Alteration project activities will be addressed through mitigation under that project. A Final Determination for the Tide Gate Alteration project will not be issued until grassland bird mitigation has been finalized.

Robin Blum
Supervising Wildlife Biologist
CT DEEP – Natural Diversity Database
Robin.blum@ct.gov

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
NEW ENGLAND DISTRICT OFFICE
696 VIRGINIA ROAD
CONCORD MASSACHUSETTS 01742-2751

October 10, 2024

Regulatory Program/Division
NAE-2022-00290

Kimberly Peace
Hoyle Tanner & Associates, Inc.
150 Dow Street
Manchester, New Hampshire 03101
Via Email: kpeace@hoyletanner.com

Dear Ms. Peace:

This letter is in response to your request to the New England District for an approved jurisdictional determination. The project/review area is located on Tweed New Haven Airport, at Latitude 41.276190 and Longitude -72.885720 in East Haven, South Central Connecticut Planning Region County, Connecticut. The review area for this determination is limited to an approximately 18 acre area, which is illustrated on the enclosed site maps. This request has been assigned the file number NAE-2022-00290. This file number should be referenced in all correspondence concerning this project.

Based on our review of the information you furnished, a site inspection conducted on July 22, 2024, and other information available to our office, we have determined the above-referenced area contains 14.96 acres of waters of the United States under U.S. Army Corps of Engineers (USACE) regulatory jurisdiction. These waters are identified in the enclosed site maps, Tweed New Haven Airport dated November 30, 2021, and include Wetland 4, Wetland 5, and Wetland 6. This determination was made in accordance with the USACE regulatory authority pursuant to Section 404 of the Clean Water Act, and based upon criteria contained in the 1987 Corps of Engineers Wetland Delineation Manual and the Northcentral and Northeast regional supplement. This determination is valid for a period of **five years** from the date of the letter, unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.

This letter contains an approved jurisdictional determination for your subject site. If you object to this determination, you may request an administrative appeal under USACE regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the Division Appeals Officer at the address listed on the RFA form. In order for an RFA to be accepted by

USACE, USACE must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, USACE must receive it by USACE by December 9, 2024. **It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.**

Section 404 of the Clean Water Act requires a Department of the Army (DA) permit be obtained prior to the discharge of dredged or fill material into waters of the United States, including wetlands. Section 10 of the Rivers and Harbors Act of 1899 requires a DA permit be obtained for any work in, on, over or under navigable waters of the United States.

This determination has been conducted to identify the limits of USACE Clean Water Act jurisdiction for the review area identified in this request. The determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

You are cautioned that work performed below the mean high water line or ordinary high water line in waters of the United States; and/or, the discharge of dredged or fill material into any areas identified on the enclosed information as within Federal jurisdiction, without a Department of the Army permit could subject you to enforcement action. Receipt of a permit from a state or local municipality does not obviate the requirement for obtaining a Department of the Army permit.

If you have any questions concerning this correspondence, please contact Andrea Williams, Project Manager, CT/RI Section of the New England District Office at 978-318-8494, by mail at the above address, or by email at andrea.n.williams@usace.army.mil. Please take a moment to complete our customer satisfaction survey located at https://regulatory.ops.usace.army.mil/customer-service-survey/.

Sincerely,

Kevin R Kotelly

Kevin Kotelly, P.E.
Chief, CT/RI Section

Enclosures

cc: Erica Sachs, U.S. EPA; sachs.erica@epa.gov

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: Kimberly Peace	File Number: NAE-2022-00290	Date: 10/10/2024
Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL WITHOUT PREJUDICE	C
	PERMIT DENIAL WITH PREJUDICE	D
X	APPROVED JURISDICTIONAL DETERMINATION	E
	PRELIMINARY JURISDICTIONAL DETERMINATION	F

SECTION I

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.

- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL WITHOUT PREJUDICE: Not appealable
You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

D: PERMIT DENIAL WITH PREJUDICE: You may appeal the permit denial
You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information for reconsideration

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

- RECONSIDERATION: You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

F: PRELIMINARY JURISDICTIONAL DETERMINATION: Not appealable
You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision you may contact:	If you have questions regarding the appeal process, or to submit your request for appeal, you may contact:
Ryan Malterud Acting Deputy Chief, Regulatory Division U.S. Army Corps of Engineers, New England District 696 Virginia Road Concord, MA 01742-2751 Phone: (651)508-2261 Email: Ryan.M.Malterud@usace.army.mil	Mr. Andrew Dangler, Regulatory Appeals Review Officer U.S. Army Corps of Engineers North Atlantic Division – Fort Hamilton 301 John Warren Avenue – First Floor Brooklyn, NY 11252-6700 Mobile: (518) 487-0215 Email: andrew.c.dangler@usace.army.mil

SECTION II – REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

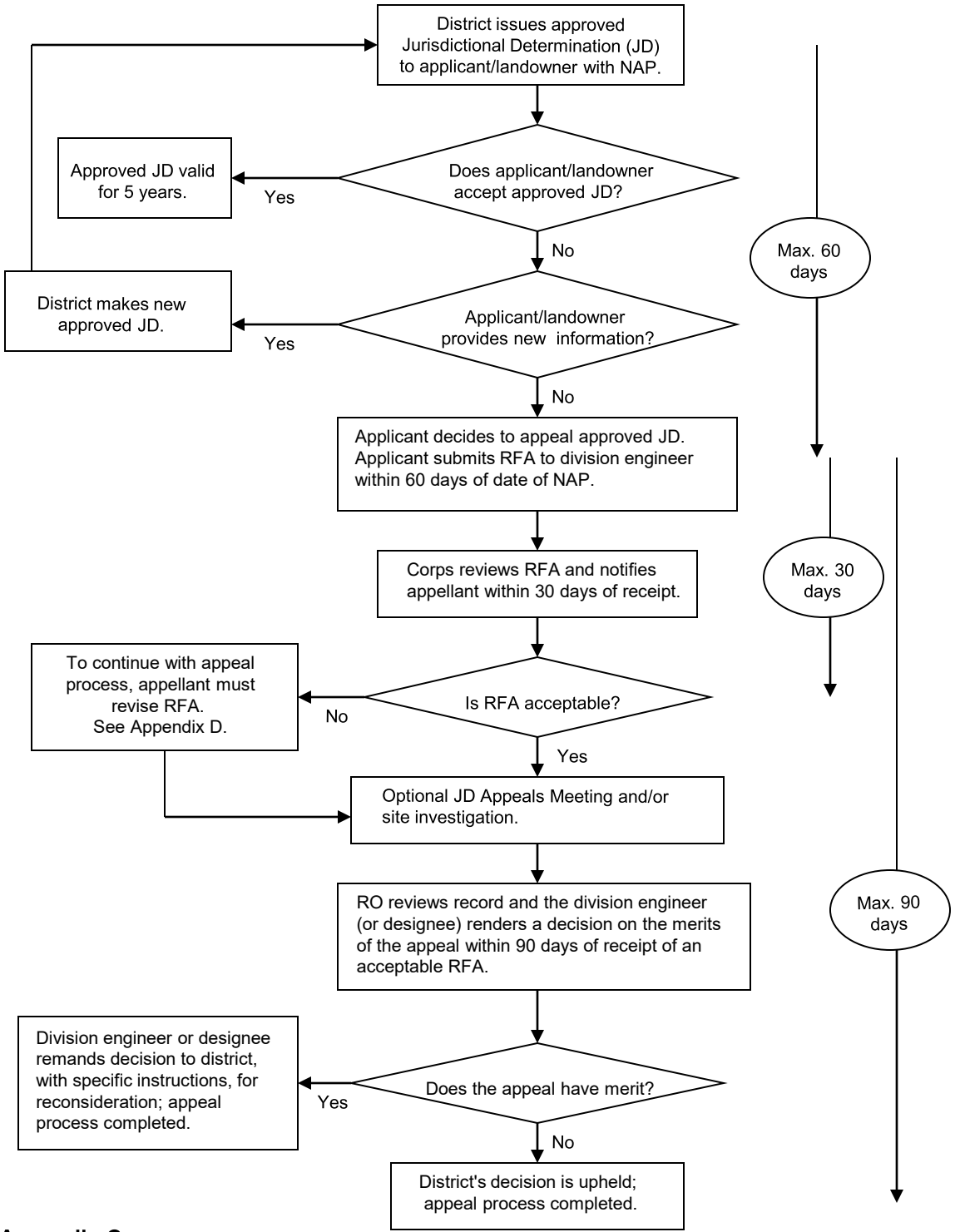
REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. Use additional pages as necessary. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15-day notice of any site investigation and will have the opportunity to participate in all site investigations.

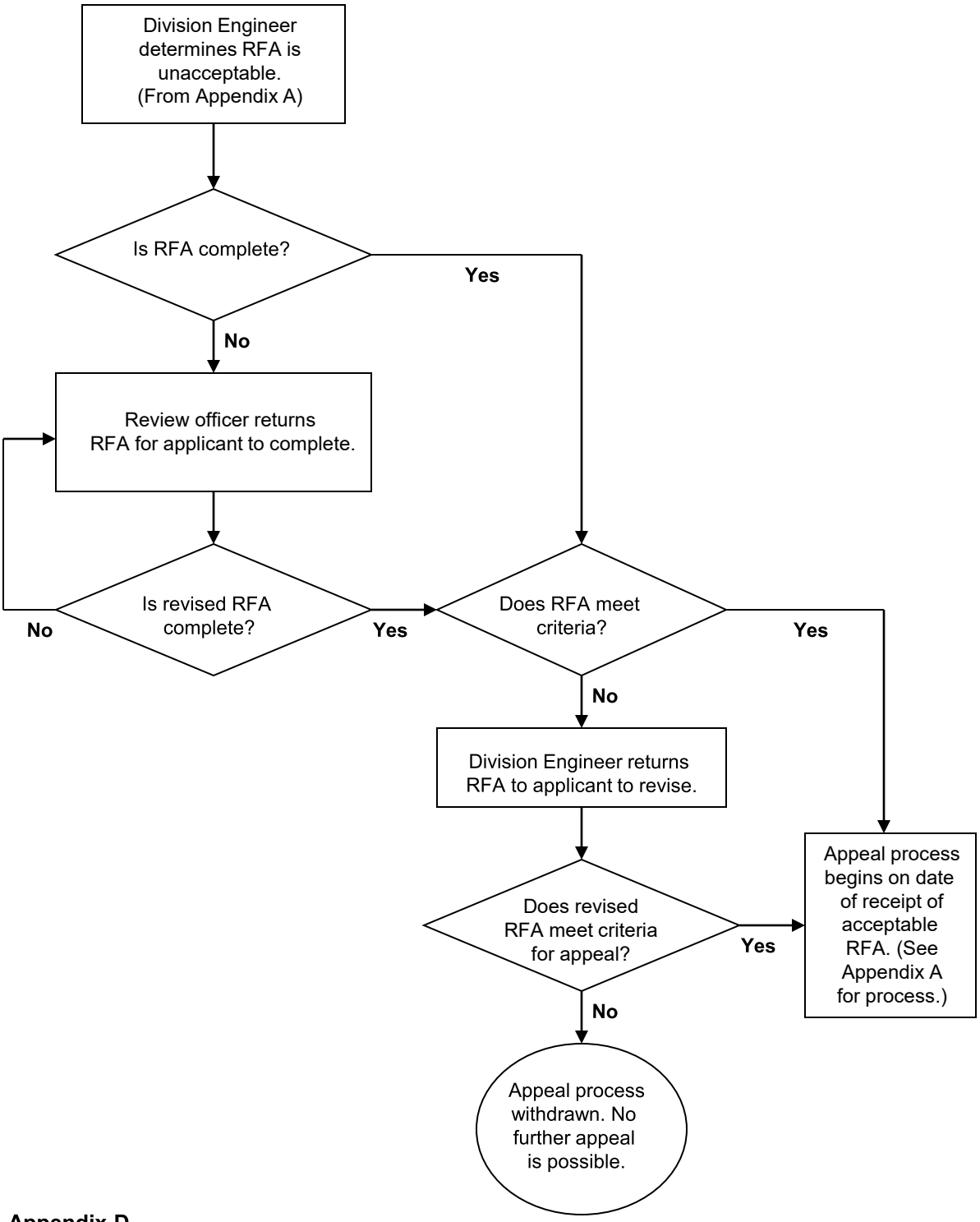
_____ Signature of appellant or agent.	Date:
Email address of appellant and/or agent:	Telephone number:

Administrative Appeal Process for Approved Jurisdictional Determinations



Appendix C

Process for Unacceptable Request for Appeal



Appendix D

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

CENAE-RD-CTRI 10 October 2024

MEMORANDUM FOR RECORD

SUBJECT: US Army Corps of Engineers (USACE) Approved Jurisdictional Determination in accordance with the "Revised Definition of 'Waters of the United States'"; (88 FR 3004 (January 18, 2023) as amended by the "Revised Definition of 'Waters of the United States'; Conforming" (8 September 2023) ,[1] NAE-2022-00290 MFR 1 of 1.[2]

BACKGROUND. An Approved Jurisdictional Determination (AJD) is a USACE document stating the presence or absence of waters of the United States on a parcel or a written statement and map identifying the limits of waters of the United States on a parcel. AJDs are clearly designated appealable actions and will include a basis of JD with the document.[3] AJDs are case-specific and are typically made in response to a request. AJDs are valid for a period of five years unless new information warrants revision of the determination before the expiration date or a District Engineer has identified, after public notice and comment, that specific geographic areas with rapidly changing environmental conditions merit re-verification on a more frequent basis.[4]

On January 18, 2023, the Environmental Protection Agency (EPA) and the Department of the Army ("the agencies") published the "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023) ("2023 Rule"). On September 8, 2023, the agencies published the "Revised Definition of 'Waters of the United States'; Conforming", which amended the 2023 Rule to conform to the 2023 Supreme Court decision in *Sackett v. EPA*, 598 U.S., 143 S. Ct. 1322 (2023) ("*Sackett*").

This Memorandum for Record (MFR) constitutes the basis of jurisdiction for a USACE AJD as defined in 33 CFR §331.2. For the purposes of this AJD, we have relied on Section 10 of the Rivers and Harbors Act of 1899 (RHA),[5] the 2023 Rule as amended,

[1] While the Revised Definition of "Waters of the United States"; Conforming had no effect on some categories of waters covered under the CWA, and no effect on any waters covered under RHA, all categories are included in this Memorandum for Record for efficiency.
[2] When documenting aquatic resources within the review area that are jurisdictional under the Clean Water Act (CWA), use an additional MFR and group the aquatic resources on each MFR based on the TNW, the territorial seas, or interstate water that they are connected to. Be sure to provide an identifier to indicate when there are multiple MFRs associated with a single AJD request (i.e., number them 1, 2, 3, etc.).
[3] 33 CFR 331.2.
[4] Regulatory Guidance Letter 05-02.
[5] USACE has authority under both Section 9 and Section 10 of the Rivers and Harbors Act of 1899 but for convenience, in this MFR, jurisdiction under RHA will be referred to as Section 10.

as well as other applicable guidance, relevant case law, and longstanding practice in evaluating jurisdiction.

1. SUMMARY OF CONCLUSIONS.

    a. There are three (3) delineated aquatic resource features within the project's review area:

        i. Wetland 4 (1.32-acres; 57,499 sf), non-jurisdictional Section 404

        ii. Wetland 5 (2.45-acres; 106,722 sf), non-jurisdictional Section 404

        iii. Wetland 6 (14.96-acres; 651,657 sf), jurisdictional Section 404

2. REFERENCES.

    a. "Revised Definition of 'Waters of the United States,'" 88 FR 3004 (January 18, 2023) ("2023 Rule")

    b. "Revised Definition of 'Waters of the United States'; Conforming" 88 FR 61964 (September 8, 2023)

    c. *Sackett v. EPA*, 598 U.S., 143 S. Ct. 1322 (2023)

3. REVIEW AREA.

The AJD review area consists of Tweed New Haven Regional Airport (the "Airport") is a public airport located in the City of New Haven and Town of East Haven, CT, owned and operated by the City of New Haven (see Figure 1, Figure 2). The property is located along the New Haven-East Haven town-line with Long Island Sound approximately ¾-mile to the south, New Haven Harbor ¼ mile to the west, and Morris Cove approximately ¼-mile to the southwest. The Airport has two asphalt runways, Runway 2-20 which is approximately 5,200 feet long by approximately 150 feet wide oriented north-south, and Runway 14-32 (currently not in use) which is approximately 3,600 feet long by 100 feet wide with a northwest – southeast orientation.

According to field observations and a review of recent aerial photographs of the review area (Image 3), the Airport is set within a mixed residential, commercial, and industrial area. To the west of the Airport (between Dean Street and Townsend Avenue), land use is mostly residential whereas to the east (along Proto Drive and Commerce Street), it is mostly industrial. There is undeveloped land (wetlands) to the south of Runway 2-20 and to the southeast of the HVN property boundary.

Areas interior to and surrounding the runways and taxiways are comprised of maintained grasslands. Along the southwestern, southern, and southeastern perimeter of the airport are extensive vegetated tidal wetland systems with constructed channels and areas of open water. Inland wetlands occur at the northwestern, northern, northeastern, and eastern edges of the runway and taxiway areas. Some of the inland wetlands appear to have been constructed as drainage features as they do not appear on U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) (Figure 4) or CT Department of Energy and Environmental Protection (CTDEEP) wetland mapping. Previous wetland delineations by others did not identity wetland resources within these infield areas (Figure 3a) and a request for a jurisdictional determination was submitted for these wetlands.

Project Review Area
The Project Review Area is outlined in Figure 3A (yellow outline) with a center point at latitude/longitude: 41.261029N, 72.882639W. Figure 3d depicts the layout of the delineated wetlands (green dotted outline) and the potential avenue on the project site.

Historic aerial photographs show that the Project Review Area has been extensively modified since before the 1930s. Aerial imagery from 1934 (Image 1) shows unmodified land and a watercourse system that flows right through where the airport runways would be placed between 1934 and 1949 (Image 2).

4. NEAREST TRADITIONAL NAVIGABLE WATER (TNW), THE TERRITORIAL SEAS, OR INTERSTATE WATER TO WHICH THE AQUATIC RESOURCE IS CONNECTED. [6]
   Morris Creek is a tidally influenced system made of salt marshes and controlled by a tide gate located at 41.250692N, 72.892217W which discharges into Long Island Sound.

5. FLOWPATH FROM THE SUBJECT AQUATIC RESOURCES TO A TNW, THE TERRITORIAL SEAS, OR INTERSTATE WATER.
   i. Wetland 1-3; 7 (outside of Review Area): Delineated wetlands directly abut relatively permanent water or have a distinct flow path to a TNW (Figure 3A).
   ii. Wetland 4 (within the Review Area): Delineated wetland area does not physically abut or touch an (a)(1), (a)(2), or (a)(3) water, nor does it have a continuous surface connection to such waters via a non-jurisdictional conveyance (e.g., swale, culvert, storm drain) (Image 4 and 5).

[6] This MFR should not be used to complete a new stand-alone TNW determination. A stand-alone TNW determination for a water that is not subject to Section 9 or 10 of the Rivers and Harbors Act of 1899 (RHA) is completed independently of a request for an AJD. A stand-alone TNW determination is conducted for a specific segment of river or stream or other type of waterbody, such as a lake, where upstream or downstream limits or lake borders are established.

iii. Wetland 5 (within the Review Area): Delineated wetland area does not physically abut or touch an (a)(1), (a)(2), or (a)(3) water, nor does it have a continuous surface connection to such waters via a non-jurisdictional conveyance (e.g., swale, culvert, storm drain) (Image 6 – 9).

iv. Wetland 6 (within the Review Area): Delineated wetland area including Wetland 6A and 6B (Image 10, 14, and 15) has a continuous surface connection to a perennial stream system that connects through a network of streams, wetland systems, and drainage ditches. Wetland 6 drains to the south to Tuttle Brook, a tributary of Morris Creek, which deposits into Long Island Sound. Conveyance methods were observed in the form of culverts along Pig Farm Road (Image 11 and 12) and at the end of Pig Farm Road running parallel to Proto Drive (Image 13).

6. SECTION 10 JURISDICTIONAL WATERS[7]: Describe aquatic resources or other features within the review area determined to be jurisdictional in accordance with Section 10 of the Rivers and Harbors Act of 1899. Include the size of each aquatic resource or other feature within the review area and how it was determined to be jurisdictional in accordance with Section 10.[8]

   There are no resources subject to Section 10 of the Rivers and Harbors Act of 1899 in the review area.

7. SECTION 404 JURISDICTIONAL WATERS: Describe the aquatic resources within the review area that were found to meet the definition of waters of the United States in accordance with the 2023 Rule as amended, consistent with the Supreme Court's decision in *Sackett*. List each aquatic resource separately, by name, consistent with the naming convention used in section 1, above. Include a rationale for each aquatic resource, supporting that the aquatic resource meets the relevant category of "waters of the United States" in the 2023 Rule as amended. The rationale should also include a written description of, or reference to a map in the administrative record that shows, the lateral limits of jurisdiction for each aquatic resource, including how that limit was determined, and incorporate relevant references used. Include the size of each aquatic resource in acres or linear feet and attach and reference related figures as needed.

[7] 33 CFR 329.9(a) A waterbody which was navigable in its natural or improved state, or which was susceptible of reasonable improvement (as discussed in § 329.8(b) of this part) retains its character as "navigable in law" even though it is not presently used for commerce, or is presently incapable of such use because of changed conditions or the presence of obstructions.

[8] This MFR is not to be used to make a report of findings to support a determination that the water is a navigable water of the United States. The district must follow the procedures outlined in 33 CFR part 329.14 to make a determination that water is a navigable water of the United States subject to Section 10 of the RHA.

a. Traditional Navigable Waters (TNWs) (a)(1)(i): N/A

b. The Territorial Seas (a)(1)(ii): N/A

c. Interstate Waters (a)(1)(iii): N/A

d. Impoundments (a)(2): N/A

e. Tributaries (a)(3):

f. Adjacent Wetlands (a)(4): Wetland 6 is a 14.96-acre, contiguous wetland system characterized by two different wetland types: Wetland 6A consists of palustrine emergent wetlands within a mowed lawn airfield. Wetland 6B consists of a palustrine forested broad-leaved deciduous, seasonally saturated, wetland (PFO1E), and bordering palustrine emergent wetlands (PEM2) containing non-persistent, persistent and Phragmites-dominated subclasses. An upper reach of Morris Creek bisects the PFO portion of this wetland east of Taxiway C and Runway 32. Sheet flow runoff from the adjacent runways and taxiways and direct precipitation contribute to the hydrology of this wetland, however portions of the wetland are transected by permanently flooded / excavated channels lending evidence of a suspected high groundwater elevation. Seasonal flooding along Morris Creek also likely contributes to the sustaining hydrology of the wetland. *Acer rubrum* dominates the PFO portion, while *Phragmites australis* has significant cover in the PEM portion. Other hydrophytes noted included the following: *Lindera benzoin*, *Vaccinium corymbosum*, *Ilex verticillata*, *Viburnum dentatum*, *Clethra alnifolia*, *Lythrum salicaria*, *Spiraea tomentosa*, *Euthrochium maculatum*, *Juncus effusus*, *Euthamia caroliniana*, *Eupatorium perfoliatum*, , and east of Taxiway C (Wetland 6B). To the west of the former runway 14/32 within the mowed portion of the RSA (Wetland 6A), the wetland is dominated by *Paspalum laeve*, *Rhynchospora capitellata, Cyperus strigosu*s, and *Setaria pumila* ssp. *pumila*.

To determine the potential for Wetland 6 to have a continuous surface connection to waters of the U.S., staff reviewed aerial photographs from 1934 to 1990 (Images 1 – 3). During a site visit on July 22, 2024, staff observed culverts installed along Proto Drive and Pig Farm Road that provide an observable connection between Wetland 6 and the unnamed stream that drains into tidal wetlands and Morris Creek. Consequently, we evaluated field site dates for the site visit date for antecedent precipitation and compared the precipitation to a normal range. Our antecedent precipitation analysis result (Figure 5) revealed wetter than normal conditions. A review of hydrologic connectivity and USGS

StreamStats show the natural and artificial connection from Wetland 6 to Morris Creek (Figure 6, Figure 7). To validate this concept, staff analyzed the State of Connecticut 2016 LiDAR elevation data (Figure 8) for water conveyance through the project review area. In addition, photographs taken from the site visit depict two culverts that allow flow from Wetland 6 and the unnamed stream abutting the wetland to tidal wetlands downstream and Morris Creek (Image 11 – 13). Our evaluation revealed evidence that Wetland 6 has a continuous surface connection via non-jurisdictional conveyance (culverts). Consequently, the wetland area contributes flow to Morris Creek and Long Island Sound.

g. Additional Waters (a)(5): N/A

8. NON-JURISDICTIONAL AQUATIC RESOURCES AND FEATURES

a. Describe aquatic resources and other features within the review area identified in the 2023 Rule as amended as not "waters of the United States" even where they otherwise meet the terms of paragraphs (a)(2) through (5). Include the type of excluded aquatic resource or feature, the size of the aquatic resource or feature within the review area and describe how it was determined to meet one of the exclusions listed in 33 CFR 328.3(b).[9]

The applicant did not identify or delineate any non-jurisdictional excluded water features in the Review Area. Aerial imagery from 1934 onward do not depict any farmland or roadside ditches within the project Review Area.

b. Describe aquatic resources and features within the review area that were determined to be non-jurisdictional because they do not meet one or more categories of waters of the United States under the 2023 Rule as amended (e.g., tributaries that are non-relatively permanent waters; non-tidal wetlands that do not have a continuous surface connection to a jurisdictional water).

i. Wetland 4: We evaluated the 1.32-acre resource feature identified as Wetland 4 for potential landscape connectivity and a continuous surface connection to waters described in Section 4 above. Wetland 4 is a shallow drainage area located north of Runway 32 and is bound by Taxiway C to the northeast and Taxiway H to the southwest. The consultant characterized Wetland 4 as a palustrine emergent, nonpersistent, intermittently flooded/saturated (PEM2J) wetland. It receives sheet flow runoff from the impervious runways and tarmacs. It is dominated by various species of hydrophytic plant species such as *J. effusus*, *C. strigosus*, *Rumex crispus*, *P. laeve*, and *Symphyotrichum*

[9] 88 FR 3004 (January 18, 2023)

lateriflorum. A catch basin serves as the outlet that regulates the surface water level of the wetland when it receives collected stormflows. Based upon its morphology and drainage structures, it appears that this wetland has formed within a drainage area that was constructed with the adjacent Runway 14/32 and Taxiways Band C were built. While it is a routinely mowed lawn, since Runway 14/32 has not been used for years, routine maintenance of the basin has declined which may have allowed for the development of hydrophytic plant community. Refer to Table 1, Figure 3d, and Images 4 and 5.

ii. Wetland 5: We evaluated the 2.45-acre resource feature identified as Wetland 5 for potential landscape connectivity and a continuous surface connection to waters described in Section 4 above. Wetland 5 is a shallow drainage area bounded by Taxiway C to the northeast and southeast, Taxiway H to the northwest, and former Runway 32 to the southwest. The consultant characterized the wetland as palustrine emergent, nonpersistent, intermittently flooded (PEM2J) that collects sheet flow runoff and direct precipitation. During the initial delineation, high levels of standing water were observed in this catch basin, which may indicate high groundwater levels in this area. Hydrophytic vegetation observed within this wetland included the following: *J. effusus*, *C. strigosus*, *P. leave*, *Coleataenia longifolia* ssp. *longifolia*, *Echinochloa muricata*, *Eleocharis obtusa*, *Juncus acuminatus*, *Ludwigia palustris*, *Persicaria hydropiperoides*, *Schoenoplectus pungens* var. *pungens*, *S. pumila* ssp. *pumila*, and *S. lateriflorum*. A catch basin serves as the outlet that regulates the surface water level of the wetland when it receives stormflows. Based upon its morphology and drainage structures, this wetland may have also formed within a drainage area that was constructed with the adjacent Runway 14/32 and Taxiways Band C were built, similar to Wetland 4. Wetland 5 was a routinely mowed lawn, however, since Runway 14/32 has not been used for years, routine maintenance of the basin has declined. Refer to Table 1, Figure 3d, and Images 6 – 9.

9. DATA SOURCES. List sources of data/information used in making determination. Include titles and dates of sources used and ensure that information referenced is available in the administrative record.

   a. Field visit completed on 22 July 2024

   b. CT ECO UCONN Aerial and Lidar Elevation Viewers (2019, 2012, 2009, 2004, and 1934 Aerial Photographs and 2016 Elevation); 30 August 2024

   c. U.S. Fish and Wildlife Service National Wetlands Inventory Mapper; 30 August 2024

d. Antecedent Precipitation Tool; 30 August 2024

e. National Regulatory Viewer, North Atlantic division, Connecticut; 22 April 2024

f. U.S. Geological Survey StreamStats; 30 August 2024

g. CT State Library Aerial Survey 1965; 11 September 2024

h. U.S. Department of Agriculture, Natural Resources Conservation Service Web Soil Survey; 11 September 2024

10. OTHER SUPPORTING INFORMATION. N/A

11. NOTE: The structure and format of this MFR were developed in coordination with the EPA and Department of the Army. The MFR's structure and format may be subject to future modification or may be rescinded as needed to implement additional guidance from the agencies; however, the approved jurisdictional determination described herein is a final agency action.

PREPARED BY:

Andrea Williams Date: 9/30/2024
Andrea Williams
Regulatory Project Manager

REVIEWED BY:

Paul Minkin
Date: 9-30-2024
Paul Minkin
Senior Wetland Scientist

APPROVED BY:

Kevin R Kotelly Date: 10-10-2024
Kevin Kotelly, P.E.
Chief, CT/RI Section

Figure 1: Site Location Map



Figure 2: Wetland and Watercourse Delineation Map

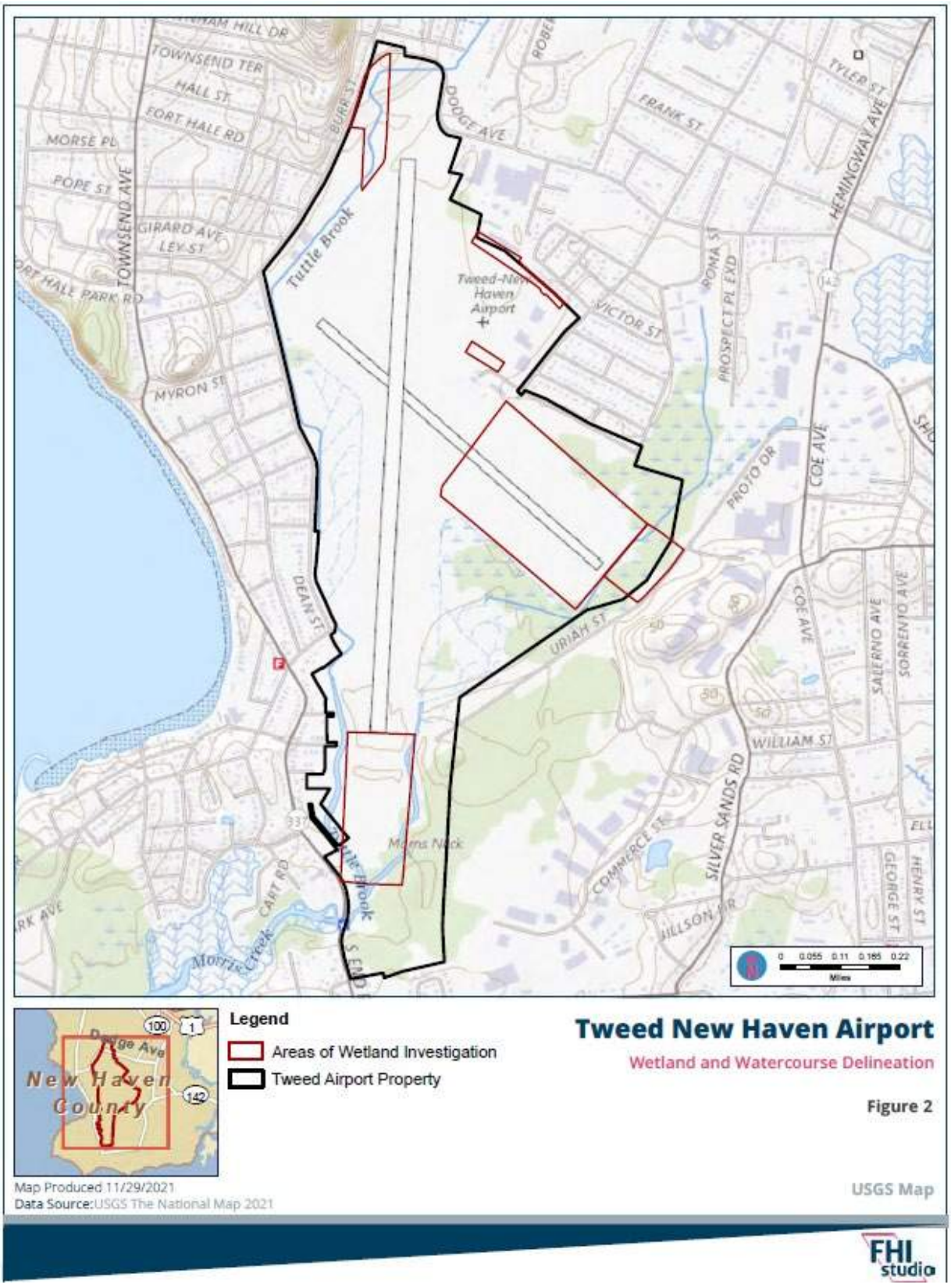


Figure 3A: Delineated Wetland Map



Figure 3d: Wetlands for AJD

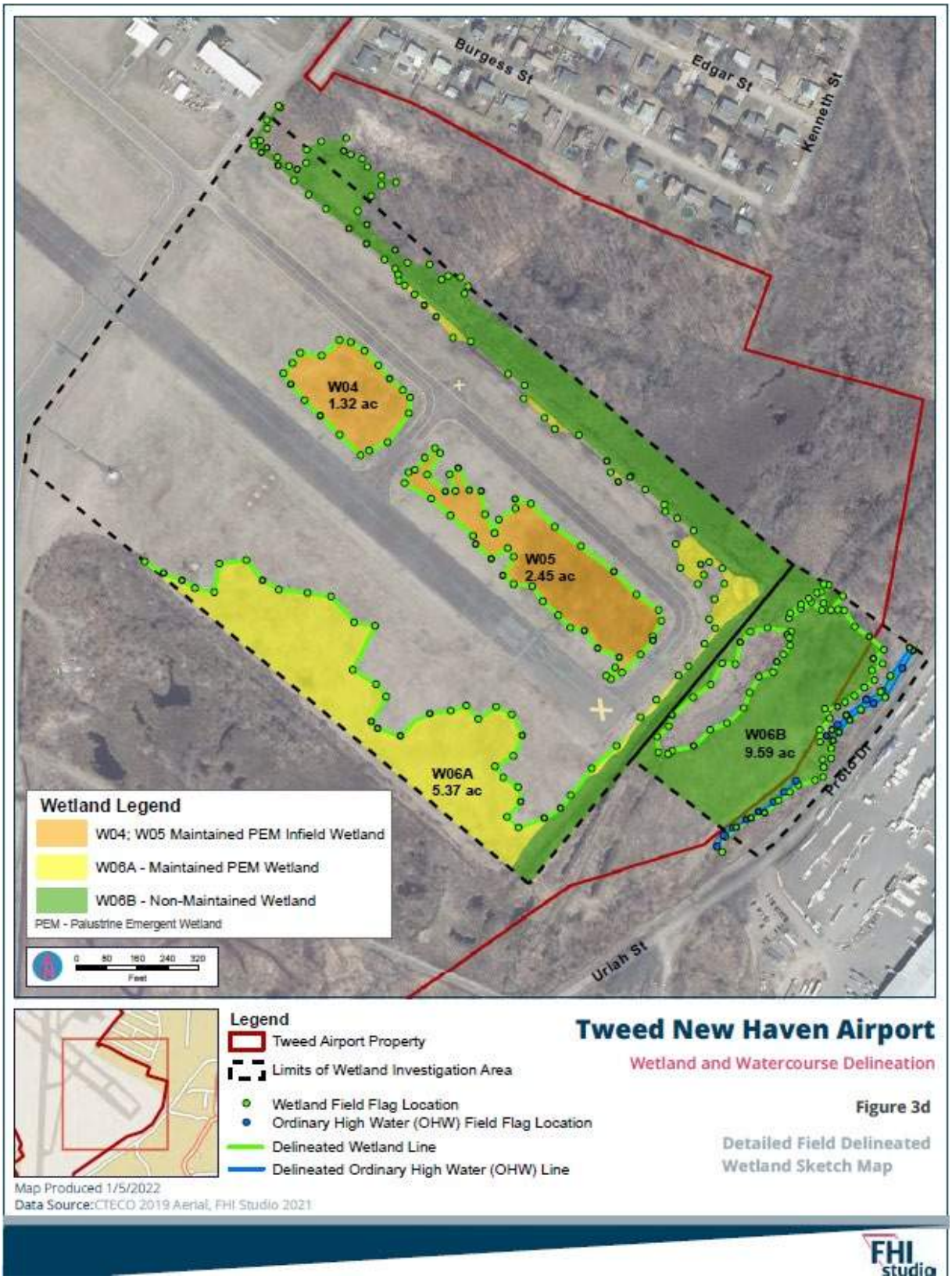


Figure 4: U.S. Fish and Wildlife Service National Wetlands Inventory Map

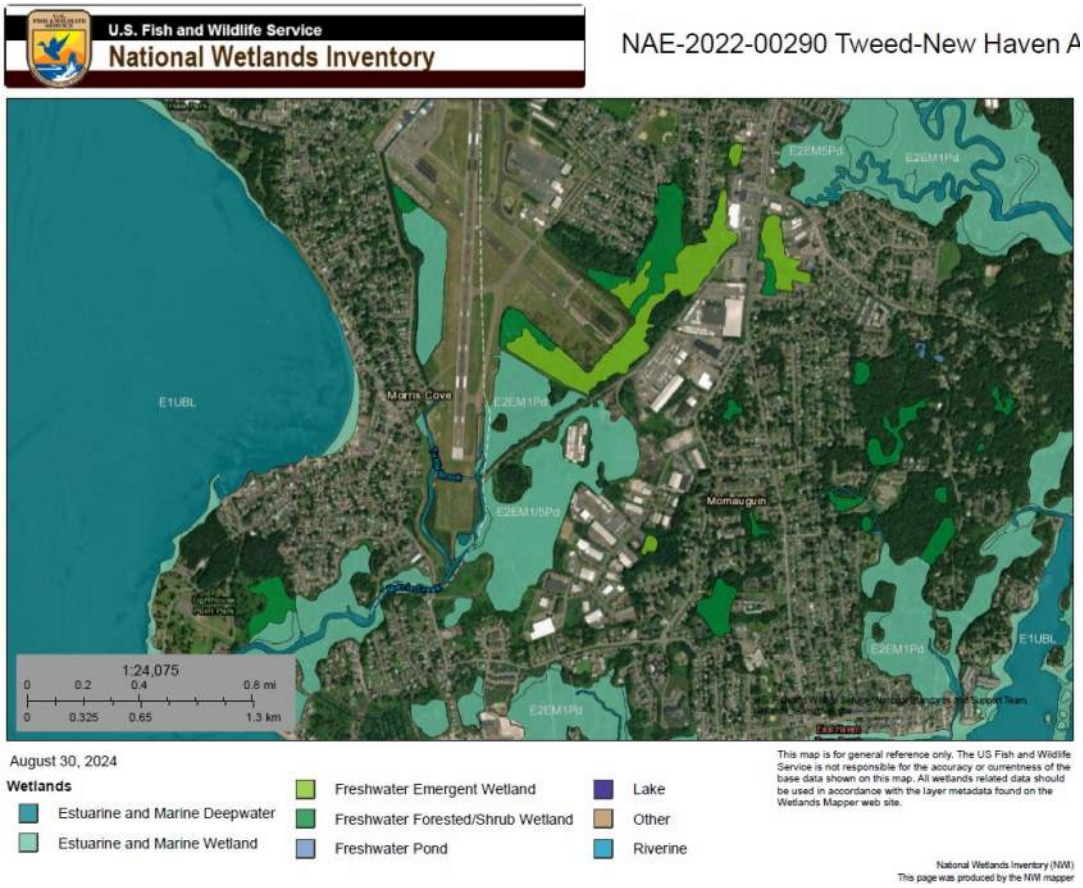


Figure 5: Antecedent Precipitation Tool 07-22-2024

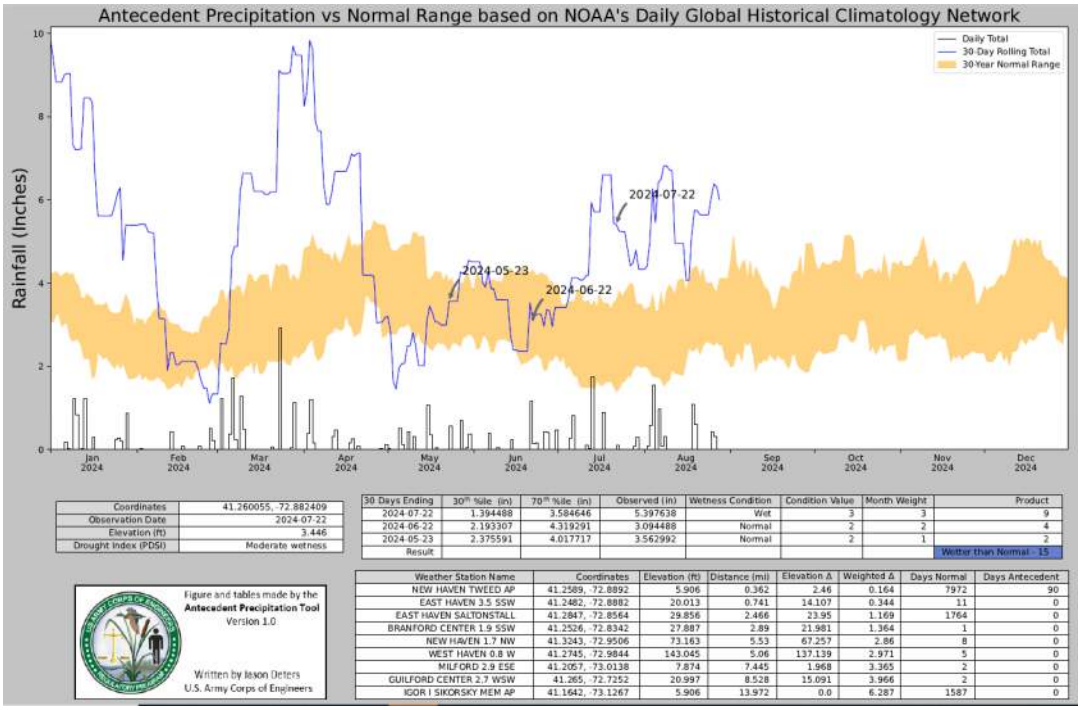


Figure 6: National Hydrography Dataset

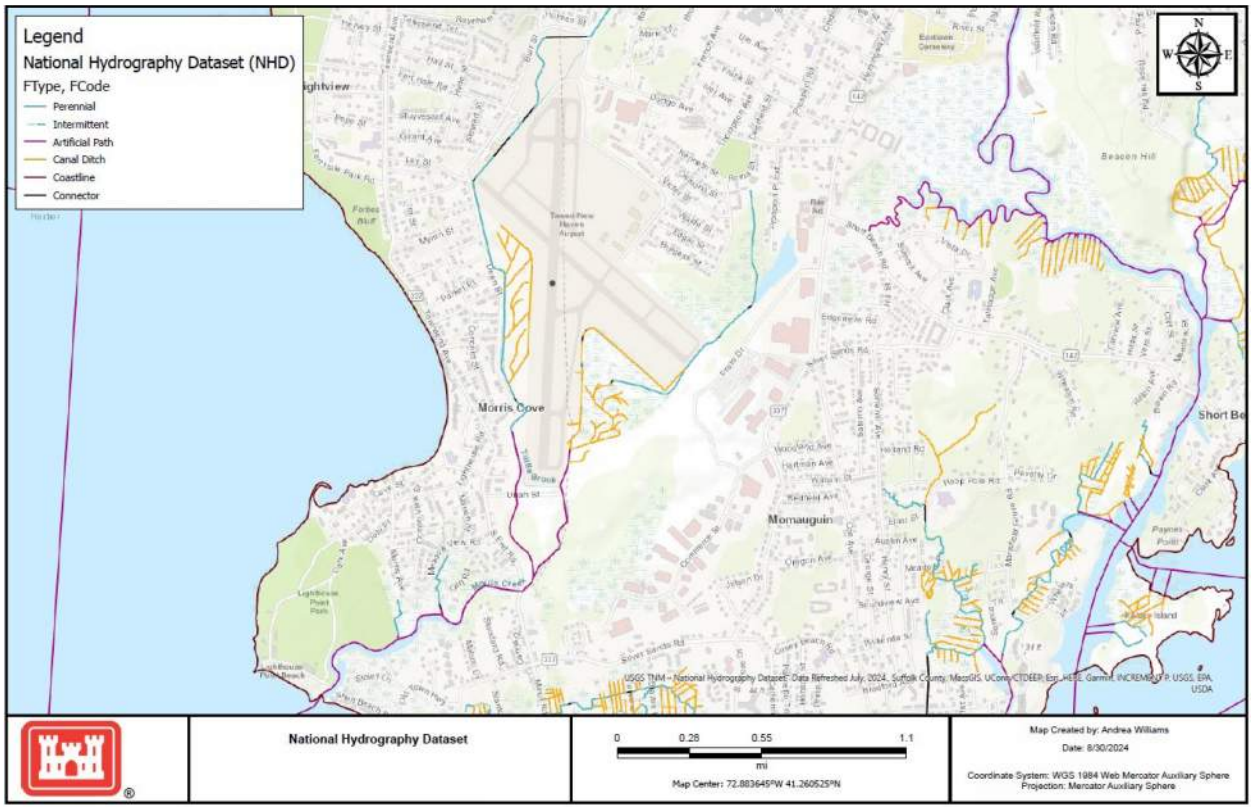


Figure 7: USGS StreamStats Map



Figure 8: Connecticut Elevation Map

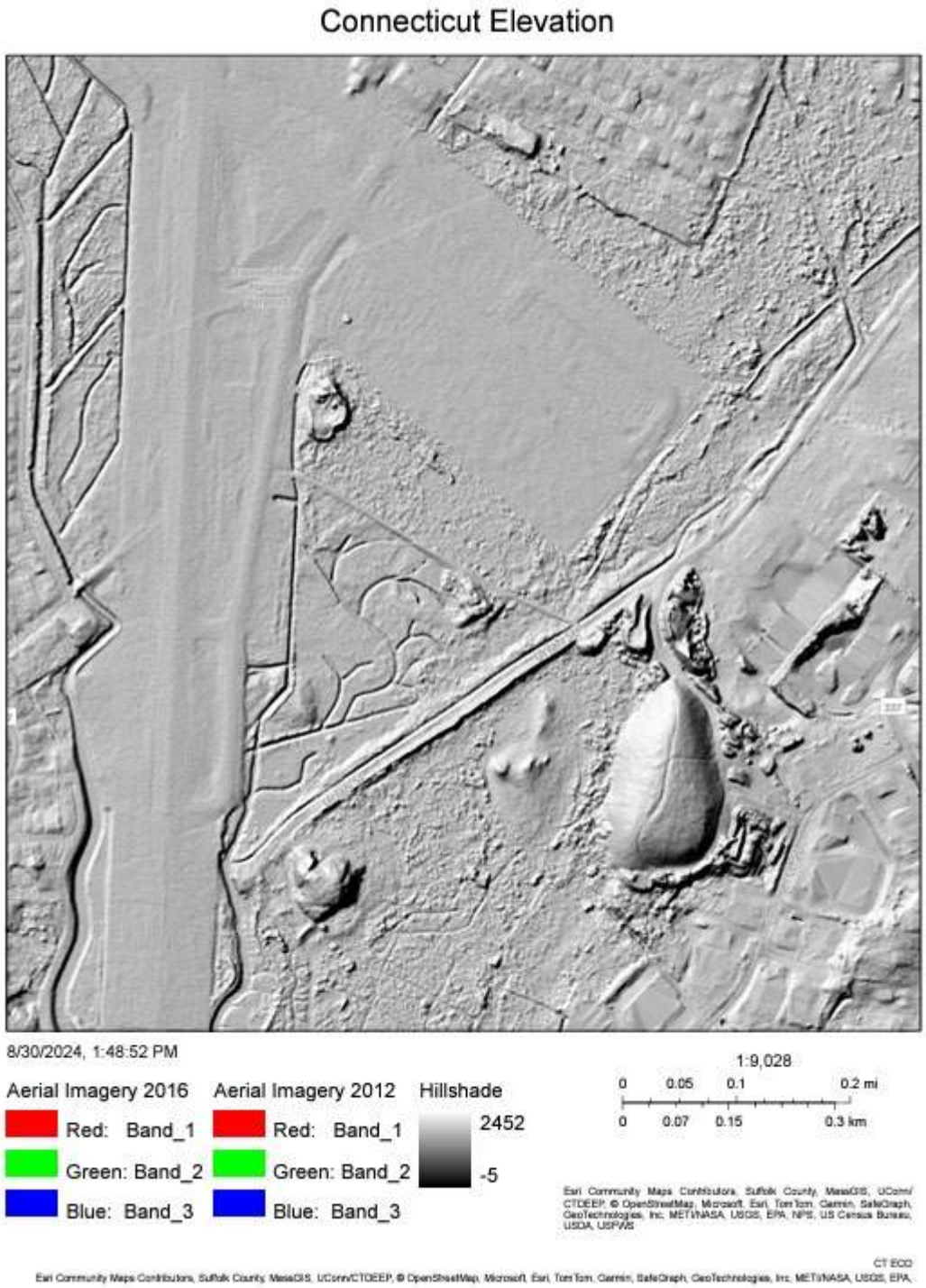
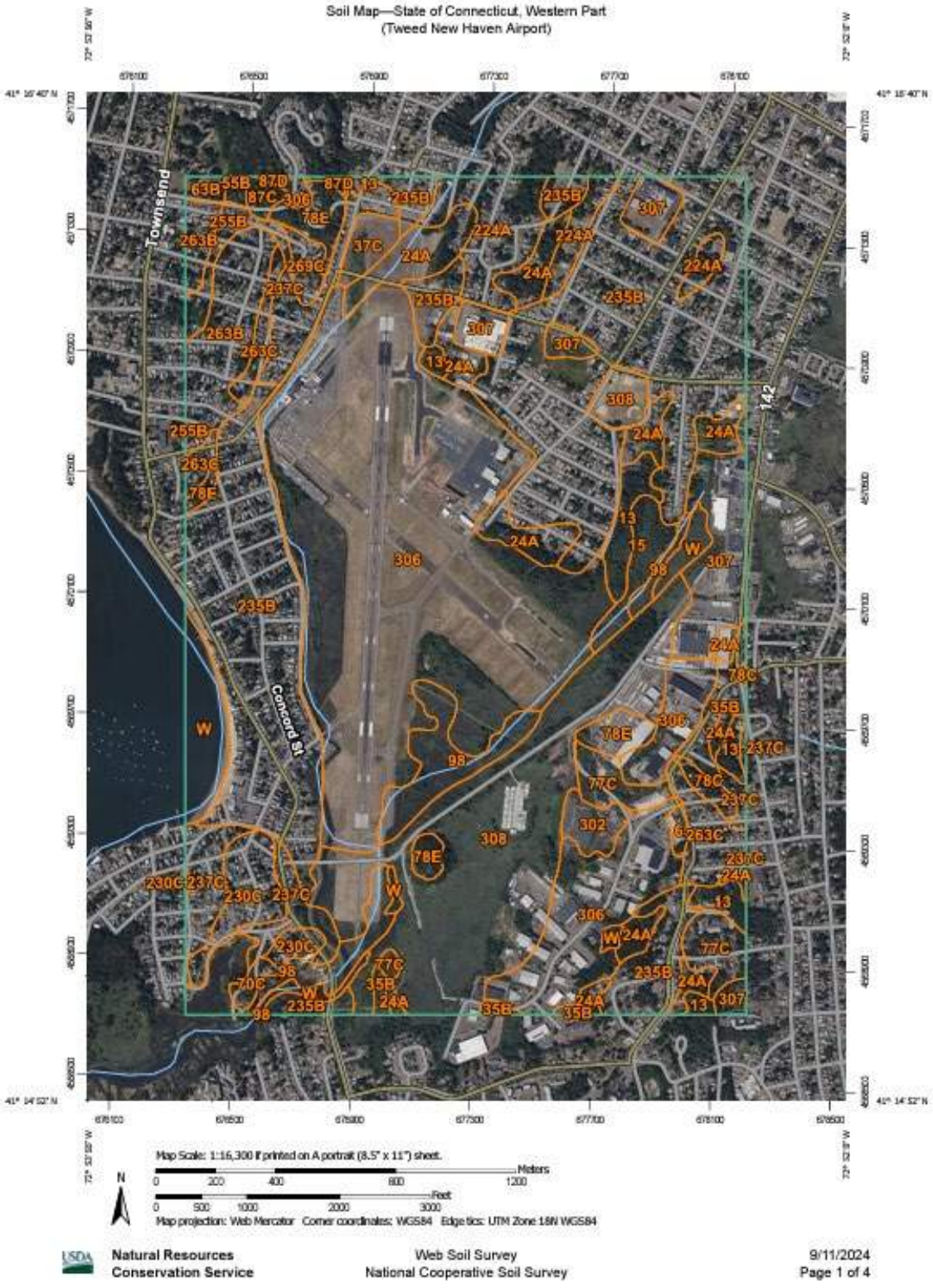


Figure 9: USDA Web Soil Survey Map



Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	2.0	0.2%
13	Walpole sandy loam, 0 to 3 percent slopes	21.7	1.7%
15	Scarboro muck, 0 to 3 percent slopes	10.8	0.8%
24A	Deerfield loamy fine sand, 0 to 3 percent slopes	61.3	4.8%
35B	Penwood loamy sand, 3 to 8 percent slopes	12.9	1.0%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	7.3	0.6%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	1.5	0.1%
63B	Cheshire fine sandy loam, 3 to 8 percent slopes	2.8	0.2%
70C	Branford-Holyoke complex, 3 to 15 percent slopes, very rocky	3.0	0.2%
77C	Cheshire-Holyoke complex, 3 to 15 percent slopes, very rocky	21.1	1.6%
78C	Holyoke-Rock outcrop complex, 3 to 15 percent slopes	4.0	0.3%
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes	20.5	1.6%
87C	Wethersfield loam, 8 to 15 percent slopes	3.3	0.3%
87D	Wethersfield loam, 15 to 25 percent slopes	1.5	0.1%
98	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	46.1	3.6%
224A	Deerfield-Urban land complex, 0 to 3 percent slopes	37.9	2.9%
230C	Branford-Urban land complex, 8 to 15 percent slopes	20.8	1.6%
235B	Penwood-Urban land complex, 0 to 8 percent slopes	302.4	23.5%
237C	Manchester-Urban land complex, 3 to 15 percent slopes	44.1	3.4%
255B	Watchaug-Urban land complex, 0 to 8 percent slopes	9.0	0.7%
263B	Cheshire-Urban land complex, 3 to 8 percent slopes	36.5	2.8%
263C	Cheshire-Urban land complex, 8 to 15 percent slopes	22.5	1.7%
269C	Yalesville-Urban land complex, 8 to 15 percent slopes	5.5	0.4%
302	Dumps	7.8	0.6%
306	Udorthents-Urban land complex	353.8	27.5%
307	Urban land	48.6	3.8%
308	Udorthents, smoothed	148.6	11.6%
W	Water	28.8	2.2%
Totals for Area of Interest		**1,286.0**	**100.0%**

Image 1: 1934 Aerial Image



Image 2: 1965 CT State Library Aerial Image



Image 3: CT ECO Viewers 2019 Aerial Image



Image 4: Mapped Photo Log (Wetland 4)



Image 5: Mapped Photo Log (Wetland 4)



Image 6: Mapped Photo Log (Wetland 5)



Image 7: Mapped Photo Log (Wetland 5)



Image 8: Mapped Photo Log (Wetland 5)



Image 9: Mapped Photo Log (Wetland 5)



Image 10: Mapped Photo Log (Wetland 6B)



Image 11: Mapped Photo Log (Culvert 1 SW side-Pig Farm Road)



Image 12: Mapped Photo Log (Culvert 1 NE Side-Pig Farm Road)



Image 13: Mapped Photo Log (Culvert 2- Proto Drive)

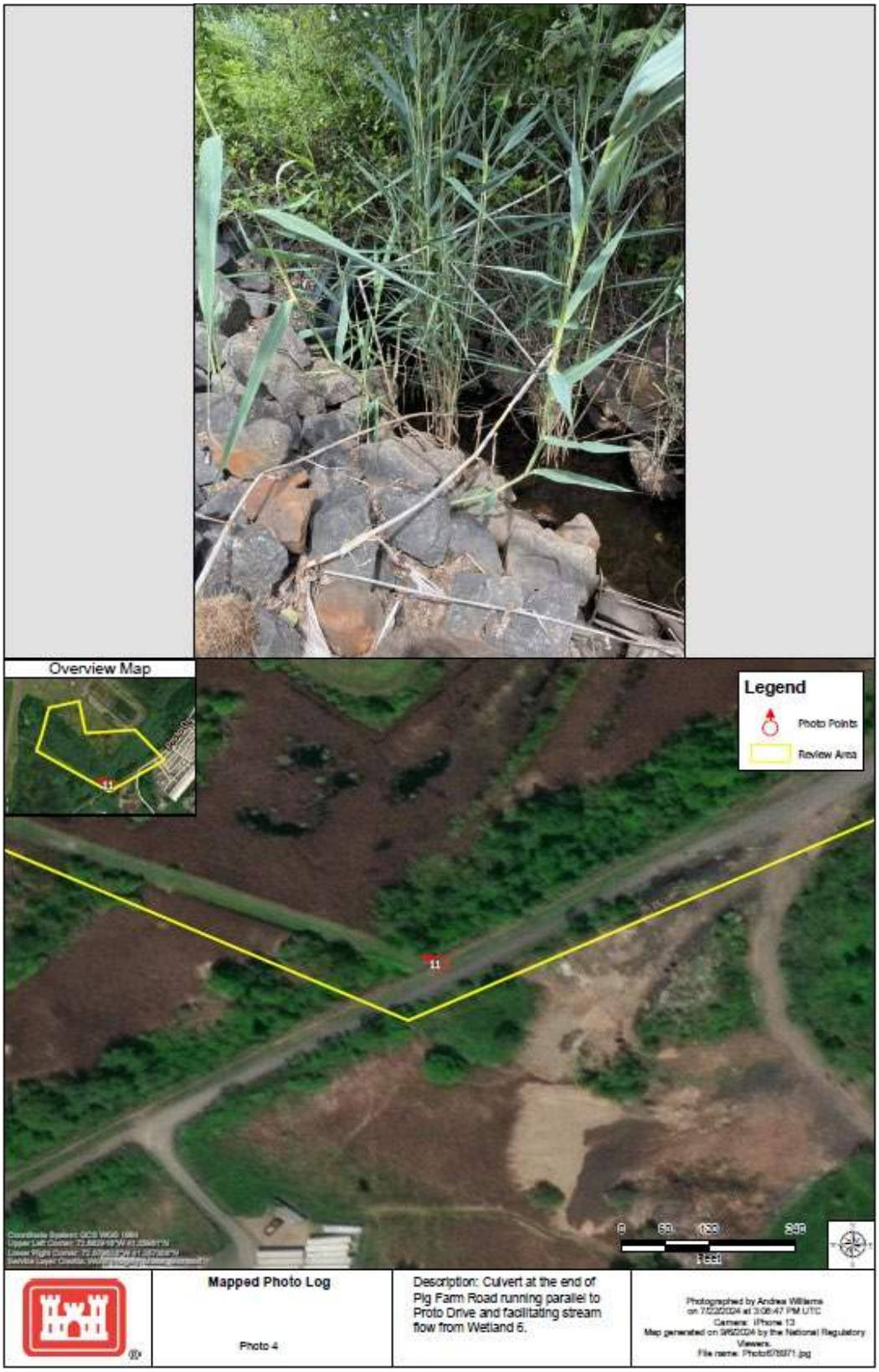


Image 14: Mapped Photo Log (Wetland 6A)



Image 15: Mapped Photo Log (Wetland 6B)



Table 1: Wetlands within the Limit if Wetland Delineation

Wetland ID (flagging sequence)	Wetland Type [a]	General Description	Soil Type (drainage class)	Principal Functions and Values of the Wetland	Characteristic Vegetation (indicator status) [b]
Wetland 1 (OHWA1-A33; OHWB1-B11; E1-E48)	R2UB2/4 and PEM1/5	A relocated reach of Tuttle Brook flanked by bordering vegetated wetland dominated by emergent persistent vegetation.	Walpole (Poorly Drained) and Scarboro (Very Poorly Drained)	Sediment/Toxicant Retention Nutrient Removal Production Export	*Sambucus nigra* (FACW) *Alnus sp.* *Phragmites australis* (FACW) *Typha latifolia* (OBL) *Onoclea sensibilis* (FACW)
Wetland 2 (H1-H32)	PFO1Ed and PEM5H	Red Maple swamp adjacent to an excavated channel that drains easterly and is flanked by stands of Phragmites	Walpole (Poorly drained) and Aquents (poorly drained fill materials)	Sediment/Toxicant Retention Nutrient Removal	*Acer rubrum* (FAC) *Nyssa sylvatica* (FAC) *Quercus palustris* (FACW) *Clethra alnifolia* (FAC) *Lindera benzoin* (FACW) *Vaccinium corymbosum* (FACW) *Phragmites australis* (FACW)
Wetland 3 (B1-B14)	PEM2J	Shallow basin dominated by gramminoids	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Juncus effusus* (OBL) *Juncus tenuis* (FAC) ***Paspalum laeve* (FAC)** *Symphyotrichum lateriflorum* (FAC) *Ludwigia palustris* (OBL)
Wetland 4 (F1-F20)	PEM2J	Routinely mowed lawn area bounded by Taxiway C on the northeast side, and Taxiway H on the southeast side. Low depression with suspected high groundwater table.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Juncus effusus* (OBL) *Cyperus strigosus* (FACW) *Rumex crispus* (FAC) ***Paspalum laeve* (FAC)** *Symphyotrichum lateriflorum* (FAC)
Wetland 5 (G1-G48)	PEM2J	Routinely mowed lawn area bounded by Taxiway C on the northeast and southeast sides, Taxiway H on the northwest side and former Runway 32 on the southwest side. Low depression with high groundwater table.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention Production Export	*Juncus effusus* (OBL) *Cyperus strigosus* (FACW) ***Paspalum laeve* (FAC)** *Coleataenia longifolia* ssp. *longifolia* (FACW) *Echinochloa muricata* (OBL) *Eleocharis obtusa* (OBL) *Juncus acuminatus* (OBL) *Ludwigia palustris* (OBL) *Persicaria hydropiperoides* (OBL) *Schoenoplectus pungens var. pungens* (OBL) *Setaria pumila* ssp. *pumila* (FAC) *Symphyotrichum lateriflorum* (FAC)
Wetland 6 (A1-A121; D1-D50; D51-D62 & D63 to D-88)	PFO1E PEM2	Forested and scrub-shrub wetland (6B portion) and bordering mowed lawn area (6A portion) transected by permanently flooded excavated channel. Low depressions with apparent high groundwater table in mowed areas.	Aquents (poorly drained fill materials)	Sediment/Toxicant Retention	*Acer rubrum* (FAC) *Lindera benzoin* (FACW) *Vaccinium corymbosum* (FACW) *Ilex verticillata* (FACW) *Viburnum dentatum* (FAC) *Clethra alnifolia* (FAC) *Phragmites australis* (FACW)

					Lythrum salicaria (OBL) *Spiraea tomentosa* (FACW) *Euthrochium maculatum* (OBL) *Juncus effusus* (OBL) ***Paspalum laeve* (FAC)** *Euthamia caroliniana* (FAC) *Eupatorium perfoliatum* (FACW) *Rhynchospora capitellata* (OBL) *Setaria pumila* ssp. *pumila* (FAC) *Cyperus strigosus* (FACW)
Wetland 7 (C1-C104)	E2EM1/5 P and E1UBL	The majority of this wetland system consists of a *Phragmites australis*-dominated tidal wetland bordered by a zone of *Baccharis halimifolia* landward.	Aquents (poorly drained fill materials)	Floodflow Alteration Fish and Shellfish Habitat Wildlife Habitat Uniqueness/Heritage	*Phragmites australis* (FACW) *Spartina alterniflora* (OBL) *Spartina patens* (FACW) *Distichlis spicata* (FACW) *Juncus gerardii* (OBL) *Baccharis halimifolia* (FACW) *Iva frutescens* (FACW)
		Notes: (a) Wetland Type (Cowardin, et. al., 1979 and Federal Geographic Data Committee, 2013) R3UB2/4 – Riverine lower perennial unconsolidated bottom (sand/mud) watercourse PFO1E – Palustrine Forested Broad-leaved Deciduous seasonally flooded/saturated wetland PEM5H – Palustrine Emergent *Phragmites australis*-dominated permanently flooded wetland PEM2 – Palustrine Emergent, non-persistent wetland PEM2J – Palustrine Emergent, non-persistent intermittently-flooded wetland E2EM1/5P – Estuarine intertidal emergent, persistent/*Phragmites australis*, irregularly flooded wetland			

From: Williams, Bruce <Bruce.Williams@ct.gov>
Sent: Monday, November 18, 2024 5:19 PM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>
Cc: Fontanella, Camille <Camille.Fontanella@ct.gov>
Subject: RE: [External] RE: Tweed Airport RW Extension, East Terminal and Tidal mitigation- Fisheries Consultation

Hi Kimberly,

I'm sorry that I have not been able to respond sooner to your emails. I have taken a look at the materials that you sent me and the three fish species noted in your NDDB review (Sand Tiger Shark, Atlantic Seasnail, and Radiated Shanny) are not present in the Morris Creek watershed. The NDDB reviews cover wide geographic areas and while those fish may be present in New Haven Harbor, they probably do not enter Morris Creek and definitely are not found upriver of the tide gates. While the NDDB reviews are only concerned with state-listed species (Endangered, Threatened, or Special Concern), the fisheries consultation assesses the impact of a permitted activity on all fisheries resources. I have not attended any of the previous meetings and the documents you sent me did not include enough information for me to complete my consultation.

My recommendation is that you send me any documents you feel are relevant to the project or its proposed mitigation. I will review them prior to Monday's meeting and may ask some additional questions then. If after the meeting I still have questions, then we can arrange to talk.

Thanks,

Bruce

Bruce Williams

Senior Fisheries Biologist

Diadromous Fish and Habitat Conservation and Enhancement Programs

Bureau of Natural Resources – Fisheries Division

Connecticut Department of Energy & Environmental Protection
Marine Headquarters – P.O. Box 719 / 333 Ferry Road

Old Lyme, CT 06371

***p:** 860.447.4317 | **c:** 860.876.9140 | **e**: bruce.williams@ct.gov*



Connecticut
Department of Energy &
Environmental Protection

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Ensuring a clean, affordable, reliable, and sustainable energy supply.

 | //portal.ct.gov/DEEP

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Thursday, November 14, 2024 11:27 AM
To: Jacobson, Susan <Susan.Jacobson@ct.gov>; Fontanella, Camille <Camille.Fontanella@ct.gov>
Cc: Caiola, Jeff <Jeff.Caiola@ct.gov>; Coon, Deb L. <dcoon@hoyletanner.com>; Williams, Bruce <Bruce.Williams@ct.gov>
Subject: RE: [External] RE: Tweed Airport RW Extension, East Terminal and Tidal mitigation- Fisheries Consultation

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Susan, thank you for this quick response. Bruce if you have time to have a conversation or quick Teams meeting with me before that larger meeting, please let me know and I can bring you up to speed on what we are proposing, and/or send you materials that have been provided previously to assist in your understanding to supplement what was in the Fisheries Consultation form. I am working with our team to be able to provide a draft Mitigation Plan within the next few weeks which will have much more detail on the proposed tidal restoration, we have been hampered by changes in design that I believe will soon be resolved.

The good news is that we tested the tide gate for a “marination” event and it was a success in getting water levels to where we expect them to be necessary for drowning the Phrag and conversion to a more native state.

Thanks to all-

Kimberly Peace

Vice President - Senior Environmental Coordinator at Hoyle Tanner

T: 603-460-5205 ° • **C**: 603-716-3343

Trusted Experts | Innovative Results

From: Jacobson, Susan <Susan.Jacobson@ct.gov>
Sent: Thursday, November 14, 2024 11:13 AM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>; Fontanella, Camille <Camille.Fontanella@ct.gov>
Cc: Caiola, Jeff <Jeff.Caiola@ct.gov>; Coon, Deb L. <dcoon@hoyletanner.com>; Williams, Bruce <Bruce.Williams@ct.gov>
Subject: [External] RE: Tweed Airport RW Extension, East Terminal and Tidal mitigation- Fisheries Consultation
Importance: Low

Hi All, Bruce Williams in Fisheries would like to know more about the mitigation piece as it relates to Morris Creek. I just forwarded an invite to him for the next meeting.

Sue

Susan Jacobson, Supervising Environmental Analyst

Land and Water Resources, Regulatory - West

Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127

P: 860-424-3693 (Tuesday and Wednesdays are best days to reach me in the office)

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Thursday, November 14, 2024 10:08 AM
To: Fontanella, Camille <Camille.Fontanella@ct.gov>
Cc: Caiola, Jeff <Jeff.Caiola@ct.gov>; Jacobson, Susan <Susan.Jacobson@ct.gov>; Coon, Deb L. <dcoon@hoyletanner.com>
Subject: FW: Tweed Airport RW Extension, East Terminal and Tidal mitigation- Fisheries Consultation

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any

attachments unless you trust the sender and know the content is safe.

Hi Camille, we have not heard a response on this email, do you have a specific person at Fisheries Division that I could reach out to, or can you do anything to help us receive a reply?

Thanks-

Kimberly Peace

Vice President - Senior Environmental Coordinator at Hoyle Tanner

T: 603-460-5205 ° • **C**: 603-716-3343

Trusted Experts | Innovative Results

From: Peace, Kimberly R.
Sent: Friday, November 1, 2024 2:19 PM
To: deep.inland.fisheries@ct.gov
Cc: Blum, Robin <Robin.Blum@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; Jacobson, Susan <Susan.Jacobson@ct.gov>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Coon, Deb L. <dcoon@hoyletanner.com>
Subject: Tweed Airport RW Extension, East Terminal and Tidal mitigation- Fisheries Consultation

Hello – please see the attached Fisheries Consultation Form for this project. We have been working with CTDEEP staff since January 2024 to develop permit applications for the Runway Extension and East Terminal building at Tweed New Haven Airport. While we initially submitted an NDDB review for the upland and freshwater wetland portions of the project, we submitted a second NDDB determination, at the request of Robin Blum, for the proposed tidal mitigation restoration that will be completed to offset inland wetland impacts for the project.

The tidal mitigation NDDB submittal package, and NDDB response, is attached. This response included three species that require coordination with your department:

Sand tiger shark (Carcharias taurus) – State Special Concern

Atlantic seasnail (Liparis atlanticus) – State Special Concern

Radiated shanny (Ulvaria subbifurcata) – State Special Concern

I can provide wetland reports with photos in a separate email of send you a sharepoint link to upload for your review due to the file sizes, however, we do not have plans for the tidal mitigation work at this time since the mitigation proposed will be adaptive. Initial efforts will consist of manipulation of the Morris Creek Tide Gate to allow for salinity to drown the existing Phragmites within the approximately 30 acres of deteriorated tidal salt marsh, which, along with physical removal of Phragmites, will allow for the marsh to rebound and the small populations of existing native marsh vegetation such as Spartina to expand. A

Mitigation Plan with more detailed information is in development and should be available within the next few weeks.

Because this plan will allow for a gradual shift in water levels and vegetation types, we do not anticipate impacts to the species of special concern that may be using the site currently as there should be time for species to shift accordingly to accommodate these changes. Additionally, because the resulting tidal marshes will provide a healthier ecosystem than the near monoculture of Phragmites that exists currently, we believe this project will benefit tidal and estuarine fisheries species that are currently within these habitats.

I would be happy to meet with you to discuss this project and the potential effects on these three species as needed. Please reach out to me, as I am the point of contact for the applicant for the project on behalf of Avports and The Tweed New Haven Airport Authority.

Thank you-

HOYLE TANNER

Kimberly Peace

Vice President - Senior Environmental Coordinator at Hoyle Tanner

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DRAFT MEETING SUMMARY

Attendees

Jenae Carraway (HTA) *jcarraway@hoyletanner.com*
Robert Furey (HTA) *rfurey@hoyletanner.com*
Nils Gonzalez (HTA) *ngonzalez@hoyletanner.com*
Kimberly Peace (HTA) *kpeace@hoyletanner.com*
Deb Coon (HTA) *dcoon@hoyletanner.com*
Eric Rothstein (eDesign) *erothstein@edesigndynamics.com*
Kyle Taylor (eDesign) *ktaylor@ edesigndynamics.com*
Jeff Caiola (CTDEEP) *Jeff.Caiola@ct.gov*
Robin Blum (CTDEEP) *Robin.Blum@ct.gov*
Anna Toledo (CTDEEP) *Anna.toledo@ct.gov*
Bruce Williams (CTDEEP) Bruce.Williams@ct.gov
Beatriz Milne (CTDEEP) *Beatriz.Miline@ct.gov*
Laura Robbins (CTDEEP) *Laura.Robbins@ct.gov*
Camille Fontanella (CTDEEP) *Camille.Fontanella@ct.gov*
Colin Clark (CTDEEP) *Colin.Clark@ct.gov*
Susan Jacobson (CTDEEP) *Susan.Jacobson@ct.gov*
Danielle Missell (CTDEEP) *Danielle.Misselle@ct.gov*
Jared Pritts (USACE) *jared.n.pritts@usace.army.mil*
Jeremy Nielson (AVPORTS) *jnielson@avports.com*
Michael Jones (AVPORTS) *mjones@avports.com*
Meade Hopkins (AVPORTS) *mhopkins@avports.com*
Diane Ifkovic (CTDEEP) *Diane.Ifkovic@ct.gov*
Cheryl Quaine (FAA) *Cheryl.J.Quaine@FAA.gov*
Sarah Barnum (BSC) *sbarnum@bscgroup.com*
Amanda DeCesare (WSP) Amanda.decesare@wsp.com

Meeting Objective: Monthly discussion with relevant permitting agency staff regarding permits for the project. *Agenda items in italics.*

1. *Wetland Mitigation*
    - *Draft Plans currently showing conservative 9.72 acres inland wetland impacts*
    - *Wetland Mitigation Plan drafted and under internal review: field data collected has been analyzed, proposed restoration approach and adaptive management strategies identified, additional wetland delineations occurred and reporting to be finalized*
        - *Adjustments to tide gate operations to allow flooding of marsh with saline water up to 2.5' elevation and retention of water levels for up to 6 hours*
        - *Tide Gate operational changes to current programming of SCADA system*
        - *Prior to storm events, tide gate will be switched to Watershed Drain Mode to allow for adjustments to prevent flooding of adjacent properties*
        - *Scheduled mowing 2X/yr, early summer and late fall, and removal of Phragmites biomass*
        - *Consistent monitoring by wetland scientist and adaptation as needed*
        - *Adaptive Management Plan- to be based on how close to coming to meeting Performance Standards, to include, in stepwise fashion: herbicide application to*

Phragmites, extended elevated water level duration, excavation of tide channels, manual excavation of Phragmites and addition of sand and plantings of Spartina.

- *Tide gate tested to determine operational approach is viable – confirmed, minor tide gate changes may be needed to obtain water levels to reach goals*
- *Financial commitment requirements and process to be discussed.*
- ***DEEP notes:*** Wetland mitigation 9.72 acres – wetlands 4, 5, 6 – wetlands mitigation study is in review internal with Hoyle Tanner. Plant species were not found in tidal mitigation areas.
- Adaptive Management plan is step wise - Phragmites inundation study shows that the salt marination will be possible with the tide gates. May need minor repair to tide gates. Removing phrag with mowing and removal, and, finally, herbicide.
- Financial mitigation commitment requirements – **set up separate meeting with USACE and DEEP and Tweed.** Federal jurisdiction is only for 5-6 acres, wetlands 4 &5. DEEP discourages submittal of incomplete applications because the 401 times out in one year.

2. *Grassland Mitigation*

- *Impact has been revised to approx. 4 acres*
- *On-site Mitigation deemed not viable*
- *Grassland Mitigation Plan in development for Off-site mitigation via Warren parcel*
- R. Blum stated they are waiting on receipt of additional site information to review for confirmation as to the adequacy of the off-site mitigation parcel, K. Peace stated she will work with eDesign team to provide.
- **DEEP Notes:**
- 4 acre impact- On-site mitigation was not deemed feasible.
- Warren Parcel – have delineated separate ecosystems on the parcel – grasslands, wet meadow, vernal pool, swamp, etc. Robin reminds that there are questions about the soils and Wildlife hasn't signed off on the suitability of this parcel yet. Will need management plan and conservation approach for the property. Hoyle will be providing two documents Grassland Mitigation Plan and the Tidal Mitigation Plan. **Side meeting with Elsa (consultant) and Robin - asap**
- Hoyle has collected seeds as part of Plant Mitigation Plan. Working with Native Plant Trust.
- Fisheries – working with Bruce Williams. Hoyle sent additional information. – Will want side meeting. 3 species in NDDB review are not actually present in the Morris Creek area. Restoring tidal flows to marsh will have benefits to fish resources. **Tide gate meeting – Kimberly will reach back out.**

3. *NDDB/Listed Plant Species*

- *Identified Paspalum within inland field wetland*
- *Seeds collected to be included as piece of Plant Mitigation Plan.*
- R. Blum asked if we have been coordinating with the Native Plant Trust since they are short staffed, and if we have difficulties to let her and Bill know. K. Peace stated she will check with BSC and keep CTDEEP informed.
- *Fisheries coordination initiated for species identified as potential within tidal mitigation area*

- B. Williams stated the three state-listed species on the NDDB report for the tidal mitigation areas will not be affected by the tidal mitigation project, and restoring tidal flows to the tidal marsh not likely to impact fisheries, however he would like to discuss the project further w/K. Peace in regard to non-listed fish species review and requested additional information on the tide gate operational changes. K. Peace will coordinate that.

4. *FEMA/CLOMR/Stormwater*

- *CLOMR Process reviewed and initiated.*
- *FEMA pending 2025 LOMR estimated to be issued January.*
- *Design drawings sent to CTDEEP/FEMA and comments received re: increase freeboard of terminal.*
- *Terminal design currently being revised to address requirement for BFE+2 conservative.*
- ***DEEP Notes:***
- FEMA/ CLOMR/ Stormwater - coordinating with New Haven and East Haven to sign CLOMR application. **Will submit to FEMA in January.**
- Terminal design being adjusted to be BFE +2. (Requirement is +1).
- FAA has jurisdiction for NEPA. USACE provides comment on FAA's NEPA decision. 404B1 is USACE's analysis to permit the least environmentally damaging alternative. Hope that the preferred options in NEPA aligns with 404B1.

5. *Schedule*

- *Design for RW and Terminal in progress, current design submittal 12/11*
- *Expected permit application submittal week of 12/16*

- J. Caiola expressed concern over receiving an incomplete application and meeting a 6-month review time. Once the application is submitted, it becomes public record and a part of the freedom of information act (FOIA) so the public can receive a copy of the application and comment on it as well as get their own specialists to refute any aspects of it. If the NDDB, etc. are approved ahead of time, it allows staff to focus more on the review process and will reduce receiving any comments/questions from the public about aspects of the application that haven't been officially approved by CTDEEP. J. Caiola can put a hold on reviews of any state project but he cannot put a hold on federal projects so if the application is submitted without the normal mitigation plans, etc. approved, it can add time to the review process and the public hearing process.
- L. Robbins stated they would typically not review an application without CTDEEP Determination number.
- Suggested that coordination with CTDEEP Wildlife to receive a Determination, and with CTDEEP Wetlands staff to receive confirmation on wetland mitigation plan, before submitting permit application would be better since any information submitted with the permit application will become available under FOIA and could be rebutted by public. CTDEEP staff will also have to take time to respond to FOIA requests that will take away from time reviewing the application.
- C. Fontanella said she is working with Tom Cavaliere and Andrew King responding to public information requests, to address Environmental Justice and to prep for adjudication.
- J. Caiola stated the 401 Water Quality Certification (WQC) has a federally-mandated 1 year timeline for CTDEEP to take action, he will look further into if that License can be applied for

separately from the CTDEEP Inland Wetland permit, and if the Inland Wetland Permit anticipated adequacy hearing, which may take several months or more, would also delay the WQC. If CTDEEP cannot act on the WQC in one-year, has to be denied.

- J. Caiola also stated this meeting would satisfy the WQC Pre-Filing meeting requirement.
- J. Pritts stated USACE has to have the 401 WQC and CZMA addressed before they can issue the 404 permit. The 401 WQC has to go to EPA for review for at least 30 days, and then possibly for 60 more days to neighboring states if there is a "may effect" determination. USACE cannot start the 404 review until the 401 is received from CTDEEP per 404b1.
- For USACE a mitigation statement could be used for public notification process.
- If further tide gate operations will be discussed with B. Williams, J. Caiola stated he and other permit specialists from CTDEEP will want to be included.
- **DEEP Notes**:
- See Sue Jacobson's notes. Added below for convenience
- *Design for RW and Terminal in progress, current design submittal 12/11*
- *Expected permit application submittal week of 12/16*
- Wetland and grassland mitigation plans have not yet been finalized. DEEP staff recommend holding off on application submission until the plans have been reviewed and conceptually approved by LWRD and Wildlife Division staff. When staff receive the applications with completed mitigation plans, public inquiries will be less time consuming. (The public will request copies of the application and an incomplete application will cause confusion.)
- Final NDDB Determination. L. Robbins stated they would typically not review an application without a final NDDB Determination. The final NDDB Determination would most likely include the grassland mitigation plan.
- 401 Water Quality Certification (WQC). J. Caiola expressed concern over receiving an incomplete application (without mitigation plans finalized) and meeting a federally-mandated one-year WQC review time. While state program applications can be placed on 'hold', the 401 cannot. The WQC would be denied if the state could not meet the one-year deadline. The Structures, Dredging and Fill and 401 applications do not need to be submitted and processed simultaneously. It was suggested that the WQC application not be submitted until the SDF application was ready for public notice. (This submission delay is common for Dam Safety and WQC applications.) J. Caiola stated this meeting would satisfy the WQC Pre-Filing meeting requirement.
- 404 WQC. J. Pritts stated USACE has to have the 401 WQC and CZMA addressed before they can issue the 404 permit. The 401 WQC has to go to EPA for review for at least 30 days, and then possibly for 60 more days to neighboring states if there is a "may effect" determination. When the Corps receives the application, they publish their notice if the application is complete or not. A mitigation statement could be used for this public notification process. (However, the state needs their applications to be complete prior to their public notice.)

- Public participation. A hearing request is anticipated. While most applications can be reviewed within a year, a hearing would impact this standard timeframe. Freedom of Information Act requests are also anticipated. The submission of complete applications will be less confusing to the public and generate less documentation for the hearing record.
- C. Fontanella said she is working with Tom Cavaliere and Andrew King responding to public information requests, to address Environmental Justice and to prep for adjudication.

- If further tide gate operations will be discussed with B. Williams, J. Caiola stated he and other permit specialists from CTDEEP will want to be included.

6. **Action Items:**
    1. **Camille will coordinate meeting regarding financial assurance with relevant parties from USACE and CTDEEP**
    2. **K. Peace will coordinate with B. Williams re: Fisheries Coordination, set up meeting, provide additional info on tide gate operations.**
    3. **Hoyle Tanner will coordinate with New Haven and East Haven for required signatures for the CLOMR application, anticipated January submittal.**
    4. **Hoyle Tanner will let CTDEEP and USACE know if permit submittal timeline will shift.**
    5. **Agreement on next monthly meeting Monday Dec 30, 2024. CTDEEP will have answer by then on how to proceed with WQC and timeline in regard to the anticipated adequacy hearing.**
    6. Side meeting with Elsa (consultant) and Robin Blum - asap

eDESIGN DYNAMICS

Kyle Taylor <ktaylor@edesigndynamics.com>

RE: [External] Tweed New Haven Airport Runway Extension and East Terminal Project- Mitigation discussion

1 message

Pritts, Jared N CIV USARMY CENAP (USA) <Jared.N.Pritts@usace.army.mil> Tue, Feb 18, 2025 at 12:33 PM

To: "Peace, Kimberly R." <kpeace@hoyletanner.com>, DEEP OPPD <DEEP.OPPD@ct.gov>, "Milne, Beatriz" <Beatriz.Milne@ct.gov>, "Fontanella, Camille" <Camille.Fontanella@ct.gov>, "Caiola, Jeff" <Jeff.Caiola@ct.gov>, "Robbins, Laura" <Laura.Robbins@ct.gov>, "Moorhead, William" <William.Moorhead@ct.gov>, "Blum, Robin" <Robin.Blum@ct.gov>, "Jacobson, Susan" <Susan.Jacobson@ct.gov>
Cc: "Furey, Robert M." <rfurey@hoyletanner.com>, "Gonzalez, Nils E." <ngonzalez@hoyletanner.com>, erothstein <erothstein@edesigndynamics.com>, Kyle Taylor <ktaylor@edesigndynamics.com>, Elsa Loehmann <eloehmann@edesigndynamics.com>, "Monz, Dave (dmonz@uks.com)" <dmonz@uks.com>, "Coon, Deb L." <dcoon@hoyletanner.com>, "Carraway, Jenae" <jcarraway@hoyletanner.com>, "Groves, Tom" <tgroves@bscgroup.com>, "Barnum, Sarah" <SBarnum@bscgroup.com>, Meade Hopkins <mhopkins@avports.com>, Michael Jones <mjones@avports.com>, Levi Gealy <lgealy@v-1consulting.com>, "Margason, Nathan" <Margason.Nathan@epa.gov>

Hi Kim and thanks for sending the meeting summary. I added Nate Margason and reattached the summary for his sake.

As promised, here are some initial thoughts of the draft mitigation plan after a cursory review:

1. The 2008 Mitigation Rule establishes a preference hierarchy for the type and location of compensatory mitigation (33 CFR 332.3(b)). It is my understanding that the airport is within the service area of an approved In-Lieu Fee Program. A discussion must be included in the mitigation plan which addresses and evaluates the feasibility of all mitigation types in the order of the preference hierarchy. At your request, I am looking for an example of such a discussion to provide and will do so when/if one becomes available.

Once item 1 is addressed and if the permittee-responsible mitigation is further considered then:

2. There is inconsistent use of the term's establishment vs. restoration. My understanding is that the site was previously thought to be tidal wetland, and this effort would restore it to the historical function. Please ensure the words, as defined in the 2008 mitigation rule, are consistently used so that proper consideration of credit can be evaluated.
3. There appears to be 5 specified objectives and 1 performance standard. Each stated objective should have associated performance standards so that success of the objective can be evaluated.
4. The land appears to be owned by the City of New Haven. If so, they would be the legal entity that would be encumbering their property through long-term site protection mechanisms. Please ensure they are aware of the potential restrictions and are on-board with placing such restrictions on their land.
5. The draft mitigation plan outlines when the first adaptive management plan would be implemented but is less clear about what factors would trigger phases 2, 3, and 4 to commence. The monitoring plan should be adapted to include provisions that would capture the additional timeframes that would be needed to effectively monitor progress after implementation of each adaptive management strategy.
6. There was discussion at the last meeting regarding areas which had previously been utilized for mitigation. At this time, I am unsure whether any of these areas were subject to previous Corps permit requirements. I will look to see what records I can locate. I request that any information regarding the history of Corps permits and their requirements be included in the application.
7. The district engineer shall require sufficient financial assurances to ensure a high level of confidence that the compensatory mitigation project will be successfully completed, in accordance with applicable performance standards. At this time, it appears that financial assurance will be needed in an amount sufficient to cover the initial construction, monitoring, and adaptive management provisions of the mitigation plan.
8. 33 CFR 332.7(b) states that: "Compensatory mitigation projects shall be designed, to the maximum extent practicable, to be self-sustaining once performance standards have been achieved. This includes minimization of

active engineering features (e.g., pumps) and appropriate siting to ensure that natural hydrology and landscape context will support long-term sustainability. Where active long-term management and maintenance are necessary to ensure long-term sustainability (e.g., prescribed burning, invasive species control, maintenance of water control structures, easement enforcement), the responsible party must provide for such management and maintenance. This includes the provision of long-term financing mechanisms where necessary. Where needed, the acquisition and protection of water rights must be secured and documented in the permit conditions or instrument." The current proposal relies on successful operation of the tide gate. Due to the criticality of this infrastructure for successful mitigation, the long-term financial assurance would likely include funding for the operation, maintenance, and eventual replacement of the tide-gate.

Thanks,

US Army Corps of Engineers

NORTH ATLANTIC DIVISION NAD BRIDGING THE ATLANTIC Technical Regional Execution Center

Jared Pritts

NEPA Subject Matter Expert

NAD – Technical Regional Execution Center

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If a response is required outside of usual communications with your Regulatory reviewer, please contact CENAD-Regulatory-TREC@usace.army.mil.

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Monday, February 17, 2025 9:10 PM
To: DEEP OPPD <DEEP.OPPD@ct.gov>; Milne, Beatriz <Beatriz.Milne@ct.gov>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; Robbins, Laura <Laura.Robbins@ct.gov>; Moorhead, William <William.Moorhead@ct.gov>; Blum, Robin <Robin.Blum@ct.gov>; Pritts, Jared N CIV USARMY CENAP (USA) <Jared.N.Pritts@usace.army.mil>; Jacobson, Susan <Susan.Jacobson@ct.gov>
Cc: Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; erothstein <erothstein@edesigndynamics.com>; Kyle Taylor <ktaylor@edesigndynamics.com>; Elsa Loehmann <eloehmann@edesigndynamics.com>; Monz, Dave (dmonz@uks.com) <dmonz@uks.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Carraway, Jenae <jcarraway@hoyletanner.com>; Groves, Tom <tgroves@bscgroup.com>; Barnum, Sarah <SBarnum@bscgroup.com>; Meade Hopkins <mhopkins@avports.com>; Michael Jones <mjones@avports.com>; Levi Gealy <lgealy@v-1consulting.com>
Subject: [Non-DoD Source] RE: [External] Tweed New Haven Airport Runway Extension and East Terminal Project- Mitigation discussion

Connecticut
Department of Energy &
Environmental Protection
LAND & WATER RESOURCES

Memo

To: Kimberly Peace, Hoyle Tanner

From: Susan Jacobson, Supervising Environmental Analyst, West Regulatory

Date: February 21, 2025

Re: Wetland Mitigation for Tweed Airport Runway Extension and Terminal Expansion

---

Thank you for the opportunity to review the "*DRAFT Wetland Mitigation Plan Developed for Pre-application Review,*" (Mitigation Plan) dated December 2024. Comments on this Mitigation Plan and responses to other side discussions including wetland jurisdiction boundaries; application fee calculation; and, Pig Farm Road removal, are addressed in this memo.

The draft wetland mitigation plan proposes to compensate for **9.49 acres** of permanent inland wetland loss by performing **28.5 acres** of enhancement to restore brackish tidal wetland to historical saltwater tidal wetland by:
1) raising the elevation of the water upstream of the tide gates from 2.0' to 2.5' NAVD88;
2) mowing, cutting, and removing *Phragmites* biomass 2x/year, and,
3) adaptively managing (grading, planting, herbicide use) as needed to foster success.

Preliminary comments were provided to you which indicated that we could not accept mitigation at a site where previously authorized mitigation is offsetting prior wetland losses[1]. However, after a review of the previous mitigation requirements and the existing conditions of those mitigation sites, it has been determined that enhancement of these sites can be counted toward the proposed mitigation at a ratio of 5:1. The 28.5 acres of tidal wetland enhancement equates to the mitigation of 5.7 acres of impacted wetlands. **The remaining 3.8 acres of impact must be mitigated with 3.8 acres of tidal wetland creation/restoration for a result of a gain in square footage.**[2]

---

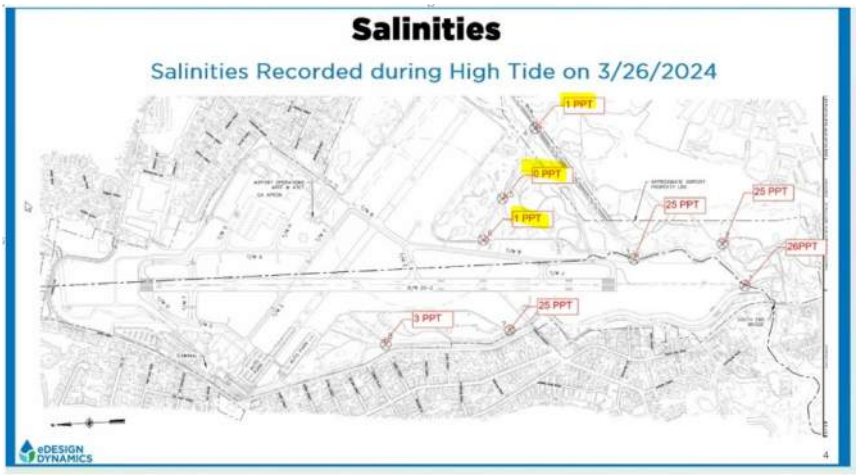
[1] The majority of the proposed 28.5-acre mitigation site, previously identified as the "Dean Street Mitigation Area," was required mitigation pursuant to Permit #20003049-KZ. An additional 3.9 acres of mitigation between Pig Farm Rd and Ora Ave was required under certificate of permission #201304084-KZ.
[2] Mitigation required by the U.S. Army Corps of Engineers may be different than state requirements.

GENERAL COMMENTS ON MITIGATION PLAN

Salinity and Elevation

Following prior mitigation efforts, including grading channels to bring tidal flow further upstream of the gate, the wetland appears to have reverted back to *Phragmites* based on recent delineation and botanical reporting. Salinity levels remain very low and *Phragmites* and inland wetland species dominate the proposed mitigation area.

- Please provide salinity data that demonstrates how wetland soil salinity in the mitigation area would support the proposed enhancement and reversion to tidal low marsh vegetation, and the eradication of Phragmites, given that dense Phragmites currently dominates the site.



The Mitigation Plan proposes to manipulate the tide gates to change the upstream water elevations from 2.0' to 2.5'. This elevation was determined based on the growth of *Spartina alterniflora* upstream of the tide gates.

- Please indicate the substrate elevation of the existing *Spartina*. If, after one year, significant reduction in phragmites density and height has not occurred, Adaptive Management Phase Three should be moved to Phase Two.

Tide Gate Management

The Mitigation Plan states that increasing upstream water elevations will not increase the risk of flooding to adjacent properties/residents, but no details are provided.

- Explain how raising water elevations by 0.5' at the mitigation site over ~28 acres would not increase the risk of flooding to nearby properties/residents/roads.
- Provide an inundation map that depicts proposed conditions given a 2.5' tide gate elevation.
- Please note a special condition of any final permit will require an annual report of tide gate operations to document the management goal is being achieved.
- In a January 22, 2025 memo to Bruce Williams, it is noted that the existing flap gate will be replaced with a third sluice gate. This modification will need to be proposed in the pending Structures, Dredging and Fill and Tidal Wetlands application with existing and proposed plans.

- The Mitigation Plan, page 45, states that once the water level of 2.5' is achieved immediately upstream of the tide gate, the gates will be closed. There may be significant lag time for the desired water level to reach upstream locations. Please address this lag in the final plan.

Long-term Site Management, Protection, and Financial Statement
As noted in the draft Mitigation Plan, the final plan needs to include details of long-term management, provide a site protection instrument (i.e. a deed restriction or conservation easement to prohibit future impacts to the mitigation site in perpetuity), and provide financial assurances to demonstrate there are available resources to support long-term management and permanent site protection.

NDDB Species and Wildlife.
Mitigation activites should not result in loss or take of threatened or endangered species. While it appears that threatened and endangered NDDB plants are not present at the proposed site[3], botanical mapping indicated the threatened freshwater *P.laeve* was found immediately adjacent to the eastern edge of the proposed mitigation site.



- Please discuss potential impacts to threatened and endangered species from the proposed salinity modification.

Mitigation Plan Sheets and Mapping
- In Layout Plans, L-101 to L-103, call out the existing habitat features:
  1. vegetated and non-vegetated areas within the wetland at low tide;
  2. tidal and non-tidal ponds/pools;
  3. tidal and non-tidal creeks and channels;
  4. intertidal flat;
  5. upland islands;
  6. boundaries/extents of Phragmites stands
- Provide a Mitigation Site Map, data and photographs which present baseline conditions of the mitigation wetland, including the flagged wetland boundary extents and the boundaries of all in-wetland features as outlined in 1 through 6 above.

[3] The botanical report indicated the mitigation site survey "was conducted outside of the proper flowering window for most of the target species", therefore additional botanical surveys may need to be performed.

- Should additional mitigation areas be added to the Mitigation Plan, provide a Mitigation Site Map, data, and photographs for each proposed mitigation area that includes delineated features as outlined in 1 through 6 above.

Wetland Impact Mapping

- For the Regulated Resource Impact Area, C-100, provide detail sheets for only the wetland impact areas, including:
  1. bridge details from Proto Drive to the new terminal area; and,
  2. identification of temporary vs. permanent impact areas.

Duplicate Information

LWRD Application Forms C (SDFTWQC) and Form L were designed so there would be no duplicate attachments submitted for the same project. These forms require the Proposed Project (Impact Site) information that is covered in Section 2.1-2.5 of the Mitigation Plan.

- To avoid duplication, the final Mitigation Plan does not need to include this information that is required in the application forms.

ADDITIONAL ITEMS

Structures, Dredging and Fill (SDF) and Tidal Wetlands (TW) Application

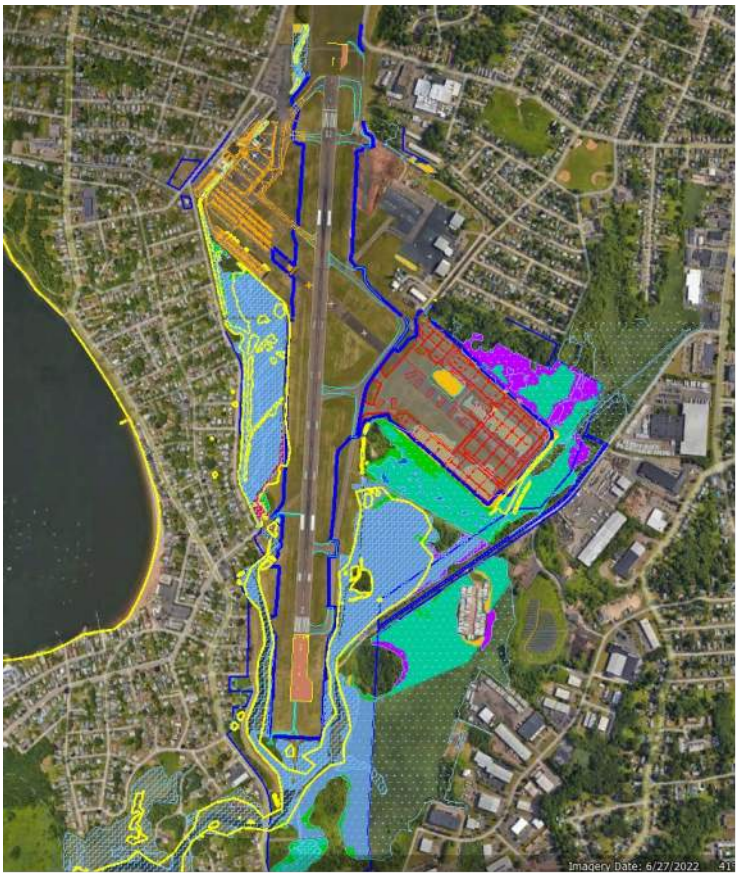
Activities in the proposed impact area will be covered under an Inland Wetland application. However, the required mitigation will occur in a tidal wetland. For this reason, the SDF application being submitted pursuant to Special Terms and Conditions, paragraph 15., of Permit #20003049-KZ, should include a Tidal Wetlands application. Additionally, modification of the tide gates can be covered under the same SDFTW application.

The fee paid for Permit #20003049-KZ covered the prior activities in the Runway 2 safety area. No additional fee for the SDFTW application is required beyond the $660 application fee.

Tidal vs. Inland Wetlands

In an email dated 2/7/25, you responded to my inquiry regarding the tidal wetland boundary. You indicated the yellow boundary in the image below was previously agreed upon and used by Land and Water Resources Division[4] (LWRD) staff. I have consulted with LWRD staff and understand the wetlands north of Pig Farm Road were determined to be Inland Wetlands. I apologize for the confusion.

[4] At the time of the determination, the office/division was called the Office of Long Island Sound Programs.



Pig Farm Road Removal

The removal of historical fill that was placed to create Pig Farm Road would create/restore approximately one acre of tidal wetlands. Fill removal may potentially be used for mitigation credit, but we need to better understand the potential impacts it would have on the upstream system, from both a habitat and flooding perspective. Would removal of the road change FEMA zones?

Appendix D- Tidal Monitoring Analysis

Tweed New Haven Tidal Monitoring Report

December 2024

Project Name:
Tweed New Haven Regional Airport Runway Extension and Terminal Expansion

Prepared by:
eDesign Dynamics
247 W 35th Street, 10th Floor
New York, New York 10001

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1. Introduction

This report summarizes tidal water surface elevation and salinity data collected from the Tweed New Haven Airport proposed marsh mitigation areas from July to September 2024. The monitoring was conducted using strategically placed salinity and water level data loggers to evaluate the potential effects of proposed mitigation actions, including increasing tidal exchange and elevating brackish water inundation upstream of the tide gate. The collected data has been analyzed to assess tidal amplitude and salinity variability, with a focus on understanding correlation to tide gate management.

Water surface elevations within the marsh mitigation areas are regulated by a tide gate structure (see Figure 1) located on Morris Creek approximately ¼ mile downstream of the airport. The structure consists of two sluice gates and a flap gate. The tidal cycle in this location ranges from -3.4' NAVD88 at Mean Low Water (MLW) to elevation 2.8 NAVD88 at Mean High Water (MHW). The sluice gates are equipped with automated SCADA and manual remote operations that allow for both advanced and real-time operation of the tide gates.

The tide gate is operated in AUTO Mode during periods of normal operation, and is managed to maintain water surface upstream of the tide gate at or below 2.0 feet NAVD88, as measured at a sensor immediately upstream of the tide gate structure. The tide gates are operated in WATERSHED DRAIN Mode in advance of a storm event to preemptively avoid flooding in the Morris Creek area. Under Watershed Drain Mode, the sluice gates are opened up to 48 hours in advance of the storm to allow the marsh to drain. The sluice gates are then closed before the next tidal cycle begins to prevent seawater from flowing upstream into the creek.



Figure 1: Tide Gate Structure

2. Data Collection

A total of seven (7) YSI EXO 1 sonde probes (data loggers) were installed by EDD staff at seven locations throughout the proposed Mitigation Wetland areas. The loggers were deployed at the locations shown in Figure 3 from July 12 to August 27, 2024.

The data loggers were located to capture the gradient of salinity and inundation conditions along the hydrological gradient of the marsh, ensuring comprehensive data collection across varying distances upstream from the tide gate. Data loggers were deployed to record salinity (in parts per thousand) and water surface elevation (in feet NAVD88) at 15-minute intervals.



Figure 2: Experimentation Setup: Data Logger and Sonde Enclosure

The data loggers were installed as described below:

Table 1
Data Logger Location Description

Data Logger	Location Description
SM-1	Positioned along the primary tidal channel at the lower boundary of the marsh. This location is within a direct path of tidal influence, capturing the salinity and water level immediately affected by the tide gate's operation.
SM-2	Situated midway along the tidal channel, this logger captures the gradient where tidal influence begins to wane, and freshwater influence becomes more evident.
SM-3	Placed at the heart of the marsh system, SM-3 provides data on the hydrological and salinity conditions within a region dominated by dense Phragmites australis stands. This central location also captures the effects of reduced tidal flushing as water moves further from the tide gate.
SM-4	This location is at the upstream edge of the mitigation site where tidal influence is weakest. The area is characterized by significant freshwater input and is often dominated by freshwater vegetation such as Phragmites.

SM-5	Positioned near a key hydrological structure (culvert), SM-5 captures data on the interaction between tidal and stormwater flows.
SM-6	Relocated downstream to location A between former location SM-5 and SM-6, renamed SM-6A
SM-7	This logger is located at the southernmost boundary of the marsh system. The area is distant from both the primary tidal channel and the tide gate.

Raw data consisting of timestamped readings of salinity and water surface elevation was downloaded from the dataloggers. The data was plotted over time to examine trends between the logger locations relative to the tide gate. Data was adjusted to remove outliers and periods of missing data. Data collection results are included in Section 3. Results.



Figure 3: Data Logger Location Plan

The locations of several data loggers were adjusted to capture water level and salinity variation within identified stands of *Spartina alterniflora*, as shown in Figure 4. A second series of data was collected with the data loggers in the post-relocation locations. The data loggers were deployed in the relocated locations from August 28th through September 20th, 2024. The following adjustments were made to the data logger locations:

Table 2
Data Logger Location Adjustments

Data Logger	Adjustment
SM-1	Removed
SM-2	Removed
SM-3	Relocated to Spartina stand C near former location of SM-1, renamed SM-3C
SM-4	Relocated to Spartina stand B near the Tuttle Brook junction, renamed SM-4B
SM-5	Removed
SM-6	Relocated downstream to location A between former location SM-5 and SM-6, renamed SM-6A
SM-7	Kept in place



Figure 4: Relocated Data Logger Location Plan

3. Results

3.1 Pre-Relocation Results

3.1.1 Pre-Relocation Elevation

Water surface elevations from July 24 – 27, 2024 were analyzed to determine the peak water surface elevations experienced within the proposed mitigation marsh area. This period of data provides a representative snapshot of the impact of the normal operational procedure on water surface elevations at the monitored locations, refer to Figure 6.

The data indicate that water surface elevations within the proposed marsh mitigation areas are managed to stay at or below elevation 2.0 feet NAVD88 during periods of normal operation. Average peak water surface elevations are given in Table 3.

Table 3
Pre-Relocation Peak Elevation
(feet, NAVD88)

ID	Location	Peak Elevation (feet, NAVD88)
SM-1	Lower boundary of Marsh along main tidal channel	1.94
SM-2	Midway along NE tidal channel	1.74
SM-3	At heart of NE marsh within Phrag stand	1.21
SM-4	Upstream end of NE marsh in mitigation site	1.77
SM-5	At culvert leading to NW marsh	1.80
SM-6	In ditch at head of NW wetland	1.70
SM-7	Within Phrag stand in NW wetland	1.67

As expected, the highest peak water surface elevations were observed at SM-1. This location also peaked first. As SM-1 is located the furthest downstream, it is expected that the water surface would peak and recede here more quickly than at the other locations. The lowest peak water surface elevations were observed at SM-3, which could be indicative of the lack of penetration of the tidal column into the dense stand of phragmites where SM-3 was located. Similarly, peak water surface elevations at SM-7 were lower than those at the surrounding gages; SM-7 was also located within a stand of Phragmites, although not as deeply within the stand as SM-3. This is further indicative that the tidal column is not able to fully penetrate into the dense stands of *Phragmites* present at the site.

Peak water surface elevations varied by a less than four (4) inches between all locations. Water surface elevations peak in the following chronological order, and are separated between approximately 10 minutes between groups: SM1, SM-2 and SM-6, SM-3 and SM-4, SM-5, and SM-7. The average peak water surface elevations and the time to peak follow the trend that downstream gages peak first and highest, with upstream gages peaking later and to lower elevations. The exception to this trend is observed at SM-6, where the peak water surface elevations are similar to those observed at SM-2, despite the fact that SM-6 is located significantly upstream from the location of SM-2. This is believed to be due to the influence of freshwater inputs at SM-6.

While water surface elevations peak concurrently at SM-3 and SM-4, the elevations at SM-3 are generally two (2) inches lower than those recorded at SM-4. This could indicate that the tidal plume is not fully penetrating into the dense stands of *Phragmites* where SM-3 is located.

Similarly, water surface elevations concurrently peak at SM-2 and SM-6. This could be due to the lack of obstructions along the tidal channel to SM-2 and constructed tidal ditches leading to SM-6 that allow for easy upstream migration of the tidal plume. Water surface elevations at SM-2 were observed to peak approximately 2.5 inches below those observed at SM-6. This is likely due to the fact that SM-6 is located approximately a quarter of a mile upstream at a higher elevation, and experiences freshwater inputs. Note that the results are provided as absolute elevation and not water depth.

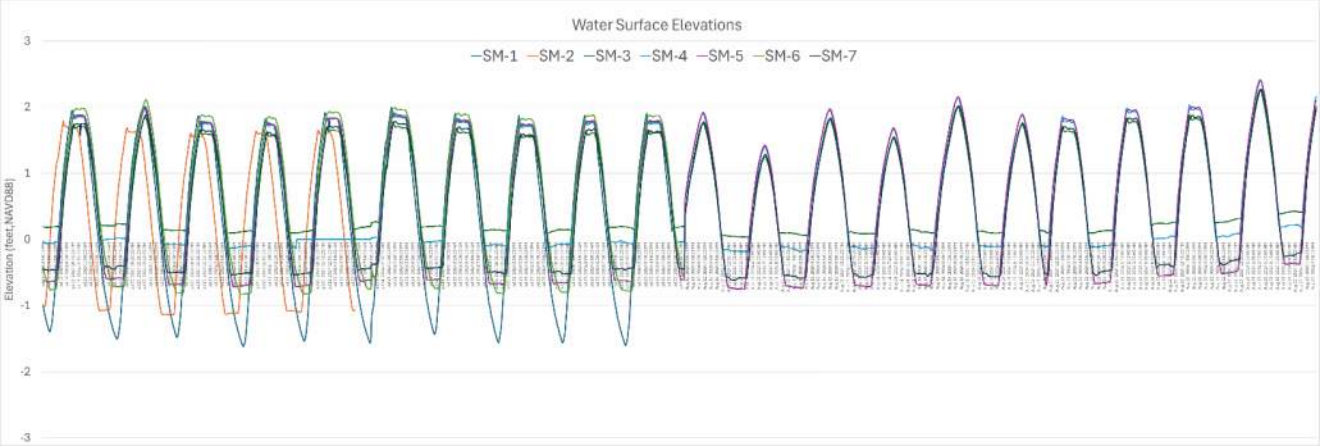

Figure 5: Pre-Relocation Elevation (NAVD88): July 19, 2024 to August 23, 2024

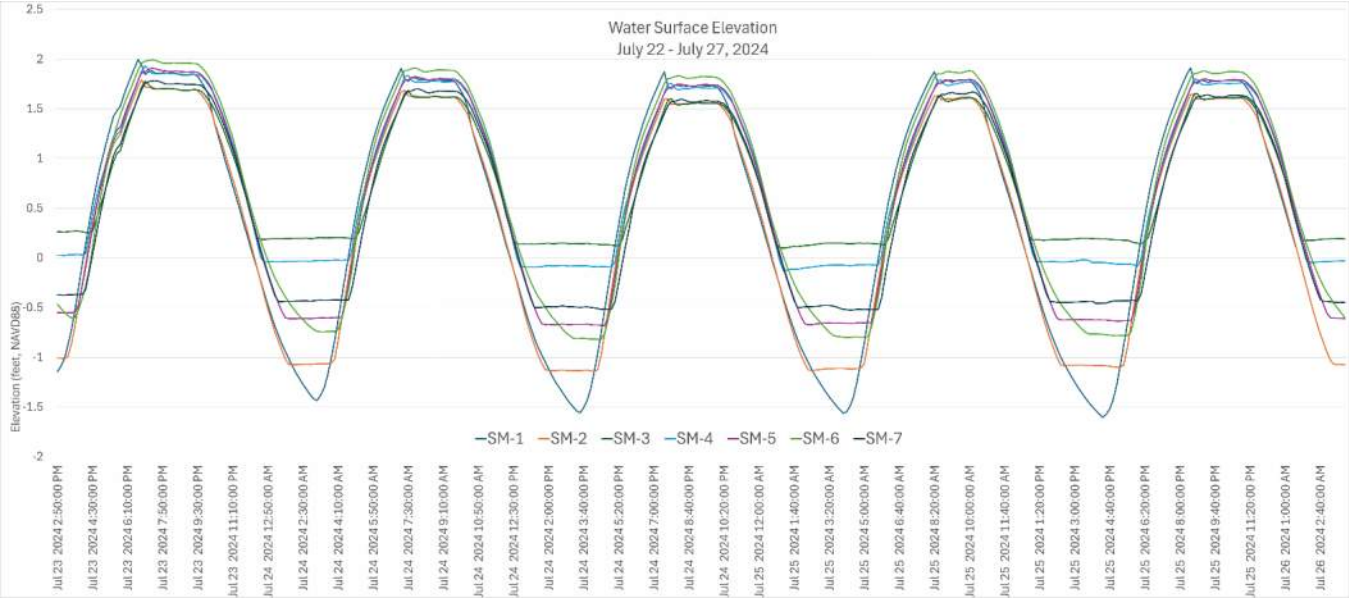

Figure 6: Pre-Relocation Tidal Water Surface Elevations, July 22, 2024 to July 27, 2024

The data loggers captured an event on July 24th in which the airport tide gate operator neglected to close the tide gates at the correct time, resulting in the data loggers catching the full range of the tidal cycle. This is shown toward the lefthand side of the chart in Figure 4.

A representative snapshot of the tidal cycle from July 25, 2024 is shown in Figure 7. The differences in peak water surface elevation, peak duration, and recession between the data locations are more clearly visible in this figure.

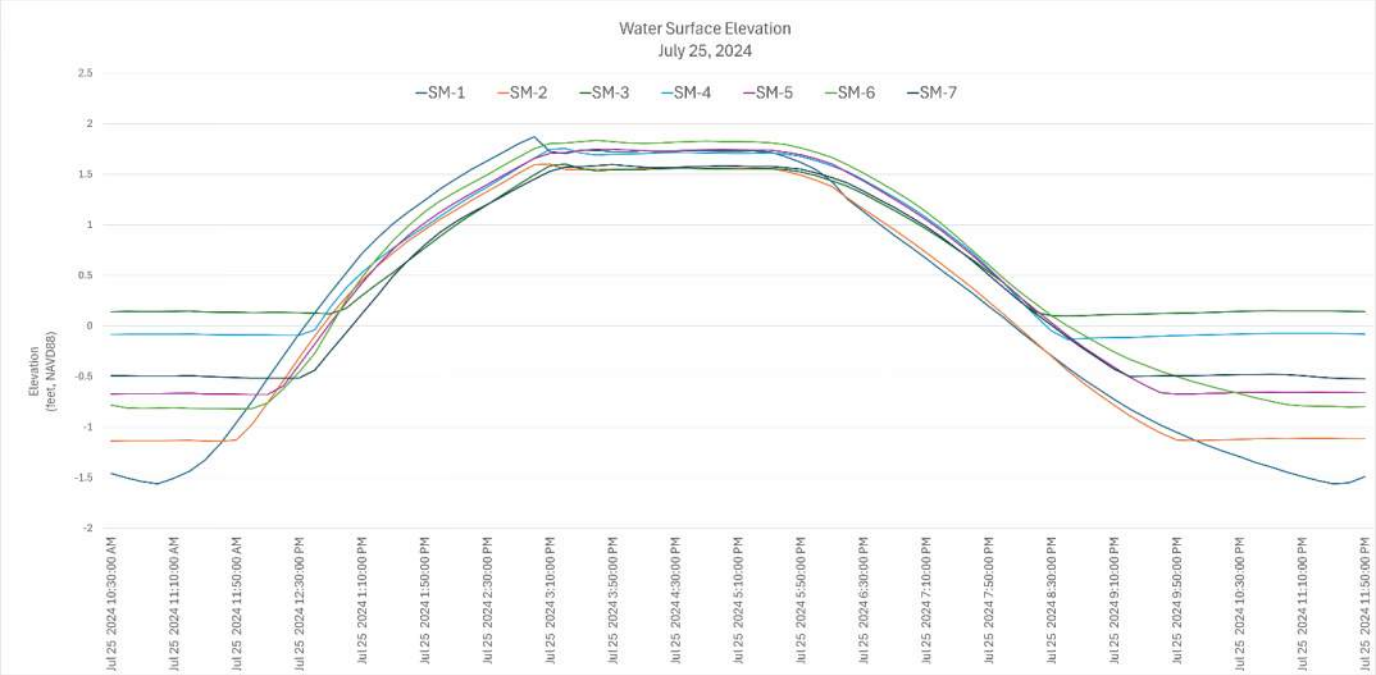

Figure 7: Pre-Relocation Tidal Water Surface Elevations, July 25, 2024

3.1.2 Pre-Relocation Salinity

The observed salinities were within the range expected for near-ocean tidal marsh system. The average peak salinity values ranged from 22.18 at SM-1 to 25.04 ppt at SM-5, refer to Table 4 and Figure 8. These salt marsh areas experience regular tidal flushing, making salinity levels close to that of seawater. Evidence of freshwater mixing was observed at SM-6, where average peak salinity values reach only 3.01 ppt. When this gage was moved a short distance downstream to location 6A, the observed peak salinities were in line with those observed at the other locations.

Table 4
Pre-Relocation
Average Peak Salinity (ppt)

Data Logger	Average Peak Salinity (ppt)
SM-1	22.18
SM-2	22.89
SM-3	24.99
SM-4	24.69
SM-5	25.04
SM-6	3.01
SM-7	23.20

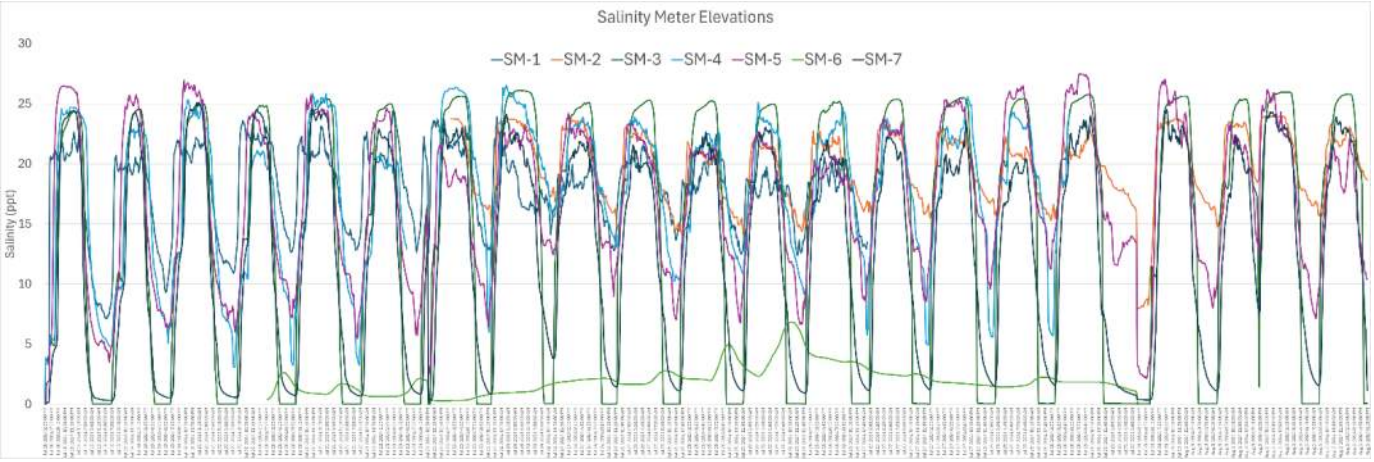

Figure 8: Pre-Relocation Salinity (ppt): July 18,2024 to August 3, 2024

3.2 Post-Relocation Results

3.2.1 Post-Relocation Elevation

The data loggers were moved to the locations shown in Figure 4 on September 18, 2024 to capture variations in water levels within the existing stands of *Spartina alterniflora* within the proposed mitigation marsh areas. Peak water surface elevations were again recorded following relocation of the data loggers, as shown in Figure 9. As with the first set of data, the peak water surface elevations are generally managed to be at or below elevation 2.0 feet NAVD88. The post-relocation average peak water surface elevations are given in Table 5. Note that the peak water surface elevations only reach and stay above elevation 2.0 feet NAVD for short periods of time, with a maximum of 2 hours spent above elevation 2.0 feet NAVD. The peak water surface elevations rarely reach elevation 2.5 feet NAVD.

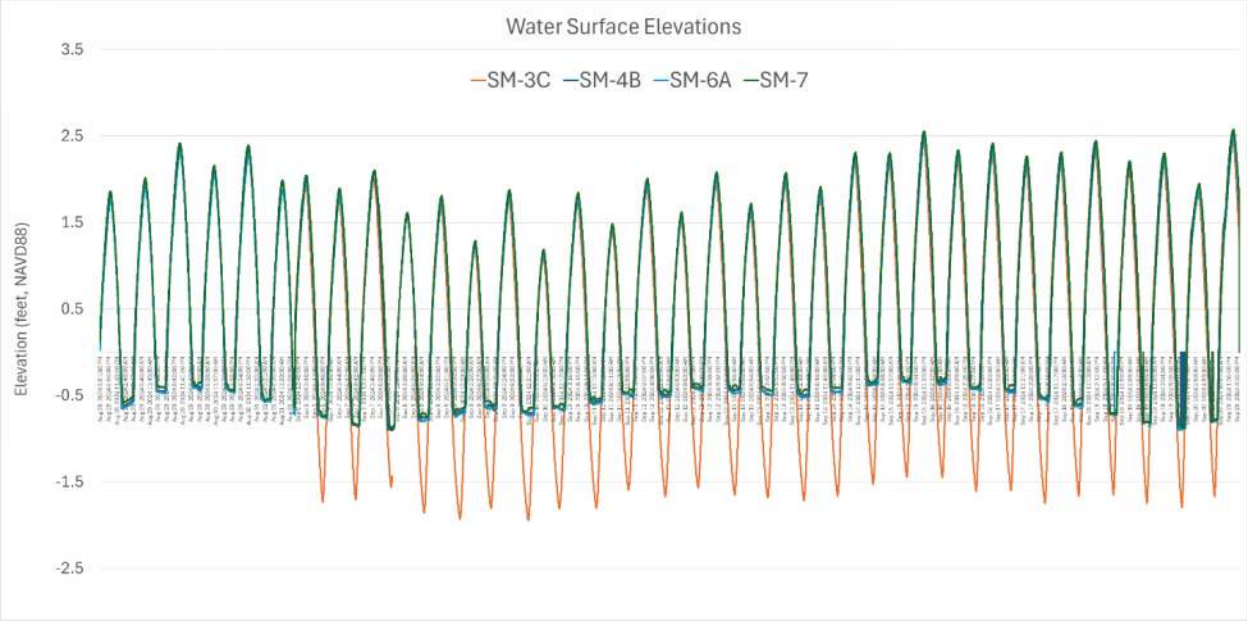

Figure 9: Post-Relocation Elevation, August 28 – September 20, 2024

Following relocation, the highest water surface elevations are observed at SM-4 and SM-7, which peak concurrently at an observed peak water surface at elevation of 1.98 feet NAVD88. Average peak water surface elevations are on average two (2) inches lower at SM-3C and one (1) inch lower at SM-6A than those observed at SM-4B and SM-7. Sample locations SM-4B and SM-7 are located further upstream than SM-6 and SM-2. These results appear to indicate the impact of the wetland longitudinal profile on the observed water surface elevations within the marsh system. The results indicate that the tidal prism is not fully extending to the upstream extents of the marsh as managed under normal operational procedure.

Table 5
Post-Relocation
Average Peak Elevation
(feet, NAVD88)

ID	Location	Avg. Peak Elevation (feet, NAVD88)
SM-3C	Lower boundary of Marsh along main tidal channel, within *Spartina* stand	1.83
SM-4B	Upstream end of NE marsh within *Spartina* stand	1.98
SM-6A	In ditch at head of NW wetland, midway between former SM-5 and SM-6	1.91
SM-7	Within *Phragmites* stand in NW wetland	1.98

3.2.2 Post-Relocation Salinity

Salinity levels recorded during the second monitoring event were generally higher than those from the first event, approaching values typical of seawater. Peak salinities at SM-6A and SM-7 were lower compared to SM-3C and SM-4B, which were situated within *Spartina alterniflora* stands. This pattern indicates that salinity levels are higher in *Spartina*-dominated areas than in locations influenced by freshwater inputs. Although the observed increase in salinity is relatively minor, it appears sufficient to support the growth of *Spartina alterniflora* over *Phragmites australis*.

Table 6
Post-Relocation
Average Peak Salinity (ppt)

Data Logger	Average Peak Salinity (ppt)
SM-3C	26.13
SM-4B	25.99
SM-6A	25.48
SM-7	25.01

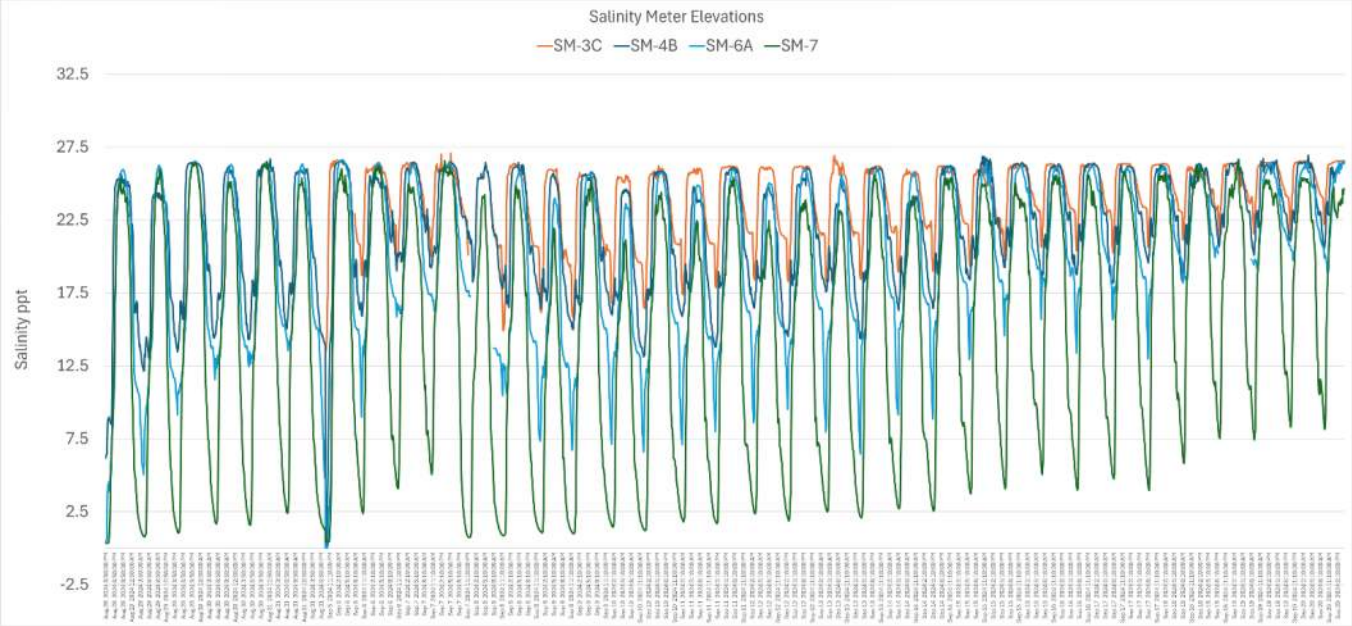

Figure 10: Post-Relocation Salinity (ppt): August 28, 2024 to September 20, 2024

4. Proposed Inundation Duration

The collected data was analyzed to determine the depth and duration of inundation in both the *Phragmites australis* and *Spartina alterniflora* dominated areas. The *Spartina alterniflora* at the site was observed to be growing at and below elevation 0.6 feet NAVD, based on field survey and observation. The average duration of inundation at elevation 0.6 feet was determined to be 6 hours from the tidal water surface elevation data.

The proposed Mitigation Plan will increase the peak elevation of inundation within the proposed marsh mitigation area wetlands to 2.5 feet NAVD. This elevation was determined as the maximum elevation of inundation allowed at the airport to retain the integrity of safety areas at the runway termini. The collected data indicate that water surface elevations rarely exceed elevation 2.5' NAVD within the proposed marsh mitigation area. When the water surface elevations do exceed this elevation, the average duration of inundation is approximately ½ hour.

Table 7
Existing Conditions Inundation Duration

Elevation (feet, NAVD88)	Inundation Duration (hours)
0.6 (*Spartina alterniflora*)	6
2.5 (*Phragmites australis*)	0.5

5. Conclusion

The results indicate the following:

- Water surface elevation within the proposed marsh mitigation areas are currently managed to stay at or below elevation 2.0 feet NAVD88 during periods of normal operation.
- The tidal column does not appear to fully penetrate into the dense stands of *Phragmites* within the marsh mitigation areas, limiting the benefits of tidal exchange in these areas. The presence of *Phragmites* appears to limit tidal flushing effectiveness, creating ecological zones with reduced salinity and less frequent inundation.
- The tidal prism does not always fully extend to the upstream extents of the marsh as managed under normal operational procedure, suggesting that the current operational procedures limit the tidal prism's reach
- Freshwater input is lowering salinities in the upper region of the northwest marsh.
- The proposed inundation duration at elevation 2.5 feet NAVD88 is 6 hours, to match the current duration of inundation experienced in thriving *Spartina alterniflora* areas.

Appendix E- Mitigation Monitoring: Transmittal and Self Certification Form & Project Overview

MITIGATION MONITORING REPORT TRANSMITTAL
AND
SELF-CERTIFICATION

DEPARTMENT OF THE ARMY PERMIT NUMBER:
PROJECT TITLE:

PERMITTEE:
MAILING ADDRESS:

TELEPHONE:

AUTHORIZED AGENT:
MAILING ADDRESS:

TELEPHONE:

ATTACHED MITIGATION REPORT
TITLE:

PREPARERS:

DATE:

CERTIFICATION OF COMPLIANCE: I certify that the attached report is accurate and discloses that the mitigation required by the Department of the Army Permit **[is] [is not]** in full compliance with the terms and conditions of that permit.

CORRECTIVE ACTION: A need for corrective action **[is] [is not]** identified in the attached report.

CONSULTATION: I **[do] [do not]** request consultation with the Corps of Engineers to discuss a corrective strategy or permit modification.
CERTIFIED:_____
(Signature of permittee) Date

MITIGATION MONITORING REPORT PROJECT OVERVIEW FORM

Corps Permit No.:
Mitigation Site Name(s):
Monitoring Report: _____ of _____
Name and Contact Information for Permittee and Agent:

Name of Party Responsible for Conducting the Monitoring:

Date(s) of Inspection(s):

Project Summary:

[include purpose of approved project, acreage and type of aquatic resources impacted, and mitigation acreage and type of aquatic resources authorized to compensate for the aquatic impacts]

Location of and Directions to Mitigation Site(s):

Start and Completion Dates for Mitigation:

Performance Standards **are/are not** being met:

[describe how]

Dates of Corrective or Maintenance Activities Conducted Since Last Report:

Recommendations for Additional Remedial Actions:

BSC GROUP

MEMORANDUM

150 DOW STREET, MANCHESTER, NH 03101 - www.bscgroup.com

TEL 617-896-4300

To:	Kimberly Peace, PM, Hoyle, Tanner & Associates, Inc.	**Date:**	November 8, 2024
From:	Tom Groves, Senior Botanist, BSC Group	**Proj. No.**	0100529.00
Re:	2024 Tidal Gate Survey Results Summary Tweed Airport 2024 Rare Plant Surveys		

cc: Sarah Barnum, BSC RTE Specialist

Transmittal Information

					Pending	Complete	Attached
Attachments:	**A**	☒ Memo	OR	☐ Report/Narrative	☐	☒	☐
	B	☒ Photos Pages			☐	☒	☒
	C	☒ ESRI Map Snapshots	OR	☐ GIS Maps	☐	☒	☐
	D	☐ PDF data forms	OR	☐ Online data forms	☐	☐	☐
		☐ Shapefiles (e-mailed separately)			☐	☐	☐
Other Attachments:					☐	☐	☐
Online Data Form Code (if applicable):		Not yet completed – will be submitted with the final report			**Printout of form:**		☐

Brief Summary of Results

Rare Species Found?	☐ Yes ☒ No
Describe:	No Target Species were observed

Survey Status

Any Surveys Remaining:	☐ Yes (*describe*) ☒ No
Describe:	All surveys have been completed for the Tidal Gate portion of this project. Surveys were performed in tidal marsh areas that will experience an increase in water levels.

Appendix F- BSC Group Tide Gate Survey Results Summary

BSC GROUP

MEMORANDUM

BACKGROUND INFO

Project Name: Tweed Airport Tidal Gate Project
Permit #(s): NDDB Filing # 117005
Project Location: NDDB State-listed species areas on Tweed Airport property at 20 Thompson St. New Haven, CT. Survey area is 32.5 acres.

Scope of Work or Purpose for Survey:

- Tweed Airport is proposing a change to Tidal Gate operations that will affect water levels in the surrounding tidal marsh of Morris Creek. The survey was conducted to identify targeted rare plant species (Table 1) in the areas where tidal levels will be altered, and to assess if suitable habitat is present for these species.

Table 1. Summary of State-Mapped Rare Species Habitat & Target Survey Areas

2024 Survey Date	Botanists	Target Species	Weather	Survey Duration (Total Person Hours)	Summary Survey Results
October 16 - 17	T. Groves and J. Kuziel	• *Krigia biflora* • *Plantago virginica* • *Cirsium horridulum* • *Paspalum laeve* • *Leptochloa fusc* ssp. *fascicularis* • *Pedicularis lanceolata* • *Liatris novae-angliae*	Mostly sunny, temperatures in the 60s ºF	32 person-hours	No Target Species Observed

*Common names provided in Table 3.

SURVEY PROTOCOL

Survey Methods:

Meander-based surveys within areas projected to experience increased water levels due to changes in tidal gate operations. Survey assessed likelihood of occurrence for rare species based on habitat assessment and survey for target species.

Target Survey Areas:

32.5 acres of Tweed Airport property located in the tidal marsh surrounding the airfield at 20 Thompson Ave. New Haven, CT. The survey area was subdivided into 16 sections determined by distinct polygons. Individual units are labeled PP (Phragmites Patch) and a unique identification number (1 - 16). Maps of the survey units are provided in Attachment A.

Target Species:

See Table 1.

SURVEY RESULTS

General Site Characteristics

Tweed Airport is an open, managed, sandplain/wet meadow surrounded by tidal marsh. In use as an airport since the 1940s, this site has likely undergone many changes to vegetative composition over the decades. Much of the area in the center of the property where mowing occurs most frequently, is

primarily non-native grasses and non-native herbaceous cover. The 32.5 acre survey area that comprised the Tidal Gate part of the project identified and surveyed areas outside of the managed part of the airport in the surrounding tidal marsh wetlands. These areas will experience an increase in brackish water and are largely dominated by common reed (*Phragmites australis*).

Summary of Results

Tidal Gate survey areas were divided into 16 units individually labeled as "PP 1-16", details on each individual locations are provided in the provided mapping (Attachment A).

During the Tidal Gate botanical surveys, 50 plant species were observed, 81.25% were native (39 species) and 18.75% (11 species) were non-native or invasive. Although there were more native species, these species comprised only a small fraction of the vegetative community observed during the survey. Common reed (*Phragmites australis*) dominates the available habitat in the Tidal Gate survey area and comprises an estimated 98% of the vegetation present. A complete species list is presented in Attachment B, Table 3.

Included with the target species surveys was an assessment of potential habitats in select locations for the threatened, endangered, or special concern species listed in Table 1. This assessment was based on observed vegetative community, available habitat and invasive species density. Table 2 below lists the dominant and non-dominant plant species observed at each survey location. Representative photos from each survey unit are presented in Attachment C.

Table 2. Tidal Gate Survey Locations and Descriptions

Location	Dominant Vegetation	Non-Dominant Vegetation
PP1	common reed (*Phragmites australis)*	climbing hempvine (*Mikania* scandens) multiflora rose (*Rosa multiflora*) poison ivy (*Toxicodendron radicans),* saltmarsh cordgrass (*Sporobolus alternifolorus*) Callery pear (*Pyrus calleryana*) small white aster (*Symphyotrichum racemosum*)
PP2	common reed (*Phragmites australis*)	climbing hempvine (*Mikania scandens)* poison ivy (*Toxicodendron radicans*) sawbrier (*Smilax glauca*) blackberry (*Rubus* ssp.) multiflora rose (*Rosa multiflora*)
PP3	common reed (*Phragmites australis*)	multiflora rose (*Rosa multiflora*) honeysuckle (*Lonicera* ssp.) groundsel tree (*Baccharis halimifolia*)
PP4	common reed (*Phragmites australis*)	groundsel tree (*Baccharis halimifolia*)
PP5	common reed (*Phragmites australis*)	spartina grass (*Sporobolus alterniflorus*) groundsel tree (*Baccharis halimifolia*)
PP6	common reed (*Phragmites australis*)	spartina grass (*Sporobolus alterniflorus*)
PP7	common reed (*Phragmites*	spartina grass (*Sporobolus alterniflorus*)

	australis)	groundsel tree (*Baccharis halimifolia*)
PP8	common reed (*Phragmites australis*)	fat-hen (*Atriplex prostrata*) saltgrass (*Distichlis spicata*) saltmeadow rush (*Juncus gerardii*) groundsel tree (*Baccharis halimifolia*) Carolina sea-lavender (*Limonium carolinianum*) Virginia glasswort (*Salicornia depressa*)
PP9	common reed (*Phragmites australis*)	spartina grass (*Sporobolus alterniflorus*)
PP10	common reed (*Phragmites australis*)	groundsel tree (*Baccharis halimifolia*) showy goldenrod (*Solidago speciosa*) Oriental bittersweet (*Celastrus orbiculatus*) autumn olive (*Elaeagnus umbellata*)
PP11	common reed (*Phragmites australis*)	N/A
PP12	common reed (*Phragmites australis*)	poison ivy (*Toxicodendron radicans*) pin oak (*Quercus palustris*) groundsel tree (*Baccharis halimifolia*) saltgrass (*Distichlis spicata*) seaside goldenrod (*Solidago sempervirens*) shining sumac (*Rhus copallinum*)
PP13	common reed (*Phragmites australis*)	spartina grass (*Sporobolus alterniflorus*) groundsel tree (*Baccharis halimifolia*) woolly sedge (*Carex pellita*) swamp rose mallow (*Hibiscus moscheutos*)
PP14	common reed (*Phragmites australis*)	N/A
PP15	common reed (*Phragmites australis*)	N/A
PP16	common reed (*Phragmites australis*)	N/A

Summary of Survey results

No target species were observed in the Tidal Gate survey locations during the October 2024 surveys. Due to the moderate to heavy density of common reed in the survey areas, the habitat in these areas is unsuitable for any of the target species.

Observations of the cover type during the survey indicate that areas to be impacted by tidal changes are currently 98% or more infested by common reed. Areas already experiencing more frequent tidal influence currently are comprised of 99% saltmarsh cordgrass (*Sporobolus alterniflorus*). The areas currently experiencing consistent tidal influence only comprise a small percentage of the total area.

Summary of Invasive Plant Species

Invasive species present that are either in very high densities or very low densities with high threat of spread are common reed (*Phragmites australis)*, Oriental bittersweet (*Celastrus orbiculatus),*

multiflora rose (*Rosa* multiflora), purple loosestrife (*Lythrum* salicaria), and pale swallowwort (*Cynanchum rossicum*). Other non-native/invasive species observed during the surveys included Callery pear (*Pyrus calleryana*), and creeping thistle (*Cirsium arvense*). Interestingly a newer non-native species, bog bulrush (*Schoenoplectiella mucronata)* was observed in the survey area and is not present in the herbarium records for New England. The closest current occurrence is from across Long Island Sound on Long Island, NY. This could represent a new non-native, potentially invasive species moving into New England.

Other Comments/Notes:

Two congener species were observed for one target species, yellow thistle (*Cirsium horridulum*).

Congeners for yellow thistle:

- *Cirsium arvense* (creeping thistle)
- *Cirsium vulgare* (bull thistle)

These similar species were distinguished from the target species by the presence of purple flowers, and capitula not closely invested by a series of narrow, spiny-marginated leaves that form a false involucre (Appendix C).

No other congener for target species was observed.

Within the survey area, habitat suitability for any of the target species was very low. Overall, the survey areas are dominated by dense, tall thickets of common reed with little available space for any other vegetation to grow. In areas that did have a native species component, the species present only made up a fraction of a percent of the total vegetation, unless it was below the elevation of the target areas and was currently experiencing water infiltration; these areas were dominated by saltmarsh cordgrass. As a note and anecdotal observation, upland areas outside the tidal marsh survey area had many more native species, contained 90% or more native plant species by area, and were generally typical of a dry oak, hickory forest.

Species Protection Measures

N/A – No target species observations or potential habitat.

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ATTACHMENT A

Maps



Map 1: Tidal Gate Survey Area Overview. Blue flags represent survey polygons (~32.5 ac.) within tidal marsh areas that will experience an increase in water inundation and duration as part of the proposed Tide Gate Alteration project for Tweed Airport. These polygons were divided into 16 separate areas for rare plant surveys.



Map 2: Tide Gate Alteration project survey areas PP1 – PP5 located on the eastern side of Tweed Airport.



Map 3: Tide Gate Alteration Project survey areas PP6 – PP12 and PP17 on the eastern and southwestern portions of Tweed Aiport.



Map 4: Areas PP12 – PP16 on the western edge of the Tweed Airport Property.

ATTACHMENT B

Target Species – Table of Identifying Characteristics

Tables of Observed Native and Non-Native Species

State Common Species Name	Species Name (binomial)	Listing Status: State	Listing Status: Federal	Ideal/ Target Survey Window	Target Survey Effort	Ideal Habitat	Key Features for Identification & Survey Target Windows
Yellow thistle	*Cirsium horridulum*	E	N/A	June – July	October 15 – 16, 2024	Coastal grasslands; airports; open-canopy trailsides and roadsides, inner salt marsh borders; Juniperus-Panicum virgatum communities, scrub communities, and forest edges bordering salt marshes	▪ Neither the stem nor the branches with decurrent wings. ▪ Involucre 20 – 50 mm tall, with bisexual flowers with reproductive stem arising from a rosette of leaves. ▪ Capitula closely invested by a series of narrow, spiny-margined leaves that form a false involucre sometimes overtopping the true involucre, corollas yellow.
Two-flowered cynthia	*Krigia biflora*	T	N/A	June	October 15 – 16, 2024	Dry to wet meadows, fields, rocky woods, and roadsides	▪ Pappus of 10 inconspicuous, hyaline scales and 20 – 35 longer, slender bristles; involucre 7 – 14 mm tall; basal leaf blades 10 – 50 mm wide, glabrous; plants perennial from a short caudex.
Hoary plantain	*Plantago virginica*	SC	N/A	May - June	October 15 – 16, 2024	Dry uplands disturbed areas.	▪ Entire, basal leaf blades only, linear to ovate with peduncles arising among basal rosettes of leaves. ▪ Bracts and/or sepals conspicuously pubescent; plants monocarpic. ▪ Plants sub-dioecious; lobes of the corolla of carpel bearing, chasmogamous flowers erect after anthesis, fruits oblanceolate to obovate.
Saltpond grass	*Leptochloa fusca ssp. fascicularis*	E	N/A	August - November	October 15 – 16, 2024	Coastal, in brackish ponds and shores of "salt ponds", borders of salt or brackish marshes, sand depressions in coastal grasslands and sandy	▪ Leaf sheaths glabrous or scabrous, but not pustulous pubescent; ligule 2 – 8 mm long, attenuate at the apex and becoming

						roadsides.	lacerate at maturity spikelets 5 – 12 mm long, with 6 – 20 florets.
Field paspalum	*Paspalum laeve*	T	N/A	August – October	October 15 – 16, 2024	Mostly coastal, hydric to moderately well-drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets and shores, seasonally flooded and exposed open-canopy vernal pools. ROWs and airports near the coast.	▪ Spikelets 2.3 – 3.3 mm long, solitary at each node, ligules 1.5 – 3.8 mm long
swamp lousewort	*Pedicularis lanceolata*	T	N/A	August - September	October 15 – 16, 2024	Open areas that are periodically flooded such as wet meadows, marsh edges, and stream banks. Usually on calcareous soils but also in non-calcareous wetlands in CT.	▪ The hairless or nearly hairless stem grows from 9 inches to 3 feet tall and usually occurs singly. Leave are 2 – 4 inches long, stalkless or short-stalked, and mostly opposite, pinnately lobed, lanceolate, with the sinuses extending less than halfway back to the midrib. Flowers are 15 – 25mm long, pale yellow, and occur in a crowded spike.
New England blazing star	*Liatris novae-angliae*	SC	N/A	August – October	October 15 – 16, 2024	Open, dry, low-nutrient sandy soils of grasslands, heathlands, and barrens. Prefers fire-influenced natural communities that are periodically disturbed and devoid of dense woody plant cover.	▪ Grows up to 2.6 feet tall and has numerous alternate, entire, and very narrow stem leaves (0.4 – 2 inches). Flowers are purple and are borne in heads, generally with 3 – 30 heads per plant. The heads are hemispheric in shape, and have stalks that range in length from very short to about 2 inches. Flower heads have 20 – 80 flowers.

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Table 3. Non-Native/Invasive Plant Species Survey Inventory

Scientific Name	Common Name
Amorpha fruticosa	false indigo-bush
Artemesia ssp.	mugwort
Cirsium arvense	creeping thistle
Cirsium vulgare	bull thistle
Cynanchum rossicum	pale swallowwort
Elaeagnus umbellata	autumn olive
Helianthus giganteus	giant sunflower
Lonicera ssp.	honeysuckles
Lythrum salicaria	purple loosestrife
Phragmites australis	common reed
Pyrus calleryana	Callery pear

Table 4. Native Plant Species Survey Inventory

Scientific Name	Common name
Atriplex prostrata	fat-hen
Baccharis halimifolia	groundsel tree
Betula populifolia	gray birch
Carex comosa	bristly sedge
Carex intumescens	bladder sedge
Carex pellita	woolly sedge
Clethera alnifolia	sweet pepperbush
Distichlis spicata	saltgrass
Eleocharis obtusa	blunt spikesedge
Elymus virginicus	Virginia wildrye
Hibiscus moscheutos	swamp rose mallow
Ilex verticillata	winterberry holly
Juiperus virginiana	eastern redcedar
Juncus gerardi	saltmeadow rush
Juncus tenuis	slender path rush
Limonium carolinianum	Carolina sea-lavender
Mikania scandens	climbing hemp vine
Morella pensylvanica	northern bayberry
Nyssa sylvatica	black tupelo
Panicum virgatum	switch panicgrass
Pluchea odorata	sweet-scented camphorweed
Quercus alba	white oak
Quercus palustris	pin oak
Rhus copallinum	shining sumac
Rubus ssp.	blackberry

Scientific Name	Common name
Salicornia depressa	Virginia glasswort
Schoenoplectis tabernaemontani	soft-stemmed bulrush
Smilax glauca	sawbrier
Solidago graminifolia	grass leaved goldenrod
Solidago sempervirens	seaside goldenrod
Solidago speciosa	showy goldenrod
Sporobolus alterniflorus	saltmarsh cordgrass
Sporobolus pumilus	marsh hay cordgrass
Symphyotrichum racemosum	small white aster
Symphyotrichum subulatum	annual saltmarsh aster
Symphyotrichum tenuifolium	perennial saltmarsh aster
Toxicodendron radicans	poison ivy
Urtica dioica	stinging nettle
Viburnum dentatum	smooth arrowwood

ATTACHMENT C

Photo Pages

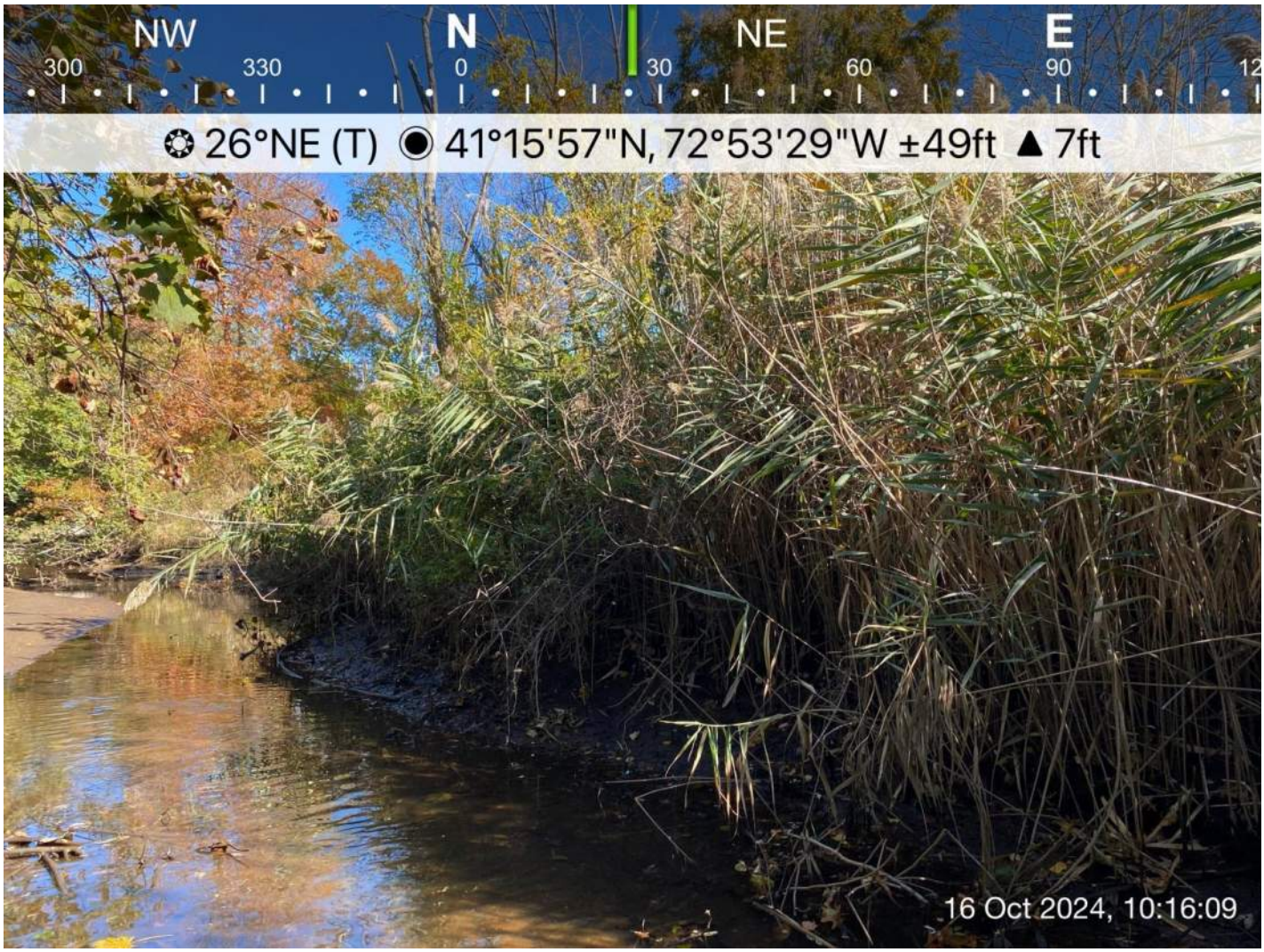


Photo 1: Survey Area PP1 – High density *Phragmites australis* making up 90%+ of the vegetation in this unit.



Photo 2: Survey Area PP3 - An aerial view from a standing dead tree over area PP3. For reference, these *Phragmites australis* stems were ~12 – 15’ tall.

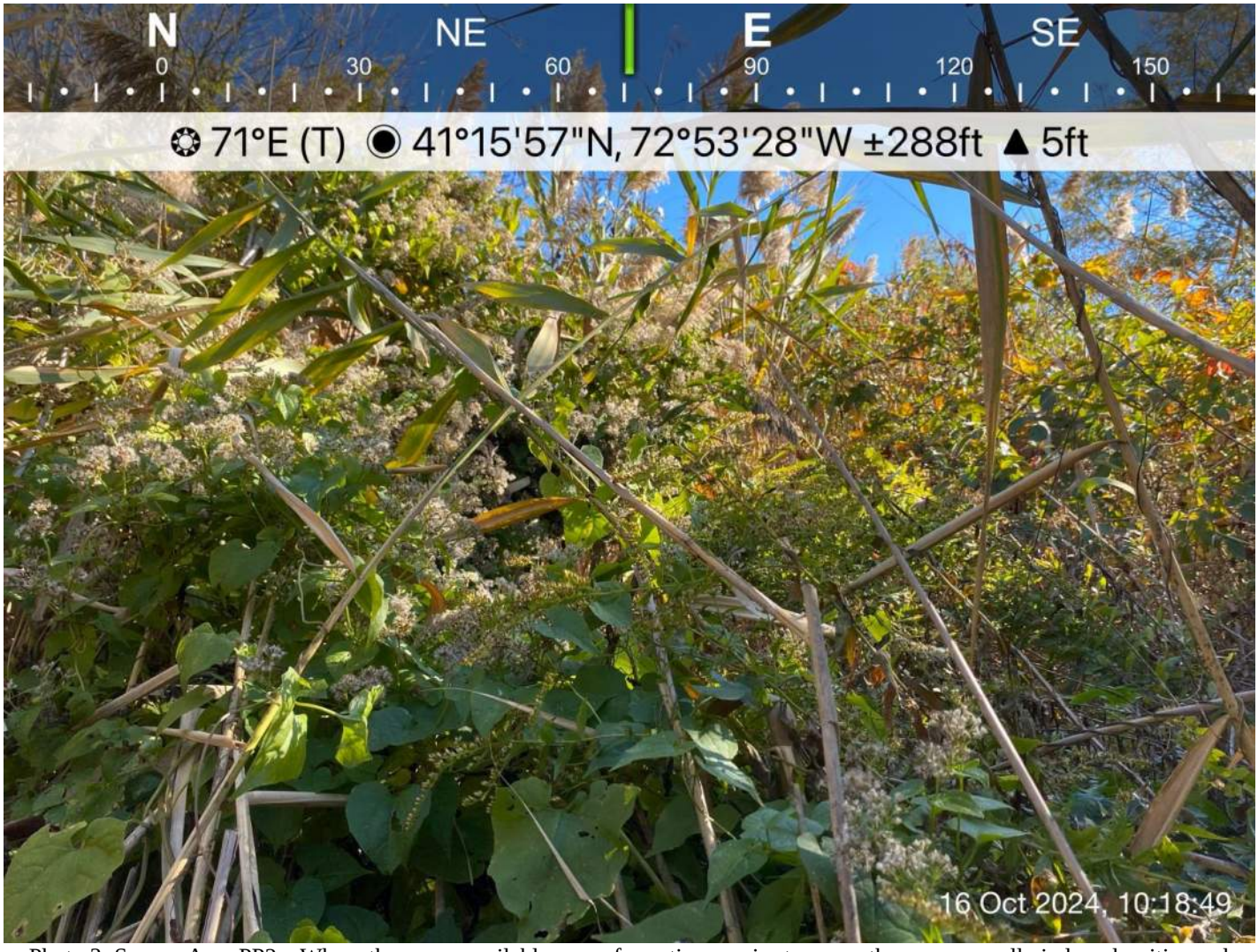


Photo 3: Survey Area PP2 – Where there was available space for native species to grow, they were usually in low densities and struggling for resources. Depicted here is climbing hemp vine (*Mikania scandens*) observed growing up common reed stems.



Photo 4: Survey Area PP4 – An example of a less dense population of *Phragmites australis* this type of reduction in density was associated with higher levels of tidal influence.



Photo 5: Survey Area PP5 – Occasionally during the survey we would find an open patch of saltmarsh cordgrass. When these areas were observed and common reed wasn't the other species present, saltmarsh cordgrass was in high densities.



Photo 6: Survey Area PP6 – An inner patch of saltmarsh cord grass. In this location the areas defined by the native species were a few inches deep with water. Common reed dominated areas were slightly drier. Additionally, the common reed in this area is slightly younger, and is potentially a newer invader in this specific area.



Photo 7: Survey Area PP7 – The area closest to the waters edge had mostly saltmarsh cordgrass while the interior of the area east to the airfield had primarily common reed, with some scattered populations of groundsel tree.

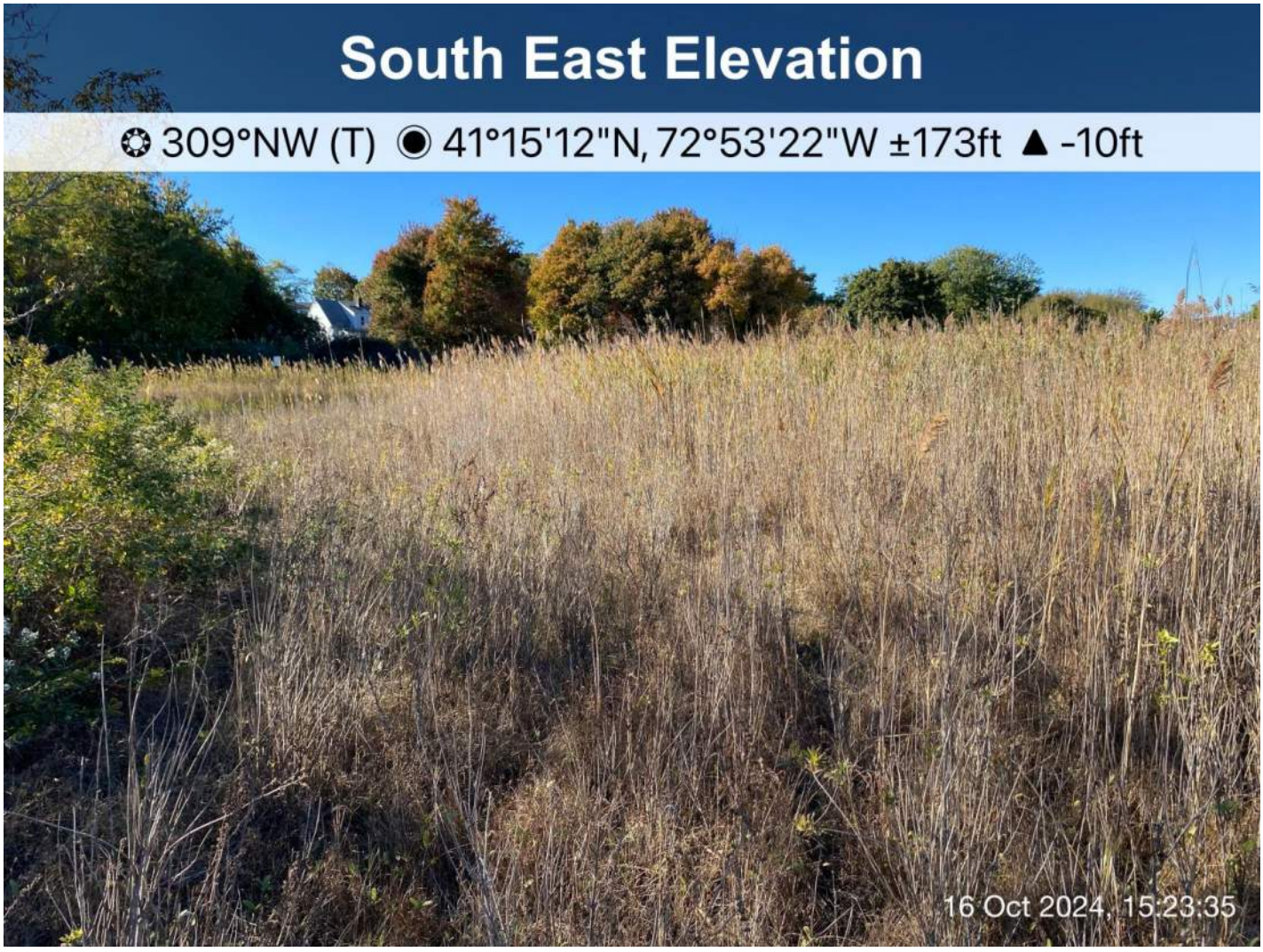


Photo 8: Survey Area PP8 – This area had a greater mix of biodiversity present. The areas closest to the upland edge of the unit was less infested with common reed and was comprised of perennial saltmarsh aster (*Symphyotrichum tenuifolium*), salt grass (*Distichlis spicata*), saltmarsh sand spurry (*Spergularia marina*), glasswort (*Salicornia depressa*) and Carolina sea lavender (*Limonium carolinianum*).



Photo 9: Survey Area PP9 – On the northwest side of Morris Creek near the Tidal Gate off Cart Rd. In areas with more tidal influence, vegetation transitions from 100% invasive common reed to 100% saltmarsh cordgrass.



Photo 10: Survey Area PP9 – A similar vegetative community exists on the eastern side of Morris Creek.



Photo 11: Survey Area PP10 – An overview photo of the only native plant location in the unit. Other invasive species in this location and along the fence line are oriental bittersweet, bush honeysuckle, mugwort, and Japanese knotweed.



Photo 12: Survey Area PP11 – A narrow strip between the airfield and Morris Creek was primarily common reed with few other species observed.



Photo 13: Survey Area PP12 – A common reed inundated area with an upland island in the background. The upland area outside of area PP12 had a relatively intact community of native species.



Photo 14: Survey Area PP13 – This area was comprised of mostly common reed with scattered patches of saltmarsh cordgrass. In the upland areas surrounding this zone, there were pin oak, white oak, and black gum observed.



Photo 15: Survey Area PP14 – Depicted in this photo is a dense, tall, monoculture of common reed with standing water at the center of the unit. It is additionally noted that upland areas adjacent to this survey area had native species representative of a more natural vegetative community where black gum present (*Nyssa sylvatica*).



Photo 16: Survey Area PP15 – Another saltmarsh cordgrass location found within a surrounding monoculture of common reed.



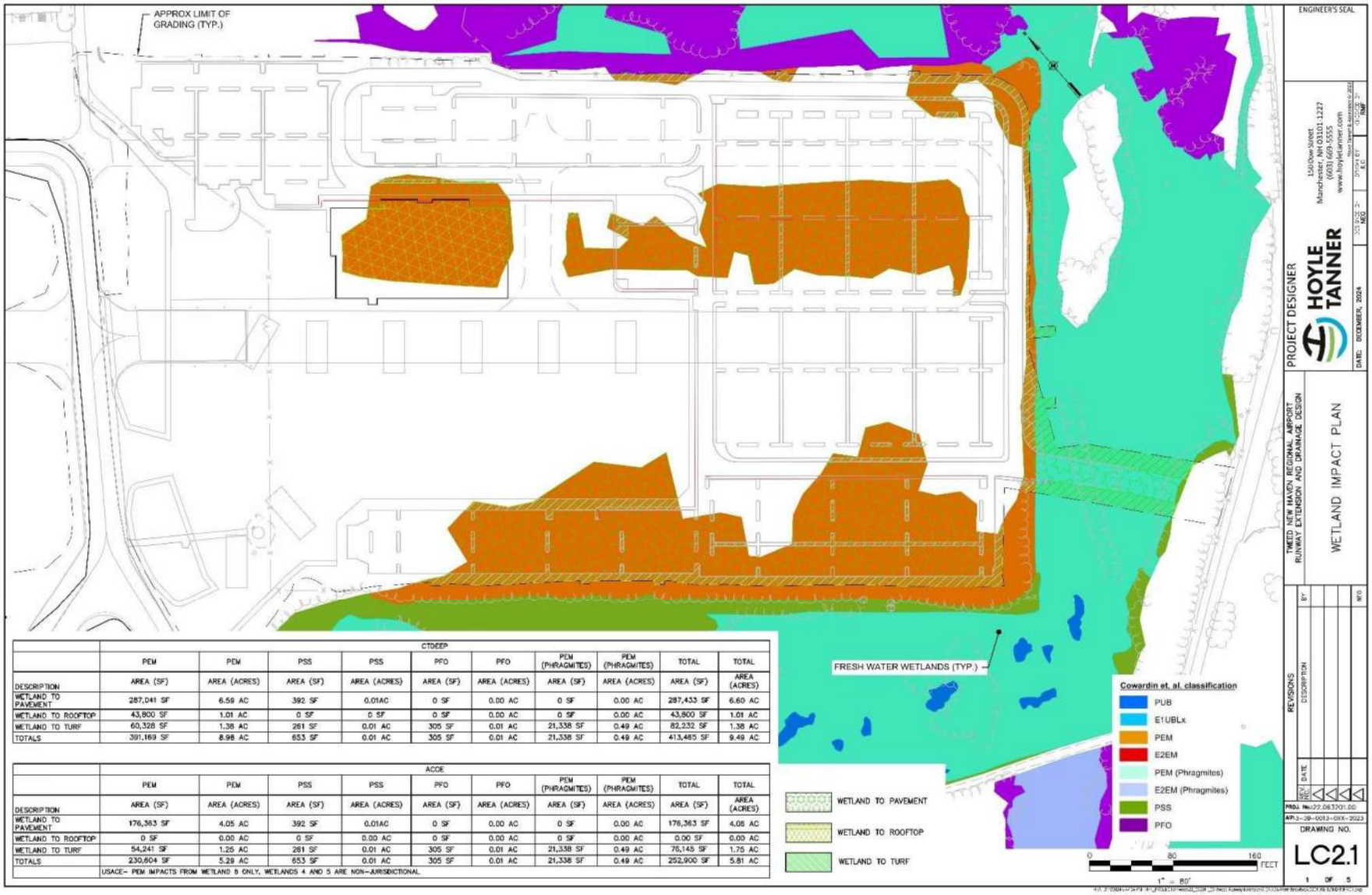
Photo 17: Survey Area PP17 – An observation of a non-native species with few other historic New England observations. *Schoenoplectiella mucronata* is a plant species native to Eurasia, Africa and Australia with the closest recent observations on Long Island, NY.

Appendix G - Description of the Impact Site

Description of the Impact Site

1.0 Description of the Proposed Project (Impact) Site

The Proposed Project impacts are depicted in depicted in Figure 1 Proposed Project Impacts Plan 1, Figure 2 Proposed Project Impacts Plan 2, Figure 3 Proposed Project Impacts Plan 3, Figure 4 Proposed Project Impacts Plan 4, and Figure 5 Proposed Project Impacts Plan 5.



CTDEEP

DESCRIPTION	PEM AREA (SF)	PEM AREA (ACRES)	PSS AREA (SF)	PSS AREA (ACRES)	PFO AREA (SF)	PFO AREA (ACRES)	PEM (PHRAGMITES) AREA (SF)	PEM (PHRAGMITES) AREA (ACRES)	TOTAL AREA (SF)	TOTAL AREA (ACRES)
WETLAND TO PAVEMENT	287,041 SF	6.59 AC	392 SF	0.01AC	0 SF	0.00 AC	0 SF	0.00 AC	287,433 SF	6.60 AC
WETLAND TO ROOFTOP	43,800 SF	1.01 AC	0 SF	0 SF	0 SF	0.00 AC	0 SF	0.00 AC	43,800 SF	1.01 AC
WETLAND TO TURF	60,328 SF	1.38 AC	261 SF	0.01 AC	305 SF	0.01 AC	21,338 SF	0.49 AC	82,232 SF	1.38 AC
TOTALS	391,169 SF	8.98 AC	653 SF	0.01 AC	305 SF	0.01 AC	21,338 SF	0.49 AC	413,465 SF	9.49 AC

ACOE

DESCRIPTION	PEM AREA (SF)	PEM AREA (ACRES)	PSS AREA (SF)	PSS AREA (ACRES)	PFO AREA (SF)	PFO AREA (ACRES)	PEM (PHRAGMITES) AREA (SF)	PEM (PHRAGMITES) AREA (ACRES)	TOTAL AREA (SF)	TOTAL AREA (ACRES)
WETLAND TO PAVEMENT	176,363 SF	4.05 AC	392 SF	0.01AC	0 SF	0.00 AC	0 SF	0.00 AC	176,363 SF	4.05 AC
WETLAND TO ROOFTOP	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	0 SF	0.00 AC	0.00 SF	0.00 AC
WETLAND TO TURF	54,241 SF	1.25 AC	261 SF	0.01 AC	305 SF	0.01 AC	21,338 SF	0.49 AC	75,145 SF	1.75 AC
TOTALS	230,604 SF	5.29 AC	653 SF	0.01 AC	305 SF	0.01 AC	21,338 SF	0.49 AC	252,900 SF	5.81 AC
	USACE- PEM IMPACTS FROM WETLAND 6 ONLY, WETLANDS 4 AND 5 ARE NON-JURISDICTIONAL									

Figure 1 Proposed Project Impacts Plan 1.

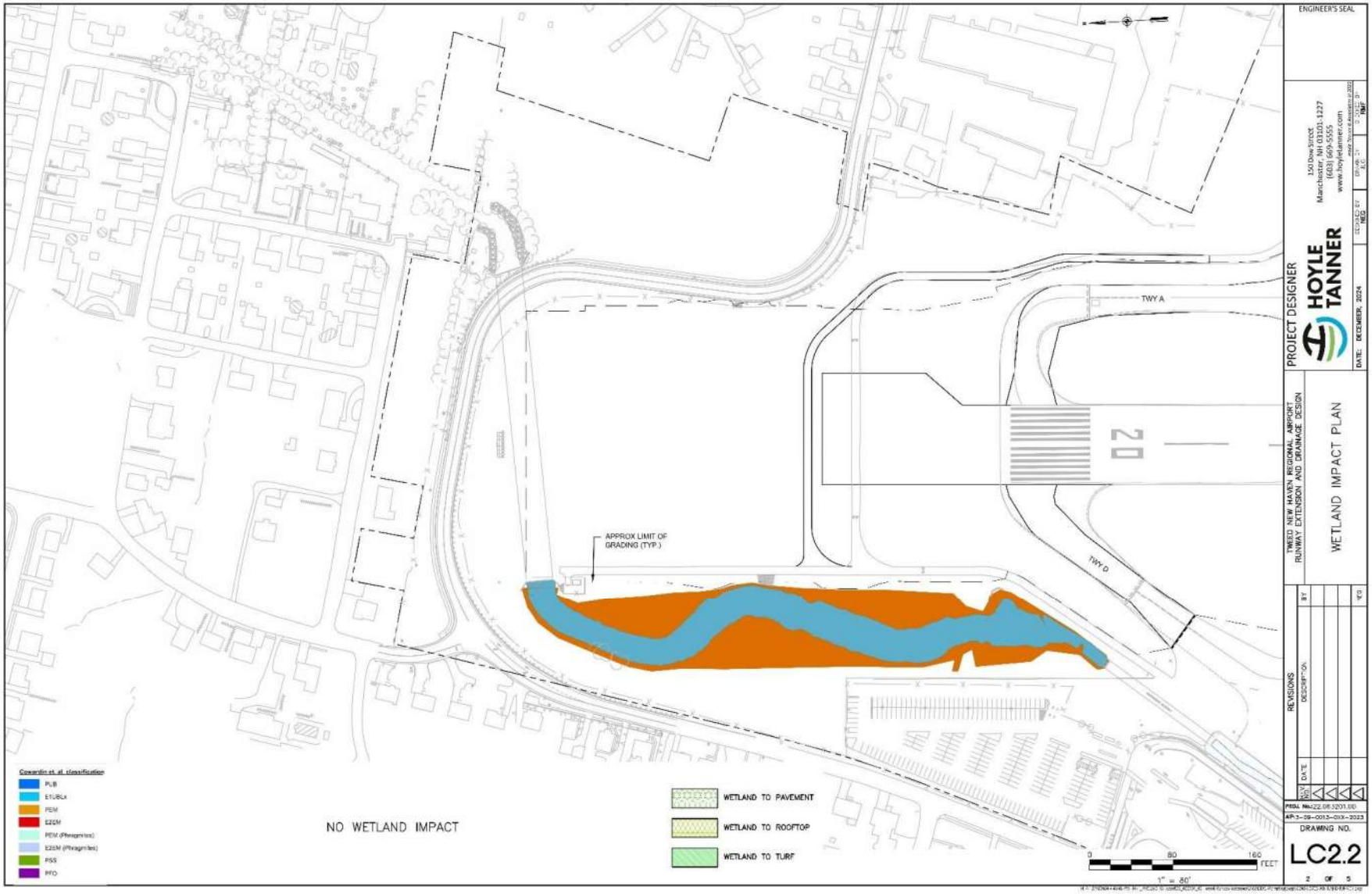


Figure 2 Proposed Project Impacts Plan 2.

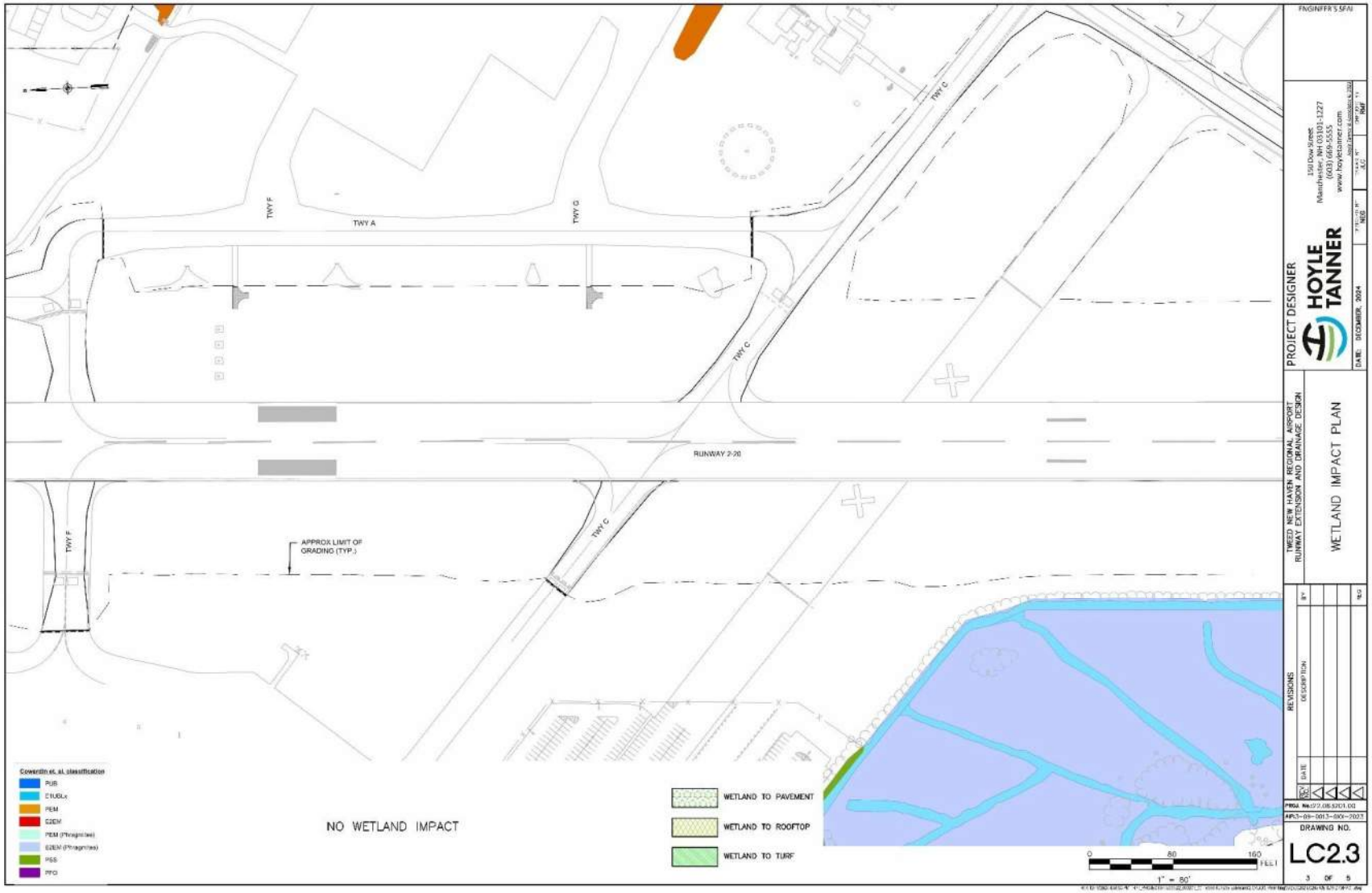


Figure 3 Proposed Project Impacts Plan 3.

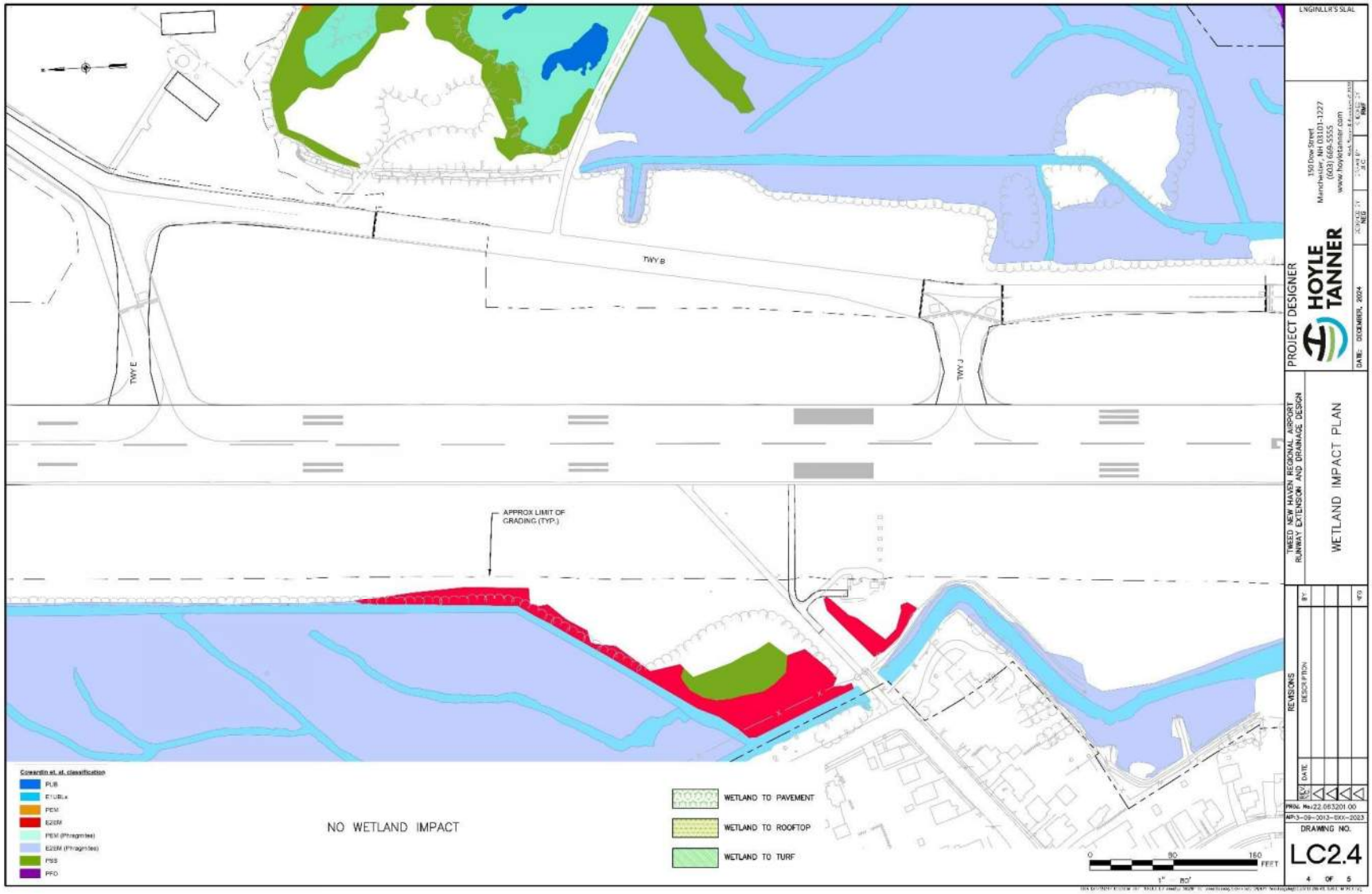


Figure 4 Proposed Project Impacts Plan 4.

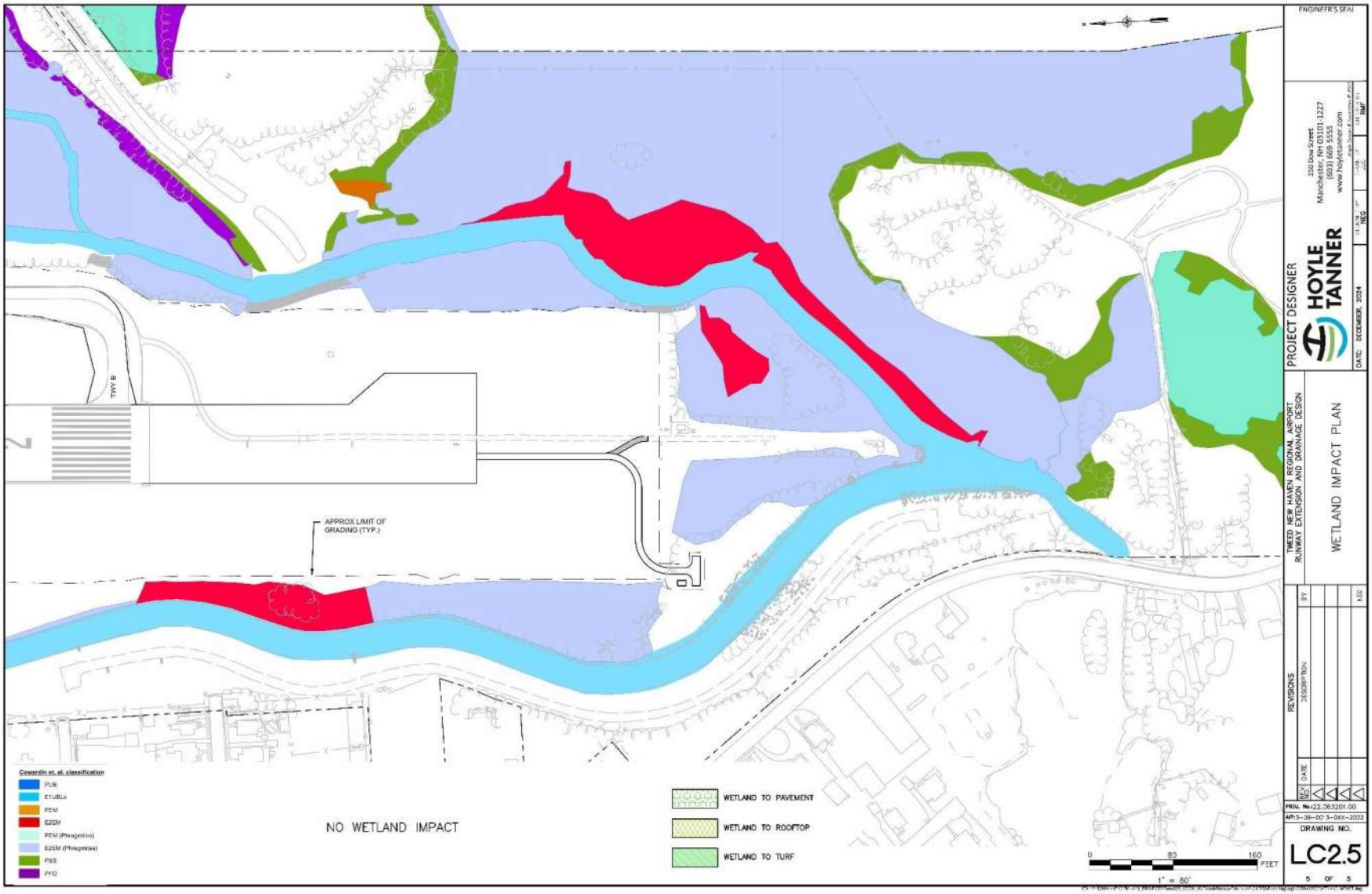


Figure 5 Proposed Project Impacts Plan 5.

The Tweed New Haven Airport Authority proposes improvements to increase the operational efficiency of the airport. These improvements consist of the extension and strengthening of Runway 02-20, drainage improvements, and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways.

The **proposed runway improvements** (extension and drainage) include:

- Extension of Runway 02-20, which entails an approximate addition of 639 feet at the Runway 02 end and 336 feet at the Runway 20 end.
- Adjustment of runway cross-section and profile to be compliant with FAA standards.
- Strengthening of existing runway to meet pavement design requirements of the existing aircraft fleet.
- Incidental grading, stormwater drainage and markings.
- Adjustment of and calibration of navigation aids for both runway ends.
- Installation of runway edge lighting, guidance signs, and other accessory features to be compliant with FAA design standards.

The **proposed East Terminal development** includes:

- New East Terminal Building
  - Construction of a new terminal building ("East Terminal") on the east side of the Airport with an approximate gross square footage (SF) (functional area) of 80,000 SF, with four (4) aircraft gates and two (2) additional aircraft boarding positions (6 total, all ground boarding).
  - Installation/relocation of security fencing and vehicle access gate.
  - Incidental site work, including grading, installation of a stormwater management system and connection to existing on-site utilities such as electricity, water, wastewater, telephone and internet, and site work activities.

- New Apron at East Terminal
  - Construction of a new aircraft apron, with an area of approximately 450,000 SF, including ancillary site elements, would include two (2) Remain Overnight (RON) parking positions and six (6) gate parking positions.
  - Construction of two access taxilanes from the terminal apron to an extended Taxiway A.
  - Incidental site work, including deicing pads, blast deflector fence, grading, stormwater management system and utilities.
  - Removal of a FAA owned decommissioned very high frequency omni-directional range (VOR).

- New Vehicle Parking and Access Road
  - Construction of approximately 2,000 new parking spaces with an approximate footprint of 1,042,000 SF, including building support areas, to serve the new East Terminal.
  - Construction of a causeway and new two-lane (with potential to expand to four lane) airport access road from Proto Drive and associated improvements.

- Installation of electrical lighting, wayfinding, signage, landscaping associated with new parking.
- Incidental site work, including grading, stormwater management system and utilities.

The Proposed Project takes into consideration the Airport's location within the 100-year floodplain and incorporates resiliency measures, such as raising the finished floor elevation above the 100-year flood base flood elevation, placing key building mechanical systems in a raised mezzanine or on roof top locations where they will be above flood elevation, and site design considerations to promote drainage and increase flood resistance for site facilities.

The proposed East Terminal will be constructed on piers, raising the finished floor elevation above mean sea level. The space below the finished floor elevation will be left open to allow floodwater to pass. Additionally, the project will take place within the airport property and within an existing airport-dedicated easement. The new access road will connect with existing Proto Drive; therefore, limited construction would occur within public rights-of-way which mainly entails roads in the immediate vicinity of the Airport. No private property will be acquired as part of the Proposed Project.

1.1 Selection of Proposed Project Site

The location for the Proposed Project at the Airport was selected through a detailed alternatives analysis process outlined in the NEPA Final Environmental Assessment for the Runway 02-20 Extension and Terminal Expansion Program, completed by McFarland Johnson, dated December 2023[1]. The key factors that contributed to the selection of the Proposed Project site (also referred to as the Impact Site) included:

1. **Operational Efficiency**:
    - The Proposed Project allows for the extension of Runway 02-20, which is critical for accommodating larger aircraft and meeting operational requirements for airlines that require a longer runway to reduce weight restrictions and operate more efficiently.
2. **Existing Infrastructure**:
    - The selected project location takes advantage of existing Airport property, minimizing the need for land acquisition or disruption to surrounding residential and commercial areas. It also leverages current Airport infrastructure, including taxiways, aprons, and the air traffic control tower.
3. **Environmental Considerations**:
    - The project site selection process included an effort to avoid and minimize environmental impacts, particularly to wetlands and tidal areas. For example, reducing the runway extension by 60 feet helps avoid construction impacts within intertidal wetlands, which was a significant environmental concern.

[1] Tweed New Haven Airport, National Environmental Policy Act (NEPA) Documents, https://www.tweedmasterplan.com/nepa-documents

4. **Land Use Compatibility**:

    - The Proposed Project site was selected to minimize the disturbance to nearby residential areas and to reduce incompatible land uses around the terminal area. By relocating the terminal building to the east side of the Airport, the Proposed Project avoids disrupting nearby neighborhoods, improves access, and addresses congestion issues.

5. **Flood and Climate Resilience**:

    - The proposed location for the new terminal building is designed with climate resiliency in mind, ensuring that the terminal is raised above the 100-year base flood elevation.

6. **Master Plan Guidance**:

    - The Proposed Project site selection aligns with the Tweed New Haven Master Plan Update dated October 2021, which identified the east side of the Airport as the most suitable location for terminal development and runway extension to address existing congestion and meet future passenger demand.

The Proposed Project site selection was based on a combination of operational, environmental, and logistical factors, aiming to improve the Airport's capacity while minimizing negative impacts on the environment and surrounding communities.

1.2 Project Site Location

The Proposed Project Site is located at the Tweed New Haven Airport (Airport) which is located on the boundary between the City of New Haven and the Town of East Haven, Connecticut. The Airport is situated approximately ¾-mile north of Long Island Sound, ¼-mile east of New Haven Harbor, and ¼-mile from Morris Cove. The Airport is a commercial service airport owned by the City of New Haven and operated by the Tweed New Haven Airport Authority (TNHAA), a quasi-public agency established in 1997. Figure 6 Project Site location map**Error! Reference source not found.** shows the Project Site location.

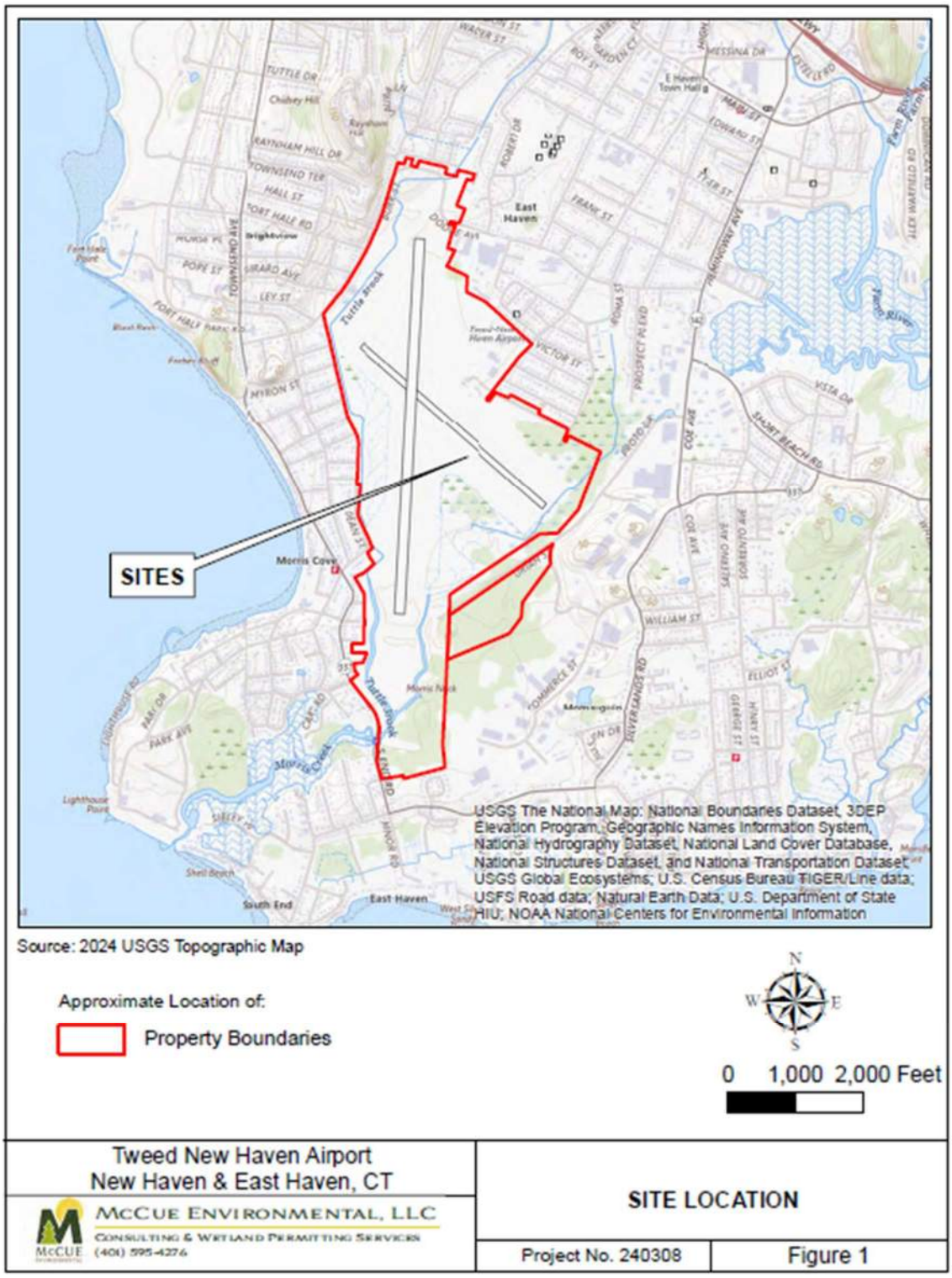


Figure 6 Project Site location map.

1.3 Current Owners

The Airport is owned by the City of New Haven, operated by the Tweed New Haven Airport Authority and managed by Avports.

1.4 Current Land Use and Surrounding Land Use

The land use surrounding and within the Airport property is diverse, reflecting both developed infrastructure and natural areas. Surrounding the Airport, the land use varies between residential, industrial, and undeveloped zones, while the on-site land use is primarily focused on aviation operations, with a mix of built infrastructure and natural wetland environments.

Surrounding Land Use:

- West of the Airport: Primarily residential areas are located between Dean Street and Townsend Avenue.
- East of the Airport: Industrial areas dominate, particularly along Proto Drive and Commerce Street.
- South of the Airport: Undeveloped lands, including wetlands, are found near the southern boundary of Runway 2-20 and the southeast perimeter of the Airport.

On-Site Land Use:

- The airport property consists of runways, taxiways, aprons, parking lots, and access roads.
- Buildings include the terminal, hangars, and facilities for private air carriers, along with maintenance and operations structures, such as a fire and rescue building.
- Mowed and maintained grass fields occupy areas around the runways and taxiways.
- Extensive vegetated tidal wetland systems, including constructed channels and areas of open water, are located along the southwestern, southern, and southeastern perimeter of the airport.

In summary, the Proposed Project Site consists of a mix of aviation infrastructure, industrial and residential areas, and significant wetland systems, reflecting both urban development and natural ecosystems.

Appendix H - Hydraulic Analysis of Proposed Tide Gate Operation, Morris Creek, New Haven, CT

HYDRAULIC ANALYSIS OF PROPOSED TIDE GATE OPERATION, MORRIS CREEK, NEW HAVEN, CT

Modeling Memo
March 25, 2025

To:
Kimberly Peace, Vice President, Senior Environmental Coordinator
Hoyle Tanner & Associates, Inc.



From:
Fatemeh Nasrollahi, EIT, Project Engineer
Elsa Loehmann, P.E., Senior Associate
eDesign Dynamics



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3.0 Methodology 3
2.1 The Geometry File 4
2.2 Assessment Locations 4
2.3 Proof of Concept of Tide Gate Operational Procedure 5
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3.1 Gate Closure Elevation 7
3.2 Lag Time Analysis 8
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1.0 Introduction

This memo outlines eDesign Dynamics' (EDD) modeling efforts to demonstrate the feasibility of tide gate management for wetland mitigation at Tweed New Haven Airport, as detailed in the Draft Wetland Mitigation Plan prepared for Pre-Application Review for submission to CT DEEP.

This modeling study evaluates the effectiveness of modified sluice gate operations in maintaining water surface elevations (WSE) behind the Morris Cove tide gate structure. Specifically, EDD aimed to determine whether adjusted gate operations could sustain an upstream water level of 2.5 ft (NAVD 88) in the marsh's upper reaches for six hours to support the proposed inundation for wetland mitigation.

To assess this, EDD conducted multiple simulations using the HEC-RAS model provided by Hoyle Tanner (HT), analyzing various gate closure scenarios under different tidal conditions. Modeling results suggest that delaying gate closure until the upstream water level reaches 2.59 ft immediately upstream of the tide gate during higher tides effectively maintains a WSE of 2.5 ft for up to six hours in the upper reaches of the marsh, meeting project objectives.

The following analysis examines model predictions across different gate operation scenarios to identify the optimal strategy for WSE control.

2.0 Base Model

A 2D HEC-RAS base model was developed by HT to model the proposed improvement activities at Tweed New Haven airport, titled and submitted as part of the CT DEEP Structures, Dredge, and Fill permit application. The base model was employed to assess floodplain impacts at Tweed New Haven Airport as a result of the proposed project activities. Refer to the full hydraulic report for a detailed description of base model development. A summary description is provided in this section.

For the base model, a pre-project (Natural Conditions) model geometry was developed using a combination of field survey data, bathymetry, and publicly available LiDAR data. The post-project geometry for the base model was developed by modifying the pre-project DEM to reflect proposed project grading.

The hydrologic inputs for the model included peak riverine flows for the 2-, 10-, 25-, 50-, 100-, and 500-year floods. Synthetic 24-hour hydrographs were developed to be used as the upstream boundary conditions in the hydraulic analysis.

The upstream limits of the study area extend approximately 80 ft upstream of FEMA Section C-C (XS 153+80), and the downstream limits extend approximately 1,270 ft downstream of the

existing tide gate, covering approximately 1,100 acres. A 2D computational mesh covering the hydraulic study area was created for both the pre- and post-project comprehensive DEMs, with a default 20-ft x 20-ft cell size. Smaller cells were utilized near existing culverts and in areas with steep, shallow flow. The tide gate was modeled from as-built plans.

3.0 Methodology

EDD used the HEC-RAS base model and data input files shared by HT.

The following geometry file was used for this analysis.

- **Model Geometry File***: PostProjectGeometry_Alt12*

For the downstream boundary conditions and steady upstream inflows, the following boundary condition files were used without modification:

- **Stage/Downstream Boundary Condition***:*
    - *NOAA tide gage data from New Haven, CT (Station ID: 8465705).*

To establish a dynamic tidal stage, data from 24-hour time-period was used (October 29, 2012, 13:30 – October 30, 2012, 13:30), as shown in Figure 1.

- **Flow Data/Upstream Boundary Condition***:*
    - *Tuttle Brook:* steady inflow of 10 cubic feet per second (cfs)
    - *Morris Creek:* steady inflow of 3 cfs

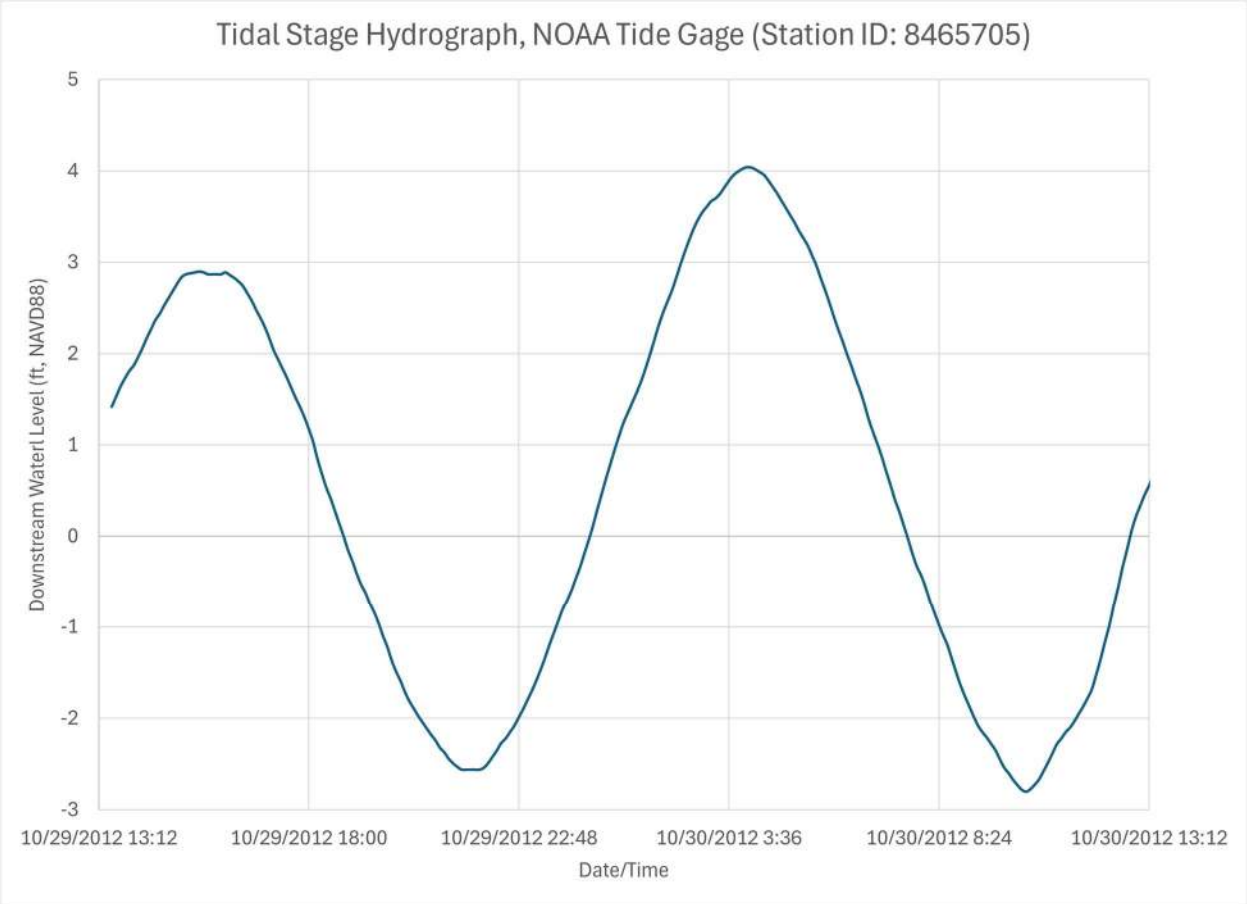

Figure 1. Stage hydrograph of tide at NOAA tide gage, used as downstream boundary condition.

2.1 The Geometry File

EDD modified the geometry file provided by HT to accurately represent the proposed replacement of the existing flap gate with a sluice gate. The key adjustments are as follows:

- **Original Geometry**: The original model from HT represented the three tide gates as separate inline structures, with the two side gates modeled as sluice gates and the middle gate as a flap gate, to represent existing conditions.
- **Modifications**: For this effort, the model was reconfigured to represent the proposed condition by consolidating the three separate structures into a single continuous structure with three openings, each corresponding to an individual tide gate. The middle gate was converted from a flap gate to a sluice gate to allow for adjustable opening height based on operational needs. Additionally, a higher-resolution mesh was applied around the tide gate structure to enhance model accuracy.

2.2 Assessment Locations

The model results were assessed at the following locations, as shown in Figure 2:

- Location 1: Immediately upstream of the tide gate structure.
- Location 2: Northeast side of the runway in the proposed eastern mitigation area.
- Location 3: Northwest side of the runway in the proposed western mitigation area.



Figure 2. Locations where the WSE was analyzed and compared

2.3 Proof of Concept of Tide Gate Operational Procedure

An iterative analysis was conducted to determine the optimal tide gate closure elevation needed to maintain a stable water surface elevation of 2.5 ft in the proposed marsh mitigation areas. The analysis initially calibrated the model by sustaining this elevation for four hours before modeling the proposed duration of six hours. Through multiple simulations, the closure

timing and elevation were refined to optimize upstream water retention while ensuring water levels remained within the acceptable range.

To achieve this, different gate closure elevations were systematically tested to determine the minimum elevation at which the gates should be closed, as measured at Location 1, while assessing their impact on water surface elevations in the marsh areas at Locations 2 and 3. All three gates were operated simultaneously, opening and closing to the same elevation at the same time.

Figure 3 illustrates the various gate closure scenarios that were tested, which include gate closure when the upstream tide level reaches:

A) 2.6 ft
B) 2.59 ft
C) 2.64 ft
D) 2.72 ft

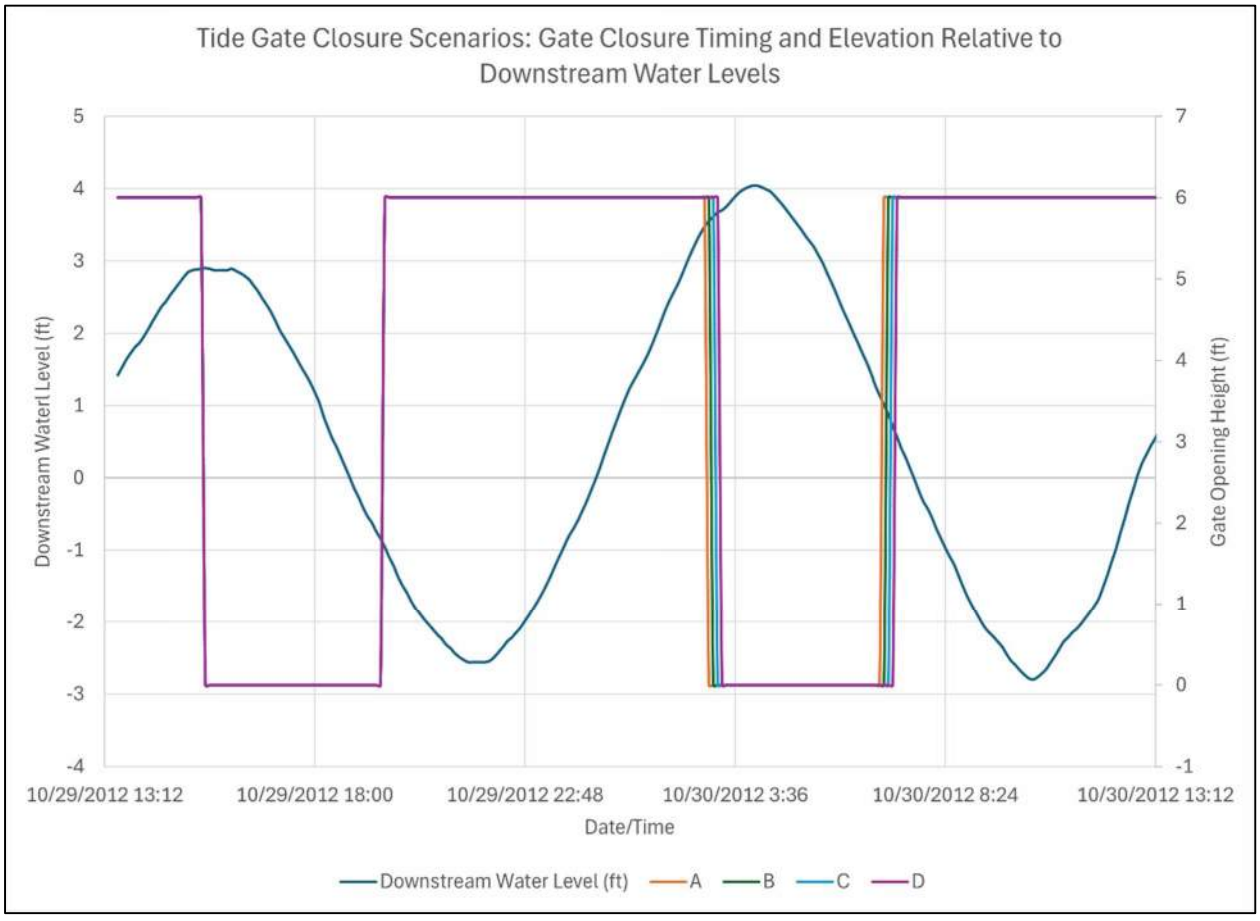

Figure 3. Gate closure scenarios relative to the downstream water level

4.0 Results and Discussion

3.1 Gate Closure Elevation

The results indicated that during the four hour retention closing the sluice gates when the water surface elevation reached 2.59 ft at Location 1 allowed for sustained elevations of 2.5 ft at Locations 2 and 3. Additionally, the analysis demonstrated that the timing of gate closure directly influences the ability to sustain a stable water surface elevation, with variations in closure elevation affecting the duration for which the target level is maintained.

In Scenarios C and D, delayed gate closure, where the gate was closed at a higher elevation, allowed more water to flow upstream before the gate was shut. This additional inflow resulted in water surface elevations exceeding 2.5 ft, as the system received a higher volume of water before the closure took effect. This suggests that closing the gate too late in the tidal cycle can lead to excessive water accumulation, making it more difficult to maintain the target elevation without overshooting.

Conversely, early gate closure represented by Scenario A, where the gate was closed at a lower elevation, restricted the amount of incoming water before the upstream elevation had fully stabilized. While this approach initially limited excessive inflow, it often resulted in an inability to sustain the target water surface elevation for the intended duration. As a result, water levels dropped too quickly and were not maintained at 2.5 ft for the full four -hour period. This indicates that closing the gate too early in the tide cycle can lead to premature declines in water surface elevation, reducing the effectiveness of water retention. Figure 4 illustrates these relationships, providing a visual representation of system performance under different operational scenarios.

Among the gate closure scenarios analyzed, Scenario B, where the gate is closed at an upstream WSE of 2.59 ft at Location 1, yielded the most favorable outcomes. Specifically, Scenario B maintains the WSE within 0.1 ft of the 2.5 ft target for the target duration, the longest consistent duration observed among all scenarios. With other gate closure scenarios, the system fails to meet the target duration as well as the target WSE. Scenario A fails to meet the target inundation duration, while Scenarios C and D result in water surface elevations exceeding 2.5 ft at Location 2. Scenario B's performance aligns closely with the project objective of sustaining a stable WSE during high tide, offering a more consistent and predictable control strategy. This scenario demonstrated an optimal balance by allowing sufficient inflow to raise upstream water levels while preventing overshoot and instability. This scenario's ability to reliably produce the desired hydraulic response at both mid- and upstream marsh zones made it an ideal candidate for extended testing, including the proposed six-hour closure duration analysis.

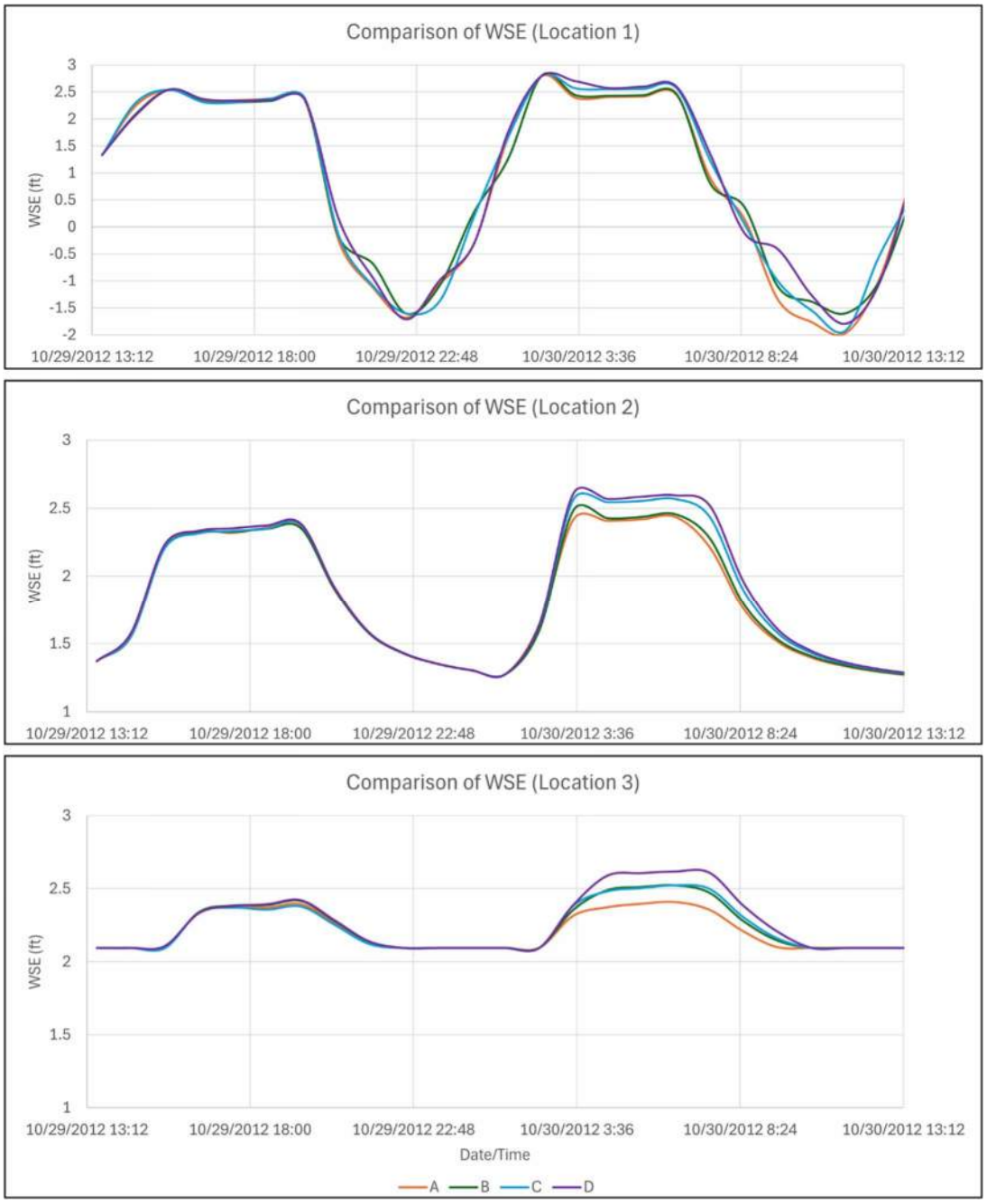

Figure 4. Water surface elevations at Locations 1, 2, and 3 for Scenarios A - D

3.2 Lag Time Analysis

Figure 5 illustrates the observed lag times at the three locations, highlighting the natural delay in water movement through the system. Location 2 experienced a one-hour lag, while Location 3, the furthest upstream, exhibited the longest delay. This pattern confirms that water surface elevation changes take longer to propagate through the marsh system as distance from the tide gate increases.

The lag time at Location 3 was influenced by the water surface elevation at the time of gate closure. When water levels were lower, stabilization occurred approximately one hour after Location 1. At slightly higher water levels, the lag extended to just over an hour, and at even higher elevations, it increased to nearly two hours.

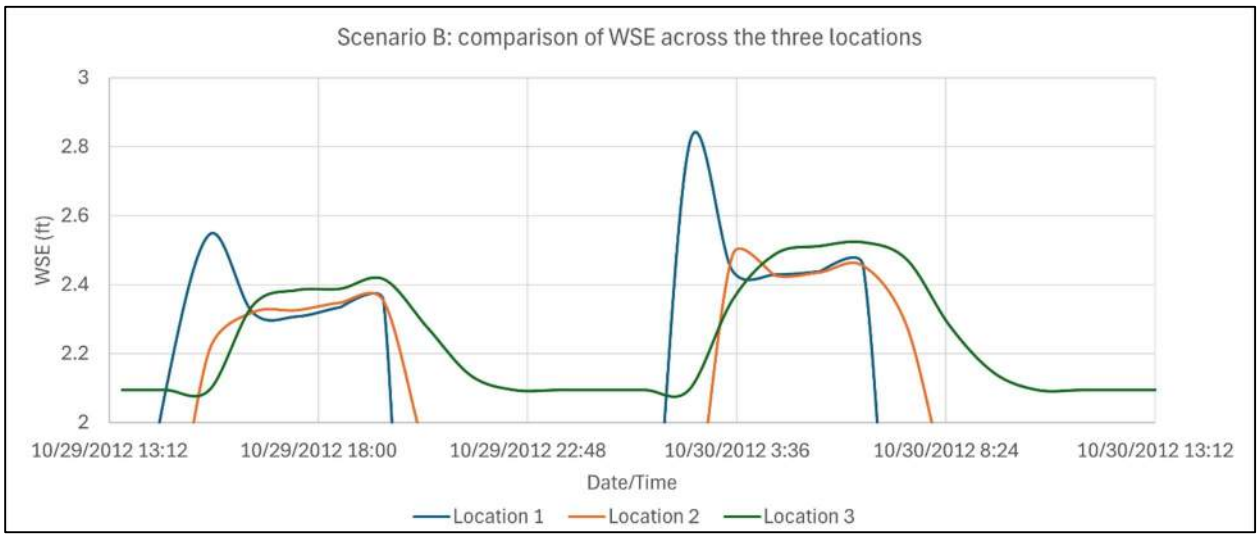

Figure 5. Lag time between the three locations (Scenario B)

These findings indicate that as more water moves through the system, upstream locations require additional time to stabilize. These findings confirm that the water surface elevation associated with gate closure directly affects lag time, with closures at higher water surface elevations resulting in longer delays in upstream water level stabilization.

3.3 Gate Closure Duration

To assess the impact of extended gate closures, the following section examines a six-hour closure period—selected based on the target inundation duration—compared to the initial four-hour period used during model calibration.

For the six-hour trial run, the tide gates were closed at the optimal upstream water surface elevation of 2.59 ft. The WSE response was monitored at the three key locations to assess the impact of the extended closure period.

The results indicate that water surface elevations at all locations were more stable during the six-hour closure duration compared to the four-hour duration. As expected, Location 1 closest to the tide gate exhibited the most immediate response, with WSE fluctuations aligning with the tidal cycle. In contrast, Locations 2 and 3, further upstream, experienced a more gradual response, with delayed and dampened fluctuations due to the natural lag in water movement.

Extending the closure period from four to six hours resulted in more sustained higher water surface elevations at upstream locations. In the four-hour trial, water surface elevation at Location 3 occasionally failed to reach the target elevation, particularly during the first tidal

cycle of the 24-hour duration, which experienced a lower-than-normal tidal peak. However, in the six-hour trial, water surface elevation at Location 3 more consistently approached or maintained 2.5 ft for an extended duration. While lag times for upstream stabilization persisted, the extended closure period reduced rapid fluctuations, leading to a more controlled and predictable water level pattern.

Overall, the six-hour closure improved water retention and stability at upstream locations, demonstrating that increasing closure duration can enhance control over water surface

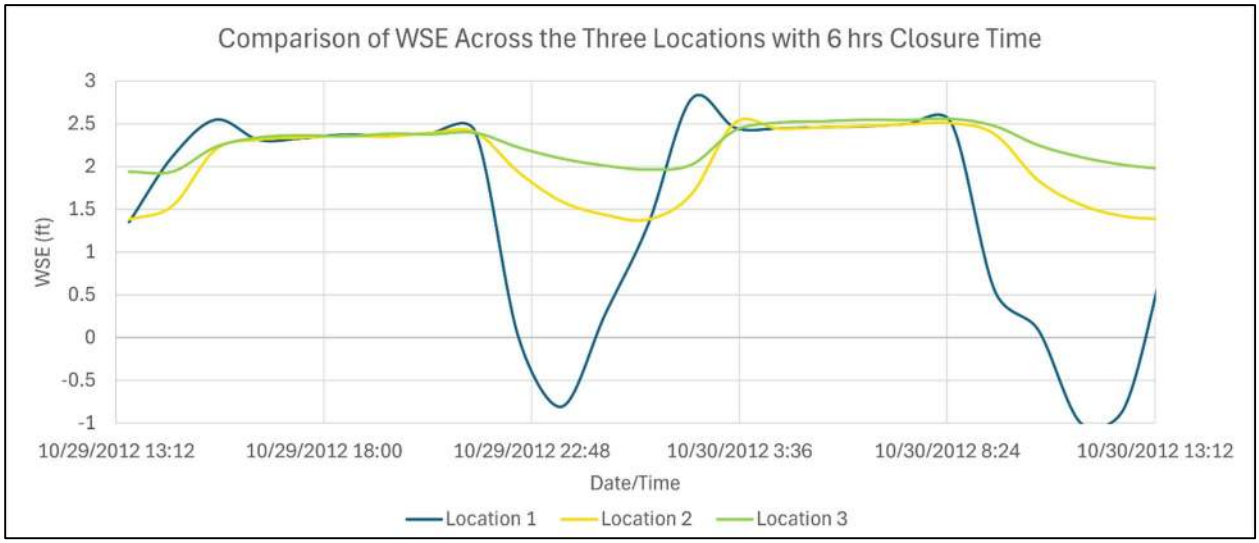

Figure 6. Water surface elevation with 6 hrs gate closure at Locations 1, 2, 3

elevation and reduce fluctuations. However, as observed in previous analyses, longer closure durations also resulted in extended lag times at Locations 2 and 3, reinforcing the need to balance closure timing with upstream response dynamics. These results are shown in Figure 6.

5.0 Conclusion

The hydraulic analysis of proposed tide gate operations confirms that modified sluice gate operations can effectively maintain target water surface elevations of 2.5 ft for extended durations in the target marsh areas. Through an iterative modeling approach, a gate closure triggered at an upstream water surface elevation of 2.59 ft proved most effective, consistently maintaining the target elevation during both four-hour and six-hour closure durations.

The results demonstrate that increasing the closure duration from four to six hours improved water retention and stability at upstream locations. The six-hour closure period led to more consistent water surface elevations at Locations 2 and 3, particularly at Location 3, which previously exhibited difficulty reaching the target elevation in the four-hour trials. While longer closure durations helped minimize fluctuations and provided greater control over water levels, they also resulted in extended lag times between gate closure and upstream water level stabilization, particularly at more distant locations.

Balancing closure timing with upstream response is key to optimizing water retention while minimizing delays. Refining tide gate operations will enhance marsh inundation, support ecological function, and ensure long-term stability.

ATTACHMENT 18 – ENGINEERING REPORT COVER SHEET

Connecticut Department of
Energy & Environmental Protection
Bureau of Water Protection & Land Reuse
Land & Water Resources Division

LWRD License Application
Engineering Report Cover Sheet

This Cover Sheet is a checklist of requirements that need to be completed and submitted with the engineering report. Please complete this checklist by identifying where each requirement listed is addressed in the engineering report (report title and page numbers). If an item is not applicable, place "NA" in the box. The engineer report must fully describe the design of the proposed facilities or other actions and the hydraulic and hydrologic effects thereof. This Cover Sheet is required to be signed and sealed by a professional engineer licensed in the State of Connecticut.

Stormwater Management

Engineering Report section title and page number	Requirement Description
Stormwater Management Report, Section 2	Description of the design storm frequency intensity, volume and duration
Stormwater Management Report, Appendix A	Watershed maps, existing and proposed
Stormwater Management Report, Appendix B, Appendix G	Computations for Tc
Stormwater Management Report, Appendix B	Imperviousness calculations
Stormwater Management Report, Appendix B	NRCS runoff curve numbers, volumetric runoff coefficients
Stormwater Management Report, Appendix B	Computations used to determine peak runoff rates, and velocities for each watershed area (24-hour storm): • Stream Channel Protection: 1-year, 2-year frequency (“over-control” of 2-year storm) • Conveyance Protection: 10-year frequency • Peak Runoff Attenuation: 2-year, 10-year, 25 year, and 100-year frequency • Emergency Outlet Sizing: safely pass the 100-year frequency or larger storm
Stormwater Management Report, Appendix B	Hydrograph routing calculations
Attachment 14, Project Plans	Description, schematics, and calculations for drainage and stormwater management systems
Attachment 14, Project Plans	Infiltration rates, geotechnical information, test pit data, perc test data, conductivity testing data
Stormwater Management Report, Appendix H	Documentation of sources
Available on Request	Electronic files in native format for any computer modelling generated for analysis.

Stormwater Management

Engineering Report section title and page number	Requirement Description
N/A	Detention basin analysis including timing and duration of expected outflow, stream stability analysis and hydrograph summation
Stormwater Management Report, Appendix E, Appendix F	Erosion & sedimentation calculations for any engineered measures
Stormwater Management Report, Appendix C, Appendix D	Calculations for any engineered water quality treatment measures

Floodway/Floodplain Assessment

Engineering Report section title and page number	Requirement Description
Floodway/Floodplain Assessment Report Sections 2, 3, 5, 7, 10	Description of existing and proposed conditions upstream and downstream of the proposed activity
Floodway/Floodplain Assessment Report Appendix I	For any bridge or culvert placement or replacement with a drainage area of 100 acres or more, plan sheets showing the existing and proposed inundation area for the 2, 10, 25, 50, and 100 year discharges, carried to convergence
Stormwater Management Report, Section 6	Flood Contingency Plan
N/A	A description and analysis of the floodplain modifications required to restore any flood conveyance and flood storage capacity
Floodway/Floodplain Assessment Report Section 6, 7, 8	Demonstration that backwater from the proposed activity will not impact an existing dam, dike, detention, or similar structure
Floodway/Floodplain Assessment Report Appendix C, D, E, F, G, H, I, J, K	Backup data and complete hydraulic analysis for proposed modifications to the floodplain including location plan and plot for sections, profile sheet, summary sheet (for riverine modeling, refer to: https://www.fema.gov/sites/default/files/2020-02/Hydraulics_OneDimensionalAnalyses_Nov_2016.pdf)
Attachment 14, Project Plans	Description, schematics, and calculations for bridges and culverts

Structures within a Coastal Floodplain

Engineering Report section title and page number	Requirement Description
N/A	Longshore sediment transport impact report
N/A	Wind, wave, load analysis for significant public access structures (Only for Flood Management Certification)
N/A	Wind, wave, load analysis for flood and erosion control structures (e.g. seawalls, bulkheads, revetments, berms, jetties, etc.)
Wetland Mitigation Plan, Sections 2 & 3	Hydrologic / Hydraulic impact report for tide regulating / influencing structures (e.g. culverts, tidegates, flood berms / levees, etc.)

Professional Certification

For any engineering report submitted as part of the LWRD License application, the following certification must be signed and sealed by a professional engineer licensed to practice in Connecticut and submitted with the Engineering Report Cover Sheet.

"I certify that in my professional judgement, each requirement listed in the Engineering Report Cover Sheet has been addressed in the engineering report submitted as part of the LWRD permit application and that the information is true, accurate and complete to the best of my knowledge and belief.

This certification is based on my review of the engineering report.

I understand that a false statement made in the submitted information may, pursuant to Section 22a-6 of the General Statutes, be punishable as a criminal offense under Section 53a-157b of the General Statutes, and may also be punishable under Section 22a-438 of the General Statutes."



Signature of Professional Engineer	Date
	04/18/2025
Name of Professional Engineer (print or type)	P.E. Number (if applicable)
Robert M. Furey	10408

Affix P.E. Stamp Here
(if applicable)



FOR RUNWAY EXTENSION PROJECT

Professional Certification

For any engineering report submitted as part of the LWRD License application, the following certification must be signed and sealed by a professional engineer licensed to practice in Connecticut and submitted with the Engineering Report Cover Sheet.

"I certify that in my professional judgement, each requirement listed in the Engineering Report Cover Sheet has been addressed in the engineering report submitted as part of the LWRD permit application and that the information is true, accurate and complete to the best of my knowledge and belief.

This certification is based on my review of the engineering report.

I understand that a false statement made in the submitted information may, pursuant to Section 22a-6 of the General Statutes, be punishable as a criminal offense under Section 53a-157b of the General Statutes, and may also be punishable under Section 22a-438 of the General Statutes."



Signature of Professional Engineer	Date
	04/18/2025
Richard L. Pettinelli	PEN.0016478
Name of Professional Engineer (print or type)	P.E. Number (if applicable)

Affix P.E. Stamp Here
(if applicable)



FOR EAST TERMINAL EXPANSION PROJECT

Tweed New Haven Regional Airport
New Haven, Connecticut

Runway Extension and Terminal Expansion

Hoyle Tanner Project No. 63201

Stormwater Management Engineering Report

April 2025

Prepared for:
Tweed New Haven Airport Authority

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1. PROJECT DESCRIPTION

The Tweed New Haven Airport Authority (TNHAA) and The New HVN LLC proposes the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways.

The proposed runway improvements (extension and drainage) include:

- Extension of Runway 02-20, which entails approximately an additional 639 feet at Runway 02 end and 336 feet at Runway 20 end.
- Adjusting runway cross-section and profile to be compliant with FAA standards.
- Strengthen existing the runway to meet pavement design requirements of the existing aircraft fleet.
- Incidental grading, stormwater drainage and markings.
- Adjusting and calibrating navigation aids for both runway ends.
- Installing runway edge lighting, guidance signs, and other accessory features to fully comply with FAA design standards.

The proposed East Terminal development includes:

- New East Terminal Building
    - Construction of a new terminal building ("East Terminal") on the east side of the Airport with an approximate gross square footage (SF) (functional area) of 80,000 SF, with four gates and two additional boarding positions (6 total, all ground boarding).
    - Installation/relocation of security fencing and access gate.
    - Incidental site work, including grading, stormwater management system and connection to existing on-site utilities such as electricity, water, wastewater, telephone and internet, and site work activities.

- New Apron at East Terminal
    - Construction of a new aircraft apron, with an area of approximately 450,000 SF, including ancillary site elements, would include two Remain Overnight (RON) parking positions and six gate parking positions.
    - Construction of two access taxilanes from the terminal apron to an extended Taxiway A.
    - Incidental site work, including deicing pads, blast deflector fence, grading, stormwater management system and utilities.
    - Removal of a FAA owned decommissioned very high frequency omni-directional range (VOR).

- New Vehicle Parking and Access Road
    - Construction of approximately 2,000 new parking spaces with an approximate footprint of 1,042,000 SF, including building support areas, to serve the new East Terminal.
    - Construction of a causeway and new two-lane, with potential to expand to four lane, airport access road from Proto Drive and associated improvements.
    - Installation of electrical lighting, wayfinding, signage, landscaping associated with new parking.
    - Incidental site work, including grading, stormwater management system and utilities.

Wetland Mitigation that will be included as part of the overall project to address wetland impacts will include enhancement of 28.5 acres of tidal salt marsh complex within existing Phragmites-dominated marsh areas by increasing the depth and duration of inundation of tidal water within these marshes. The enhancement objectives will be primarily achieved by modifying the operational procedure of the existing tide gate. The storm event / wet weather operations procedure of the tide gate will remain unchanged, ensuring flood prevention through the use of the Watershed Drain Mode when severe weather is forecast. Mitigation will also include the creation of 3.61 acres of tidal salt marsh complex within upland areas of the Airport property dominated by Phragmites australis. This process will involve excavating existing upland material, ensuring tidal flow through the creation of tidal channels that connect with existing channels, placing a clean, sandy planting medium, and grading the site to appropriate elevations for tidal inundation—the upper quarter of the tidal cycle. The newly created marsh will be planted with native salt marsh vegetation, including Spartina alterniflora in low marsh zones, to support habitat function and ecological resilience.

The project takes into consideration the Airport's location within the 100-year floodplain and would incorporate resiliency measures, such as raising the finished floor elevation above the 100-year flood elevation, placing key building mechanical systems in a raised mezzanine or roof top location where they would be above flood elevation, and site design considerations to promote drainage and make facilities flood resistant. The proposed East Terminal would be constructed on piers, raising the finished floor elevation above mean sea level. The space below the finished floor elevation would be left open to allow floodwater to pass. Additionally, the project would take place within the airport property and within an existing airport dedicated easement. The new access road would connect with existing Proto Drive; therefore, limited construction would occur within public rights-of-way which mainly entails roads in the immediate vicinity of the Airport. No private property is intended to be acquired as part of the project

2. STUDY METHODOLOGY AND ASSUMPTIONS

HydroCAD Stormwater Modeling System Software (Version 10.20-5c) was used to model the 2, 10, and 100-year storm events for a Type III 24-hour storm. Precipitation amounts from NRCS Design Storm specifications for New Haven County, Connecticut were utilized.

Table 1 – Rainfall Amounts

Storm Durations	2-Year	10-Year	100-Year
24 Hour	3.35"	5.23"	8.23"

The TR-55 method was used to estimate the Time of Concentration (Tc). This method involves estimating the length of sheet flow, shallow concentrated flow and channel flow that occurs within each subcatchment. Each Tc Path and corresponding length and slope is identified in the Existing and Proposed Watershed Plans (Appendix A). From this information, the time of concentration is determined for each watershed. If the calculated time of concentration was less than 5 minutes for a subcatchment, the Direct Entry method was used with a minimum time of concentration of 5 minutes.

CN values were determined using surface descriptions listed in HydroCAD's CN data table and the average soil condition for the area as determined from the USGS Web Soil Survey boundaries. The original and proposed cover types were assumed to be either Impervious (Paved Parking lots, roofs, driveways, etc.) or non-grazed meadow. Both are under the Fully Developed Urban Areas category. Both freshwater and saltwater wetlands are approximated using the Water Surface 0% impervious curve number. Roofs and miscellaneous impervious cover types were lumped in with unconnected impervious due to the scale of the project area.

The following reports regarding the project site's soils, natural resources, and subsurface investigation are included as attachments to the permit application:

- Subsurface Site Investigation by BL Companies (January 2025)
- Geotechnical Investigation by RW Gillespie (March 2024)

3. EXISTING CONDITIONS

Under the existing conditions, the site is modeled as forty-one subcatchment areas that are bound by grade breaks and topography. This includes Runway 02-20, Airport Access roads to the north, proposed access road to the south, as well as natural grade breaks in the wetland area to the west and east side of the runway. The model has 4 analysis points located around the site that direct stormwater to the final terminus analysis point AP1 located near the tide gate.

West of the runway, there are seven subcatchment areas that flow to 1L. Analysis point 1L is located on the northwest parking lot where stormwater runoff enters the Tuttle Brook flowing south to the tide gate. Continuing south, there are six subcatchment areas that flow to 2L. Analysis point 2L is located in Tuttle Brook south of 1L. Stormwater runoff continues flowing south towards the tide gate from analysis point 2L.

East of the runway, there are fifteen subcatchment areas that flow to 3L. Analysis point 3L is located in the eastern wetlands north of Pig Farm Road. Continuing south, there are seven subcatchment areas that flow to 4L. Analysis point 4L is located in Morris Creek south of 3L. Stormwater runoff continues flowing south towards the tide gate from analysis point 4L.

At the south end of the runway, there are six subcatchment areas that flow to AP1. Analysis point AP1 is located near the tide gate where Tuttle Brook meets Morris Creek. AP1 represents the only outfall from the site.

The following table summarizes the existing flows during the 2, 10, and 100 – year storm events:

Table 2 – Existing Flows

Analysis Point	Discharges by Storm Event (cfs)		
	2-yr	10-yr	100-yr
1L	56.16	124.67	249.29
2L	151.66	317.02	604.73
3L	104.86	225.13	424.71
4L	200.97	388.79	707.81
AP1 (FINAL)	**374.05**	**767.51**	**1449.80**

4. PROPOSED CONDITIONS

Under the proposed conditions, the site is modeled as fifty-eight subcatchment areas that are bound by similar grade breaks as the existing conditions with the addition of new closed drainage systems and water quality treatment. The proposed model has the same 4 analysis points that direct stormwater to the final terminus analysis point AP1 located near the tide gate.

West of the runway, there are eight subcatchment areas that flow to analysis point 1L. Continuing south, there are six subcatchment areas that flow to analysis point 2L. Runway subcatchment area S19A is treated by a sand filter (node T1) before discharging into Tuttle brook.

East of the runway, there are eight subcatchment areas that flow to analysis point 3L. East Terminal subcatchment areas 1, 2, 3, 4, 5, 6, and 7 are collected and treated by sub-surficial sand filters and hydrodynamic separators prior to being discharged by the northwest pump station (node PS1). Flow from the northwest pump station and subcatchment S9 are directed to a series of proposed box culverts (node 11P) that run under the proposed causeway. Continuing south, there are thirty subcatchment areas that flow to analysis point 4L. Runway subcatchment areas 7A, 3A and 3B are treated by sand filters (nodes T2, T3, T4) before discharging into Morris Creek. East Terminal subcatchment areas A1, A2, A3, 8, 9A, 9B, 9C, 9D, and 9E are collected and treated by sub-surficial sand filters and hydrodynamic separators prior to being discharged by the southeast pump station (node PS2). In addition, Runway subcatchment areas N3, N4, N6, N7, N8, N9, N10, N12, N14, N15, DS1, DS2, and DS3 are directed to a series of proposed arch culverts (node CC1) that bypass analysis point 3L and discharge into Morris Creek.

At the south end of the runway, there are six subcatchment areas that flow to AP1. Analysis point AP1 is located near the tide gate where Tuttle Brook meets Morris Creek. AP1 represents the only outfall from the site.

The following table summarizes the proposed flows during the 2, 10, and 100 – year storm events:

Table 3 – Proposed Flows

Analysis Point	Discharges by Storm Event (cfs)		
	2-yr	10-yr	100-yr
1L	47.82	111.42	231.56
2L	124.12	265.06	516.39
3L	97.06	203.85	386.31
4L	248.57	450.97	739.04
AP1 (FINAL)	**400.27**	**793.57**	**1446.46**

The following table compares the proposed flows to the existing flows for the 2, 10, and 100 – year storm events:

Table 4 – Proposed vs. Existing Flows

Analysis Point	Discharges by Storm Event (cfs)		
	2-yr	10-yr	100-yr
1L	-8.34	-13.25	-17.73
2L	-27.54	-51.96	-88.34
3L	-7.8	-21.28	-38.40
4L	+47.60	+62.18	+31.23
AP1 (FINAL)	**+26.22**	**+26.06**	**-3.34**

Per Chapter 4 page 58 of the Connecticut Stormwater Quality Manual, the review authority may waive compliance with one or more of the peak runoff attenuation requirements for sites that discharge into tidal waters. The Runway Extension and Terminal Expansion project will have minimal to no impact on the Tuttle Brook-Morris Creek floodplain for lower storm events and no impact on the regulatory 100-year floodplain. Refer to the "Floodway/Floodplain Assessment Report" in this application for more information.

5. WATER QUALITY TREATMENT MEASURES

The proposed Runway water quality measures include:

Impervious Area Disconnection

Per Chapter 5 of the Connecticut Stormwater Quality Manual – Impervious area (simple) disconnection can be used to direct runoff from roofs, driveways, roads, parking lots, and solar arrays to natural or landscaped vegetated areas that are of sufficient size and with adequately permeable soils (also called "Qualifying Pervious Areas" or QPAs) to disperse and retained runoff without causing erosion, basement seepage, or negative impacts to adjacent downgradient properties.

If stormwater runoff from an impervious area is directed to a QPA that meets the minimum criteria described in Chapter 5, the area can be deducted from the total impervious area, reducing the required Water Quality Volume and Required Retention Volume of the site and the size of the structural stormwater BMPs needed to meet the retention and treatment requirements of Standard 1.

See the Treatment Plan in Appendix C of this report for the areas labeled as Qualifying Pervious Area. These areas meet all criteria described in Chapter 5 of the Connecticut Stormwater Quality Manual. They are located outside of wetlands, consist of low-maintenance grasses, have a minimum of 4" topsoil, sloped less than 8%, flow enters and remains as sheet flow, and have a depth to seasonal high groundwater of 18 inches or greater. The lengths and widths of the QPA's shown in the Treatment Plan are equal to or exceed the lengths and widths of the contributing impervious areas.

HSG classification and depth to seasonal high groundwater table for these areas were verified by a Qualifying Professional through field evaluation performed by BL companies.

Surface Sand Filter with Underdrain and Liner

Sand filters were designed to treat the remaining portions of the site where the impervious area could not be disconnected. The reason these areas could not be disconnected is due to the separation to seasonal high groundwater table was less than 18" as shown in the field evaluations performed by BL Companies and R. W. Gillespie.

The Treatment Plan in Appendix C of this report identifies four directly connected impervious areas (DCIA 1, DCIA 2, DCIA 3, DCIA 4). Runoff from these four areas are pretreated by vegetative filter strips before entering a surface sand filter. These sand filters will include an underdrain system and impermeable liner due to the required vertical separation to seasonal high groundwater table described in Chapter 8 of the Connecticut Stormwater Quality Manual could not be met. Buoyancy calculations were performed due to the seasonal high groundwater being located above the bottom of our systems, see Appendix C in this report for calculations.

These lined sand filter systems are suitable for providing treatment but do not provide retention credit. To demonstrate compliance with Standard 1 of the Connecticut Stormwater Quality Manual, individual pollutant calculations were performed to show the sand filters exceed the minimum pollutant reductions shown in Table 4.3 of the Connecticut Stormwater Quality Manual.

As shown in Appendix C of this report, the pollutant reduction of each sand filter exceeds the requirements of Table 4.3. The sand filters are sized to convey the 10-year 24-hour storm event through an outlet pipe and an emergency spillway to convey the 100-year storm. The sand filters will be constructed and maintained per all criteria described in Chapter 13 of the Connecticut Stormwater Quality Manual. See Attachment 14 – Project Plans for further sand filter details.

The proposed East Terminal water quality measures:

Due to the proximity to air operations and the need to minimize open bodies of water, water quality requirements will be satisfied through a series of sub-surficial sand filters or hydrodynamic separators. For the purposes of this design the sand filters were based on StormTrap units. A total of 9 filters are distributed throughout the site. In some locations, hydrodynamic separators will treat stormwater, using Stormtrap's SiteSaver as the basis of design. These were chosen for use where the sand filter's size or depth could cause issue. A total of 8 hydrodynamic separators are distributed throughout the site. Filters and hydrodynamic separators are located prior to discharge to the pump stations and are sized to treat the required Water Quality Volume.

Water Quality Volume (WQV) requirements will be met through the use of underground filter units. The WQV calculations were performed in accordance with the State of Connecticut Department of Energy and Environmental Protection standards. The required WQV was calculated for the individual sub-basins contributing to each filter unit.

See Appendix D for East Terminal Water Quality Treatment calculations.

6. FLOOD CONTINGENCY PLAN

The majority of Tweed New Haven Regional Airport is subject to flooding during a 100-year storm event and is therefore located within a coastal hazard area. Based on the recently revised Flood Insurance Rate Maps (FIRMs) for the City of New Haven and the Town of East Haven (New Haven County CT, Panel 444 of 635, Revised to Reflect LOMR effective January 10th, 2025), flood prone areas onsite include unnumbered areas within AE zones. The 100-year flood elevation is delineated at 12 feet NAVD. With the exception of some land north of Dodge Avenue and several isolated knolls in wetlands, all airport property is at or below 12 feet NAVD.

In both pre- and post-construction periods, the Tweed-New Haven Airport Authority relies upon advanced warning by the National Weather Service of an approaching severe storm on the magnitude of a 100-year event. In such instances, all removable equipment, i.e., bulldozers, dump trucks, miscellaneous motors and generators, etc., will be removed from the construction site to locations above the 100-year flood elevation. Similarly, stockpiles of supplies, i.e., framing lumber, floatable construction materials, and so on, will be moved to sites or locations above the 100-year flood elevation and/or off the property to higher ground. Additionally, the City of New Haven and the Airport have the ability to manipulate the flood control tide gates downstream of this site. In anticipation of a storm event, the tide gates are opened and closed accordingly to allow the site to be drained and provide flood storage. Although this control is limited due to the size of the flood plain and the limitations of the hydraulic openings of the floodgates, this is effective in high frequency storm events and will provide protection to the project site during construction.

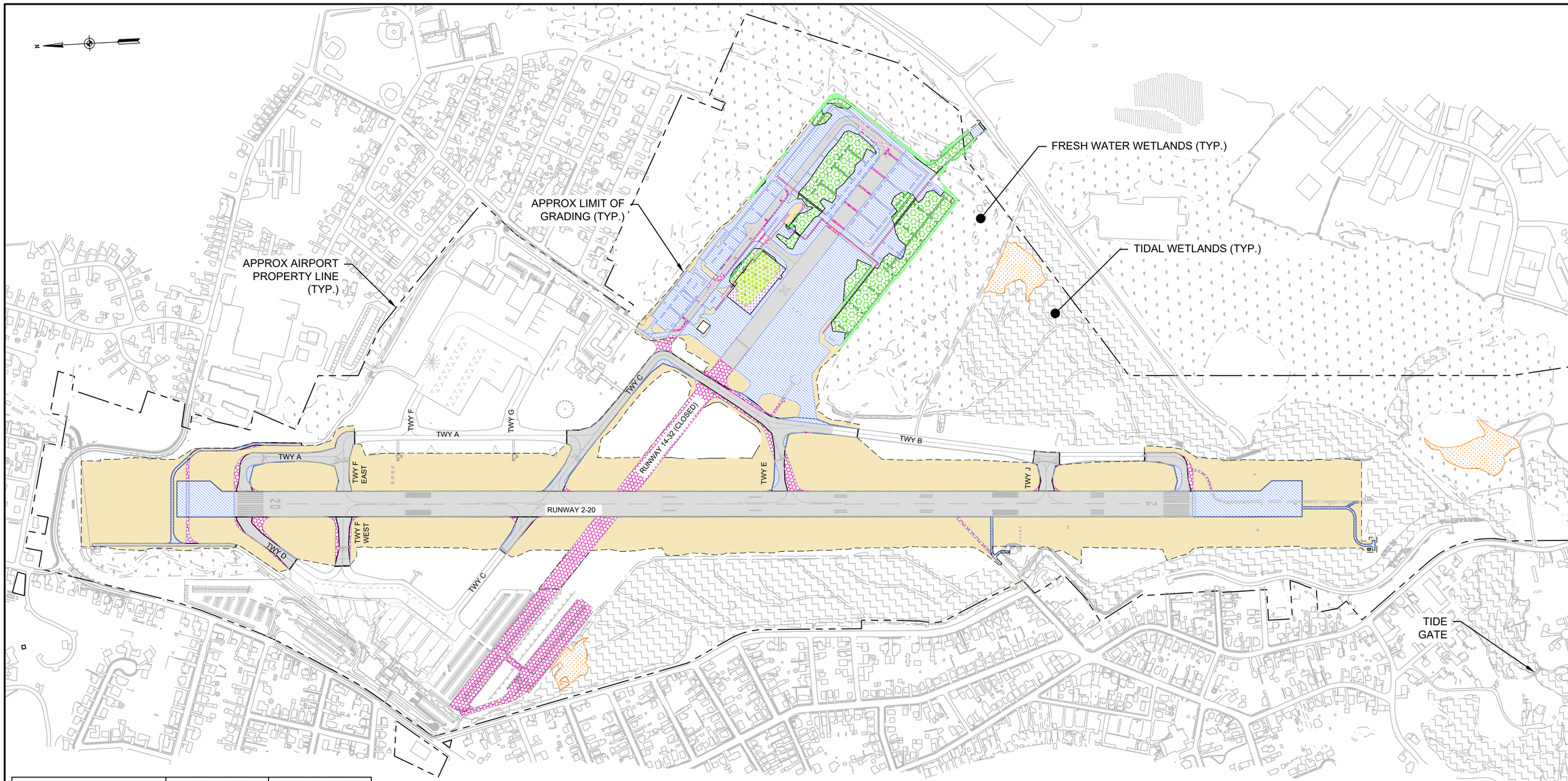
Adherence to these measures is indicated clearly on the construction plans and the contractor is required to meet all CTDEEP flood contingency requirements during construction. Hazardous materials such as small construction equipment with diesel tanks, portable generators, de-watering pumps, construction light carts, etc. will be removed from the site in anticipation of a 100-year storm. Per CTDEEP requirements, the same list of typical items would be removed from the site in anticipation of a 500-year storm.

According to the existing FEMA floodplain maps, there are two reasonably accessible areas on airport property that would stay dry in a 500-year storm. One location is approximately 1 acre in size and the other is approximately 3 acres in size. To put these areas in perspective, the airport is approximately 395 acres; the total accessible high ground in a 500-year storm (approximately 4 acres) represents 1 percent of the total airport property area. Although this is a small area to plan on for contingency, the airport will make both areas available to the contractor for equipment storage in event of a 100-year or 500-year storm.

The Runway Extension and Terminal Expansion project at Tweed New Haven Regional Airport has no net effect on the site's hydraulic drainage characteristics during rain events. Refer to the "Floodway/Floodplain Assessment Report" for more information.

APPENDIX A

Land Conversion Plan, Existing Watershed Plan, Proposed Watershed Plan



DESCRIPTION	AREA (SF)	AREA (ACRES)
PAVEMENT TO PAVEMENT	1,446,568 SF	33.20 AC
TURF TO TURF	3,094,040 SF	71.0 AC
TURF TO PAVEMENT	1,073,598 SF	24.65 AC
TURF TO ROOFTOP	15,912 SF	0.37 AC
PAVEMENT TO TURF	414,388 SF	9.51 AC
WETLAND TO PAVEMENT	290,075 SF	6.66 AC
WETLAND TO ROOFTOP	45,265 SF	1.04 AC
WETLAND TO TURF	70,196 SF	1.62 AC
NET CHANGE IN IMPERVIOUS	1,010,462 SF	23.20 AC
NET CHANGE IN WETLANDS	(405,536) SF	(9.31) AC

DESCRIPTION	AREA (SF)	AREA (ACRES)
UPLAND TO WETLAND	157,424 SF	3.61 AC

TURF TO TURF
PAVEMENT TO PAVEMENT
TURF TO PAVEMENT
WETLAND TO PAVEMENT
TURF TO ROOFTOP
WETLAND TO ROOFTOP
PAVEMENT TO TURF
WETLAND TO TURF
UPLAND TO WETLAND

0 300 600 1200 FEET

ENGINEER'S SEAL

STATE OF CONNECTICUT ROBERT M. FURST No. 25,933 LICENSED PROFESSIONAL ENGINEER

PROJECT DESIGNER

HOYLE TANNER

150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

Hoyle Tanner & Associates © 2023

DESIGNED BY NEG | DRAWN BY CJM | CHECKED BY RMF

DATE: APRIL 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

LAND CONVERSION PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/18/25	PERMIT SUBMISSION	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2025

DRAWING NO.
G1.19

SHEET 19 OF 174

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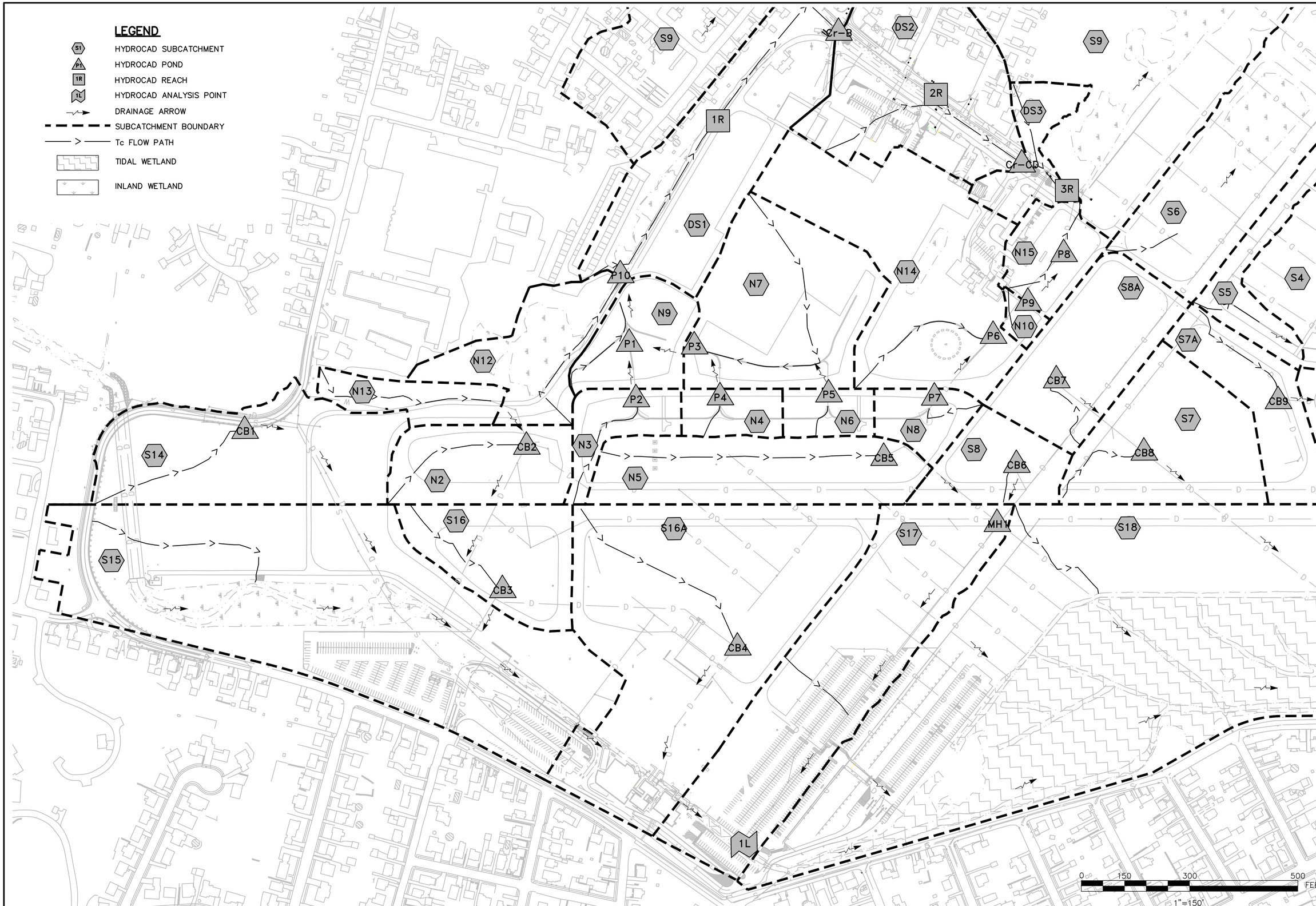

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DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EXISTING WATERSHED PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
△			
△			
△			
△	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

DRAWING NO.

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1 OF 3

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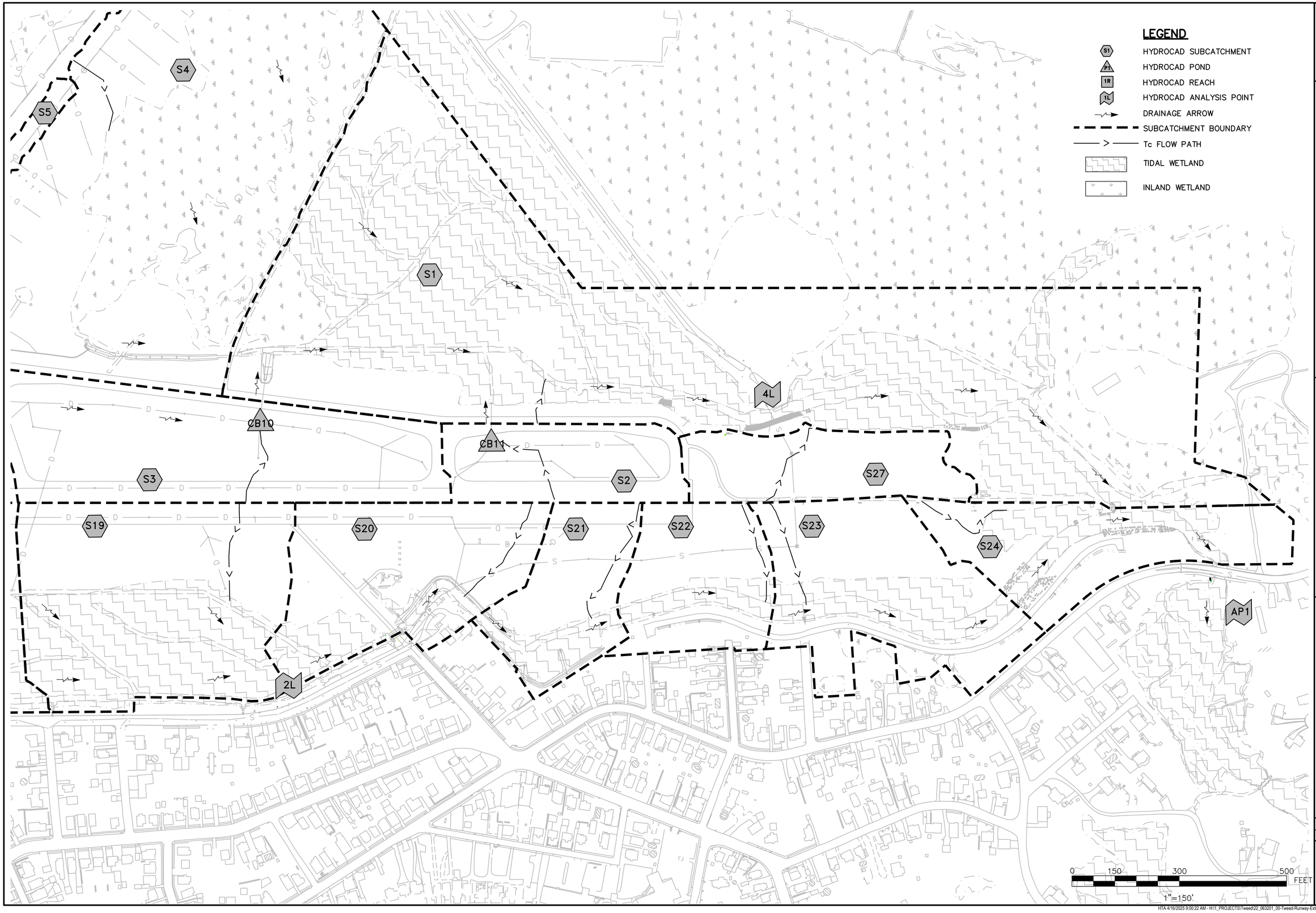

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EXISTING WATERSHED PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

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2 OF 3

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

EXISTING WATERSHED PLAN

REVISIONS

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△	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

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3 OF 3

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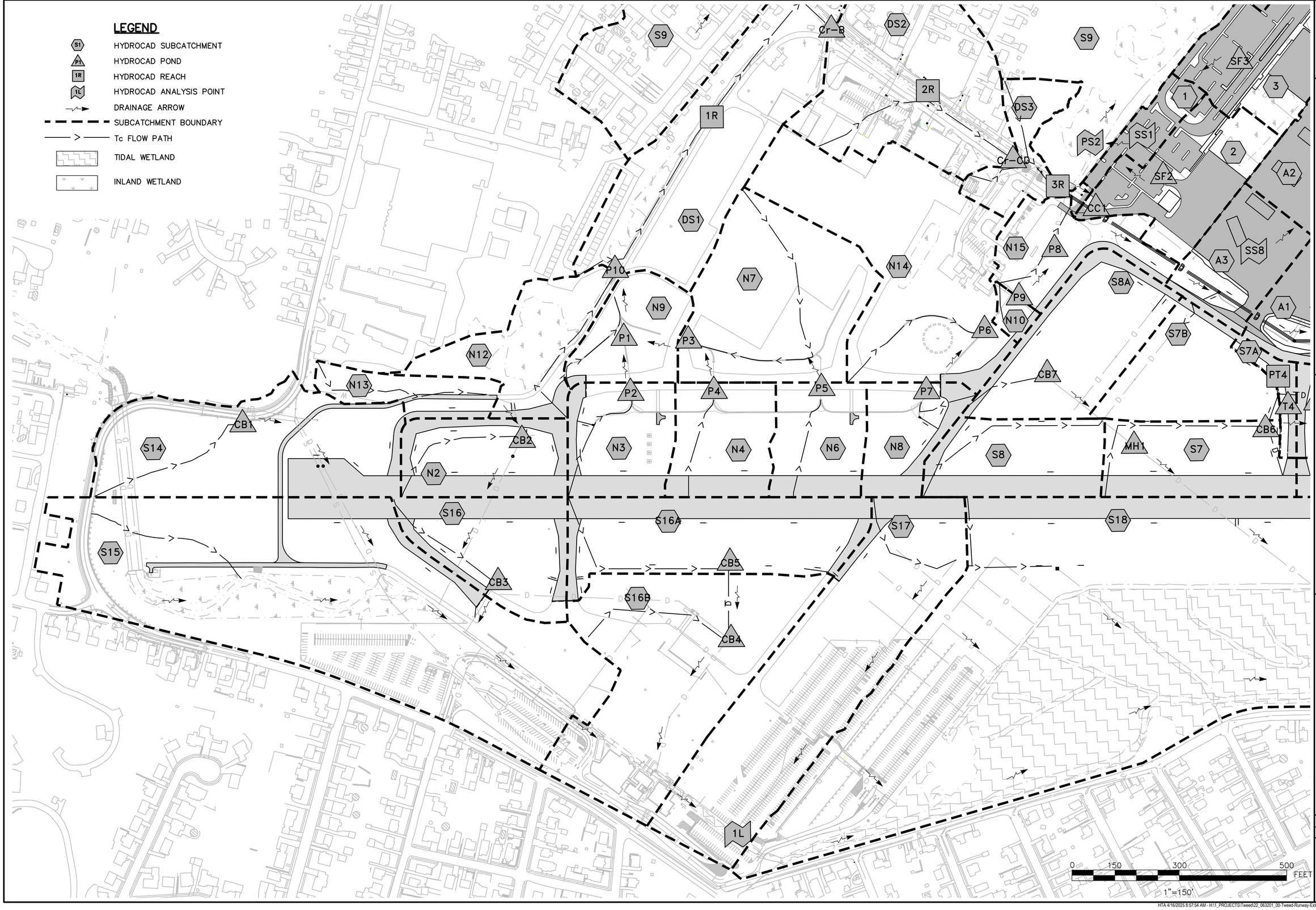
LEGEND

- HYDROCAD SUBCATCHMENT
- HYDROCAD POND
- HYDROCAD REACH
- HYDROCAD ANALYSIS POINT
- DRAINAGE ARROW
- SUBCATCHMENT BOUNDARY
- Tc FLOW PATH
- TIDAL WETLAND
- INLAND WETLAND



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DESIGNED: BY NEG
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROPOSED WATERSHED PLAN

REVISIONS

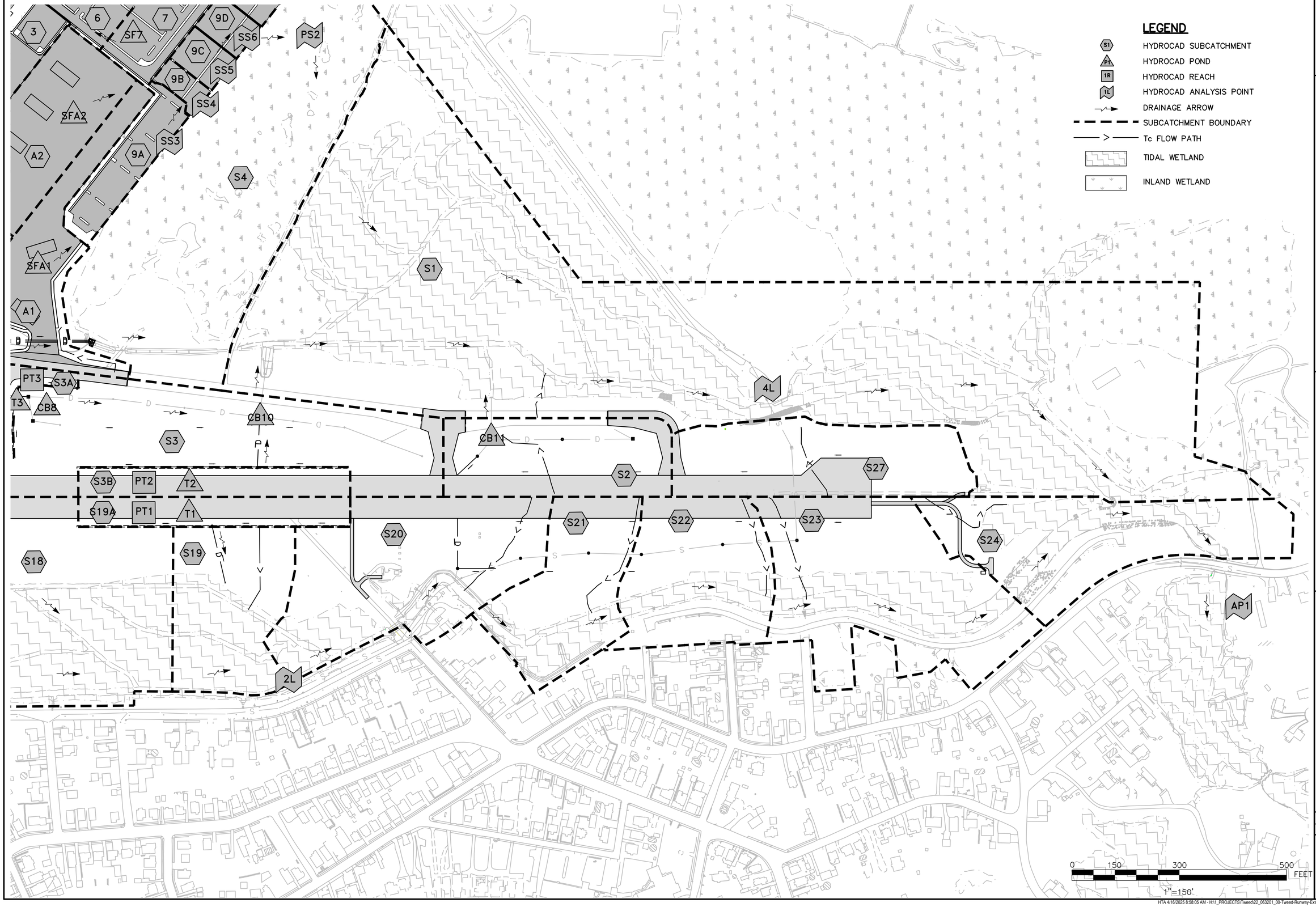
REV. NO.	DATE	DESCRIPTION	BY
	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2023

DRAWING NO.

HC2.1

1 OF 3



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RUNWAY EXTENSION AND TERMINAL EXPANSION

PROPOSED WATERSHED PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

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AIP: 3-09-0013-0XX-2023

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DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

PROPOSED WATERSHED PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
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△	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2023

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3 OF 3

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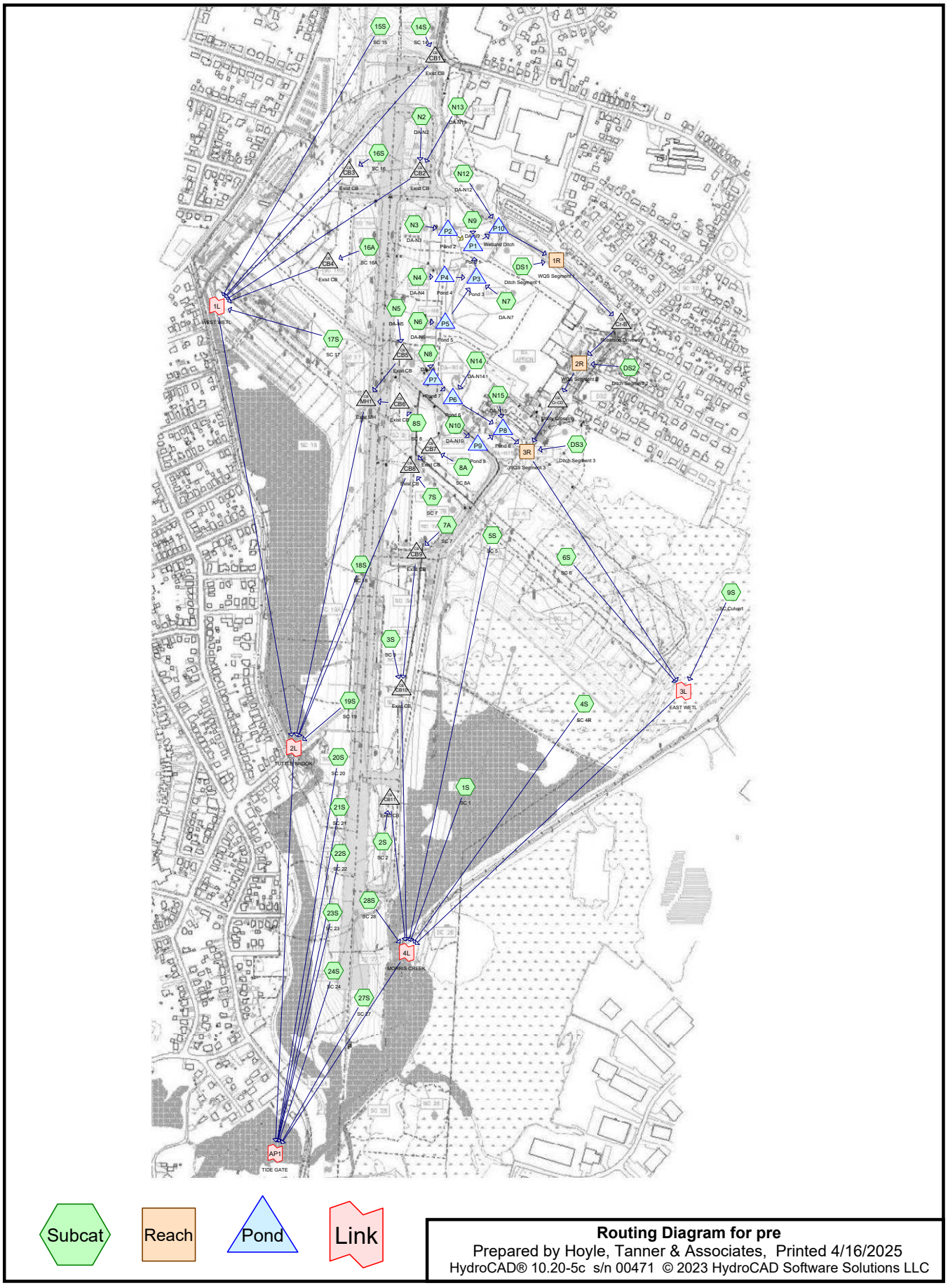
APPENDIX B

HydroCAD Report for Existing and Proposed Conditions



Routing Diagram for pre

Prepared by Hoyle, Tanner & Associates, Printed 4/16/2025

HydroCAD® 10.20-5c s/n 00471 © 2023 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2YR - 24HR	Type III 24-hr		Default	24.00	1	3.35	2
2	10YR - 24HR	Type III 24-hr		Default	24.00	1	5.23	2
3	100YR - 24HR	Type III 24-hr		Default	24.00	1	8.23	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
374,616	54	1/2 acre lots, 25% imp, HSG A (9S)
101,930	85	1/2 acre lots, 25% imp, HSG D (9S)
535,352	61	1/4 acre lots, 38% imp, HSG A (9S)
15,682	75	1/4 acre lots, 38% imp, HSG B (9S)
436	87	1/4 acre lots, 38% imp, HSG D (9S)
2,403,205	77	1/8 acre lots, 65% imp, HSG A (9S)
21,344	85	1/8 acre lots, 65% imp, HSG B (9S)
436	92	1/8 acre lots, 65% imp, HSG D (9S)
936,048	39	>75% Grass cover, Good, HSG A (9S, 14S, 15S, N13)
5,666,659	61	>75% Grass cover, Good, HSG B (2S, 3S, 4S, 5S, 6S, 7A, 7S, 8A, 8S, 9S, 16A, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 27S, 28S, DS1, DS2, DS3, N12, N14, N15)
274,582	80	>75% Grass cover, Good, HSG D (1S, 9S)
96,268	67	Brush, Poor, HSG B (9S)
32,234	83	Brush, Poor, HSG D (9S)
4,356	82	Dirt roads, HSG B (9S)
14,930	76	Gravel roads, HSG A (15S, DS1, DS3)
170	96	Gravel surface, HSG A (14S)
48,822	96	Gravel surface, HSG B (20S, 22S, 23S, 24S, 27S, 28S)
42,541	96	Gravel surface, HSG D (1S)
655,224	58	Meadow, non-grazed, HSG B (N10, N2, N3, N4, N5, N6, N7, N8, N9)
436,093	98	Paved parking, HSG B (N2, N4, N5, N7, N8)
446,926	98	Paved roads w/curbs & sewers, HSG A (9S)
125,888	98	Paved roads w/curbs & sewers, HSG B (9S)
61,420	98	Paved roads w/curbs & sewers, HSG D (9S)
31,799	98	Unconnected Pavement, HSG B (9S)
500,841	98	Unconnected pavement, HSG A (14S, 15S, 16A, 17S, N12, N13, N14, N3, N6, N9)
314,219	98	Unconnected pavement, HSG B (2S, 3S, 4S, 5S)
1,988,611	98	Unconnected pavement, HSG D (1S, 5S, 6S, 7A, 7S, 8A, 8S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 27S, 28S, DS1, DS2, DS3, N10, N12, N13, N15, N3, N6, N9)
125,453	89	Urban commercial, 85% imp, HSG A (9S)
490,486	92	Urban commercial, 85% imp, HSG B (9S)
914,760	95	Urban commercial, 85% imp, HSG D (9S)
7,841	81	Urban industrial, 72% imp, HSG A (9S)
22,651	93	Urban industrial, 72% imp, HSG D (9S)
42,799	98	Water Surface, 0% imp, HSG A (15S, DS2, DS3)
569,393	98	Water Surface, 0% imp, HSG D (1S, 18S, 19S, 20S, 21S, 22S, 23S, 24S)
29,633	98	Wetland/Water Surface, 0% imp, HSG A (9S, 27S, DS1)

Area Listing (all nodes) (continued)

Area (sq-ft)	CN	Description (subcatchment-numbers)
641,707	98	Wetland/Water Surface, 0% imp, HSG B (6S, 9S, DS3)
2,583,607	98	Wetland/Water Surface, 0% imp, HSG D (1S, 9S, N12)
284,447	98	Wetland/Water Surface, HSG B (4S)
449,539	98	Wetland/Water Surface. HSG D (4S)
107,642	98	Wetland/water Surface, 0% imp, HSG A (15S)
1,081,064	98	Wetland/water Surface, 0% imp, HSG D (18S, 19S, 20S, 21S, 22S, 23S, 24S)
298,079	30	Woods, Good, HSG A (9S, 15S, 19S, DS3)
953,393	55	Woods, Good, HSG B (9S, 23S, 24S, DS1, N12)
84,918	70	Woods, Good, HSG C (18S)
470,681	77	Woods, Good, HSG D (1S, 9S)
24,288,724	**79**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
5,823,535	HSG A	9S, 14S, 15S, 16A, 17S, 19S, 27S, DS1, DS2, DS3, N12, N13, N14, N3, N6, N9
9,786,386	HSG B	2S, 3S, 4S, 5S, 6S, 7A, 7S, 8A, 8S, 9S, 16A, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 27S, 28S, DS1, DS2, DS3, N10, N12, N14, N15, N2, N3, N4, N5, N6, N7, N8, N9
84,918	HSG C	18S
8,593,885	HSG D	1S, 4S, 5S, 6S, 7A, 7S, 8A, 8S, 9S, 14S, 15S, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, 27S, 28S, DS1, DS2, DS3, N10, N12, N13, N15, N3, N6, N9
0	Other	
24,288,724		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
374,616	0	0	101,930	0	476,546	1/2 acre lots, 25% imp
535,352	15,682	0	436	0	551,470	1/4 acre lots, 38% imp
2,403,205	21,344	0	436	0	2,424,985	1/8 acre lots, 65% imp
936,048	5,666,659	0	274,582	0	6,877,290	>75% Grass cover, Good
0	96,268	0	32,234	0	128,502	Brush, Poor
0	4,356	0	0	0	4,356	Dirt roads
14,930	0	0	0	0	14,930	Gravel roads
170	48,822	0	42,541	0	91,533	Gravel surface
0	655,224	0	0	0	655,224	Meadow, non-grazed
0	436,093	0	0	0	436,093	Paved parking
446,926	125,888	0	61,420	0	634,234	Paved roads w/curbs & sewers
0	31,799	0	0	0	31,799	Unconnected Pavement
500,841	314,219	0	1,988,611	0	2,803,671	Unconnected pavement
125,453	490,486	0	914,760	0	1,530,698	Urban commercial, 85% imp
7,841	0	0	22,651	0	30,492	Urban industrial, 72% imp
42,799	0	0	569,393	0	612,192	Water Surface, 0% imp
0	284,447	0	0	0	284,447	Wetland/Water Surface
29,633	641,707	0	2,583,607	0	3,254,946	Wetland/Water Surface, 0% imp
0	0	0	449,539	0	449,539	Wetland/Water Surface.
107,642	0	0	1,081,064	0	1,188,706	Wetland/water Surface, 0% imp
298,079	953,393	84,918	470,681	0	1,807,071	Woods, Good
5,823,535	**9,786,386**	**84,918**	**8,593,885**	**0**	**24,288,724**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	CB1	2.10	1.32	845.0	0.0009	0.013	0.0	36.0	0.0	
2	CB10	-1.62	-1.82	152.0	0.0013	0.012	0.0	24.0	0.0	
3	CB11	-0.73	-0.93	148.0	0.0014	0.012	0.0	18.0	0.0	
4	CB2	1.40	0.50	658.0	0.0014	0.011	0.0	15.0	0.0	
5	CB3	4.14	1.94	200.0	0.0110	0.025	0.0	10.0	0.0	
6	CB4	4.89	0.00	200.0	0.0244	0.012	0.0	18.0	0.0	
7	CB5	1.30	-0.25	497.0	0.0031	0.025	0.0	12.0	0.0	
8	CB6	0.01	-0.25	249.0	0.0010	0.025	0.0	12.0	0.0	
9	CB7	0.00	-0.62	380.0	0.0016	0.025	0.0	15.0	0.0	
10	CB8	-0.72	-2.37	787.0	0.0021	0.012	0.0	18.0	0.0	
11	CB9	-0.77	-1.62	1,029.0	0.0008	0.012	0.0	24.0	0.0	
12	Cr-B	1.72	1.70	48.0	0.0004	0.011	0.0	24.0	0.0	
13	Cr-B	1.72	1.70	48.0	0.0004	0.011	0.0	24.0	0.0	
14	Cr-B	1.72	1.70	48.0	0.0004	0.011	0.0	24.0	0.0	
15	Cr-CD	1.33	1.28	114.0	0.0004	0.011	0.0	30.0	0.0	
16	Cr-CD	1.33	1.28	114.0	0.0004	0.011	0.0	30.0	0.0	
17	Cr-CD	1.33	1.28	114.0	0.0004	0.011	0.0	30.0	0.0	
18	MH1	-0.25	-1.09	400.0	0.0021	0.025	0.0	18.0	0.0	
19	P1	2.40	2.35	48.0	0.0010	0.011	0.0	21.0	0.0	
20	P1	2.40	2.35	48.0	0.0010	0.011	0.0	21.0	0.0	
21	P1	2.40	2.35	48.0	0.0010	0.011	0.0	21.0	0.0	
22	P10	2.33	2.32	32.0	0.0003	0.011	0.0	21.0	0.0	
23	P10	2.33	2.32	32.0	0.0003	0.011	0.0	21.0	0.0	
24	P10	2.33	2.32	32.0	0.0003	0.011	0.0	21.0	0.0	
25	P2	3.35	3.25	133.0	0.0008	0.011	18.0	11.0	0.0	
26	P3	2.65	2.55	136.0	0.0007	0.011	18.0	11.0	0.0	
27	P3	2.65	2.55	136.0	0.0007	0.011	18.0	11.0	0.0	
28	P3	2.65	2.55	136.0	0.0007	0.011	18.0	11.0	0.0	
29	P4	3.20	3.10	134.0	0.0007	0.011	18.0	11.0	0.0	
30	P5	2.85	2.75	142.0	0.0007	0.011	18.0	11.0	0.0	
31	P6	0.50	-0.40	265.0	0.0034	0.012	0.0	15.0	0.0	
32	P7	2.75	2.65	180.0	0.0006	0.011	18.0	11.0	0.0	
33	P8	2.50	2.50	20.0	0.0000	0.011	0.0	12.0	0.0	
34	P9	4.70	4.50	37.0	0.0054	0.011	0.0	12.0	0.0	
35	P9	4.70	4.50	37.0	0.0054	0.011	0.0	12.0	0.0	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: SC 1 Runoff Area=2,006,120 sf 2.14% Impervious Runoff Depth=2.59"
Flow Length=162' Tc=5.0 min CN=93 Runoff=135.80 cfs 433,008 cf

Subcatchment2S: SC 2 Runoff Area=227,320 sf 45.94% Impervious Runoff Depth=1.38"
Flow Length=385' Tc=10.1 min CN=78 Runoff=7.17 cfs 26,224 cf

Subcatchment3S: SC 3 Runoff Area=574,521 sf 32.47% Impervious Runoff Depth=1.08"
Flow Length=294' Tc=8.0 min CN=73 Runoff=14.50 cfs 51,706 cf

Subcatchment4S: SC 4R Runoff Area=1,526,342 sf 49.57% Impervious Runoff Depth=1.45"
Tc=53.3 min CN=79 Runoff=24.73 cfs 184,481 cf

Subcatchment5S: SC 5 Runoff Area=118,275 sf 56.94% Impervious Runoff Depth=1.66"
Flow Length=256' Tc=5.0 min CN=82 Runoff=5.28 cfs 16,357 cf

Subcatchment6S: SC 6 Runoff Area=621,776 sf 28.09% Impervious Runoff Depth=1.38"
Flow Length=261' Tc=6.2 min UI Adjusted CN=78 Runoff=22.28 cfs 71,730 cf

Subcatchment7A: SC 7 Runoff Area=80,542 sf 58.79% Impervious Runoff Depth=1.73"
Flow Length=445' Tc=8.2 min CN=83 Runoff=3.43 cfs 11,632 cf

Subcatchment7S: SC 7 Runoff Area=341,390 sf 27.45% Impervious Runoff Depth=0.72"
Flow Length=383' Tc=9.9 min UI Adjusted CN=66 Runoff=4.77 cfs 20,490 cf

Subcatchment8A: SC 8A Runoff Area=239,688 sf 24.36% Impervious Runoff Depth=0.72"
Flow Length=292' Tc=8.2 min UI Adjusted CN=66 Runoff=3.51 cfs 14,386 cf

Subcatchment8S: SC 8 Runoff Area=122,063 sf 47.26% Impervious Runoff Depth=1.38"
Flow Length=134' Tc=5.0 min CN=78 Runoff=4.49 cfs 14,081 cf

Subcatchment9S: SC Culvert Runoff Area=212.980 ac 41.97% Impervious Runoff Depth=1.45"
Tc=110.6 min CN=79 Runoff=93.04 cfs 1,121,313 cf

Subcatchment14S: SC 14 Runoff Area=351,203 sf 11.14% Impervious Runoff Depth=0.02"
Flow Length=426' Tc=15.4 min UI Adjusted CN=42 Runoff=0.02 cfs 703 cf

Subcatchment15S: SC 15 Runoff Area=972,159 sf 37.92% Impervious Runoff Depth=0.92"
Flow Length=706' Tc=19.9 min CN=70 Runoff=14.59 cfs 74,270 cf

Subcatchment16A: SC 16A Runoff Area=591,011 sf 44.08% Impervious Runoff Depth=1.32"
Flow Length=629' Tc=6.5 min CN=77 Runoff=19.91 cfs 65,016 cf

Subcatchment16S: SC 16 Runoff Area=189,563 sf 36.68% Impervious Runoff Depth=1.20"
Flow Length=446' Tc=7.7 min CN=75 Runoff=5.47 cfs 18,905 cf

Subcatchment17S: SC 17 Runoff Area=428,788 sf 58.89% Impervious Runoff Depth=1.73"
Flow Length=297' Tc=5.0 min CN=83 Runoff=20.01 cfs 61,928 cf

Subcatchment18S: SC 18 Runoff Area=1,339,230 sf 14.98% Impervious Runoff Depth=1.89"
Flow Length=461' Tc=10.4 min UI Adjusted CN=85 Runoff=58.11 cfs 210,522 cf

Subcatchment19S: SC 19 Runoff Area=640,204 sf 11.38% Impervious Runoff Depth=1.73"
Flow Length=229' Tc=5.6 min UI Adjusted CN=83 Runoff=29.53 cfs 92,462 cf

Subcatchment20S: SC 20 Runoff Area=421,231 sf 20.14% Impervious Runoff Depth=1.08"
Flow Length=414' Tc=8.0 min UI Adjusted CN=73 Runoff=10.63 cfs 37,910 cf

Subcatchment21S: SC 21 Runoff Area=229,029 sf 10.34% Impervious Runoff Depth=1.08"
Flow Length=497' Tc=9.9 min UI Adjusted CN=73 Runoff=5.45 cfs 20,612 cf

Subcatchment22S: SC 22 Runoff Area=253,454 sf 5.23% Impervious Runoff Depth=0.97"
Flow Length=356' Tc=21.8 min UI Adjusted CN=71 Runoff=3.93 cfs 20,480 cf

Subcatchment23S: SC 23 Runoff Area=441,014 sf 0.00% Impervious Runoff Depth=1.20"
Flow Length=383' Tc=20.2 min CN=75 Runoff=9.12 cfs 43,981 cf

Subcatchment24S: SC 24 Runoff Area=328,915 sf 0.00% Impervious Runoff Depth=1.08"
Flow Length=381' Tc=31.5 min CN=73 Runoff=4.98 cfs 29,602 cf

Subcatchment27S: SC 27 Runoff Area=207,350 sf 1.82% Impervious Runoff Depth=0.55"
Flow Length=323' Tc=7.8 min CN=62 Runoff=2.00 cfs 9,447 cf

Subcatchment28S: SC 28 Runoff Area=22,258 sf 18.08% Impervious Runoff Depth=0.63"
Flow Length=54' Slope=0.0110 '/' Tc=7.5 min UI Adjusted CN=64 Runoff=0.27 cfs 1,170 cf

SubcatchmentDS1: Ditch Segment 1 Runoff Area=412,198 sf 28.62% Impervious Runoff Depth=0.87"
Flow Length=1,385' Tc=13.4 min UI Adjusted CN=69 Runoff=6.68 cfs 29,727 cf

SubcatchmentDS2: Ditch Segment 2 Runoff Area=366,199 sf 54.34% Impervious Runoff Depth=1.66"
Flow Length=790' Tc=16.5 min CN=82 Runoff=11.80 cfs 50,644 cf

SubcatchmentDS3: Ditch Segment 3 Runoff Area=252,713 sf 15.46% Impervious Runoff Depth=0.51"
Flow Length=680' Tc=34.0 min UI Adjusted CN=61 Runoff=1.32 cfs 10,674 cf

SubcatchmentN10: DA-N10 Runoff Area=18,401 sf 28.03% Impervious Runoff Depth=0.63"
Flow Length=137' Tc=13.2 min UI Adjusted CN=64 Runoff=0.19 cfs 967 cf

SubcatchmentN12: DA-N12 Runoff Area=176,144 sf 15.13% Impervious Runoff Depth=1.26"
Flow Length=630' Tc=15.0 min UI Adjusted CN=76 Runoff=4.34 cfs 18,459 cf

SubcatchmentN13: DA-N13 Runoff Area=82,503 sf 17.65% Impervious Runoff Depth=0.05"
Flow Length=665' Tc=19.3 min UI Adjusted CN=44 Runoff=0.01 cfs 329 cf

SubcatchmentN14: DA-N14 Runoff Area=185,324 sf 24.56% Impervious Runoff Depth=0.72"
Flow Length=609' Tc=32.7 min UI Adjusted CN=66 Runoff=1.64 cfs 11,123 cf

SubcatchmentN15: DA-N15 Runoff Area=95,816 sf 37.69% Impervious Runoff Depth=1.20"
Flow Length=438' Tc=14.7 min CN=75 Runoff=2.25 cfs 9,555 cf

SubcatchmentN2: DA-N2 Runoff Area=169,261 sf 49.91% Impervious Runoff Depth=1.38"
Flow Length=644' Tc=11.0 min CN=78 Runoff=5.20 cfs 19,526 cf

SubcatchmentN3: DA-N3 Runoff Area=80,876 sf 37.79% Impervious Runoff Depth=1.08"
Flow Length=425' Tc=16.6 min CN=73 Runoff=1.60 cfs 7,279 cf

SubcatchmentN4: DA-N4 Runoff Area=57,929 sf 17.47% Impervious Runoff Depth=0.67"
Flow Length=122' Tc=9.2 min CN=65 Runoff=0.75 cfs 3,257 cf

SubcatchmentN5: DA-N5 Runoff Area=260,989 sf 33.14% Impervious Runoff Depth=0.97"
Flow Length=985' Tc=166.5 min CN=71 Runoff=1.22 cfs 21,088 cf

SubcatchmentN6: DA-N6 Runoff Area=52,606 sf 20.20% Impervious Runoff Depth=0.55"
Flow Length=181' Tc=7.9 min UI Adjusted CN=62 Runoff=0.51 cfs 2,397 cf

SubcatchmentN7: DA-N7 Runoff Area=336,441 sf 68.89% Impervious Runoff Depth=1.97"
Flow Length=1,058' Tc=86.5 min CN=86 Runoff=5.58 cfs 55,124 cf

SubcatchmentN8: DA-N8 Runoff Area=67,118 sf 34.62% Impervious Runoff Depth=1.02"
Flow Length=214' Tc=13.0 min CN=72 Runoff=1.36 cfs 5,728 cf

SubcatchmentN9: DA-N9 Runoff Area=123,351 sf 23.76% Impervious Runoff Depth=0.59"
Flow Length=368' Tc=34.5 min UI Adjusted CN=63 Runoff=0.80 cfs 6,044 cf

Reach 1R: WQS Segment 1 Avg. Flow Depth=0.90' Max Vel=1.13 fps Inflow=11.68 cfs 107,285 cf
n=0.022 L=1,255.0' S=0.0005 '/' Capacity=98.41 cfs Outflow=8.86 cfs 107,285 cf

Reach 2R: WQS Segment 2 Avg. Flow Depth=1.23' Max Vel=1.35 fps Inflow=17.68 cfs 157,929 cf
n=0.022 L=760.0' S=0.0005 '/' Capacity=99.31 cfs Outflow=16.21 cfs 157,929 cf

Reach 3R: WQS Segment 3 Avg. Flow Depth=1.40' Max Vel=1.44 fps Inflow=21.27 cfs 195,502 cf
n=0.022 L=610.0' S=0.0005 '/' Capacity=98.14 cfs Outflow=20.52 cfs 195,502 cf

Pond CB1: Exist CB Peak Elev=2.20' Inflow=0.02 cfs 703 cf
36.0" Round Culvert n=0.013 L=845.0' S=0.0009 '/' Outflow=0.02 cfs 703 cf

Pond CB10: Exist CB Peak Elev=1.77' Inflow=17.93 cfs 63,339 cf
24.0" Round Culvert n=0.012 L=152.0' S=0.0013 '/' Outflow=17.93 cfs 63,339 cf

Pond CB11: Exist CB Peak Elev=1.54' Inflow=7.17 cfs 26,224 cf
18.0" Round Culvert n=0.012 L=148.0' S=0.0014 '/' Outflow=7.17 cfs 26,224 cf

Pond CB2: Exist CB Peak Elev=5.23' Inflow=5.20 cfs 19,855 cf
15.0" Round Culvert n=0.011 L=658.0' S=0.0014 '/' Outflow=5.20 cfs 19,855 cf

Pond CB3: Exist CB Peak Elev=51.67' Inflow=5.47 cfs 18,905 cf
10.0" Round Culvert n=0.025 L=200.0' S=0.0110 '/' Outflow=5.47 cfs 18,905 cf

Pond CB4: Exist CB Peak Elev=11.11' Inflow=19.91 cfs 65,016 cf
18.0" Round Culvert n=0.012 L=200.0' S=0.0244 '/' Outflow=19.91 cfs 65,016 cf

Pond CB5: Exist CB Peak Elev=3.00' Inflow=1.22 cfs 21,088 cf
12.0" Round Culvert n=0.025 L=497.0' S=0.0031 '/' Outflow=1.22 cfs 21,088 cf

Pond CB6: Exist CB Peak Elev=16.30' Inflow=4.49 cfs 14,081 cf
12.0" Round Culvert n=0.025 L=249.0' S=0.0010 '/' Outflow=4.49 cfs 14,081 cf

Pond CB7: Exist CB Peak Elev=5.03' Inflow=3.51 cfs 14,386 cf
15.0" Round Culvert n=0.025 L=380.0' S=0.0016 '/' Outflow=3.51 cfs 14,386 cf

Pond CB8: Exist CB Peak Elev=3.77' Inflow=8.24 cfs 34,876 cf
18.0" Round Culvert n=0.012 L=787.0' S=0.0021 '/' Outflow=8.24 cfs 34,876 cf

Pond CB9: Exist CB Peak Elev=0.47' Inflow=3.43 cfs 11,632 cf
24.0" Round Culvert n=0.012 L=1,029.0' S=0.0008 '/' Outflow=3.43 cfs 11,632 cf

Pond Cr-B: Robinson Driveway Peak Elev=2.69' Inflow=8.86 cfs 107,285 cf
Outflow=8.86 cfs 107,285 cf

Pond Cr-CD: Utility Crossing Peak Elev=2.61' Inflow=16.21 cfs 157,929 cf
Outflow=16.21 cfs 157,929 cf

Pond MH1: Exist MH Peak Elev=3.31' Inflow=4.50 cfs 35,170 cf
18.0" Round Culvert n=0.025 L=400.0' S=0.0021 '/' Outflow=4.50 cfs 35,170 cf

Pond P1: Pond 1 Peak Elev=3.13' Storage=4,346 cf Inflow=5.68 cfs 68,612 cf
Discarded=0.61 cfs 9,513 cf Primary=4.86 cfs 59,099 cf Outflow=5.47 cfs 68,612 cf

Pond P10: Wetland Ditch Peak Elev=3.13' Storage=1,703 cf Inflow=5.88 cfs 77,559 cf
Outflow=5.67 cfs 77,559 cf

Pond P2: Pond 2 Peak Elev=3.99' Storage=457 cf Inflow=1.60 cfs 7,279 cf
Discarded=0.06 cfs 355 cf Primary=1.30 cfs 6,924 cf Outflow=1.36 cfs 7,279 cf

Pond P3: Pond 3 Peak Elev=3.41' Storage=3,139 cf Inflow=5.80 cfs 60,705 cf
Discarded=0.41 cfs 5,060 cf Primary=5.11 cfs 55,644 cf Outflow=5.52 cfs 60,705 cf

Pond P4: Pond 4 Peak Elev=3.65' Storage=64 cf Inflow=0.75 cfs 3,257 cf
Discarded=0.02 cfs 51 cf Primary=0.68 cfs 3,206 cf Outflow=0.70 cfs 3,257 cf

Pond P5: Pond 5 Peak Elev=3.24' Storage=19 cf Inflow=0.51 cfs 2,397 cf
Discarded=0.00 cfs 22 cf Primary=0.50 cfs 2,375 cf Outflow=0.50 cfs 2,397 cf

Pond P6: Pond 6 Peak Elev=2.51' Storage=0 cf Inflow=2.46 cfs 16,786 cf
Discarded=0.00 cfs 1 cf Primary=2.46 cfs 16,785 cf Outflow=2.46 cfs 16,786 cf

Pond P7: Pond 7 Peak Elev=3.41' Storage=139 cf Inflow=1.36 cfs 5,728 cf
Discarded=0.02 cfs 65 cf Primary=1.25 cfs 5,663 cf Outflow=1.28 cfs 5,728 cf

Pond P8: Pond 8 Peak Elev=4.39' Storage=75 cf Inflow=4.28 cfs 26,899 cf
12.0" Round Culvert n=0.011 L=20.0' S=0.0000 '/' Outflow=4.26 cfs 26,899 cf

Pond P9: Pond 9 Peak Elev=4.77' Storage=532 cf Inflow=0.19 cfs 967 cf
Outflow=0.03 cfs 558 cf

Link 1L: WEST WETL Inflow=56.16 cfs 240,676 cf
Primary=56.16 cfs 240,676 cf

Link 2L: TUTTLE BROOK Inflow=151.66 cfs 613,706 cf
Primary=151.66 cfs 613,706 cf

Link 3L: EAST WETL Inflow=104.86 cfs 1,388,545 cf
Primary=104.86 cfs 1,388,545 cf

Link 4L: MORRIS CREEK Inflow=200.97 cfs 2,113,124 cf
Primary=200.97 cfs 2,113,124 cf

Link AP1: TIDE GATE Inflow=374.05 cfs 2,888,861 cf
Primary=374.05 cfs 2,888,861 cf

Total Runoff Area = 24,288,724 sf Runoff Volume = 2,904,337 cf Average Runoff Depth = 1.43"
67.61% Pervious = 16,420,958 sf 32.39% Impervious = 7,867,766 sf

Summary for Subcatchment 1S: SC 1

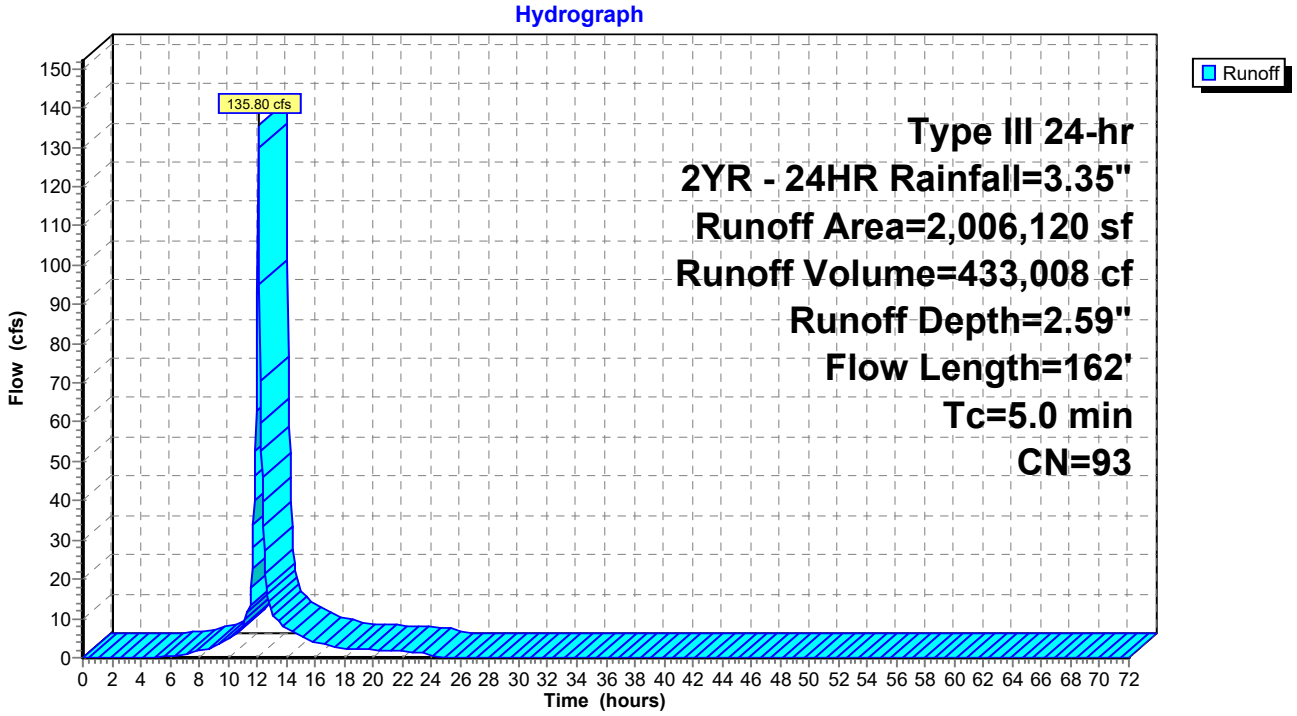
Runoff = 135.80 cfs @ 12.07 hrs, Volume= 433,008 cf, Depth= 2.59"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	220,568	80	>75% Grass cover, Good, HSG D
	42,541	96	Gravel surface, HSG D
	176,389	98	Water Surface, 0% imp, HSG D
	0	98	Unconnected pavement, HSG A
	43,007	98	Unconnected pavement, HSG D
	248,525	77	Woods, Good, HSG D
*	1,275,090	98	Wetland/Water Surface, 0% imp, HSG D
	2,006,120	93	Weighted Average
	1,963,113		97.86% Pervious Area
	43,007		2.14% Impervious Area
	43,007		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	23	0.0130	0.88		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	34	0.0289	1.19		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.5	105	0.0197	0.70		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.6					**Direct Entry, Minimum**
5.0	162	Total			

Subcatchment 1S: SC 1



Summary for Subcatchment 2S: SC 2

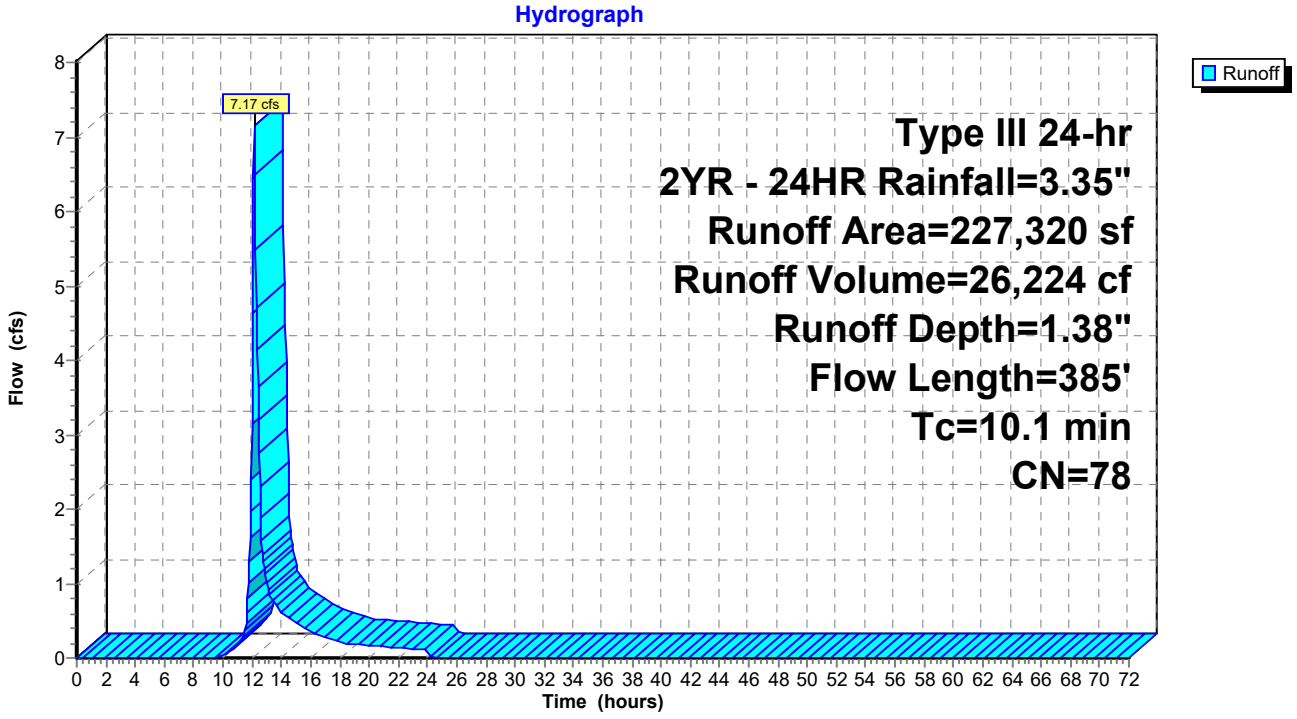
Runoff = 7.17 cfs @ 12.15 hrs, Volume= 26,224 cf, Depth= 1.38"
Routed to Pond CB11 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
122,890	61	>75% Grass cover, Good, HSG B
104,430	98	Unconnected pavement, HSG B
227,320	78	Weighted Average
122,890		54.06% Pervious Area
104,430		45.94% Impervious Area
104,430		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	67	0.0119	1.05		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.0	318	0.0070	0.59		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
10.1	385	Total			

Subcatchment 2S: SC 2



Summary for Subcatchment 3S: SC 3

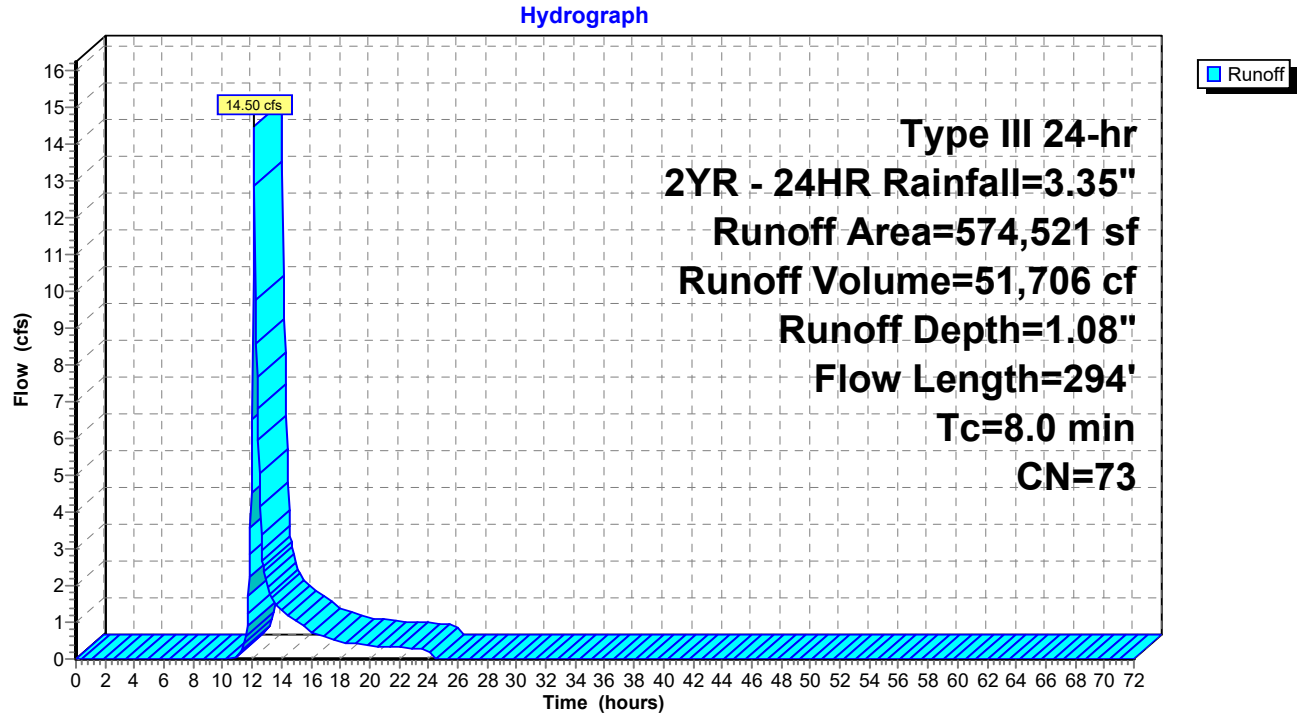
Runoff = 14.50 cfs @ 12.12 hrs, Volume= 51,706 cf, Depth= 1.08"
Routed to Pond CB10 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
388,000	61	>75% Grass cover, Good, HSG B
186,521	98	Unconnected pavement, HSG B
574,521	73	Weighted Average
388,000		67.53% Pervious Area
186,521		32.47% Impervious Area
186,521		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0122	1.15		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.0	6	0.0176	2.69		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.5	188	0.0048	0.48		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
8.0	294	Total			

Subcatchment 3S: SC 3



Summary for Subcatchment 4S: SC 4R

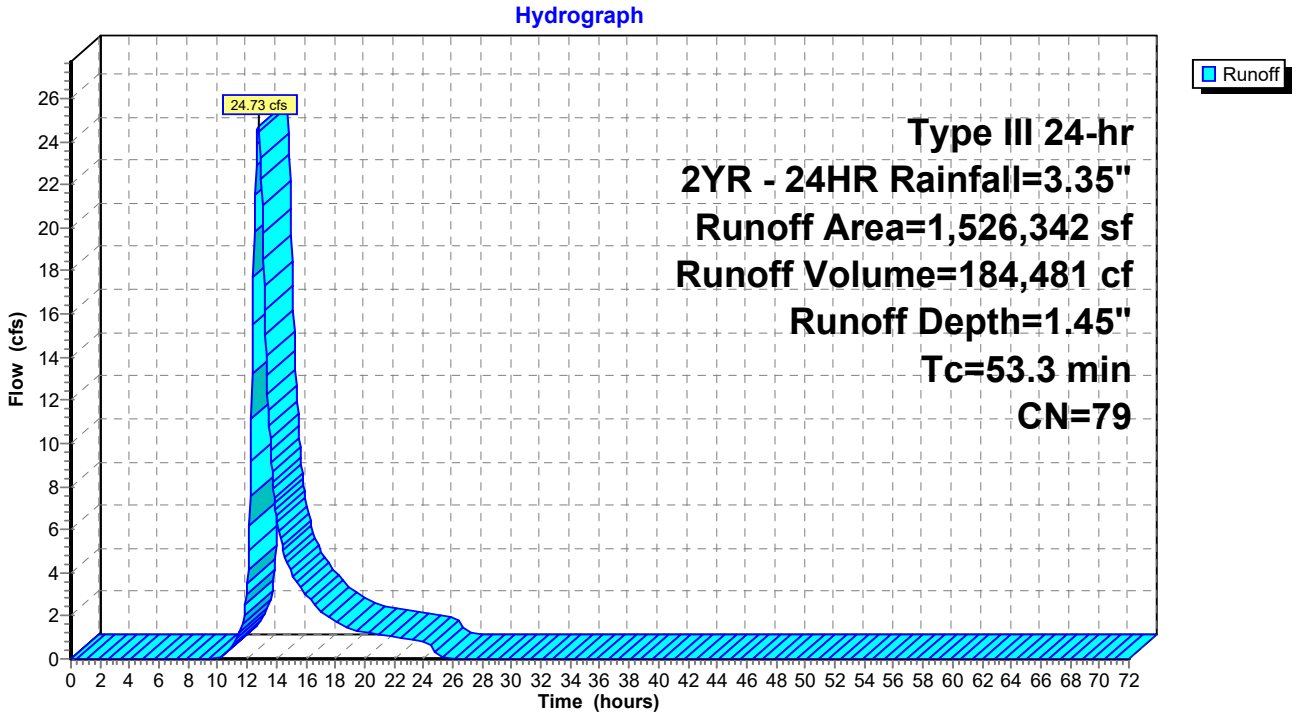
Runoff = 24.73 cfs @ 12.75 hrs, Volume= 184,481 cf, Depth= 1.45"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	769,705	61	>75% Grass cover, Good, HSG B
	22,651	98	Unconnected pavement, HSG B
*	284,447	98	Wetland/Water Surface, HSG B
*	449,539	98	Wetland/Water Surface. HSG D
	1,526,342	79	Weighted Average
	769,705		50.43% Pervious Area
	756,637		49.57% Impervious Area
	22,651		2.99% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.3					**Direct Entry, See Calculation Sheet**

Subcatchment 4S: SC 4R



Summary for Subcatchment 5S: SC 5

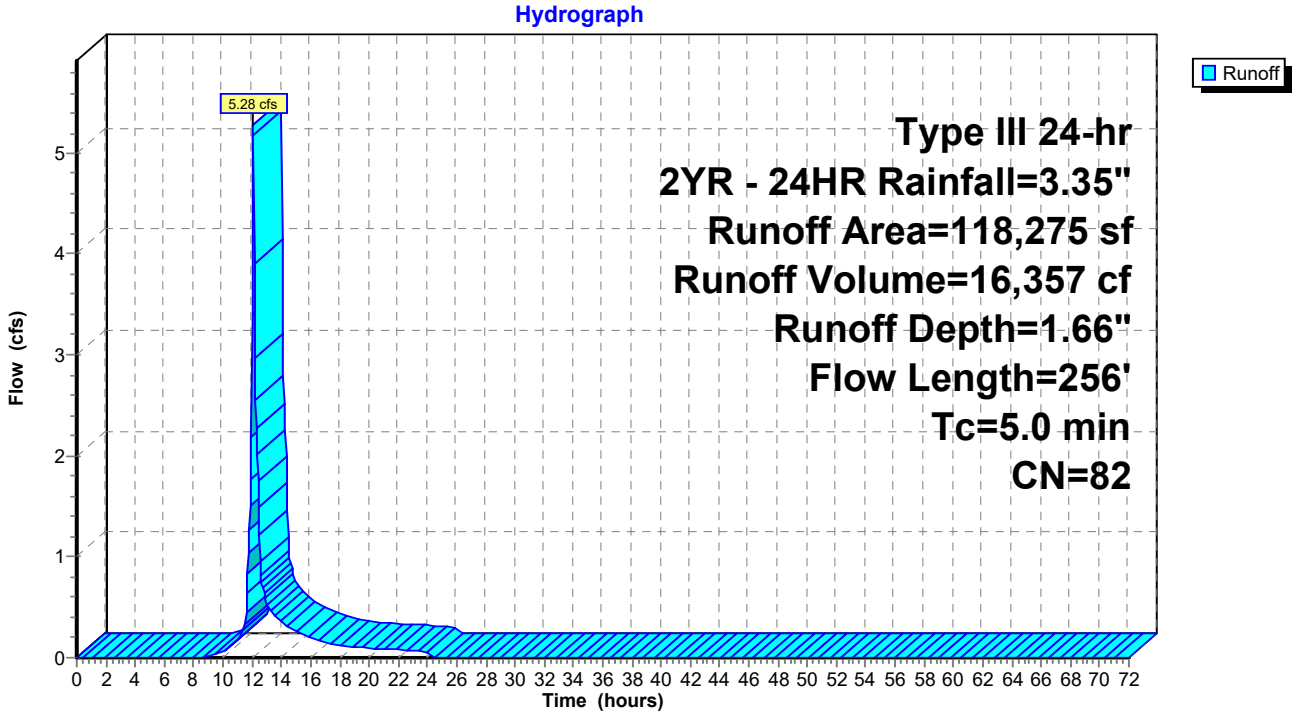
Runoff = 5.28 cfs @ 12.08 hrs, Volume= 16,357 cf, Depth= 1.66"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
50,931	61	>75% Grass cover, Good, HSG B
617	98	Unconnected pavement, HSG B
66,727	98	Unconnected pavement, HSG D
118,275	82	Weighted Average
50,931		43.06% Pervious Area
67,344		56.94% Impervious Area
67,344		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0073	0.93		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.1	12	0.0120	2.22		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.4	32	0.0434	1.46		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
2.5	112	0.0014	0.76		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
0.2					**Direct Entry, Minimum**
5.0	256	Total			

Subcatchment 5S: SC 5



Summary for Subcatchment 6S: SC 6

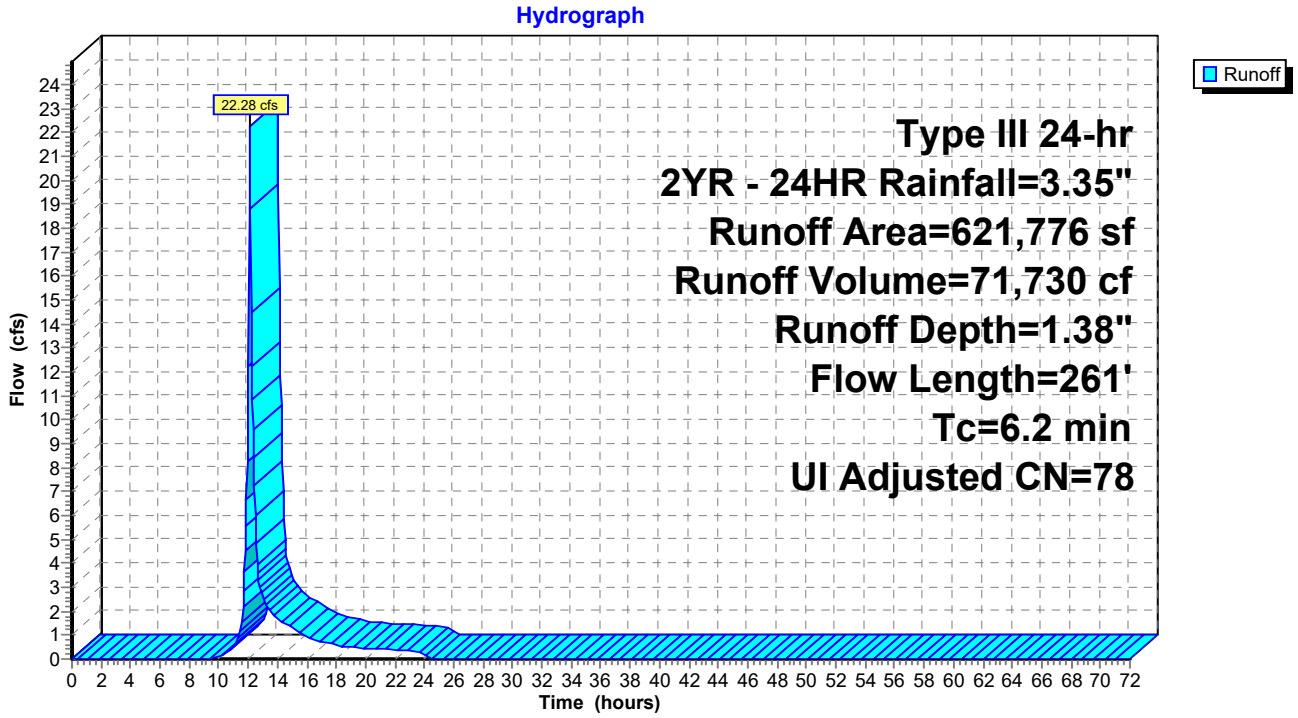
Runoff = 22.28 cfs @ 12.10 hrs, Volume= 71,730 cf, Depth= 1.38"
Routed to Link 3L : EAST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	282,812	61		>75% Grass cover, Good, HSG B
	0	98		Unconnected pavement, HSG A
	174,659	98		Unconnected pavement, HSG D
*	164,305	98		Wetland/Water Surface, 0% imp, HSG B
	621,776	81	78	Weighted Average, UI Adjusted
	447,117			71.91% Pervious Area
	174,659			28.09% Impervious Area
	174,659			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	78	0.0101	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.9	183	0.0080	0.63		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	261	Total			

Subcatchment 6S: SC 6



Summary for Subcatchment 7A: SC 7

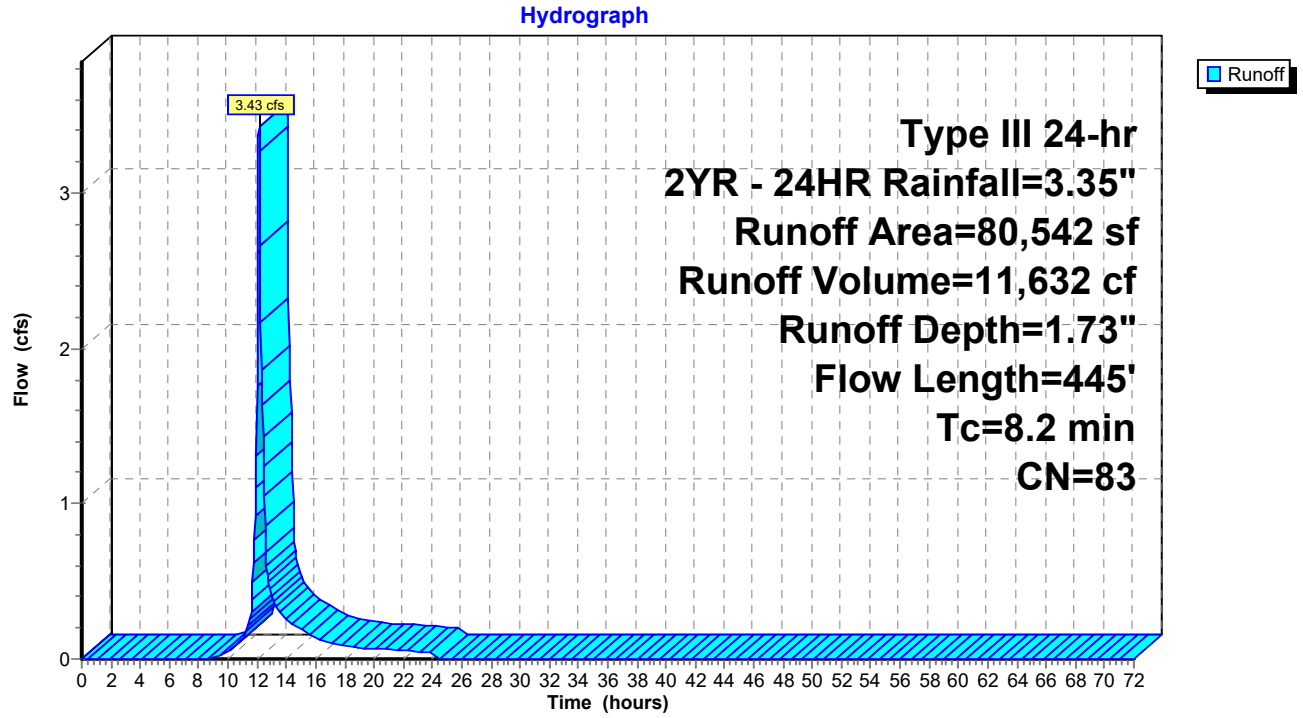
Runoff = 3.43 cfs @ 12.12 hrs, Volume= 11,632 cf, Depth= 1.73"
Routed to Pond CB9 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
33,190	61	>75% Grass cover, Good, HSG B
47,352	98	Unconnected pavement, HSG D
80,542	83	Weighted Average
33,190		41.21% Pervious Area
47,352		58.79% Impervious Area
47,352		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	75	0.0095	0.98		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.3	20	0.0255	1.12		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.6	350	0.0019	0.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	445	Total			

Subcatchment 7A: SC 7



Summary for Subcatchment 7S: SC 7

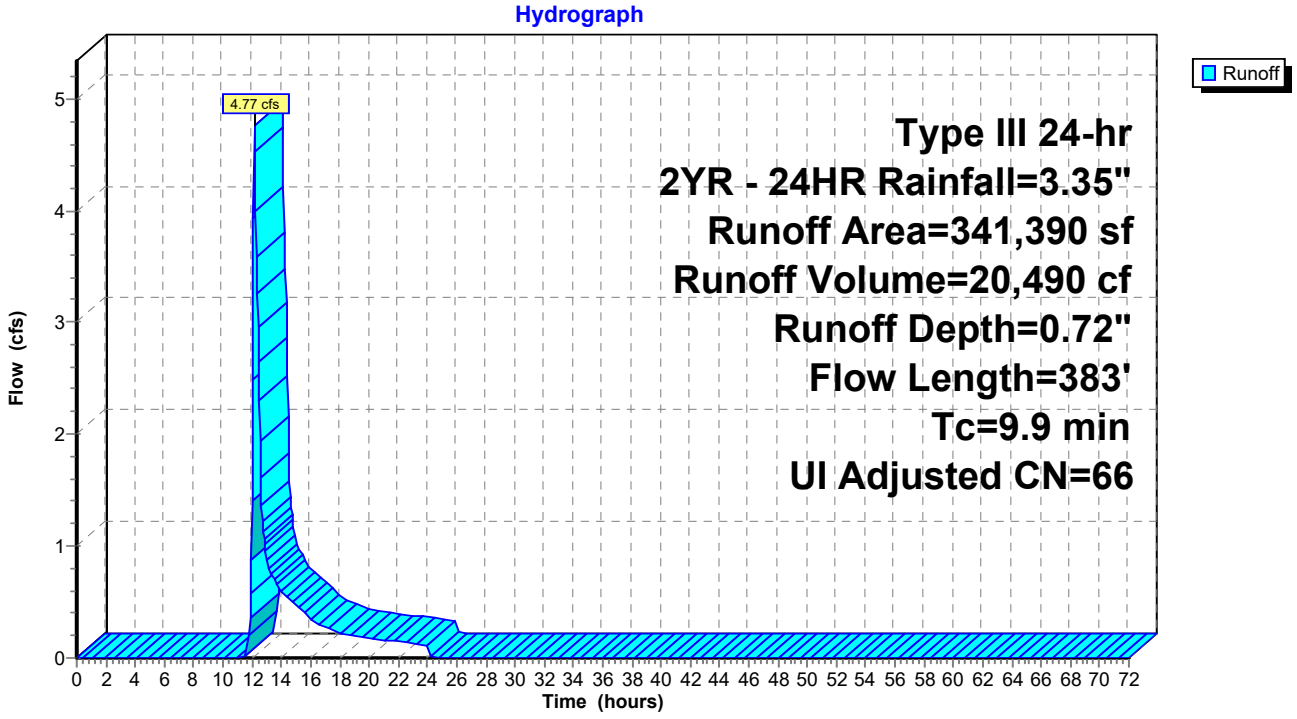
Runoff = 4.77 cfs @ 12.16 hrs, Volume= 20,490 cf, Depth= 0.72"
Routed to Pond CB8 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
247,681	61		>75% Grass cover, Good, HSG B
93,709	98		Unconnected pavement, HSG D
341,390	71	66	Weighted Average, UI Adjusted
247,681			72.55% Pervious Area
93,709			27.45% Impervious Area
93,709			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	72	0.0041	0.69		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
8.2	311	0.0081	0.63		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.9	383	Total			

Subcatchment 7S: SC 7



Summary for Subcatchment 8A: SC 8A

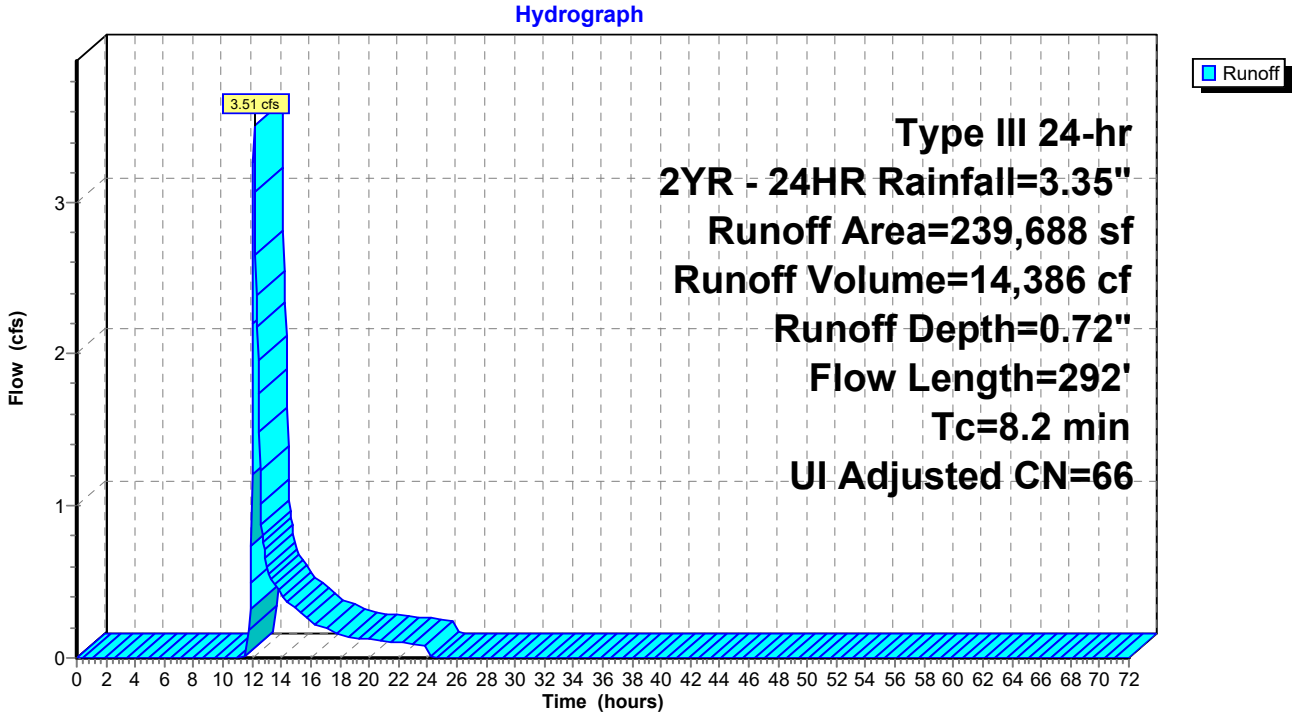
Runoff = 3.51 cfs @ 12.14 hrs, Volume= 14,386 cf, Depth= 0.72"
Routed to Pond CB7 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
181,295	61		>75% Grass cover, Good, HSG B
58,393	98		Unconnected pavement, HSG D
239,688	70	66	Weighted Average, UI Adjusted
181,295			75.64% Pervious Area
58,393			24.36% Impervious Area
58,393			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0101	0.93		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	240	0.0061	0.55		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.2	292	Total			

Subcatchment 8A: SC 8A



Summary for Subcatchment 8S: SC 8

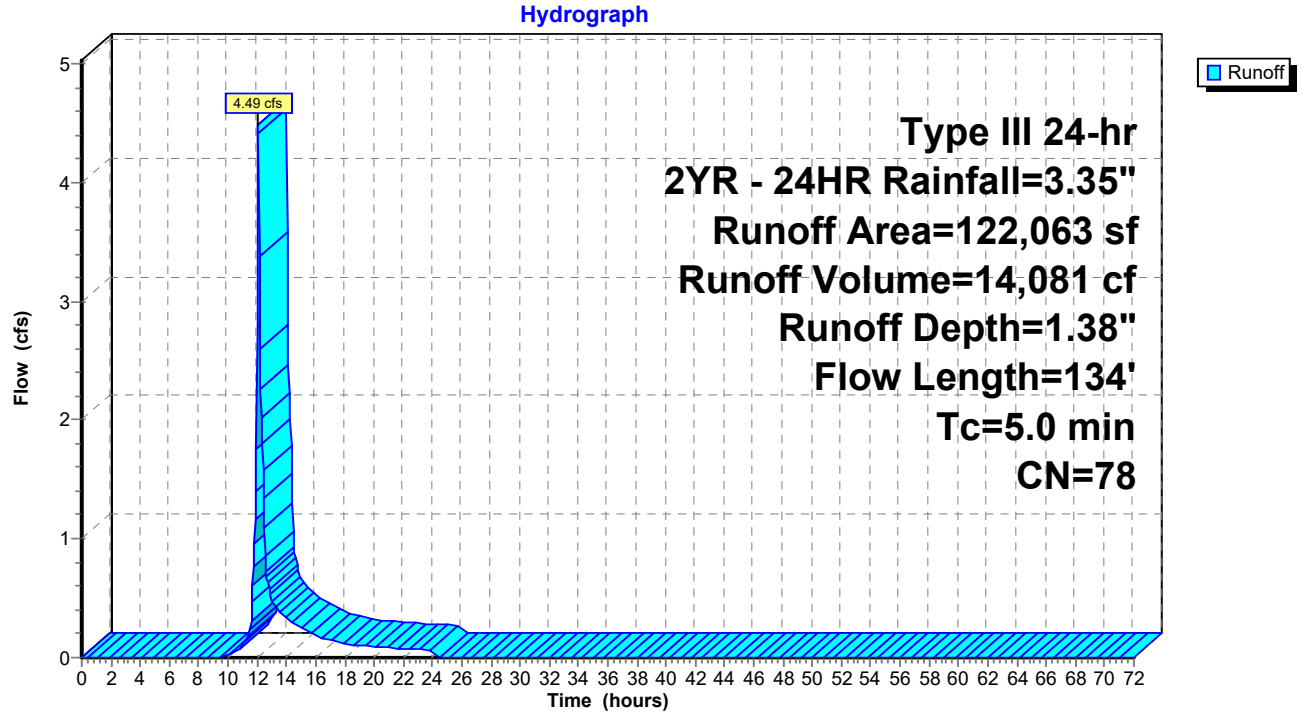
Runoff = 4.49 cfs @ 12.08 hrs, Volume= 14,081 cf, Depth= 1.38"
Routed to Pond CB6 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
64,371	61	>75% Grass cover, Good, HSG B
57,692	98	Unconnected pavement, HSG D
122,063	78	Weighted Average
64,371		52.74% Pervious Area
57,692		47.26% Impervious Area
57,692		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	69	0.0036	0.65		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.1	65	0.0217	1.03		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.1					**Direct Entry, min Tc**
5.0	134	Total			

Subcatchment 8S: SC 8



Summary for Subcatchment 9S: SC Culvert

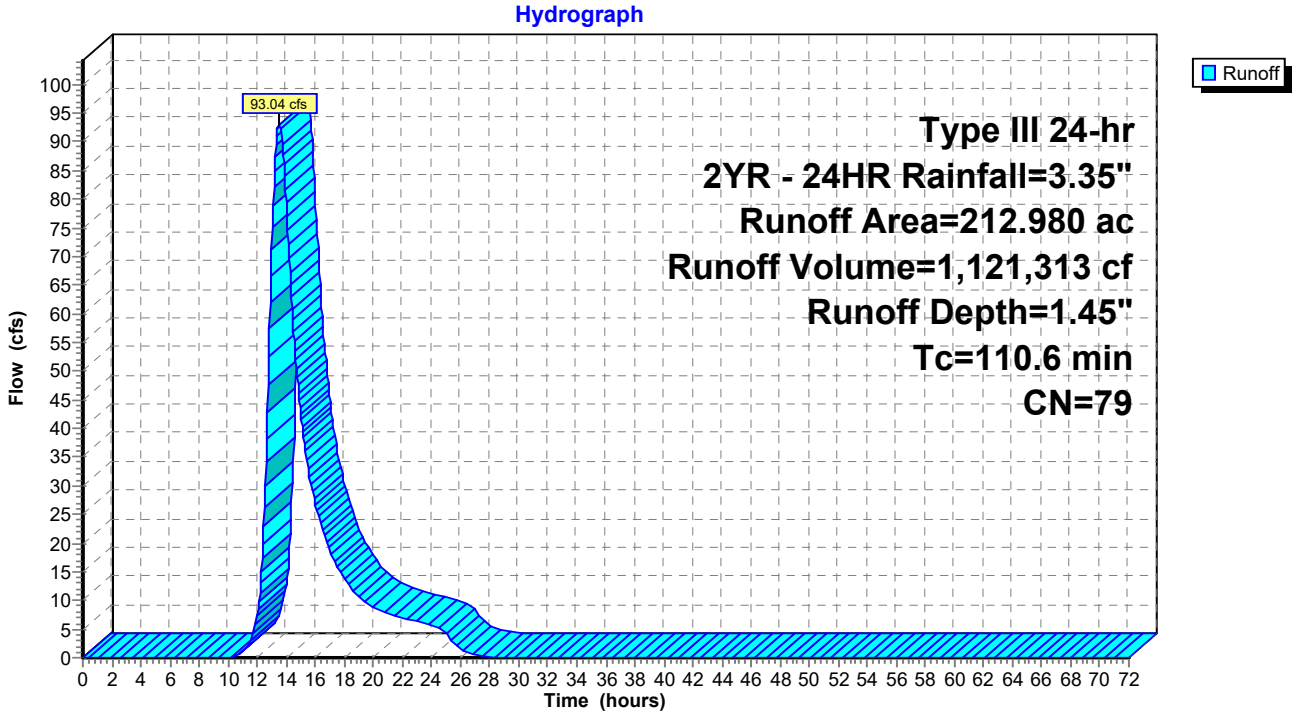
Runoff = 93.04 cfs @ 13.51 hrs, Volume= 1,121,313 cf, Depth= 1.45"
Routed to Link 3L : EAST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (ac)	CN	Description
	8.600	54	1/2 acre lots, 25% imp, HSG A
	2.340	85	1/2 acre lots, 25% imp, HSG D
	12.290	61	1/4 acre lots, 38% imp, HSG A
	0.360	75	1/4 acre lots, 38% imp, HSG B
	0.010	87	1/4 acre lots, 38% imp, HSG D
	55.170	77	1/8 acre lots, 65% imp, HSG A
	0.490	85	1/8 acre lots, 65% imp, HSG B
	0.010	92	1/8 acre lots, 65% imp, HSG D
	2.210	67	Brush, Poor, HSG B
	0.740	83	Brush, Poor, HSG D
	2.880	89	Urban commercial, 85% imp, HSG A
	11.260	92	Urban commercial, 85% imp, HSG B
	21.000	95	Urban commercial, 85% imp, HSG D
	2.430	39	>75% Grass cover, Good, HSG A
	11.890	61	>75% Grass cover, Good, HSG B
	1.240	80	>75% Grass cover, Good, HSG D
	0.180	81	Urban industrial, 72% imp, HSG A
	0.520	93	Urban industrial, 72% imp, HSG D
	10.260	98	Paved roads w/curbs & sewers, HSG A
	2.890	98	Paved roads w/curbs & sewers, HSG B
	1.410	98	Paved roads w/curbs & sewers, HSG D
*	0.010	98	Wetland/Water Surface, 0% imp, HSG A
*	10.010	98	Wetland/Water Surface, 0% imp, HSG B
*	28.580	98	Wetland/Water Surface, 0% imp, HSG D
	4.690	30	Woods, Good, HSG A
	15.580	55	Woods, Good, HSG B
	5.100	77	Woods, Good, HSG D
	0.100	82	Dirt roads, HSG B
*	0.730	98	Unconnected Pavement, HSG B
	212.980	79	Weighted Average
	123.586		58.03% Pervious Area
	89.394		41.97% Impervious Area
	0.730		0.82% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.6					**Direct Entry, See Calculation Sheet**

Subcatchment 9S: SC Culvert



Summary for Subcatchment 14S: SC 14

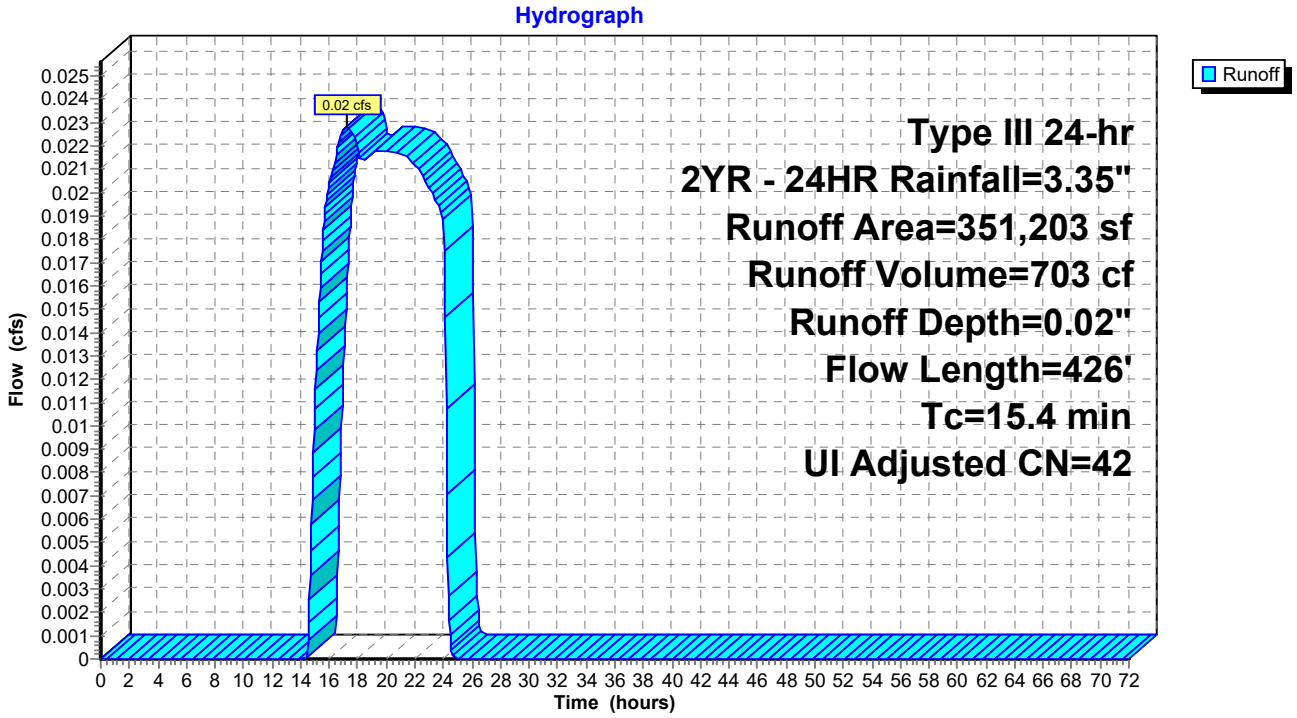
Runoff = 0.02 cfs @ 17.25 hrs, Volume= 703 cf, Depth= 0.02"
Routed to Pond CB1 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
311,900	39		>75% Grass cover, Good, HSG A
170	96		Gravel surface, HSG A
26,561	98		Unconnected pavement, HSG A
12,572	98		Unconnected pavement, HSG D
351,203	46	42	Weighted Average, UI Adjusted
312,070			88.86% Pervious Area
39,133			11.14% Impervious Area
39,133			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0427	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
5.0	326	0.0238	1.08		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
15.4	426	Total			

Subcatchment 14S: SC 14



Summary for Subcatchment 15S: SC 15

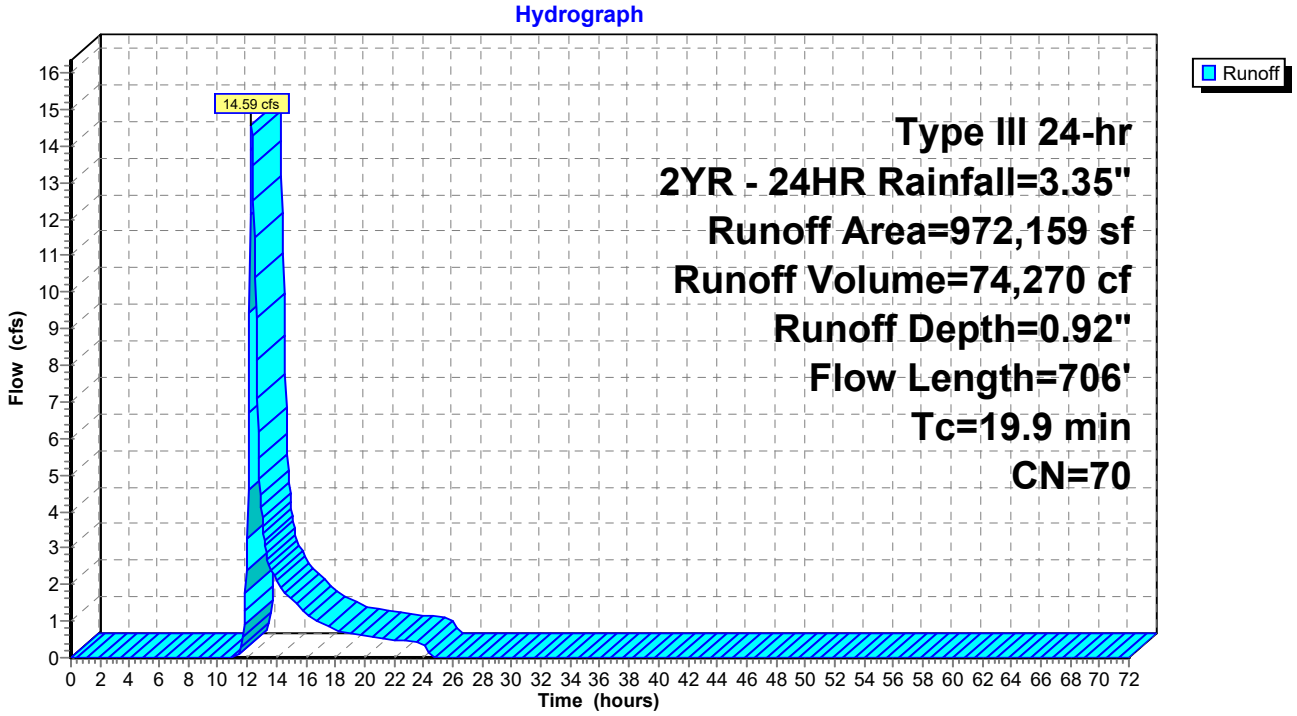
Runoff = 14.59 cfs @ 12.31 hrs, Volume= 74,270 cf, Depth= 0.92"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	450,354	39	>75% Grass cover, Good, HSG A
	1,164	76	Gravel roads, HSG A
	33,083	98	Water Surface, 0% imp, HSG A
	24,397	98	Unconnected pavement, HSG A
	344,271	98	Unconnected pavement, HSG D
	11,248	30	Woods, Good, HSG A
*	107,642	98	Wetland/water Surface, 0% imp, HSG A
	972,159	70	Weighted Average
	603,491		62.08% Pervious Area
	368,668		37.92% Impervious Area
	368,668		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0634	0.19		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
10.5	564	0.0164	0.90		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.3	16	0.0025	1.02		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.2	26	0.1222	2.45		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
19.9	706	Total			

Subcatchment 15S: SC 15



Summary for Subcatchment 16A: SC 16A

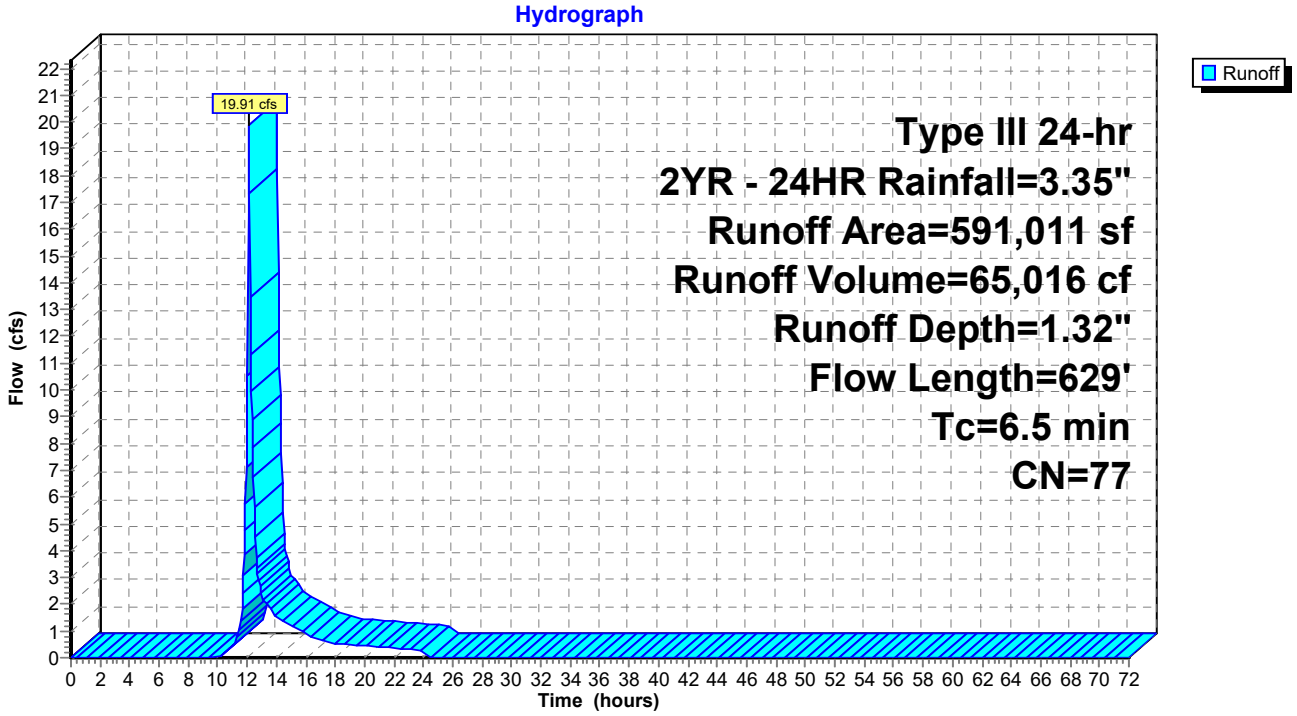
Runoff = 19.91 cfs @ 12.10 hrs, Volume= 65,016 cf, Depth= 1.32"
Routed to Pond CB4 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
330,483	61	>75% Grass cover, Good, HSG B
260,528	98	Unconnected pavement, HSG A
591,011	77	Weighted Average
330,483		55.92% Pervious Area
260,528		44.08% Impervious Area
260,528		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0107	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.0	157	0.0160	0.89		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	372	0.0030	3.09	110.88	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
6.5	629	Total			

Subcatchment 16A: SC 16A



Summary for Subcatchment 16S: SC 16

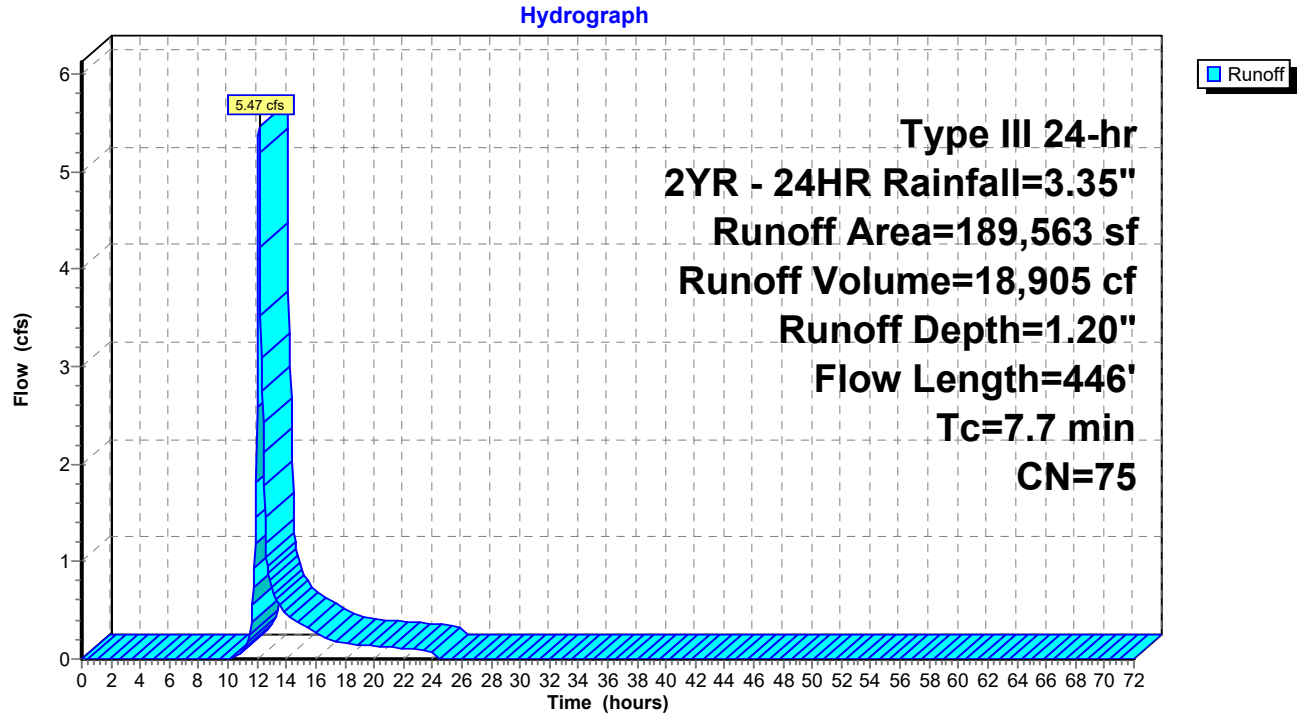
Runoff = 5.47 cfs @ 12.12 hrs, Volume= 18,905 cf, Depth= 1.20"
Routed to Pond CB3 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
120,029	61	>75% Grass cover, Good, HSG B
69,534	98	Unconnected pavement, HSG D
189,563	75	Weighted Average
120,029		63.32% Pervious Area
69,534		36.68% Impervious Area
69,534		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0139	1.21		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.2	39	0.0187	2.78		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.1	307	0.0142	0.83		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
7.7	446	Total			

Subcatchment 16S: SC 16



Summary for Subcatchment 17S: SC 17

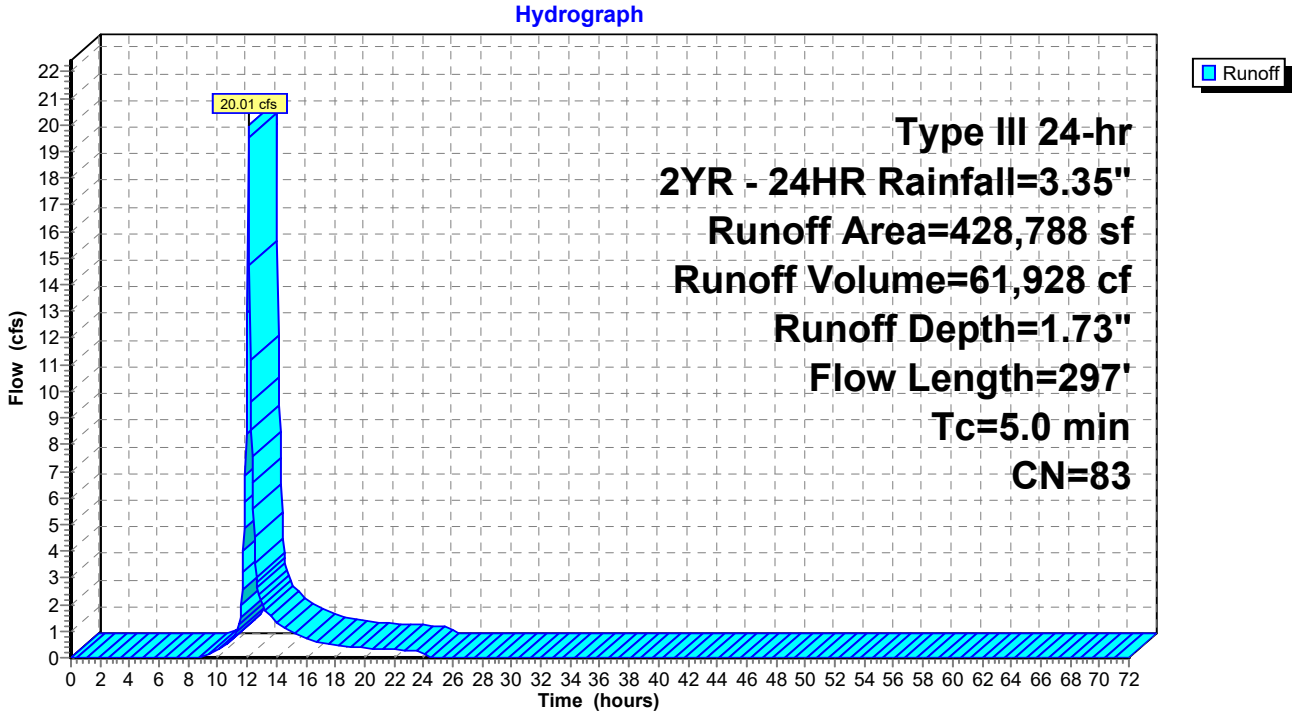
Runoff = 20.01 cfs @ 12.08 hrs, Volume= 61,928 cf, Depth= 1.73"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
176,294	61	>75% Grass cover, Good, HSG B
57,032	98	Unconnected pavement, HSG A
195,462	98	Unconnected pavement, HSG D
428,788	83	Weighted Average
176,294		41.11% Pervious Area
252,494		58.89% Impervious Area
252,494		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	22	0.0103	0.79		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.9	106	0.0170	0.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	169	0.0049	1.42		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.6					**Direct Entry, Minimum**
5.0	297	Total			

Subcatchment 17S: SC 17



Summary for Subcatchment 18S: SC 18

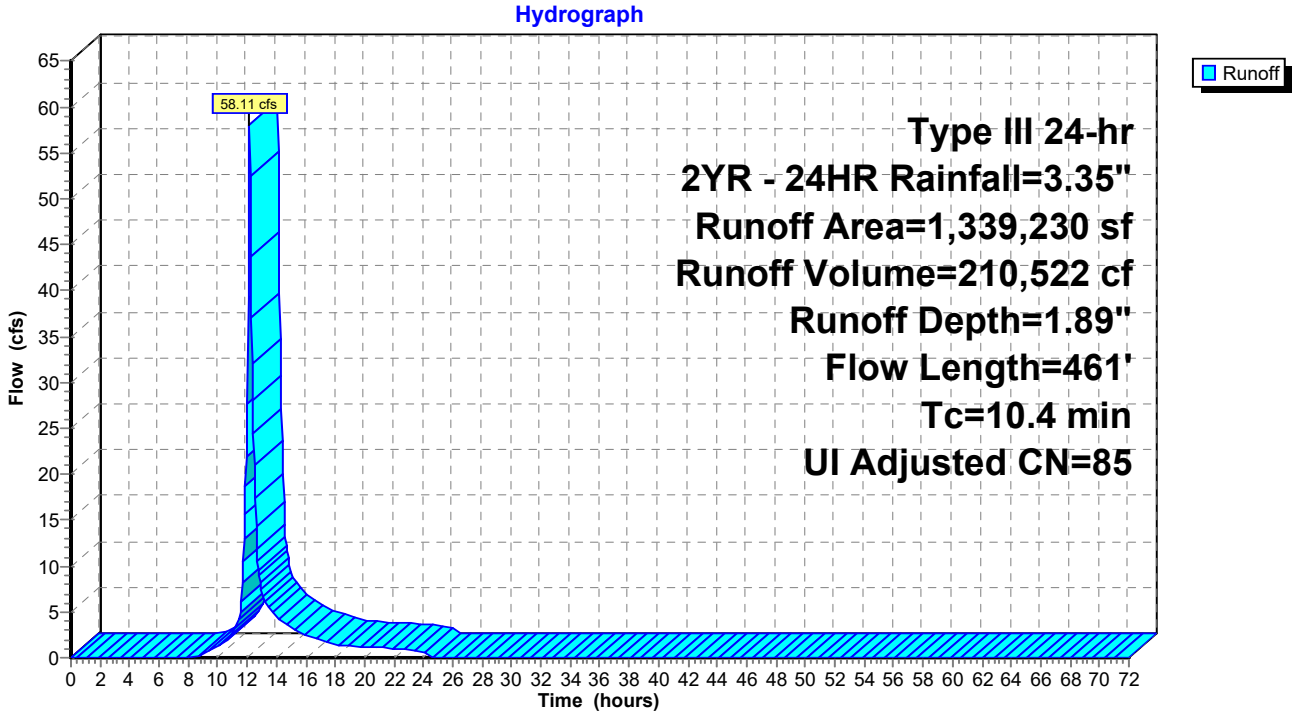
Runoff = 58.11 cfs @ 12.15 hrs, Volume= 210,522 cf, Depth= 1.89"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	379,958	61		>75% Grass cover, Good, HSG B
	171,281	98		Water Surface, 0% imp, HSG D
	0	98		Unconnected pavement, HSG A
	200,633	98		Unconnected pavement, HSG D
	84,918	70		Woods, Good, HSG C
*	502,440	98		Wetland/water Surface, 0% imp, HSG D
	1,339,230	86	85	Weighted Average, UI Adjusted
	1,138,597			85.02% Pervious Area
	200,633			14.98% Impervious Area
	200,633			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0035	0.70		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.1	12	0.0093	1.96		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
7.9	349	0.0111	0.74		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
10.4	461	Total			

Subcatchment 18S: SC 18



Summary for Subcatchment 19S: SC 19

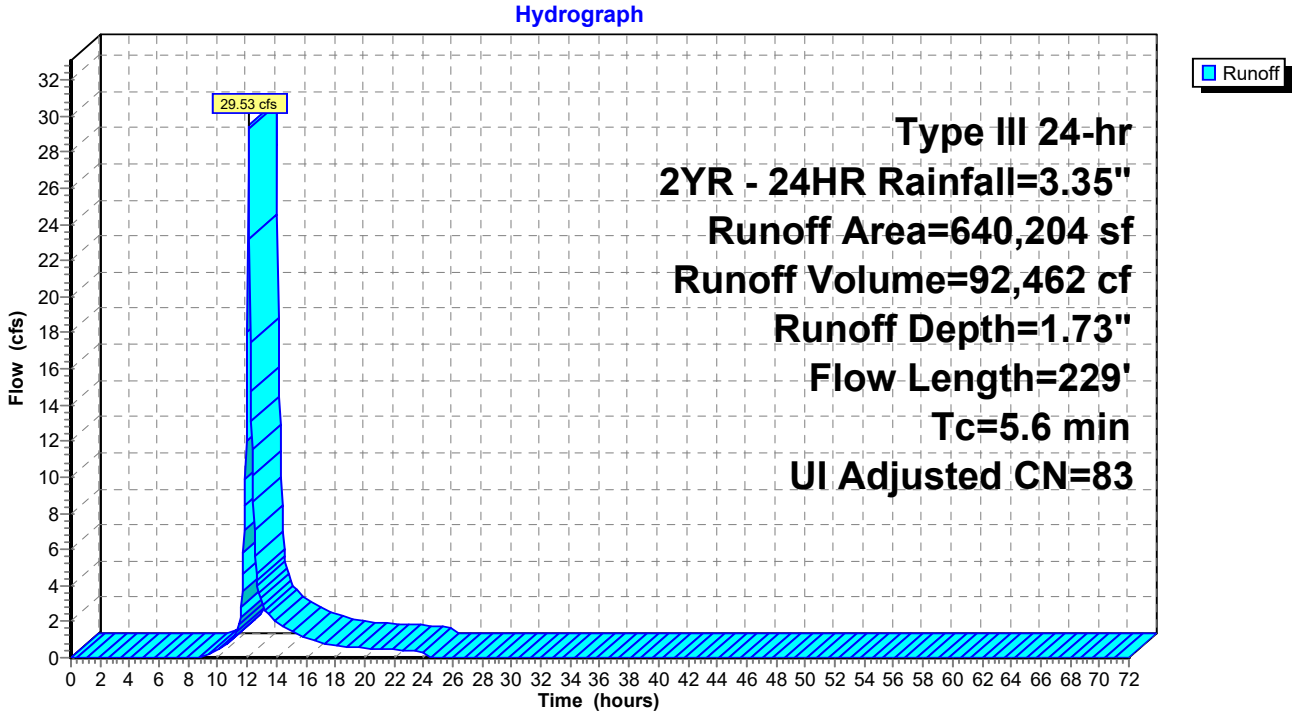
Runoff = 29.53 cfs @ 12.09 hrs, Volume= 92,462 cf, Depth= 1.73"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	227,240	61		>75% Grass cover, Good, HSG B
	60,140	98		Water Surface, 0% imp, HSG D
	72,866	98		Unconnected pavement, HSG D
	5,422	30		Woods, Good, HSG A
*	274,536	98		Wetland/water Surface, 0% imp, HSG D
	640,204	84	83	Weighted Average, UI Adjusted
	567,338			88.62% Pervious Area
	72,866			11.38% Impervious Area
	72,866			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0126	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.5	155	0.0067	0.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
5.6	229	Total			

Subcatchment 19S: SC 19



Summary for Subcatchment 20S: SC 20

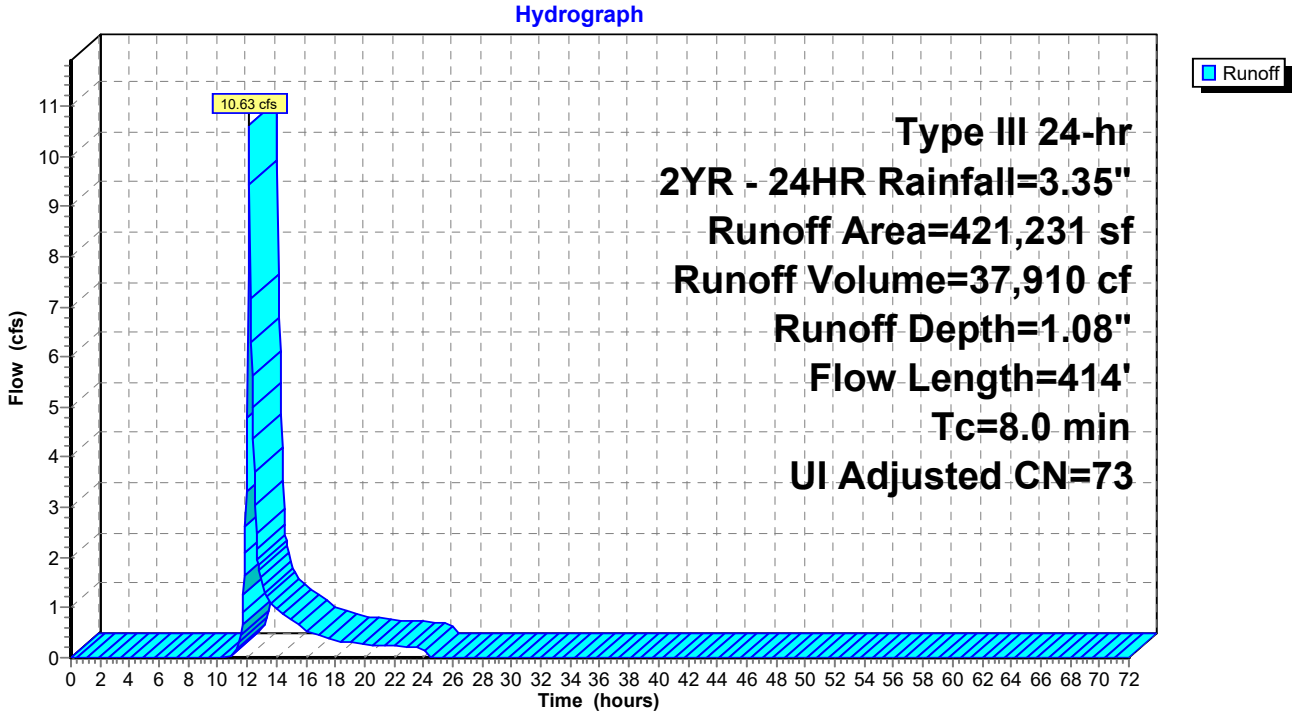
Runoff = 10.63 cfs @ 12.12 hrs, Volume= 37,910 cf, Depth= 1.08"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	248,488	61		>75% Grass cover, Good, HSG B
	2,322	96		Gravel surface, HSG B
	21,627	98		Water Surface, 0% imp, HSG D
	84,822	98		Unconnected pavement, HSG D
	0	30		Woods, Good, HSG A
*	63,972	98		Wetland/water Surface, 0% imp, HSG D
	421,231	76	73	Weighted Average, UI Adjusted
	336,409			79.86% Pervious Area
	84,822			20.14% Impervious Area
	84,822			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	83	0.0118	1.09		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.30"
6.7	331	0.0140	0.83		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
8.0	414	Total			

Subcatchment 20S: SC 20



Summary for Subcatchment 21S: SC 21

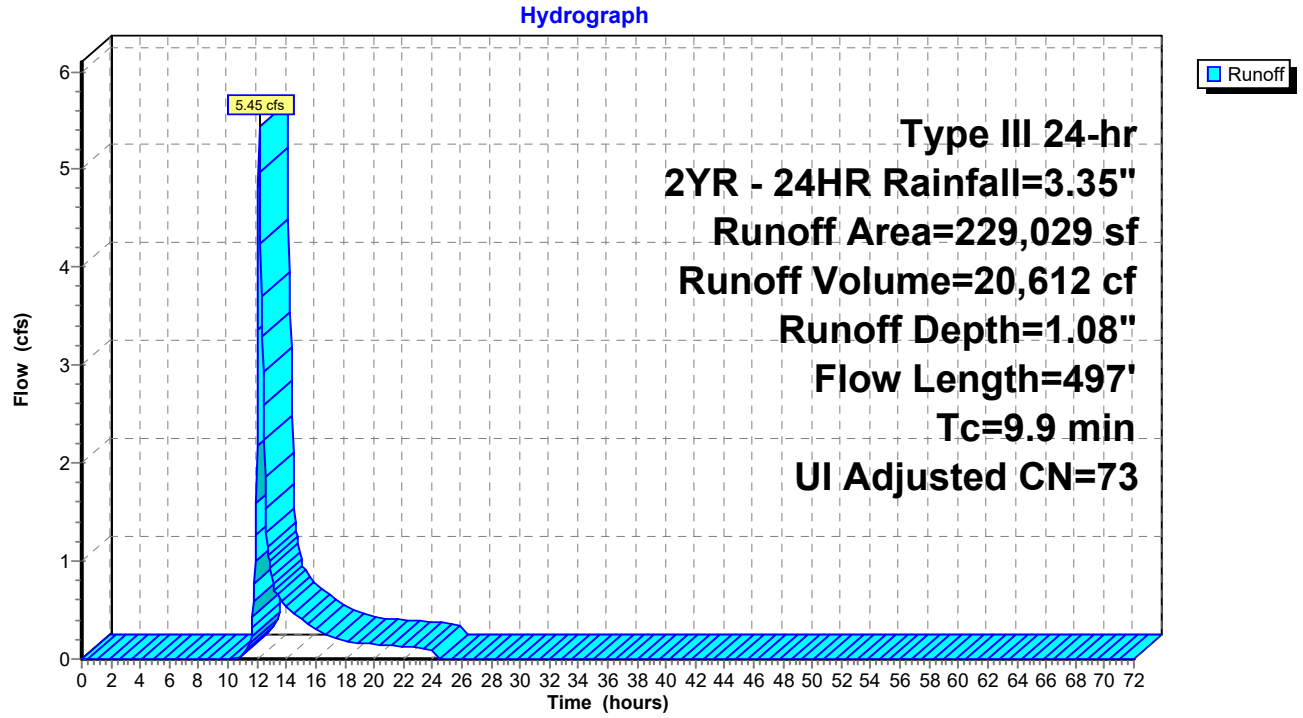
Runoff = 5.45 cfs @ 12.15 hrs, Volume= 20,612 cf, Depth= 1.08"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	144,689	61		>75% Grass cover, Good, HSG B
	14,490	98		Water Surface, 0% imp, HSG D
	23,677	98		Unconnected pavement, HSG D
*	46,173	98		Wetland/water Surface, 0% imp, HSG D
	229,029	75	73	Weighted Average, UI Adjusted
	205,352			89.66% Pervious Area
	23,677			10.34% Impervious Area
	23,677			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	73	0.0118	1.06		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
8.8	424	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.9	497	Total			

Subcatchment 21S: SC 21



Summary for Subcatchment 22S: SC 22

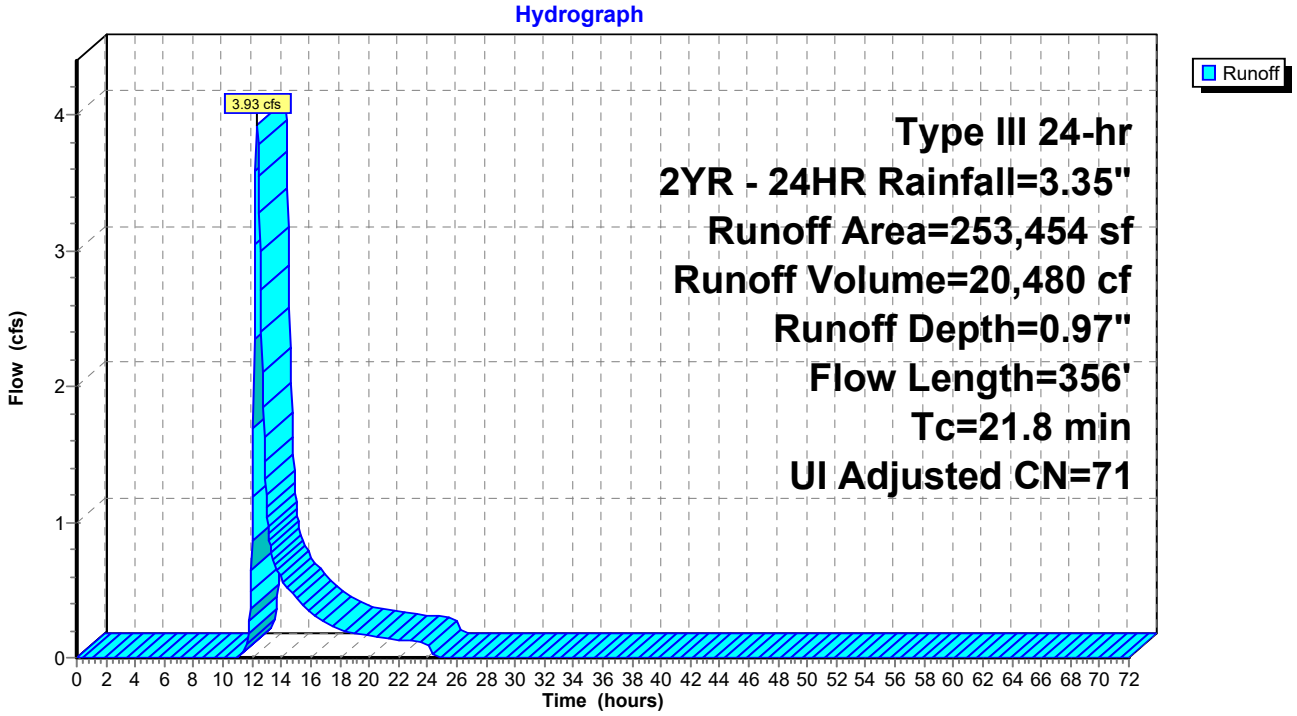
Runoff = 3.93 cfs @ 12.34 hrs, Volume= 20,480 cf, Depth= 0.97"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	178,497	61		>75% Grass cover, Good, HSG B
	9,087	96		Gravel surface, HSG B
	25,499	98		Water Surface, 0% imp, HSG D
	13,257	98		Unconnected pavement, HSG D
*	27,114	98		Wetland/water Surface, 0% imp, HSG D
	253,454	72	71	Weighted Average, UI Adjusted
	240,197			94.77% Pervious Area
	13,257			5.23% Impervious Area
	13,257			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0044	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.1	256	0.0218	1.03		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
21.8	356	Total			

Subcatchment 22S: SC 22



Summary for Subcatchment 23S: SC 23

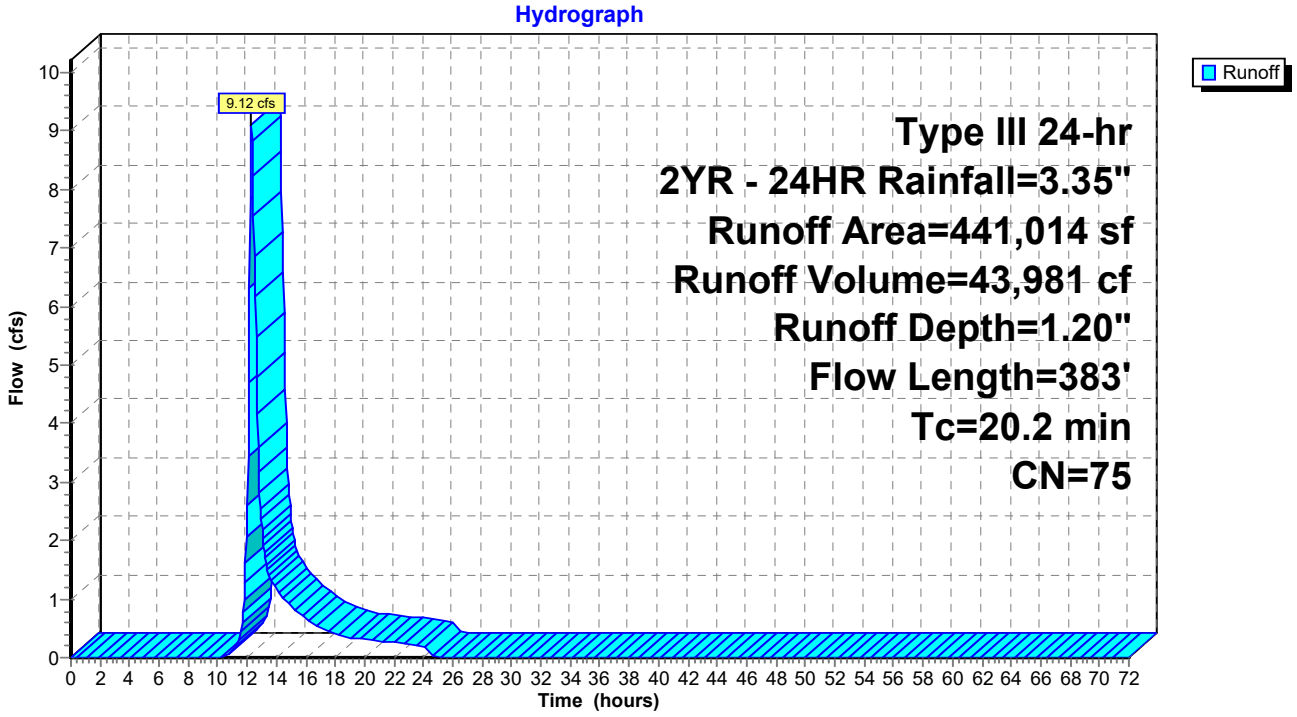
Runoff = 9.12 cfs @ 12.30 hrs, Volume= 43,981 cf, Depth= 1.20"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	200,568	61	>75% Grass cover, Good, HSG B
	18,545	96	Gravel surface, HSG B
	45,671	98	Water Surface, 0% imp, HSG D
	66,364	55	Woods, Good, HSG B
*	109,866	98	Wetland/water Surface, 0% imp, HSG D
	441,014	75	Weighted Average
	441,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0062	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.8	283	0.0198	0.98		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
20.2	383	Total			

Subcatchment 23S: SC 23



Summary for Subcatchment 24S: SC 24

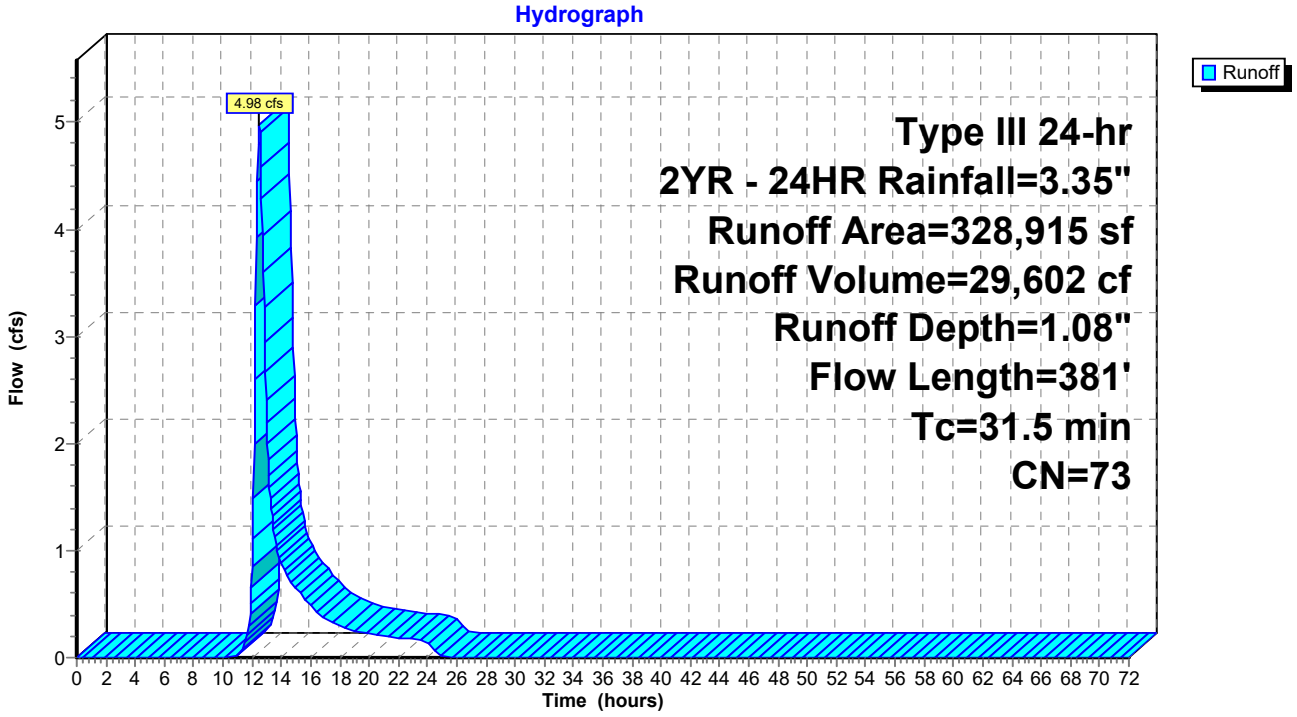
Runoff = 4.98 cfs @ 12.48 hrs, Volume= 29,602 cf, Depth= 1.08"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	70,558	61	>75% Grass cover, Good, HSG B
	14,252	96	Gravel surface, HSG B
	54,296	98	Water Surface, 0% imp, HSG D
	132,846	55	Woods, Good, HSG B
*	56,963	98	Wetland/water Surface, 0% imp, HSG D
	328,915	73	Weighted Average
	328,915		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0048	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
6.6	281	0.0103	0.71		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
31.5	381	Total			

Subcatchment 24S: SC 24



Summary for Subcatchment 27S: SC 27

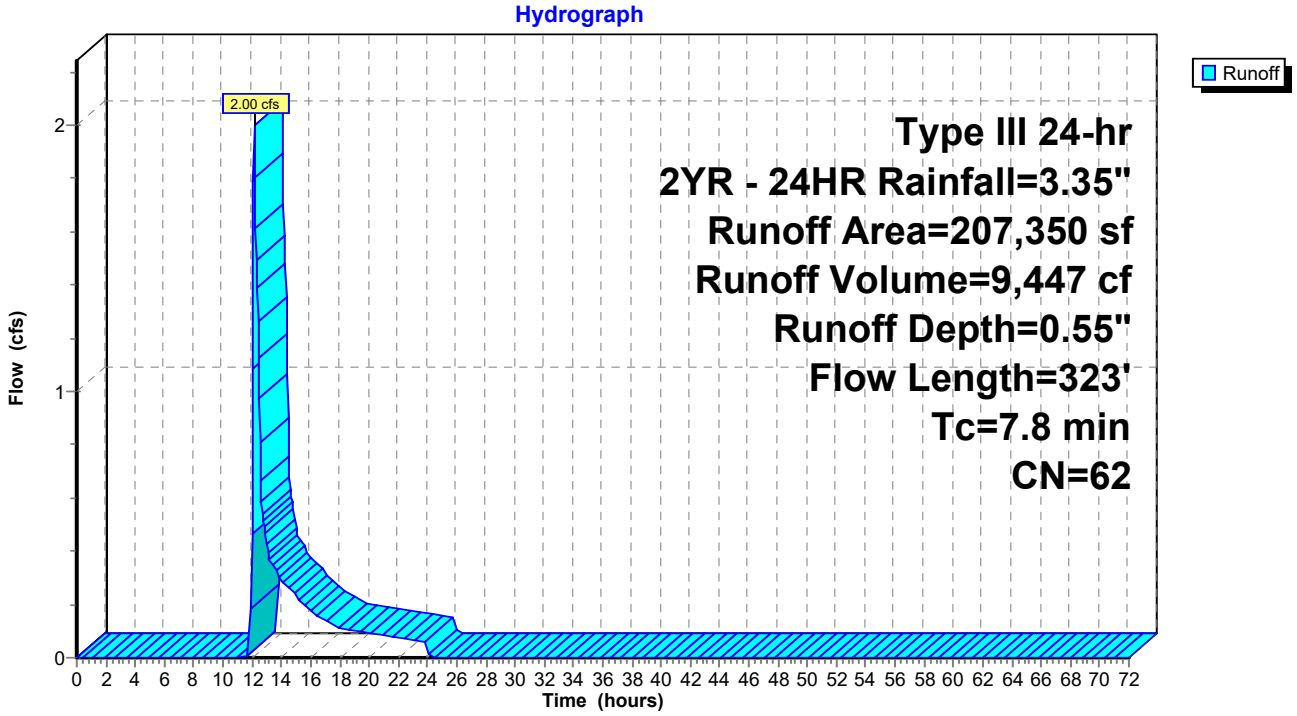
Runoff = 2.00 cfs @ 12.15 hrs, Volume= 9,447 cf, Depth= 0.55"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	198,922	61	>75% Grass cover, Good, HSG B
	4,606	96	Gravel surface, HSG B
	0	98	Unconnected pavement, HSG A
	3,765	98	Unconnected pavement, HSG D
*	57	98	Wetland/Water Surface, 0% imp, HSG A
	207,350	62	Weighted Average
	203,585		98.18% Pervious Area
	3,765		1.82% Impervious Area
	3,765		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	17	0.0048	0.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	306	0.0099	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.8	323	Total			

Subcatchment 27S: SC 27



Summary for Subcatchment 28S: SC 28

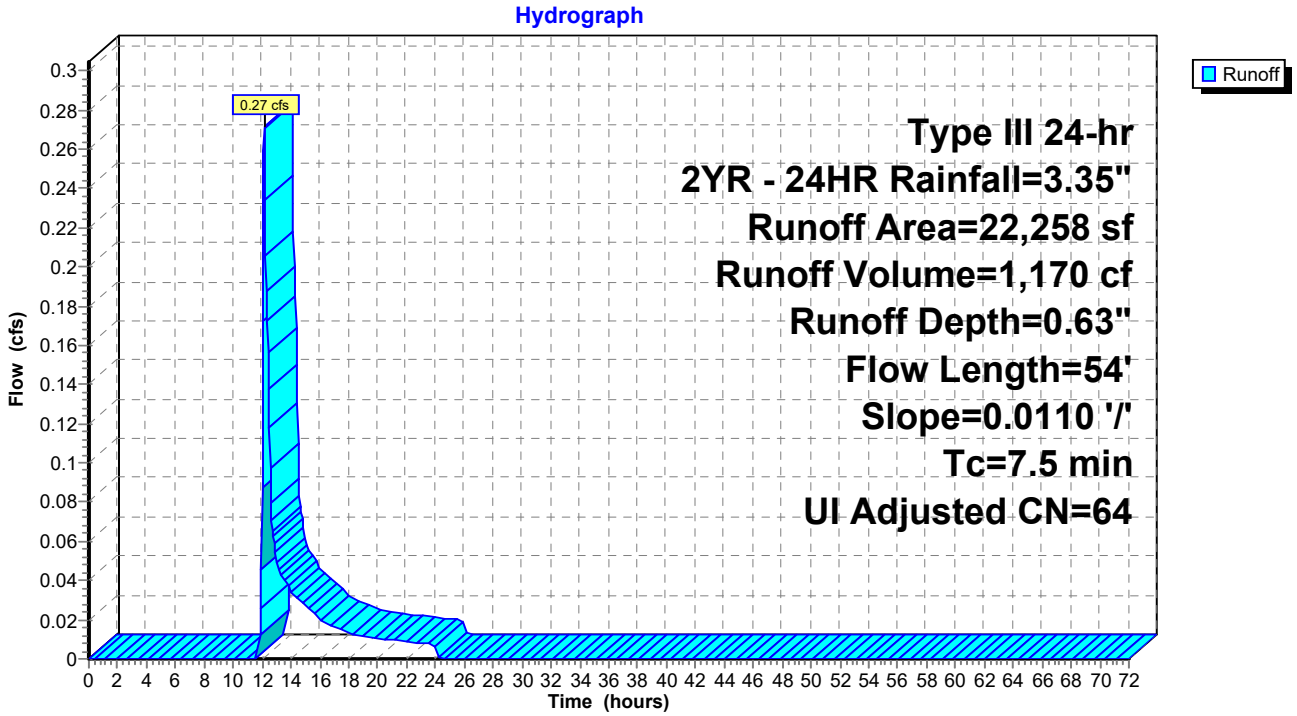
Runoff = 0.27 cfs @ 12.14 hrs, Volume= 1,170 cf, Depth= 0.63"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
18,224	61		>75% Grass cover, Good, HSG B
10	96		Gravel surface, HSG B
4,024	98		Unconnected pavement, HSG D
22,258	68	64	Weighted Average, UI Adjusted
18,234			81.92% Pervious Area
4,024			18.08% Impervious Area
4,024			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	54	0.0110	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"

Subcatchment 28S: SC 28



Summary for Subcatchment DS1: Ditch Segment 1

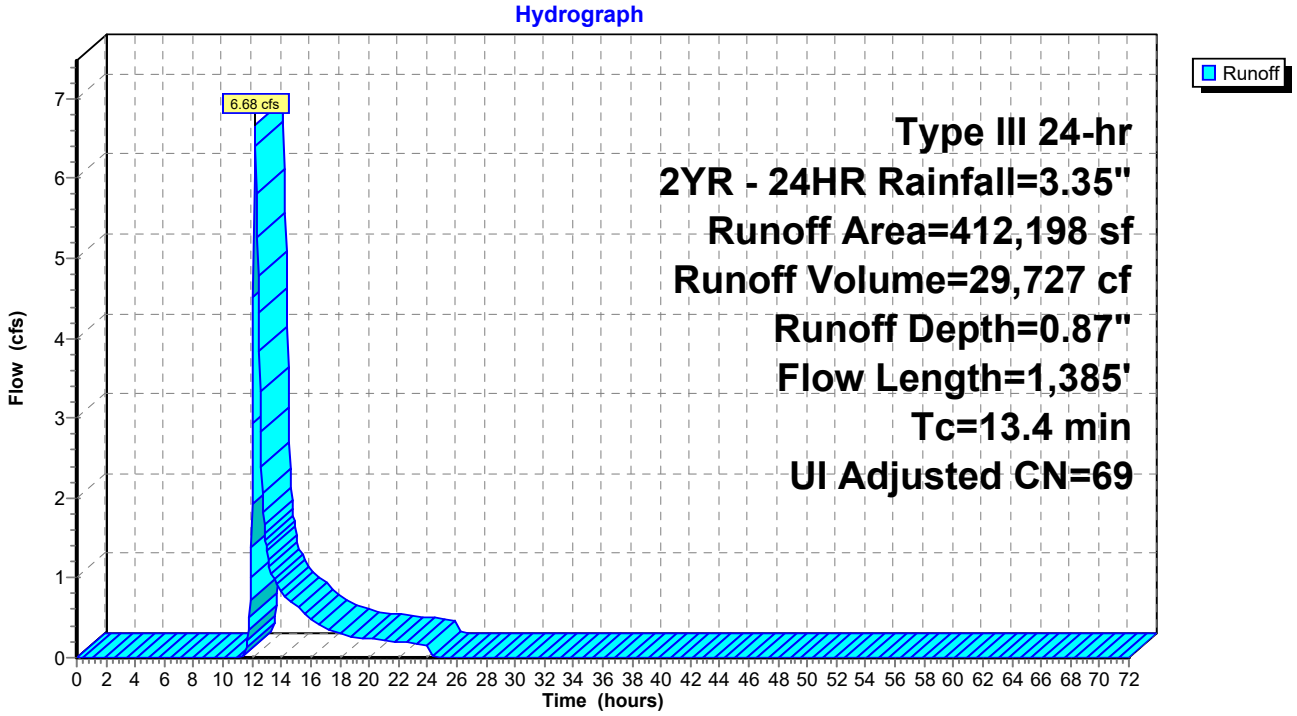
Runoff = 6.68 cfs @ 12.21 hrs, Volume= 29,727 cf, Depth= 0.87"
Routed to Reach 1R : WQS Segment 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	242,115	61		>75% Grass cover, Good, HSG B
	2,212	76		Gravel roads, HSG A
	0	98		Water Surface, 0% imp, HSG A
	0	98		Unconnected pavement, HSG A
	117,963	98		Unconnected pavement, HSG D
	20,768	55		Woods, Good, HSG B
*	29,140	98		Wetland/Water Surface, 0% imp, HSG A
	412,198	74	69	Weighted Average, UI Adjusted
	294,235			71.38% Pervious Area
	117,963			28.62% Impervious Area
	117,963			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	110	0.0200	1.42		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
0.8	65	0.0400	1.40		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.3	1,210	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
13.4	1,385	Total			

Subcatchment DS1: Ditch Segment 1



Summary for Subcatchment DS2: Ditch Segment 2

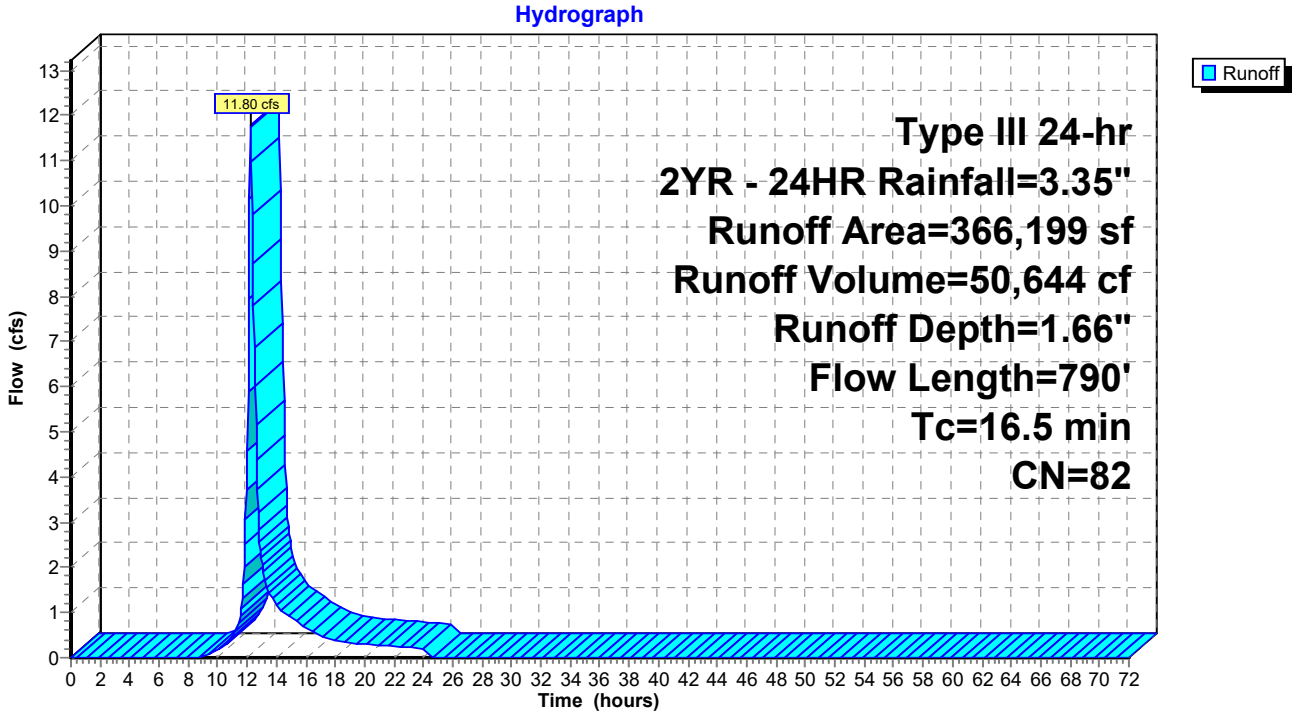
Runoff = 11.80 cfs @ 12.23 hrs, Volume= 50,644 cf, Depth= 1.66"
Routed to Reach 2R : WQS Segment 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
158,039	61	>75% Grass cover, Good, HSG B
9,172	98	Water Surface, 0% imp, HSG A
198,988	98	Unconnected pavement, HSG D
366,199	82	Weighted Average
167,211		45.66% Pervious Area
198,988		54.34% Impervious Area
198,988		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	140	0.0050	0.86		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
10.3	280	0.0005	0.45		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	370	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
16.5	790	Total			

Subcatchment DS2: Ditch Segment 2



Summary for Subcatchment DS3: Ditch Segment 3

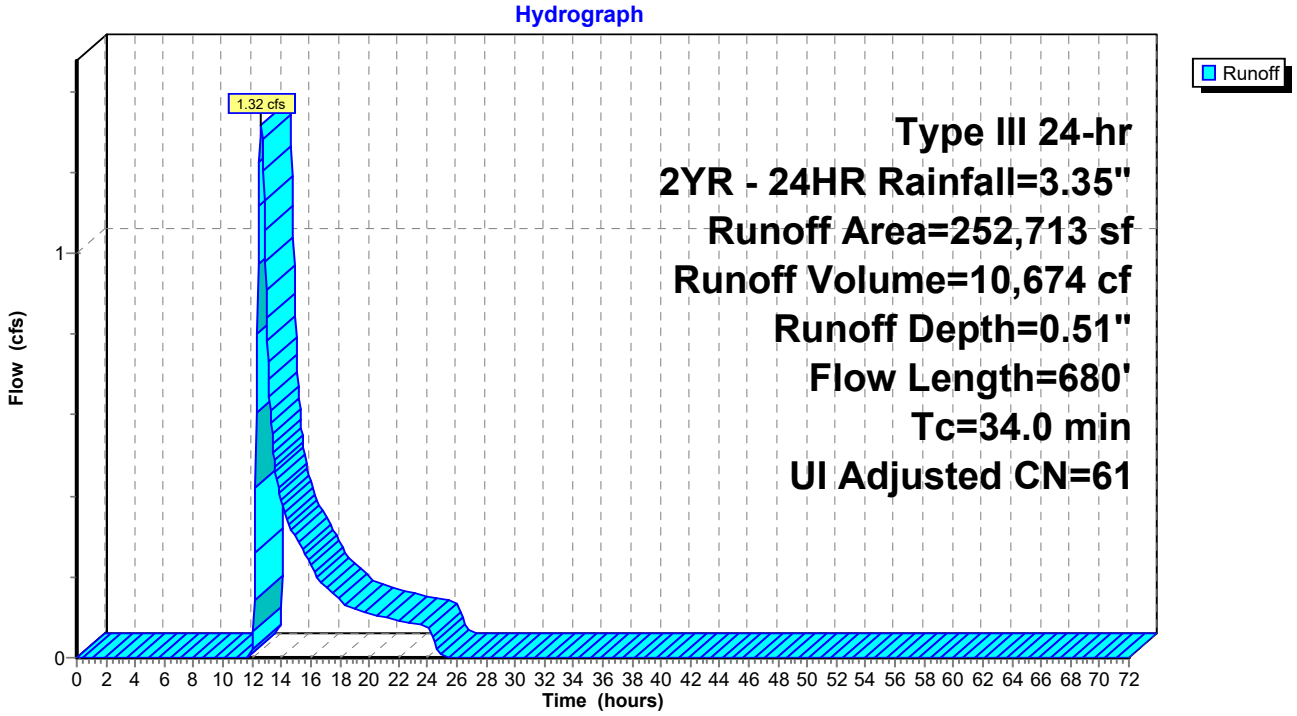
Runoff = 1.32 cfs @ 12.61 hrs, Volume= 10,674 cf, Depth= 0.51"
Routed to Reach 3R : WQS Segment 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	83,059	61		>75% Grass cover, Good, HSG B
	11,554	76		Gravel roads, HSG A
	544	98		Water Surface, 0% imp, HSG A
	39,077	98		Unconnected pavement, HSG D
	77,113	30		Woods, Good, HSG A
*	41,366	98		Wetland/Water Surface, 0% imp, HSG B
	252,713	64	61	Weighted Average, UI Adjusted
	213,636			84.54% Pervious Area
	39,077			15.46% Impervious Area
	39,077			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	90	0.0050	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
16.3	345	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.3	245	0.0005	1.79	48.22	**Channel Flow,** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
34.0	680	Total			

Subcatchment DS3: Ditch Segment 3



Summary for Subcatchment N10: DA-N10

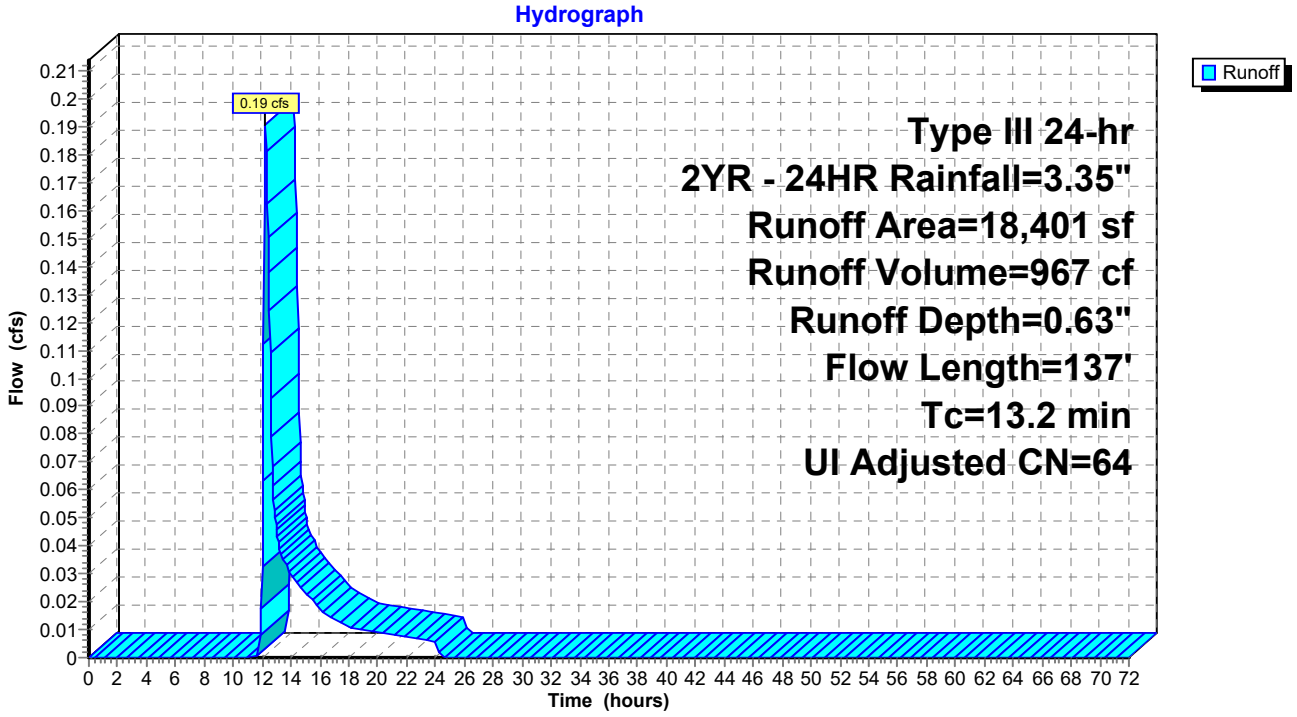
Runoff = 0.19 cfs @ 12.22 hrs, Volume= 967 cf, Depth= 0.63"
Routed to Pond P9 : Pond 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
13,244	58		Meadow, non-grazed, HSG B
0	98		Unconnected pavement, HSG A
5,157	98		Unconnected pavement, HSG D
18,401	69	64	Weighted Average, UI Adjusted
13,244			71.97% Pervious Area
5,157			28.03% Impervious Area
5,157			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	79	0.0709	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
8.4	58	0.0095	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
13.2	137	Total			

Subcatchment N10: DA-N10



Summary for Subcatchment N12: DA-N12

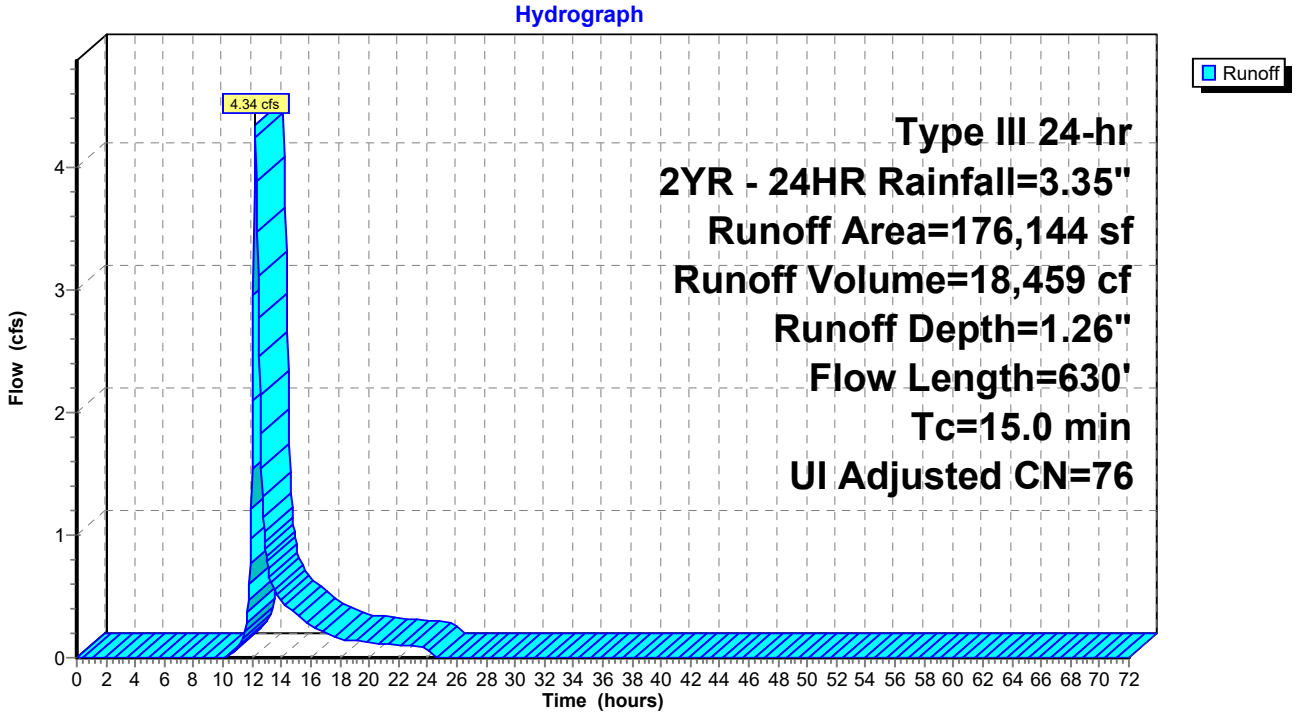
Runoff = 4.34 cfs @ 12.22 hrs, Volume= 18,459 cf, Depth= 1.26"
Routed to Pond P10 : Wetland Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	31,174	61		>75% Grass cover, Good, HSG B
	22,034	98		Unconnected pavement, HSG A
	4,614	98		Unconnected pavement, HSG D
	54,750	55		Woods, Good, HSG B
*	63,572	98		Wetland/Water Surface, 0% imp, HSG D
	176,144	78	76	Weighted Average, UI Adjusted
	149,496			84.87% Pervious Area
	26,648			15.13% Impervious Area
	26,648			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	152	0.0105	1.17		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
8.1	251	0.0054	0.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	227	0.0029	0.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	630	Total			

Subcatchment N12: DA-N12



Summary for Subcatchment N13: DA-N13

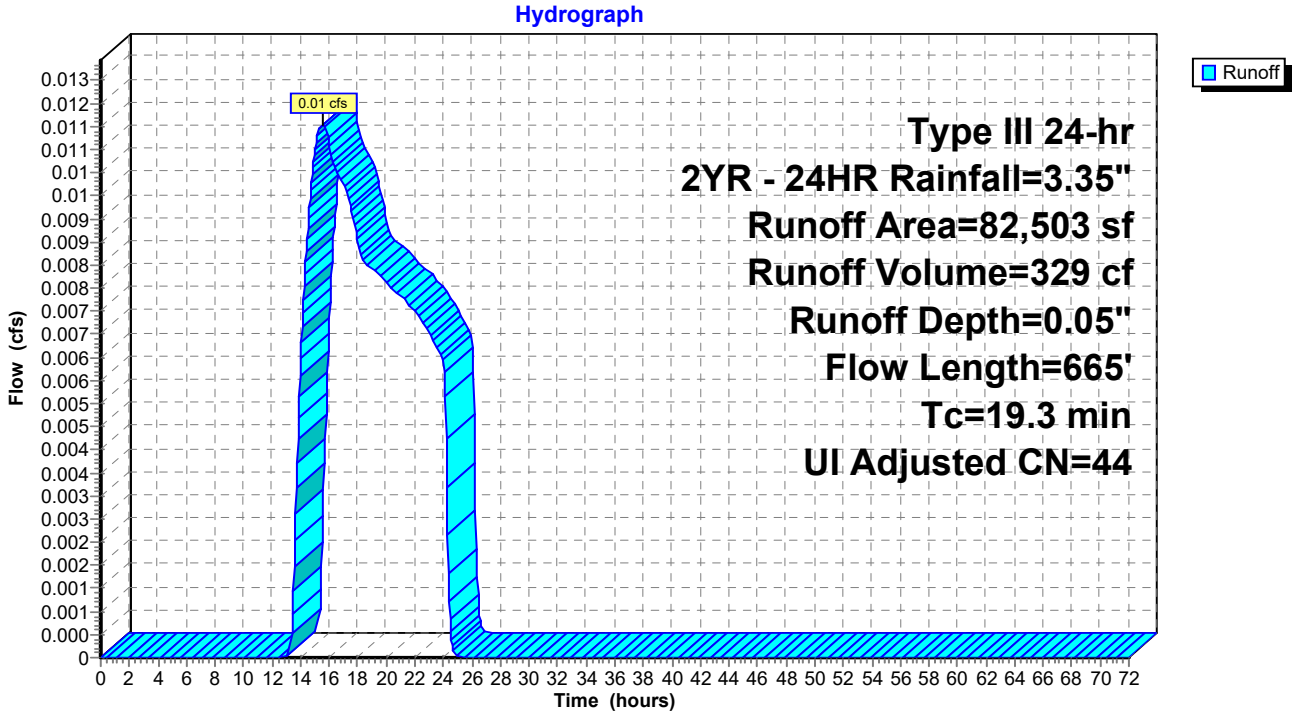
Runoff = 0.01 cfs @ 15.52 hrs, Volume= 329 cf, Depth= 0.05"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
183	98		Unconnected pavement, HSG A
14,377	98		Unconnected pavement, HSG D
67,943	39		>75% Grass cover, Good, HSG A
82,503	49	44	Weighted Average, UI Adjusted
67,943			82.35% Pervious Area
14,560			17.65% Impervious Area
14,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	115	0.0391	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
11.0	550	0.0141	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	665	Total			

Subcatchment N13: DA-N13



Summary for Subcatchment N14: DA-N14

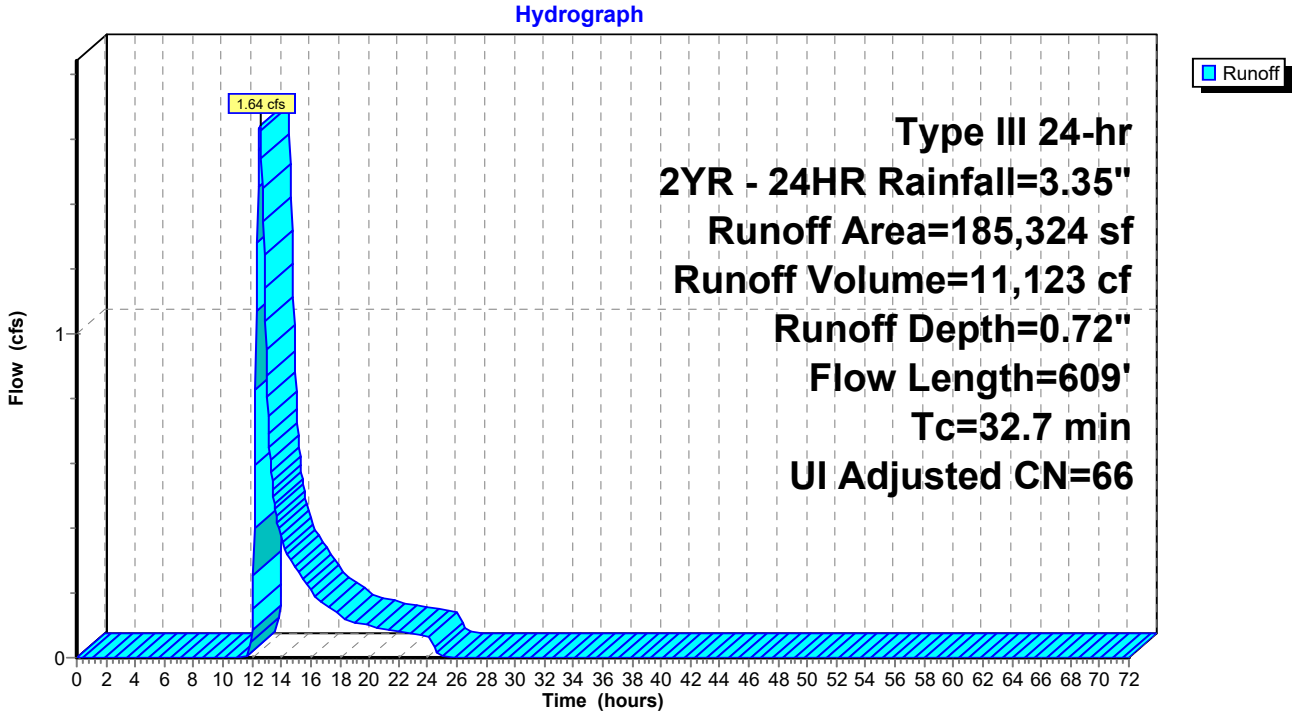
Runoff = 1.64 cfs @ 12.54 hrs, Volume= 11,123 cf, Depth= 0.72"
Routed to Pond P6 : Pond 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
139,813	61		>75% Grass cover, Good, HSG B
45,511	98		Unconnected pavement, HSG A
185,324	70	66	Weighted Average, UI Adjusted
139,813			75.44% Pervious Area
45,511			24.56% Impervious Area
45,511			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0122	1.08		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
13.2	122	0.0135	0.15		**Sheet Flow, Grasss** Grass: Short n= 0.150 P2= 3.30"
18.4	413	0.0036	0.37	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
32.7	609	Total			

Subcatchment N14: DA-N14



Summary for Subcatchment N15: DA-N15

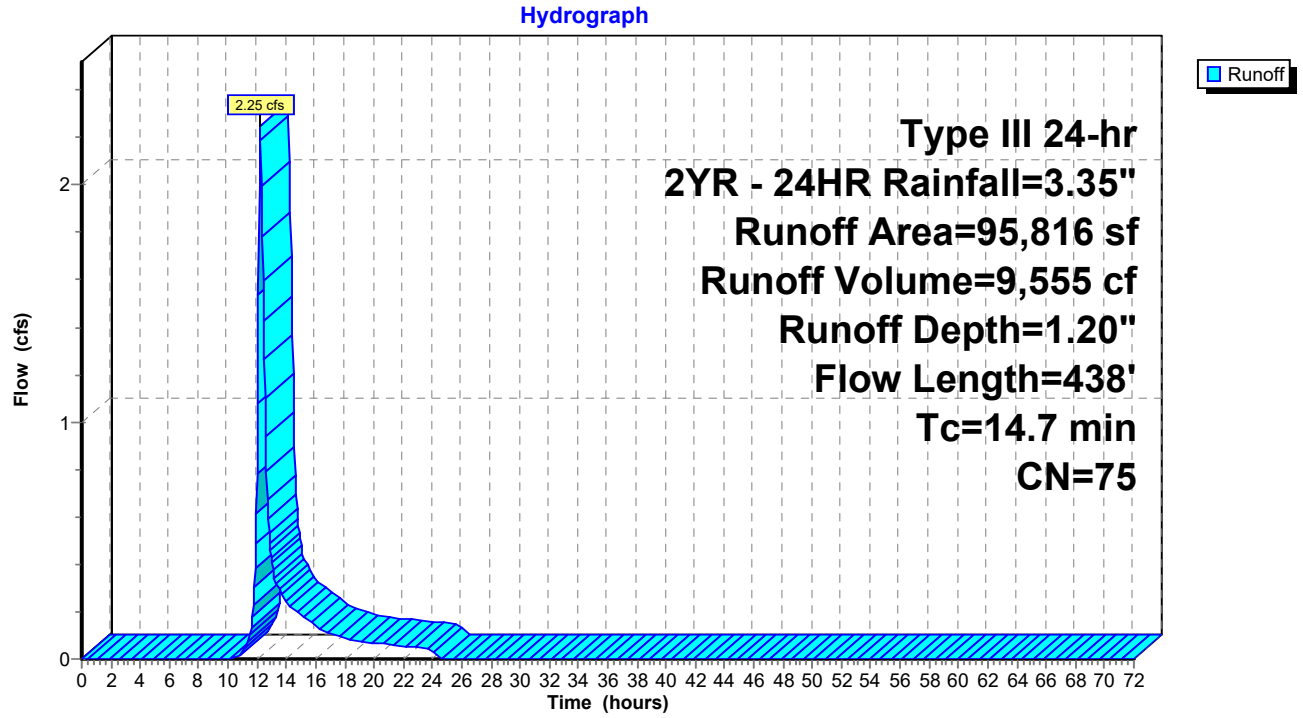
Runoff = 2.25 cfs @ 12.22 hrs, Volume= 9,555 cf, Depth= 1.20"
Routed to Pond P8 : Pond 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
59,706	61	>75% Grass cover, Good, HSG B
36,110	98	Unconnected pavement, HSG D
95,816	75	Weighted Average
59,706		62.31% Pervious Area
36,110		37.69% Impervious Area
36,110		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0783	0.27		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
6.9	60	0.0166	0.14		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.30"
4.1	318	0.0075	1.30		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
14.7	438	Total			

Subcatchment N15: DA-N15



Summary for Subcatchment N2: DA-N2

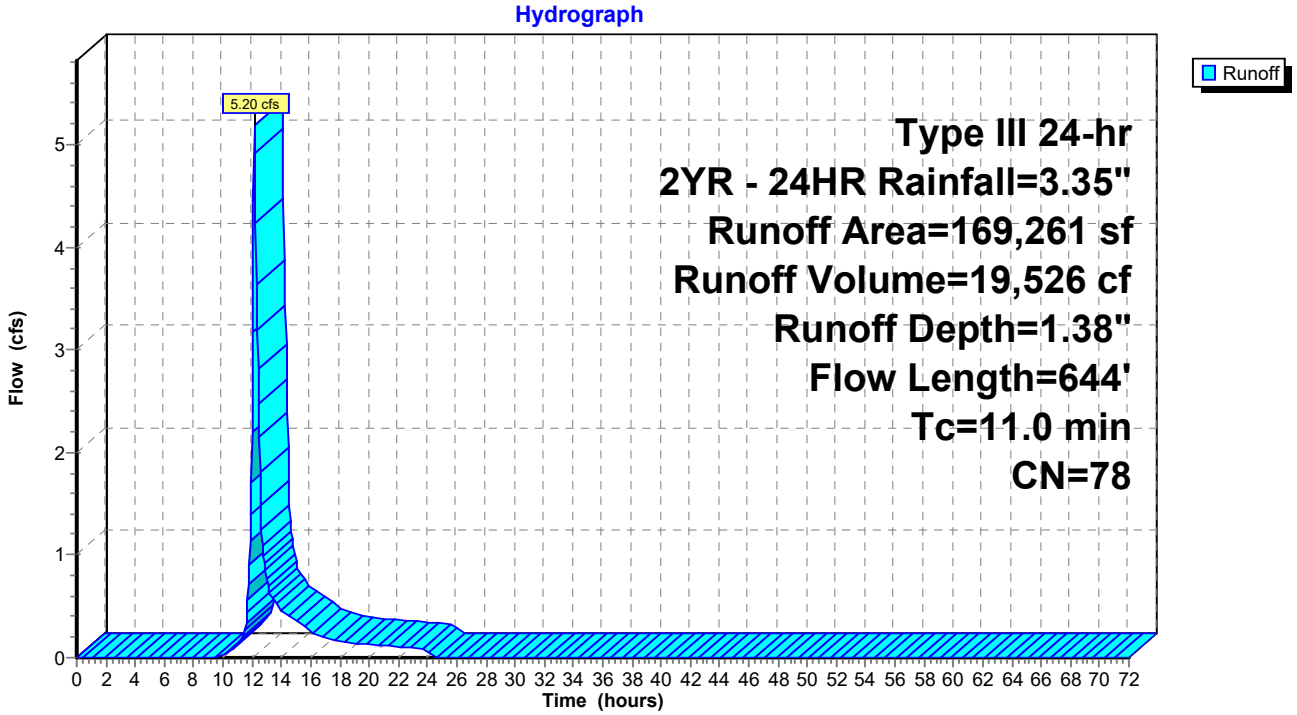
Runoff = 5.20 cfs @ 12.16 hrs, Volume= 19,526 cf, Depth= 1.38"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
84,479	98	Paved parking, HSG B
84,782	58	Meadow, non-grazed, HSG B
169,261	78	Weighted Average
84,782		50.09% Pervious Area
84,479		49.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	146	0.0137	1.30		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
9.1	498	0.0169	0.91		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.0	644	Total			

Subcatchment N2: DA-N2



Summary for Subcatchment N3: DA-N3

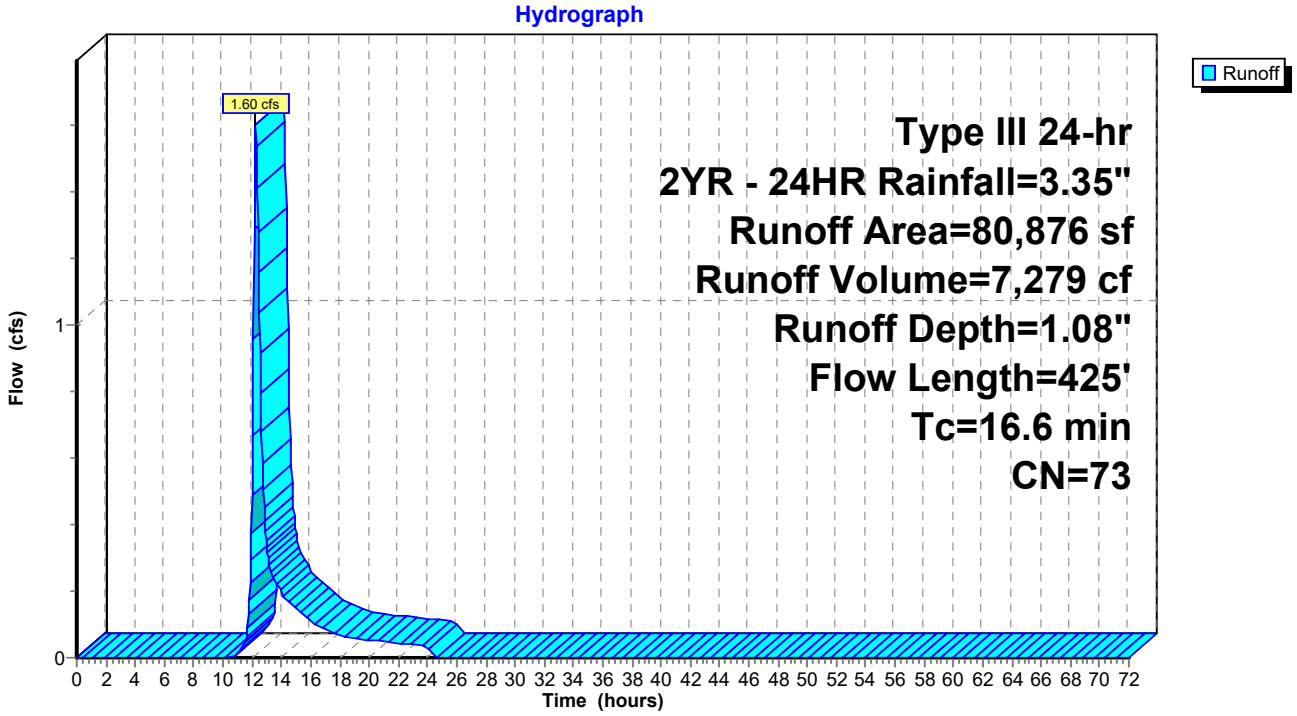
Runoff = 1.60 cfs @ 12.25 hrs, Volume= 7,279 cf, Depth= 1.08"
Routed to Pond P2 : Pond 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
50,316	58	Meadow, non-grazed, HSG B
29,045	98	Unconnected pavement, HSG A
1,515	98	Unconnected pavement, HSG D
80,876	73	Weighted Average
50,316		62.21% Pervious Area
30,560		37.79% Impervious Area
30,560		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	118	0.0127	1.20		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
6.7	69	0.0239	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
8.3	238	0.0059	0.48	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
16.6	425	Total			

Subcatchment N3: DA-N3



Summary for Subcatchment N4: DA-N4

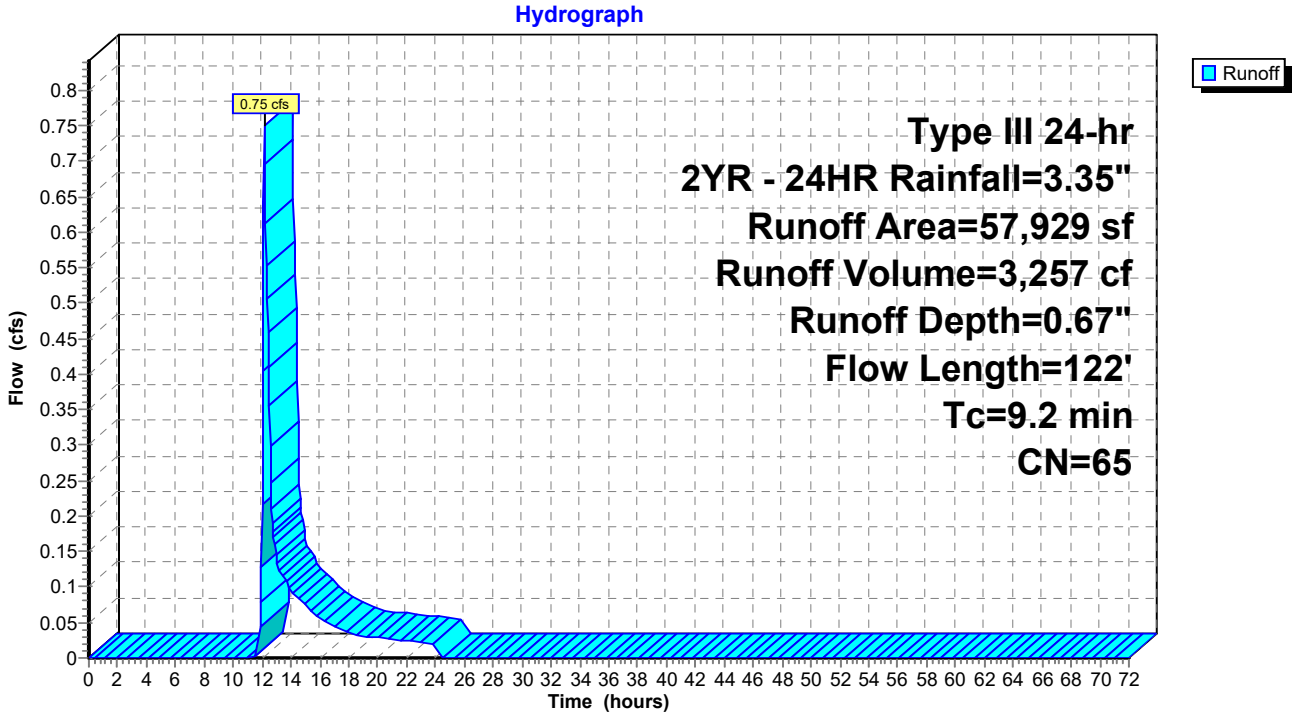
Runoff = 0.75 cfs @ 12.16 hrs, Volume= 3,257 cf, Depth= 0.67"
Routed to Pond P4 : Pond 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
47,807	58	Meadow, non-grazed, HSG B
10,122	98	Paved parking, HSG B
57,929	65	Weighted Average
47,807		82.53% Pervious Area
10,122		17.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	79	0.0190	0.16		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
1.0	43	0.0128	0.71	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
9.2	122	Total			

Subcatchment N4: DA-N4



Summary for Subcatchment N5: DA-N5

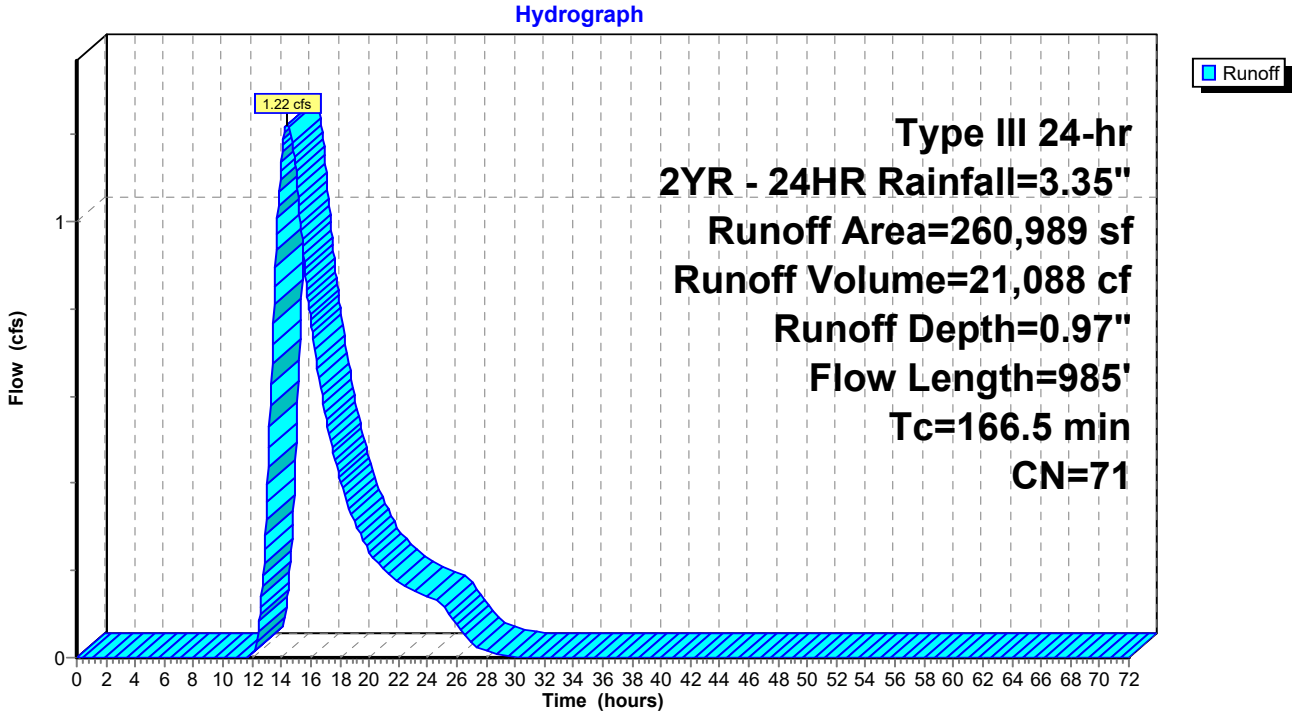
Runoff = 1.22 cfs @ 14.43 hrs, Volume= 21,088 cf, Depth= 0.97"
Routed to Pond CB5 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
86,498	98	Paved parking, HSG B
174,491	58	Meadow, non-grazed, HSG B
260,989	71	Weighted Average
174,491		66.86% Pervious Area
86,498		33.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	115	0.0043	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
146.5	870	0.0002	0.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
166.5	985	Total			

Subcatchment N5: DA-N5



Summary for Subcatchment N6: DA-N6

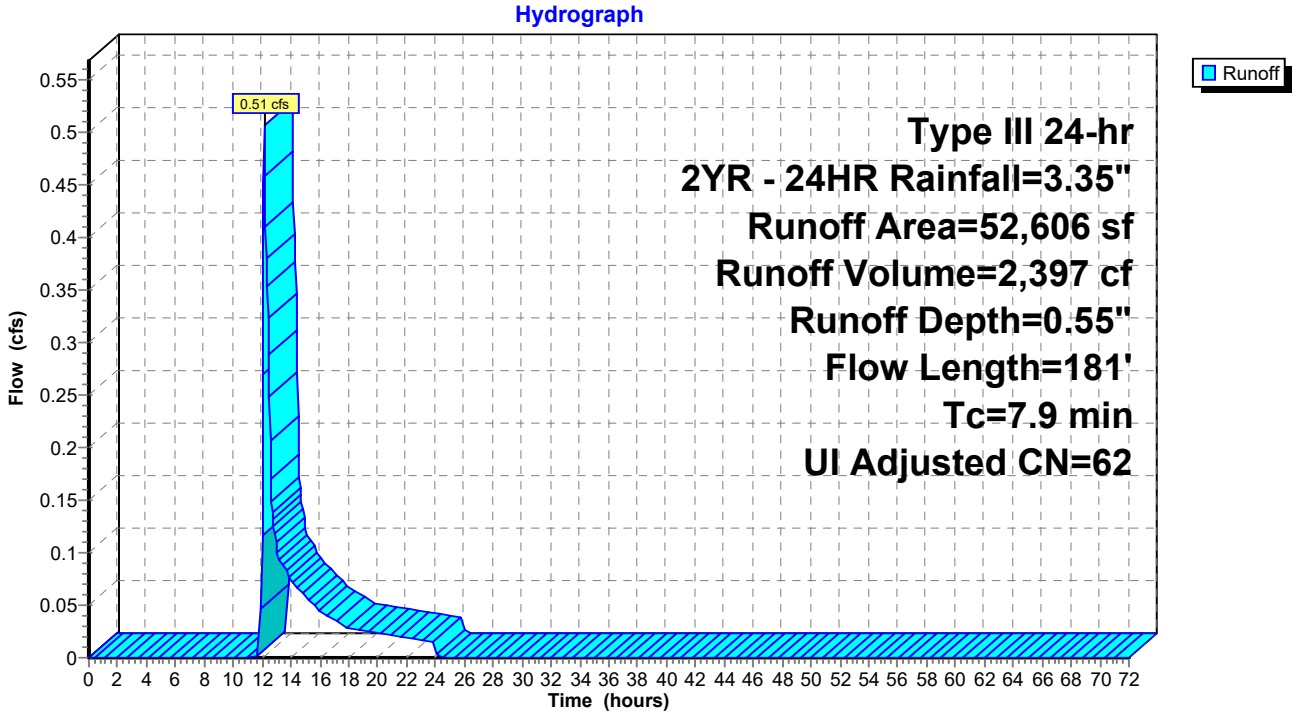
Runoff = 0.51 cfs @ 12.15 hrs, Volume= 2,397 cf, Depth= 0.55"
Routed to Pond P5 : Pond 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
41,980	58		Meadow, non-grazed, HSG B
9,109	98		Unconnected pavement, HSG A
1,517	98		Unconnected pavement, HSG D
52,606	66	62	Weighted Average, UI Adjusted
41,980			79.80% Pervious Area
10,626			20.20% Impervious Area
10,626			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	63	0.0238	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.4	59	0.0153	2.51		**Shallow Concentrated Flow, PCC Channel** Paved Kv= 20.3 fps
1.3	59	0.0153	0.77	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
7.9	181	Total			

Subcatchment N6: DA-N6



Summary for Subcatchment N7: DA-N7

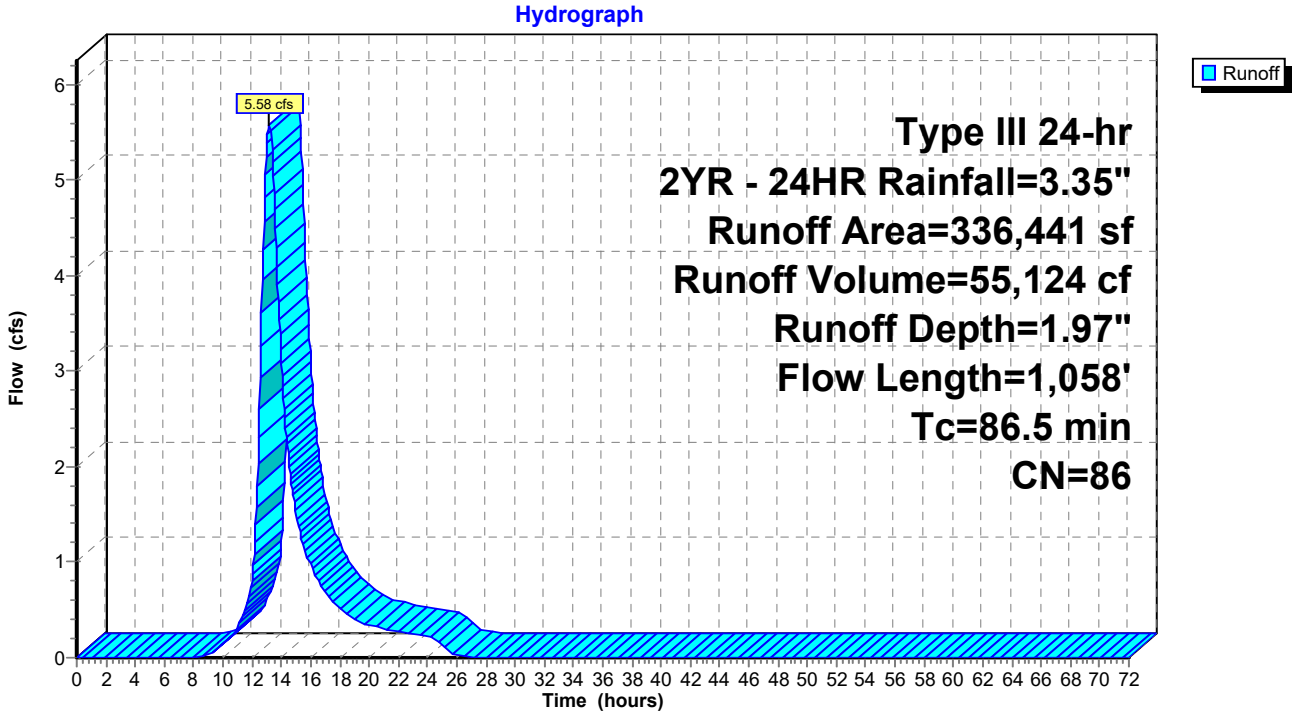
Runoff = 5.58 cfs @ 13.16 hrs, Volume= 55,124 cf, Depth= 1.97"
Routed to Pond P3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
104,683	58	Meadow, non-grazed, HSG B
231,758	98	Paved parking, HSG B
336,441	86	Weighted Average
104,683		31.11% Pervious Area
231,758		68.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	300	0.0043	0.94		**Sheet Flow, Apron** Smooth surfaces n= 0.011 P2= 3.30"
4.0	318	0.0043	1.33		**Shallow Concentrated Flow, Apron** Paved Kv= 20.3 fps
0.4	33	0.0424	1.44		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
76.8	407	0.0002	0.09	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
86.5	1,058	Total			

Subcatchment N7: DA-N7



Summary for Subcatchment N8: DA-N8

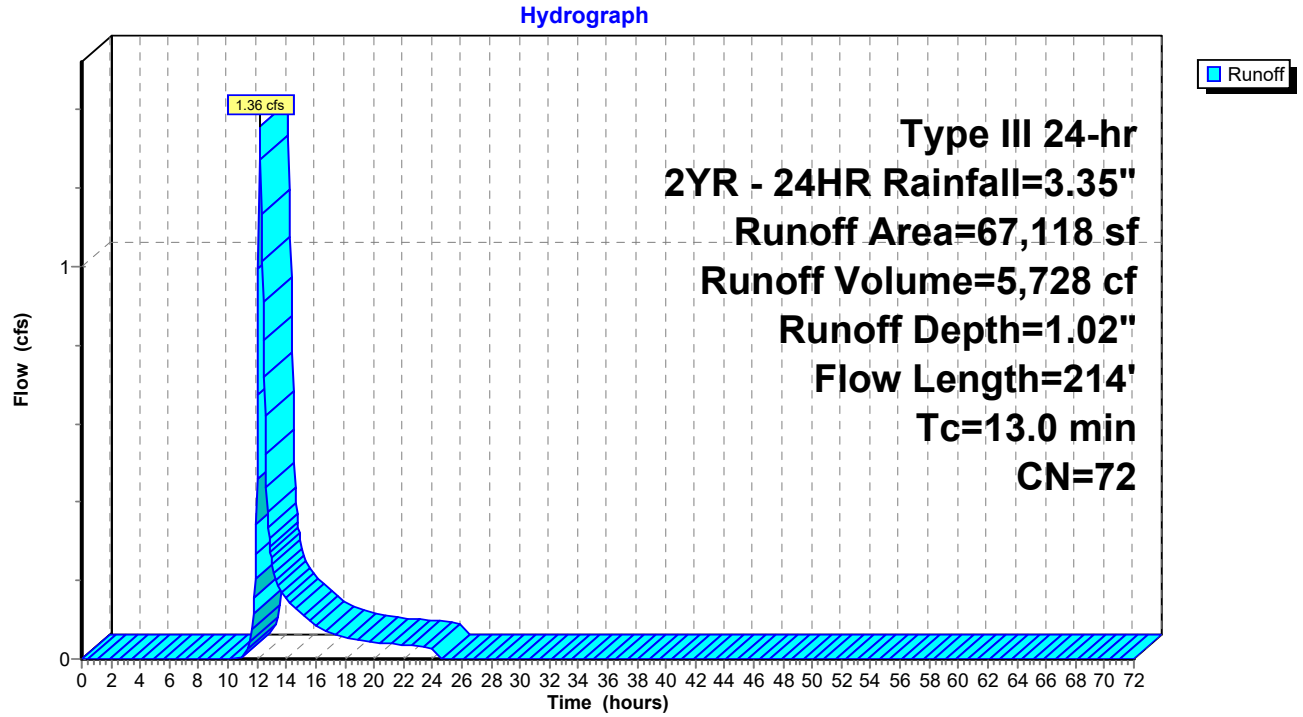
Runoff = 1.36 cfs @ 12.20 hrs, Volume= 5,728 cf, Depth= 1.02"
Routed to Pond P7 : Pond 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
43,882	58	Meadow, non-grazed, HSG B
23,236	98	Paved parking, HSG B
67,118	72	Weighted Average
43,882		65.38% Pervious Area
23,236		34.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0133	0.93		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
11.0	112	0.0179	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
1.5	72	0.0174	0.82	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
13.0	214	Total			

Subcatchment N8: DA-N8



Summary for Subcatchment N9: DA-N9

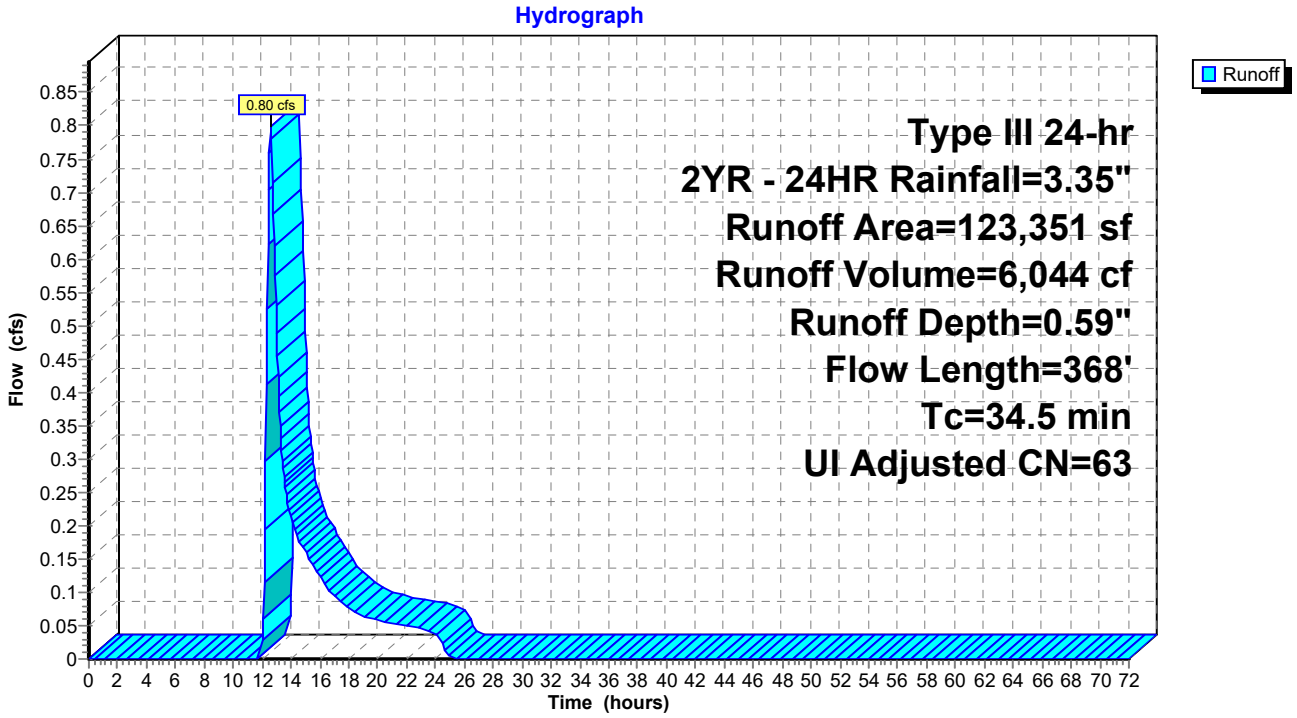
Runoff = 0.80 cfs @ 12.59 hrs, Volume= 6,044 cf, Depth= 0.59"
Routed to Pond P1 : Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
94,039	58		Meadow, non-grazed, HSG B
26,441	98		Unconnected pavement, HSG A
2,871	98		Unconnected pavement, HSG D
123,351	68	63	Weighted Average, UI Adjusted
94,039			76.24% Pervious Area
29,312			23.76% Impervious Area
29,312			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	214	0.0201	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
16.8	154	0.0006	0.15	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
34.5	368	Total			

Subcatchment N9: DA-N9



Summary for Reach 1R: WQS Segment 1

Inflow Area = 1,239,545 sf, 36.87% Impervious, Inflow Depth = 1.04" for 2YR - 24HR event
Inflow = 11.68 cfs @ 12.26 hrs, Volume= 107,285 cf
Outflow = 8.86 cfs @ 12.54 hrs, Volume= 107,285 cf, Atten= 24%, Lag= 16.9 min
Routed to Pond Cr-B : Robinson Driveway

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.13 fps, Min. Travel Time= 18.5 min
Avg. Velocity = 0.33 fps, Avg. Travel Time= 63.7 min

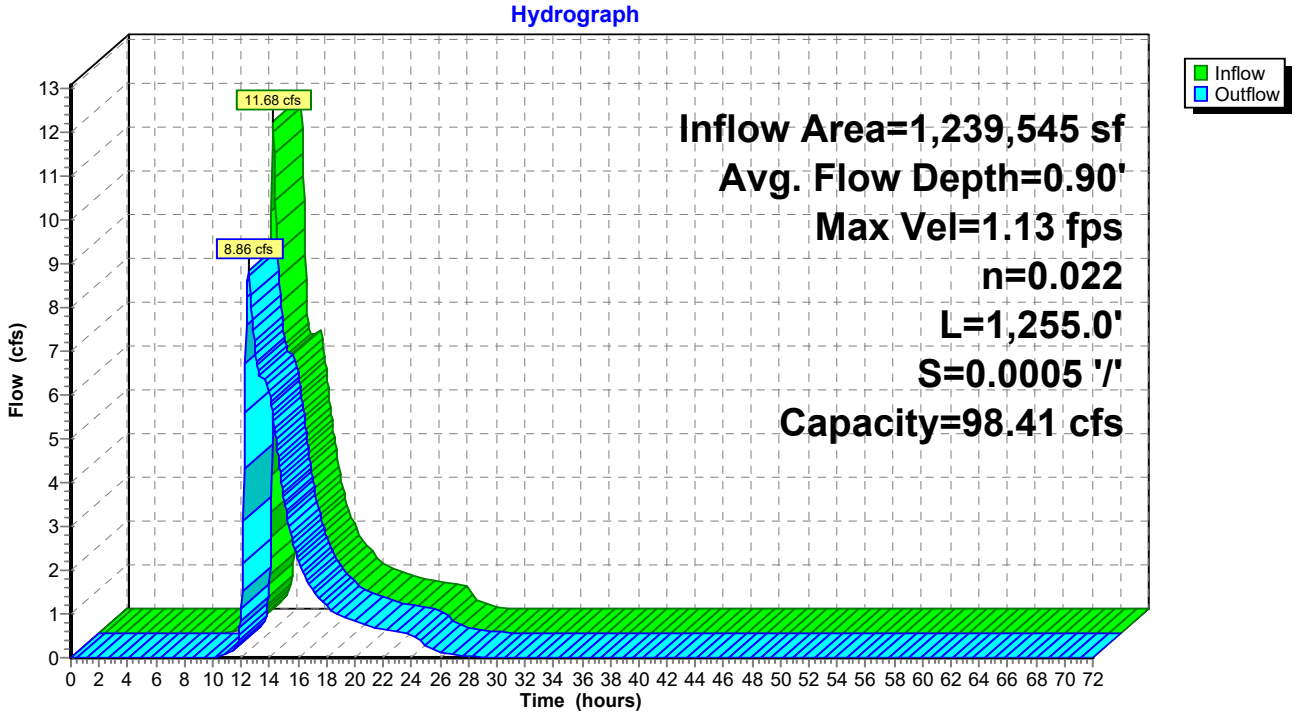
Peak Storage= 9,829 cf @ 12.54 hrs
Average Depth at Peak Storage= 0.90' , Surface Width= 11.40'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 239.23 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.41 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 1,255.0' Slope= 0.0005 '/'
Inlet Invert= 2.32', Outlet Invert= 1.72'



‡

Reach 1R: WQS Segment 1



Summary for Reach 2R: WQS Segment 2

Inflow Area = 1,605,744 sf, 40.85% Impervious, Inflow Depth = 1.18" for 2YR - 24HR event
Inflow = 17.68 cfs @ 12.30 hrs, Volume= 157,929 cf
Outflow = 16.21 cfs @ 12.47 hrs, Volume= 157,929 cf, Atten= 8%, Lag= 9.8 min
Routed to Pond Cr-CD : Utility Crossing

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.35 fps, Min. Travel Time= 9.4 min
Avg. Velocity = 0.36 fps, Avg. Travel Time= 35.2 min

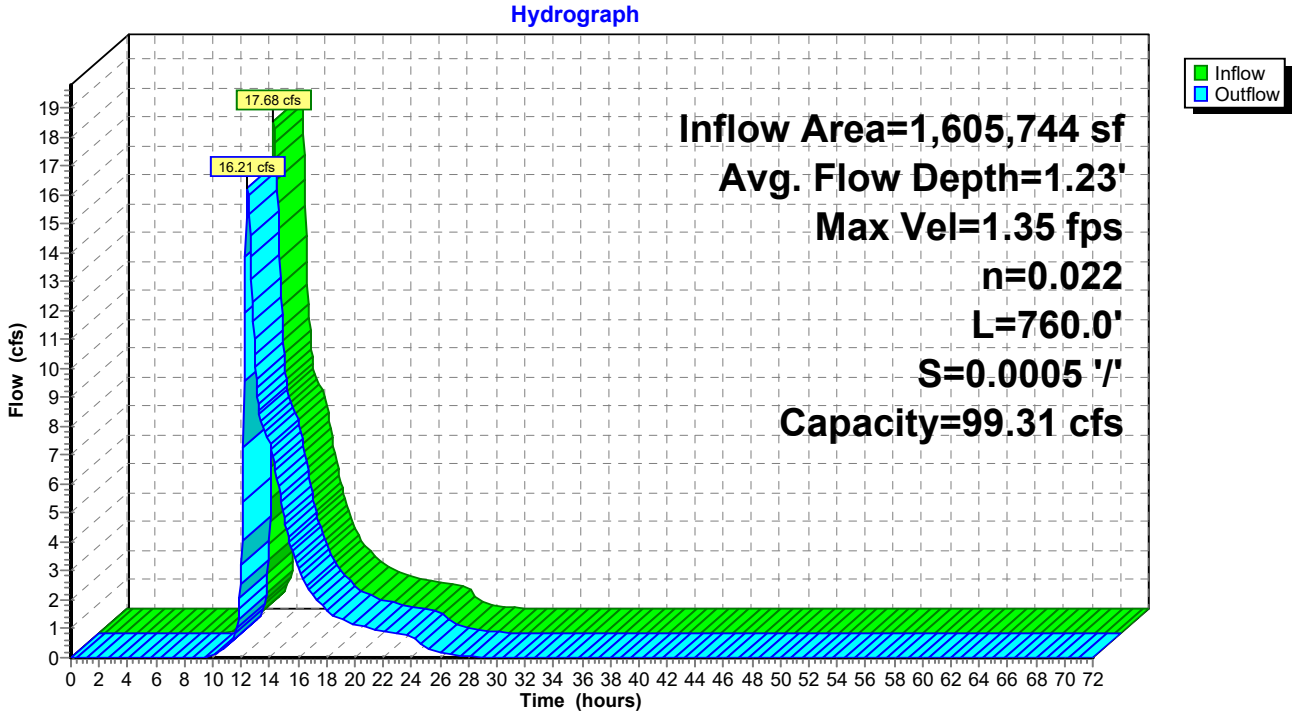
Peak Storage= 9,092 cf @ 12.47 hrs
Average Depth at Peak Storage= 1.23' , Surface Width= 13.40'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 241.41 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 99.31 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 760.0' Slope= 0.0005 '/'
Inlet Invert= 1.70', Outlet Invert= 1.33'



‡

Reach 2R: WQS Segment 2



Summary for Reach 3R: WQS Segment 3

Inflow Area = 2,225,116 sf, 36.18% Impervious, Inflow Depth = 1.05" for 2YR - 24HR event
Inflow = 21.27 cfs @ 12.46 hrs, Volume= 195,502 cf
Outflow = 20.52 cfs @ 12.56 hrs, Volume= 195,502 cf, Atten= 4%, Lag= 6.1 min
Routed to Link 3L : EAST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.44 fps, Min. Travel Time= 7.1 min
Avg. Velocity = 0.32 fps, Avg. Travel Time= 32.2 min

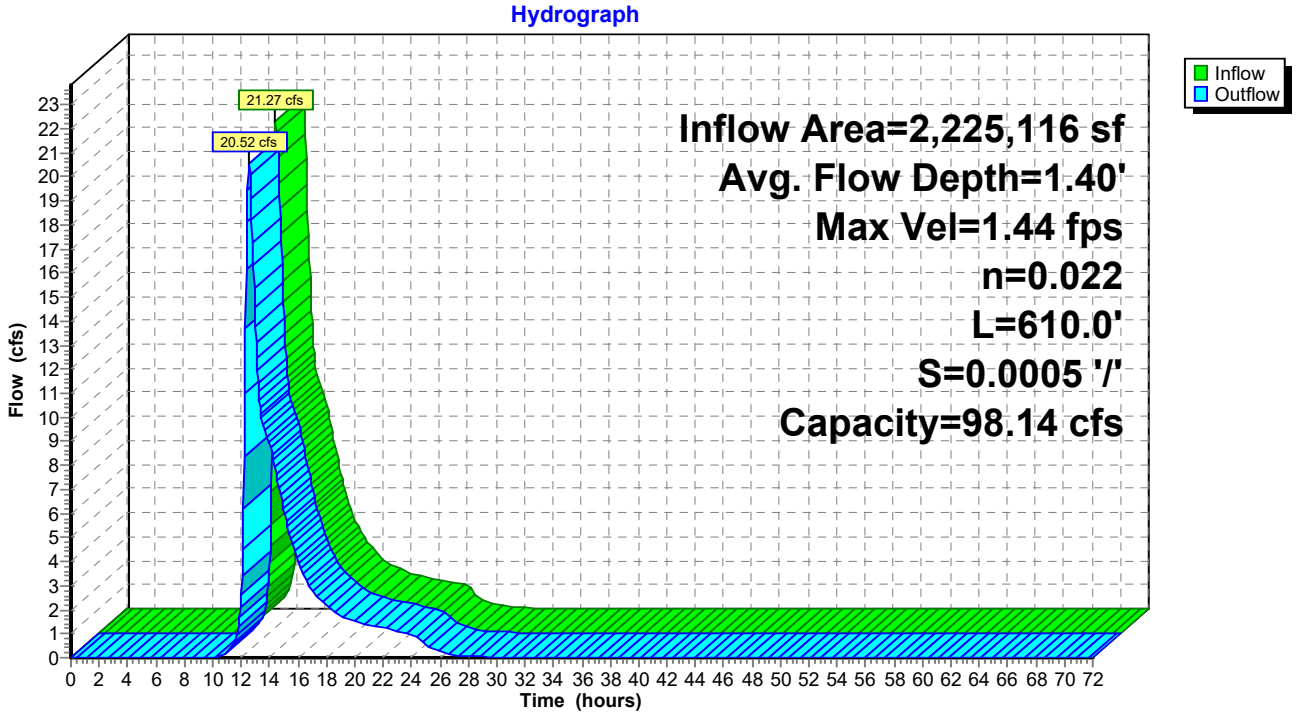
Peak Storage= 8,720 cf @ 12.56 hrs
Average Depth at Peak Storage= 1.40' , Surface Width= 14.41'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 238.55 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.14 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 610.0' Slope= 0.0005 '/'
Inlet Invert= 1.28', Outlet Invert= 0.99'



‡

Reach 3R: WQS Segment 3



Summary for Pond CB1: Exist CB

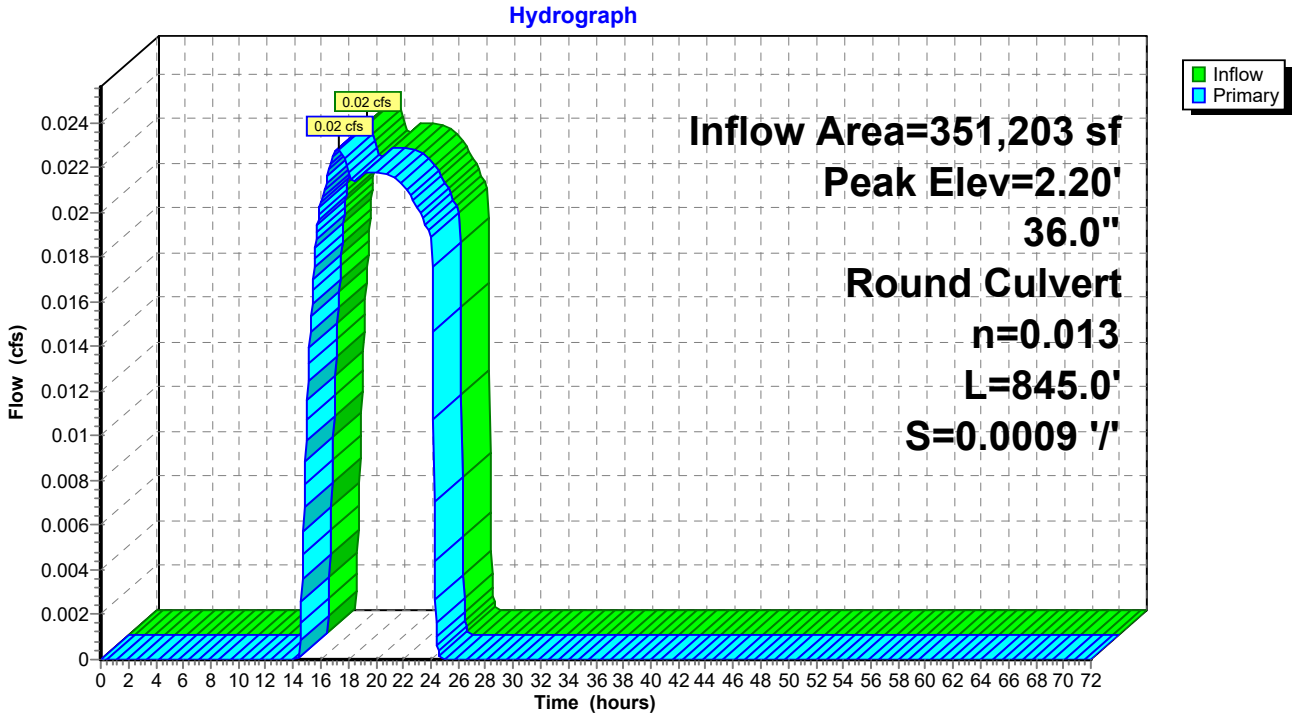
Inflow Area = 351,203 sf, 11.14% Impervious, Inflow Depth = 0.02" for 2YR - 24HR event
Inflow = 0.02 cfs @ 17.25 hrs, Volume= 703 cf
Outflow = 0.02 cfs @ 17.25 hrs, Volume= 703 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.02 cfs @ 17.25 hrs, Volume= 703 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.20' @ 17.25 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.10'	**36.0" Round Culvert** L= 845.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 2.10' / 1.32' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf

Primary OutFlow Max=0.02 cfs @ 17.25 hrs HW=2.20' (Free Discharge)
1=Culvert (Barrel Controls 0.02 cfs @ 0.47 fps)

Pond CB1: Exist CB



Summary for Pond CB10: Exist CB

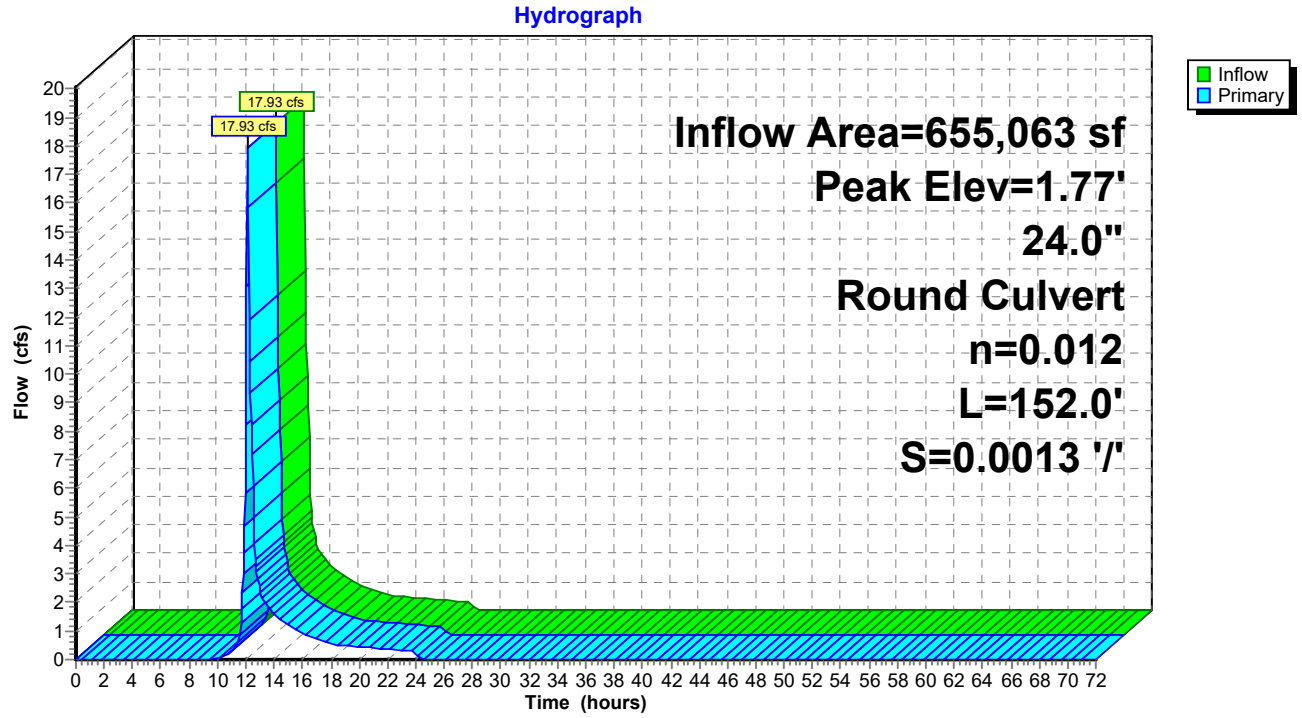
Inflow Area = 655,063 sf, 35.70% Impervious, Inflow Depth = 1.16" for 2YR - 24HR event
Inflow = 17.93 cfs @ 12.12 hrs, Volume= 63,339 cf
Outflow = 17.93 cfs @ 12.12 hrs, Volume= 63,339 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.93 cfs @ 12.12 hrs, Volume= 63,339 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.77' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.62'	**24.0" Round Culvert** L= 152.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -1.62' / -1.82' S= 0.0013 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=17.37 cfs @ 12.12 hrs HW=1.66' (Free Discharge)
1=Culvert (Barrel Controls 17.37 cfs @ 5.53 fps)

Pond CB10: Exist CB



Summary for Pond CB11: Exist CB

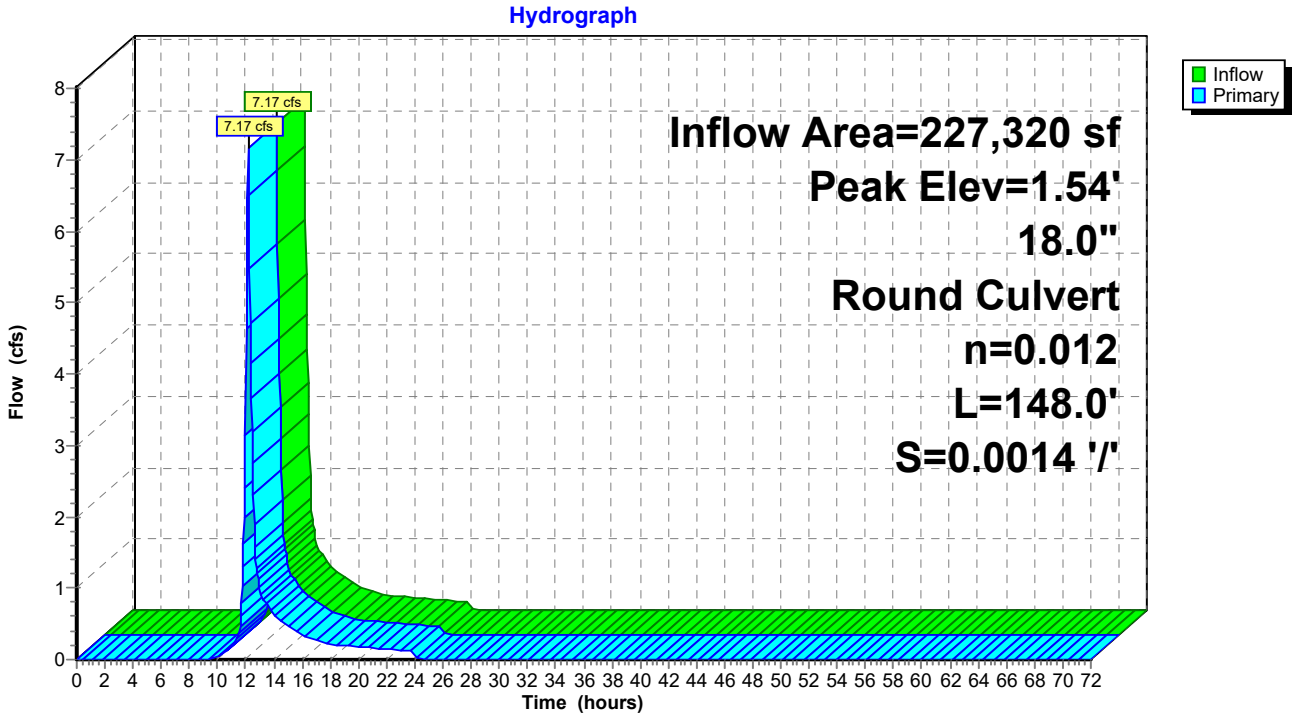
Inflow Area = 227,320 sf, 45.94% Impervious, Inflow Depth = 1.38" for 2YR - 24HR event
Inflow = 7.17 cfs @ 12.15 hrs, Volume= 26,224 cf
Outflow = 7.17 cfs @ 12.15 hrs, Volume= 26,224 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.17 cfs @ 12.15 hrs, Volume= 26,224 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.54' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.73'	**18.0" Round RCP_Round 18"** L= 148.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.73' / -0.93' S= 0.0014 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=7.16 cfs @ 12.15 hrs HW=1.54' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 7.16 cfs @ 4.05 fps)

Pond CB11: Exist CB



Summary for Pond CB2: Exist CB

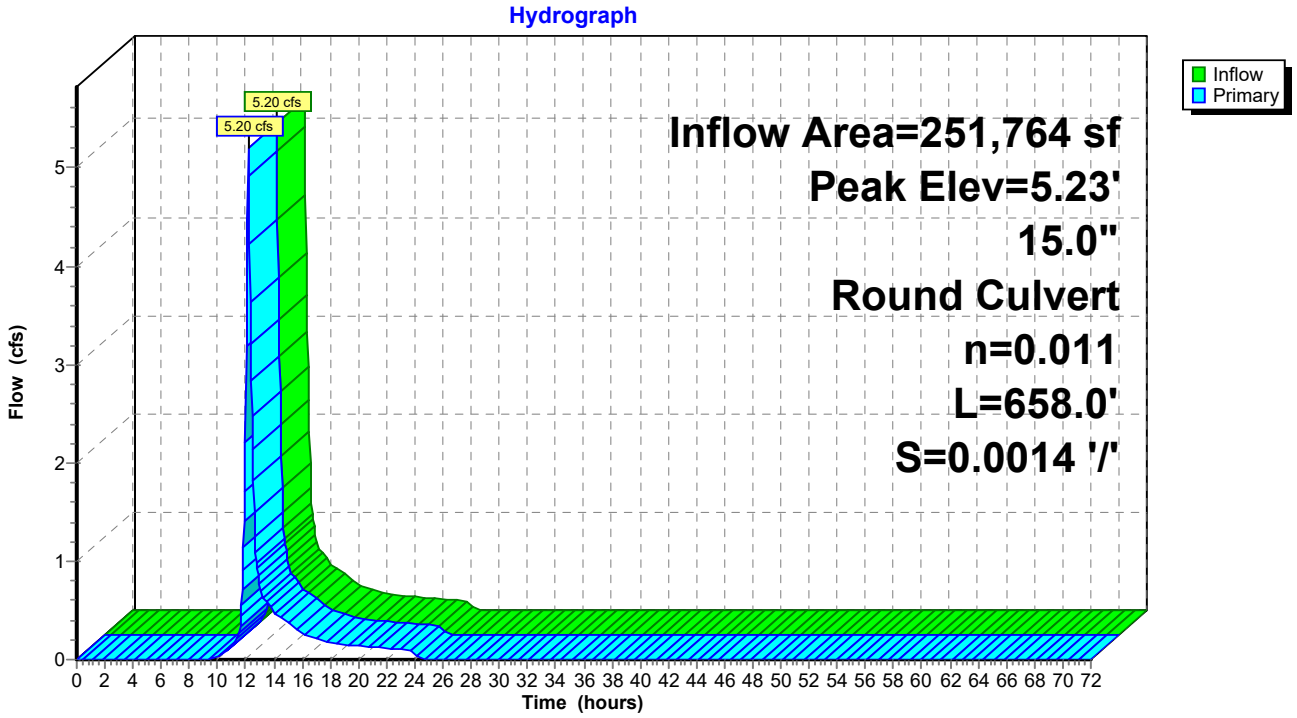
Inflow Area = 251,764 sf, 39.34% Impervious, Inflow Depth = 0.95" for 2YR - 24HR event
Inflow = 5.20 cfs @ 12.16 hrs, Volume= 19,855 cf
Outflow = 5.20 cfs @ 12.16 hrs, Volume= 19,855 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.20 cfs @ 12.16 hrs, Volume= 19,855 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.23' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.40'	**15.0" Round Culvert** L= 658.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.40' / 0.50' S= 0.0014 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=5.12 cfs @ 12.16 hrs HW=5.12' (Free Discharge)
1=Culvert (Barrel Controls 5.12 cfs @ 4.17 fps)

Pond CB2: Exist CB



Summary for Pond CB3: Exist CB

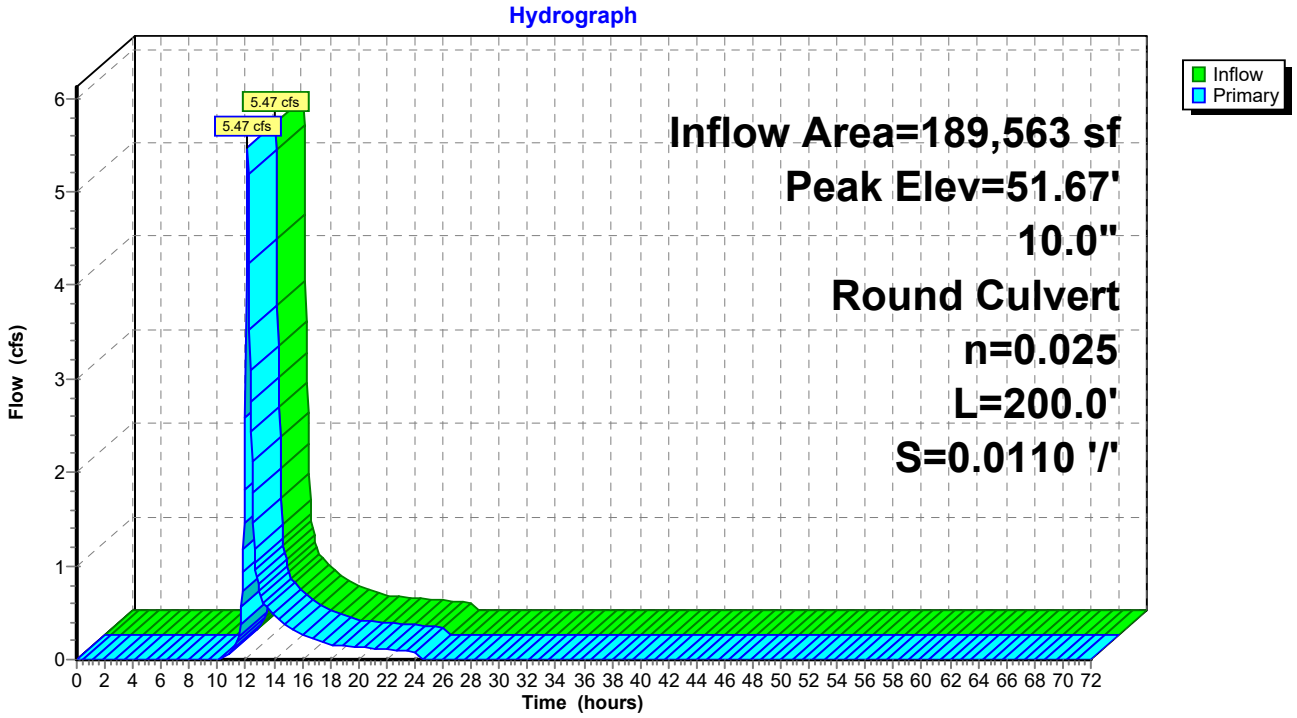
Inflow Area = 189,563 sf, 36.68% Impervious, Inflow Depth = 1.20" for 2YR - 24HR event
Inflow = 5.47 cfs @ 12.12 hrs, Volume= 18,905 cf
Outflow = 5.47 cfs @ 12.12 hrs, Volume= 18,905 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.47 cfs @ 12.12 hrs, Volume= 18,905 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 51.67' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.14'	**10.0" Round CMP_Round 10"** L= 200.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 4.14' / 1.94' S= 0.0110 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.55 sf

Primary OutFlow Max=5.30 cfs @ 12.12 hrs HW=48.99' (Free Discharge)
1=CMP_Round 10" (Barrel Controls 5.30 cfs @ 9.72 fps)

Pond CB3: Exist CB



Summary for Pond CB4: Exist CB

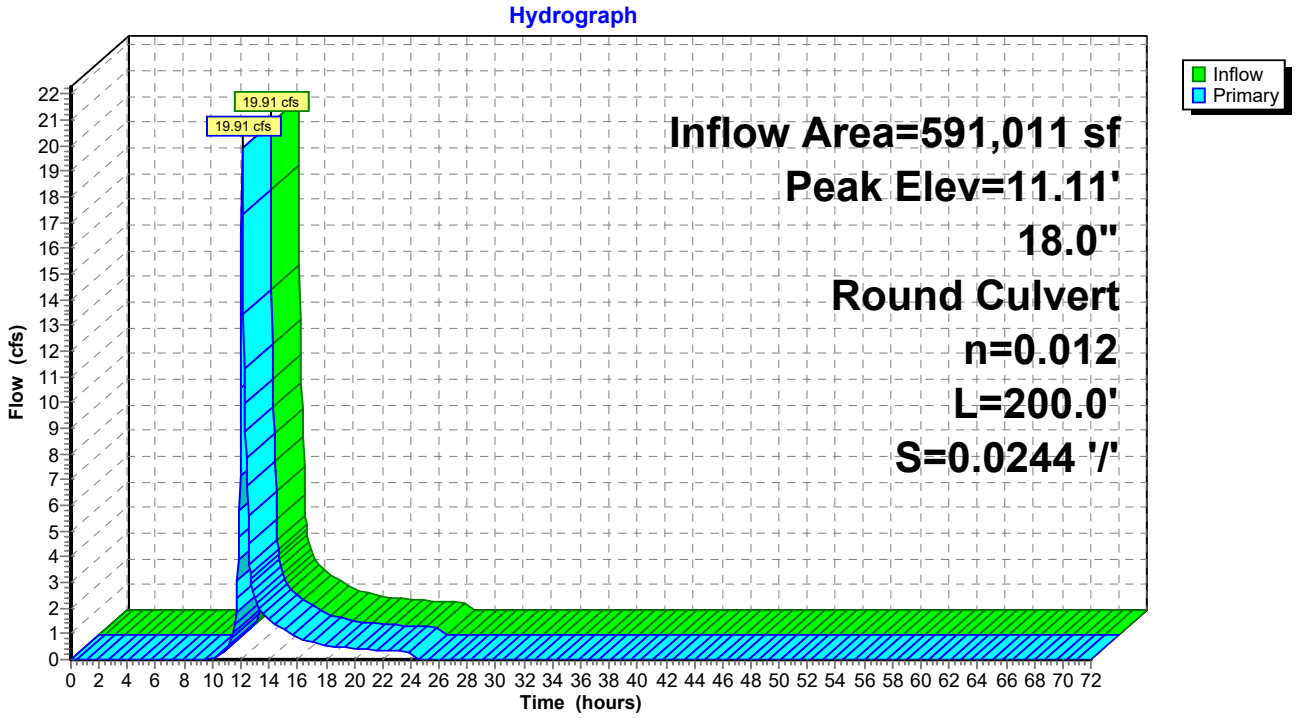
Inflow Area = 591,011 sf, 44.08% Impervious, Inflow Depth = 1.32" for 2YR - 24HR event
Inflow = 19.91 cfs @ 12.10 hrs, Volume= 65,016 cf
Outflow = 19.91 cfs @ 12.10 hrs, Volume= 65,016 cf, Atten= 0%, Lag= 0.0 min
Primary = 19.91 cfs @ 12.10 hrs, Volume= 65,016 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 11.11' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.89'	**18.0" Round RCP_Round 18"** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.89' / 0.00' S= 0.0244 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=19.74 cfs @ 12.10 hrs HW=11.02' (Free Discharge)
1=RCP_Round 18" (Inlet Controls 19.74 cfs @ 11.17 fps)

Pond CB4: Exist CB



Summary for Pond CB5: Exist CB

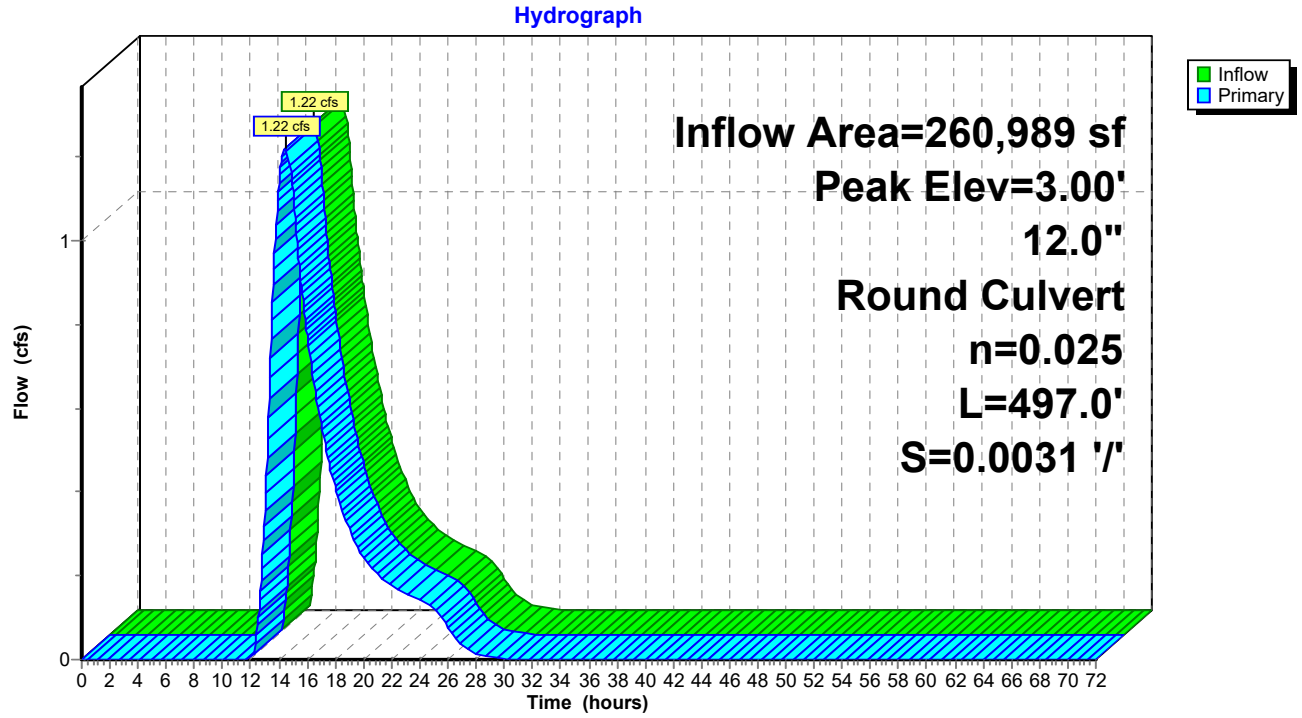
Inflow Area = 260,989 sf, 33.14% Impervious, Inflow Depth = 0.97" for 2YR - 24HR event
Inflow = 1.22 cfs @ 14.43 hrs, Volume= 21,088 cf
Outflow = 1.22 cfs @ 14.43 hrs, Volume= 21,088 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.22 cfs @ 14.43 hrs, Volume= 21,088 cf
Routed to Pond MH1 : Exist MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.00' @ 14.43 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.30'	**12.0" Round CMP_Round 12"** L= 497.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1.30' / -0.25' S= 0.0031 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=1.22 cfs @ 14.43 hrs HW=2.99' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 1.22 cfs @ 1.56 fps)

Pond CB5: Exist CB



Summary for Pond CB6: Exist CB

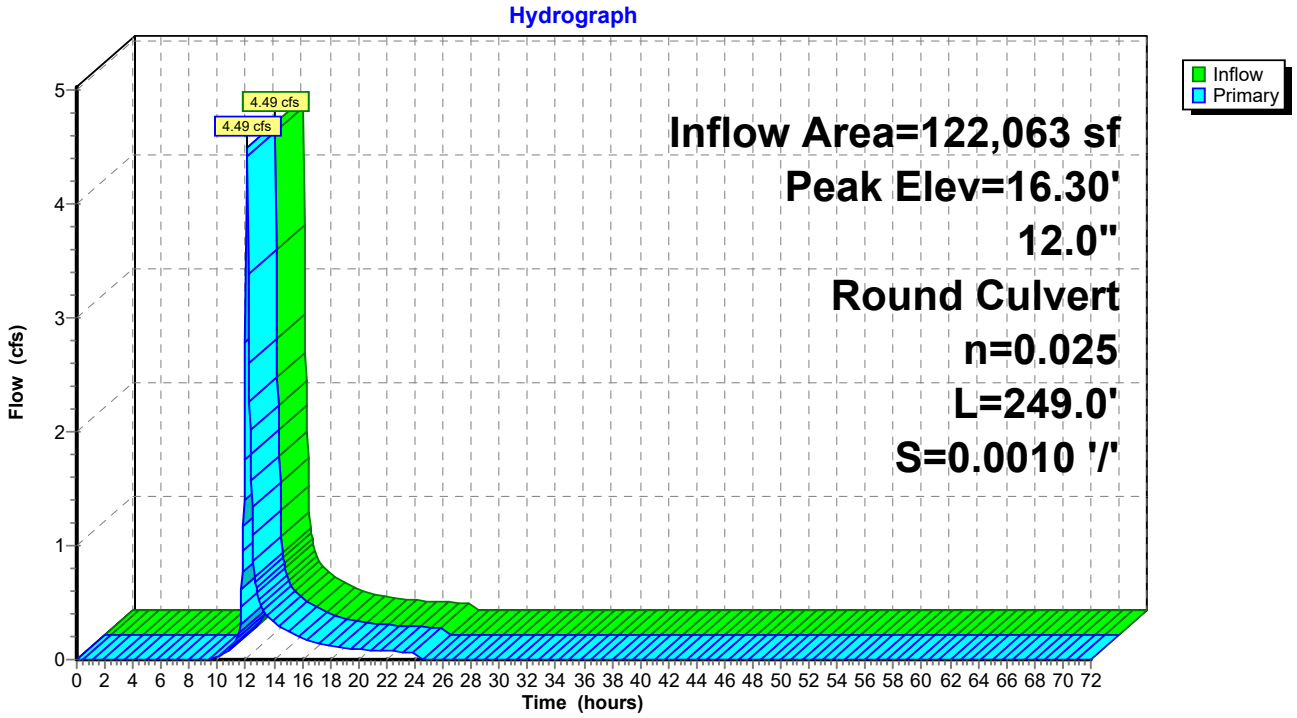
Inflow Area = 122,063 sf, 47.26% Impervious, Inflow Depth = 1.38" for 2YR - 24HR event
Inflow = 4.49 cfs @ 12.08 hrs, Volume= 14,081 cf
Outflow = 4.49 cfs @ 12.08 hrs, Volume= 14,081 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.49 cfs @ 12.08 hrs, Volume= 14,081 cf
Routed to Pond MH1 : Exist MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 16.30' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.01'	**12.0" Round CMP_Round 12"** L= 249.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.01' / -0.25' S= 0.0010 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=4.35 cfs @ 12.08 hrs HW=15.45' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 4.35 cfs @ 5.54 fps)

Pond CB6: Exist CB



Summary for Pond CB7: Exist CB

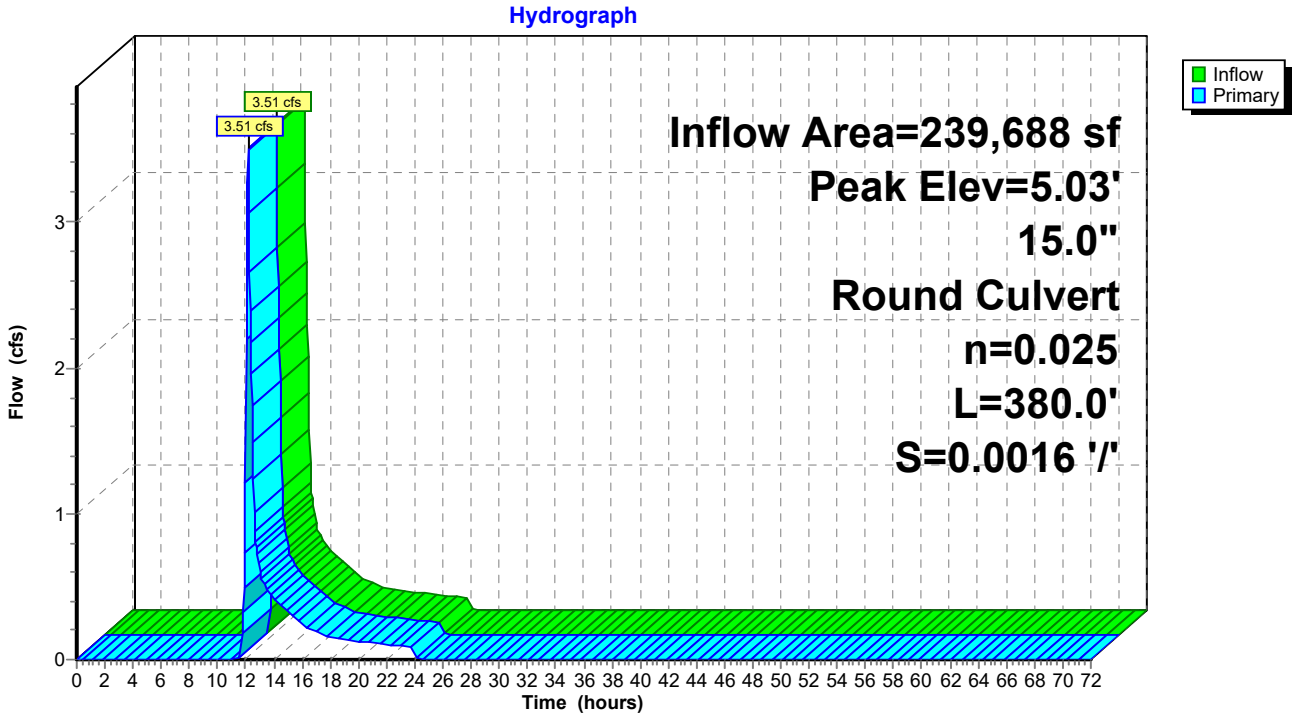
Inflow Area = 239,688 sf, 24.36% Impervious, Inflow Depth = 0.72" for 2YR - 24HR event
Inflow = 3.51 cfs @ 12.14 hrs, Volume= 14,386 cf
Outflow = 3.51 cfs @ 12.14 hrs, Volume= 14,386 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.51 cfs @ 12.14 hrs, Volume= 14,386 cf
Routed to Pond CB8 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.03' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**15.0" Round CMP_Round 15"** L= 380.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -0.62' S= 0.0016 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=3.47 cfs @ 12.14 hrs HW=4.93' (Free Discharge)
1=CMP_Round 15" (Barrel Controls 3.47 cfs @ 2.83 fps)

Pond CB7: Exist CB



Summary for Pond CB8: Exist CB

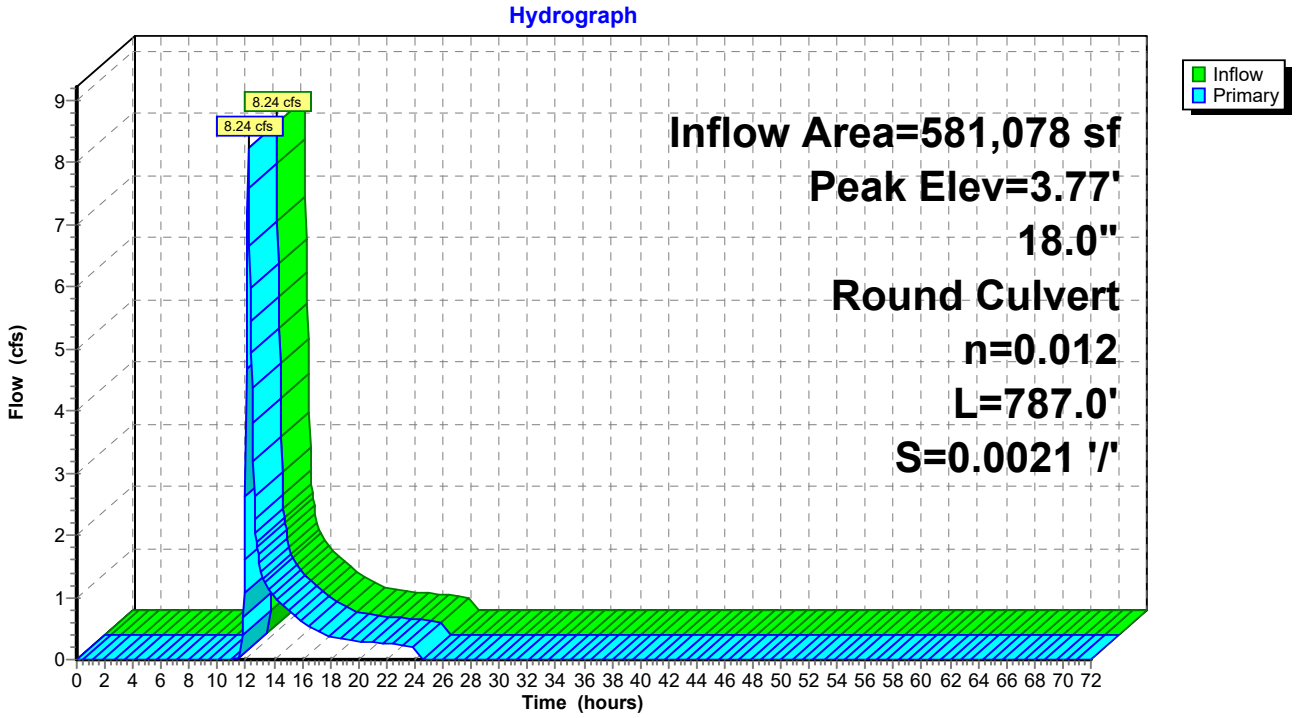
Inflow Area = 581,078 sf, 26.18% Impervious, Inflow Depth = 0.72" for 2YR - 24HR event
Inflow = 8.24 cfs @ 12.16 hrs, Volume= 34,876 cf
Outflow = 8.24 cfs @ 12.16 hrs, Volume= 34,876 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.24 cfs @ 12.16 hrs, Volume= 34,876 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.77' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.72'	**18.0" Round RCP_Round 18"** L= 787.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.72' / -2.37' S= 0.0021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=8.15 cfs @ 12.16 hrs HW=3.68' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 8.15 cfs @ 4.61 fps)

Pond CB8: Exist CB



Summary for Pond CB9: Exist CB

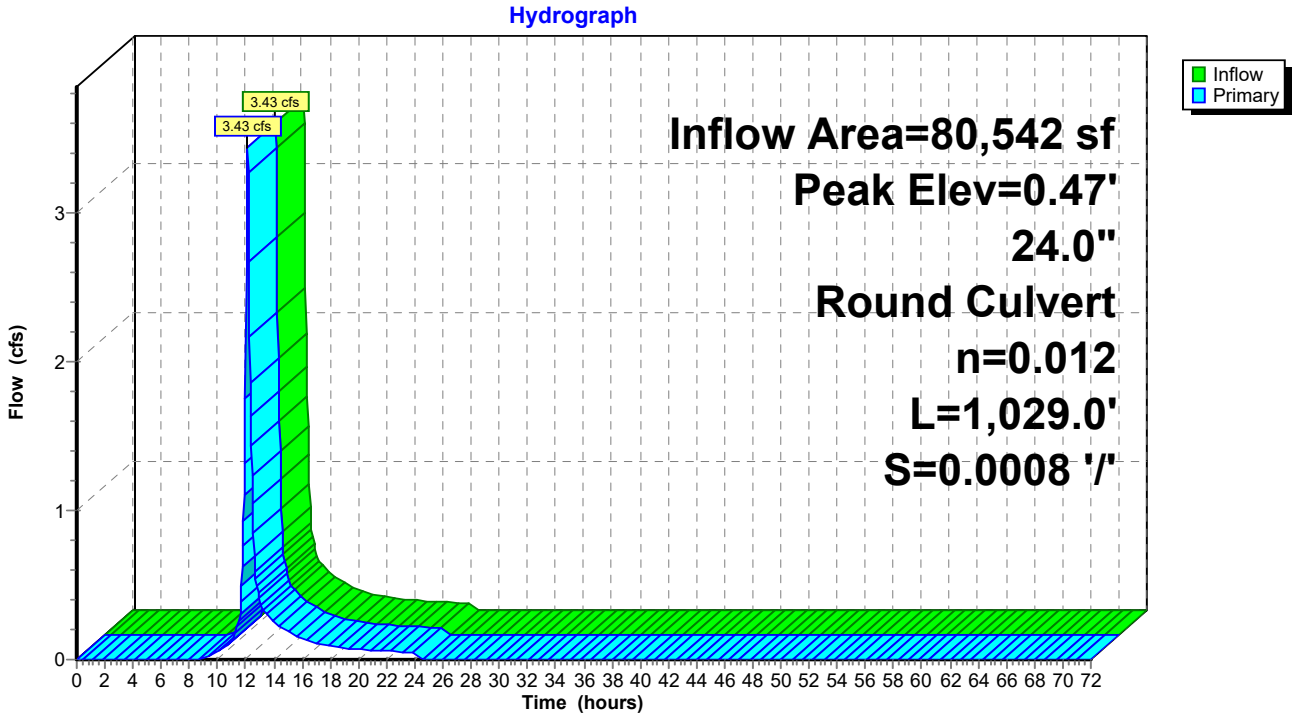
Inflow Area = 80,542 sf, 58.79% Impervious, Inflow Depth = 1.73" for 2YR - 24HR event
Inflow = 3.43 cfs @ 12.12 hrs, Volume= 11,632 cf
Outflow = 3.43 cfs @ 12.12 hrs, Volume= 11,632 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.43 cfs @ 12.12 hrs, Volume= 11,632 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.47' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.77'	**24.0" Round Culvert** L= 1,029.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.77' / -1.62' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=3.33 cfs @ 12.12 hrs HW=0.45' (Free Discharge)
1=Culvert (Barrel Controls 3.33 cfs @ 2.37 fps)

Pond CB9: Exist CB



Summary for Pond Cr-B: Robinson Driveway

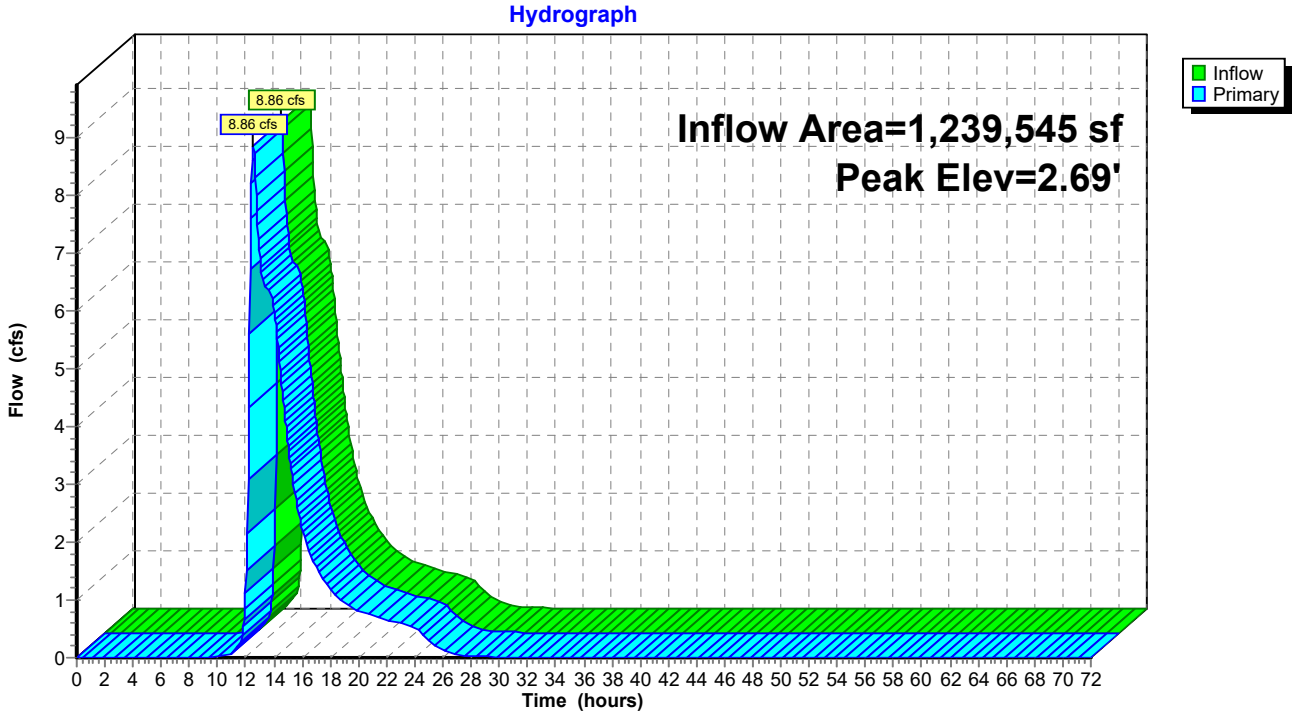
Inflow Area = 1,239,545 sf, 36.87% Impervious, Inflow Depth = 1.04" for 2YR - 24HR event
Inflow = 8.86 cfs @ 12.54 hrs, Volume= 107,285 cf
Outflow = 8.86 cfs @ 12.54 hrs, Volume= 107,285 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.86 cfs @ 12.54 hrs, Volume= 107,285 cf
Routed to Reach 2R : WQS Segment 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.69' @ 12.54 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=8.84 cfs @ 12.54 hrs HW=2.69' (Free Discharge)
- **1=RCP_Round 24"** (Barrel Controls 2.95 cfs @ 2.85 fps)
- **2=RCP_Round 24"** (Barrel Controls 2.95 cfs @ 2.85 fps)
- **3=RCP_Round 24"** (Barrel Controls 2.95 cfs @ 2.85 fps)

Pond Cr-B: Robinson Driveway



Summary for Pond Cr-CD: Utility Crossing

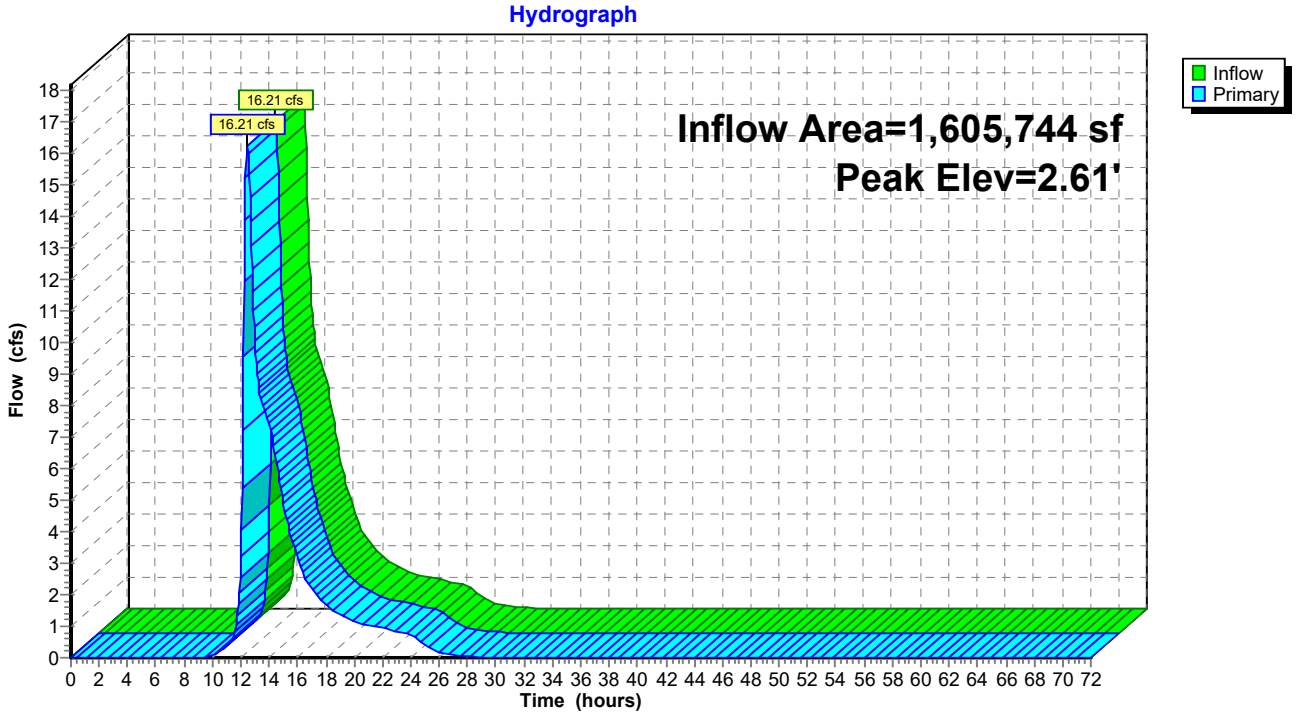
Inflow Area = 1,605,744 sf, 40.85% Impervious, Inflow Depth = 1.18" for 2YR - 24HR event
Inflow = 16.21 cfs @ 12.47 hrs, Volume= 157,929 cf
Outflow = 16.21 cfs @ 12.47 hrs, Volume= 157,929 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.21 cfs @ 12.47 hrs, Volume= 157,929 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.61' @ 12.47 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#3	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=16.17 cfs @ 12.47 hrs HW=2.61' (Free Discharge)
- **1=RCP_Round 30"** (Barrel Controls 5.39 cfs @ 3.11 fps)
- **2=RCP_Round 30"** (Barrel Controls 5.39 cfs @ 3.11 fps)
- **3=RCP_Round 30"** (Barrel Controls 5.39 cfs @ 3.11 fps)

Pond Cr-CD: Utility Crossing



Summary for Pond MH1: Exist MH

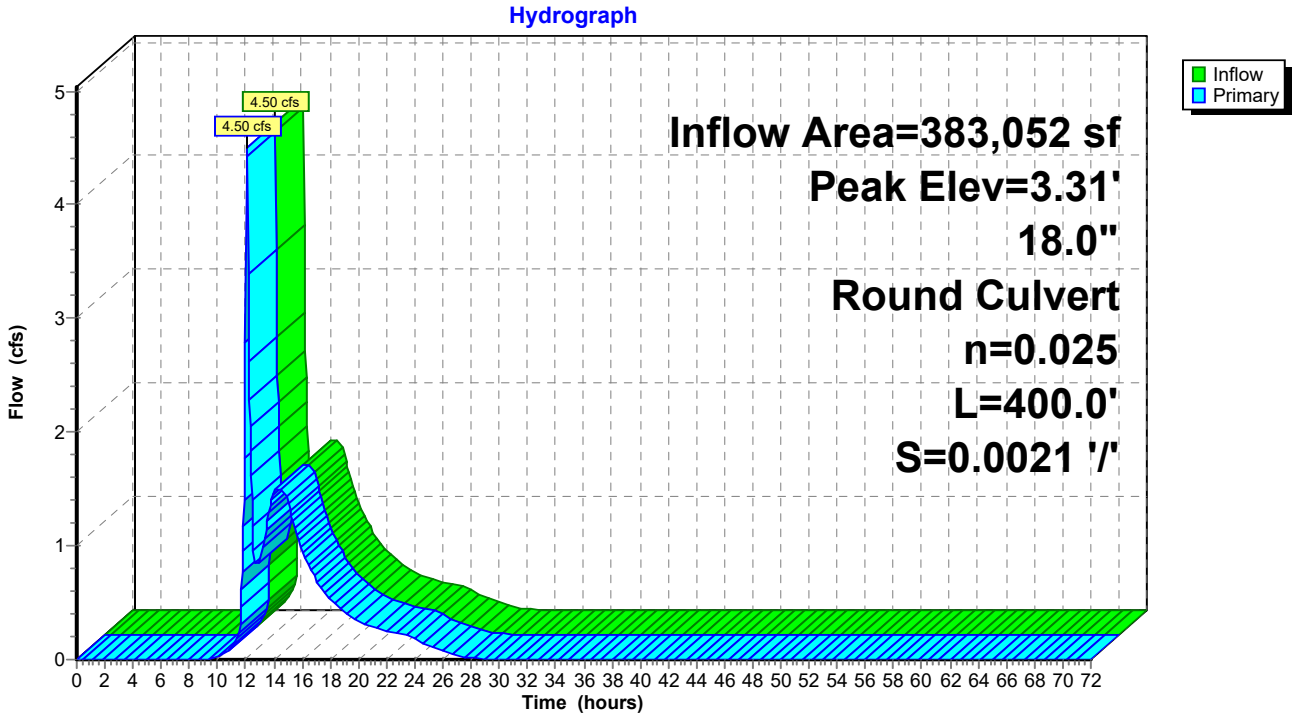
Inflow Area = 383,052 sf, 37.64% Impervious, Inflow Depth = 1.10" for 2YR - 24HR event
Inflow = 4.50 cfs @ 12.08 hrs, Volume= 35,170 cf
Outflow = 4.50 cfs @ 12.08 hrs, Volume= 35,170 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.50 cfs @ 12.08 hrs, Volume= 35,170 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.31' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.25'	**18.0" Round CMP_Round 18"** L= 400.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= -0.25' / -1.09' S= 0.0021 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=4.36 cfs @ 12.08 hrs HW=3.15' (Free Discharge)
1=CMP_Round 18" (Barrel Controls 4.36 cfs @ 2.47 fps)

Pond MH1: Exist MH



Summary for Pond P1: Pond 1

Inflow Area = 651,203 sf, 47.97% Impervious, Inflow Depth = 1.26" for 2YR - 24HR event
Inflow = 5.68 cfs @ 13.29 hrs, Volume= 68,612 cf
Outflow = 5.47 cfs @ 13.52 hrs, Volume= 68,612 cf, Atten= 4%, Lag= 13.6 min
Discarded = 0.61 cfs @ 13.52 hrs, Volume= 9,513 cf
Primary = 4.86 cfs @ 13.52 hrs, Volume= 59,099 cf
Routed to Pond P10 : Wetland Ditch

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.13' @ 13.52 hrs Surf.Area= 13,880 sf Storage= 4,346 cf

Plug-Flow detention time= 11.1 min calculated for 68,565 cf (100% of inflow)
Center-of-Mass det. time= 11.1 min (912.1 - 901.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2.40'	69,114 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

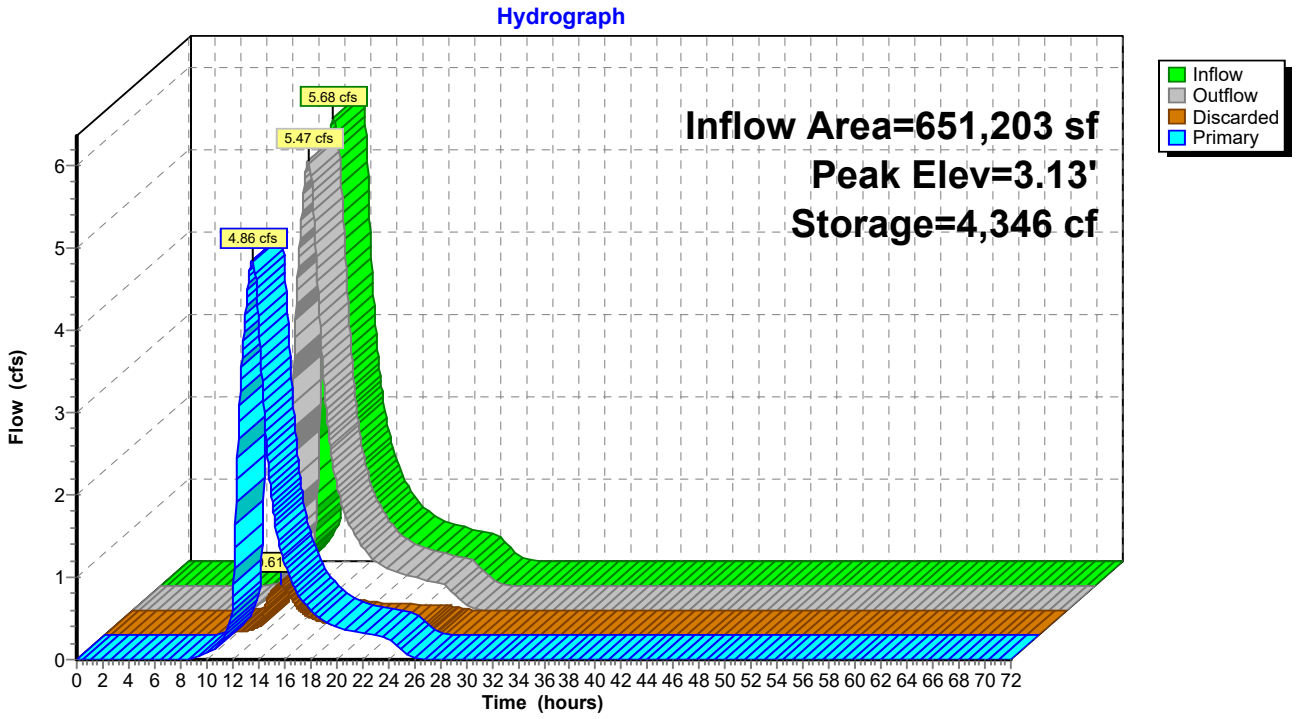
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.40	0	0.0	0	0	0
2.50	1,116	311.0	37	37	7,697
3.00	11,546	598.0	2,709	2,746	28,458
3.50	22,069	715.0	8,263	11,009	40,688
4.00	32,945	769.0	13,663	24,672	47,075
4.50	44,009	867.0	19,172	43,844	59,841
5.00	57,369	999.0	25,271	69,114	79,447

Device	Routing	Invert	Outlet Devices
#1	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#4	Discarded	2.40'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.30'

Discarded OutFlow Max=0.61 cfs @ 13.52 hrs HW=3.13' (Free Discharge)
└**4=Exfiltration** (Controls 0.61 cfs)

Primary OutFlow Max=4.86 cfs @ 13.52 hrs HW=3.13' (Free Discharge)
├**1=Culvert** (Barrel Controls 1.62 cfs @ 2.54 fps)
├**2=Culvert** (Barrel Controls 1.62 cfs @ 2.54 fps)
└**3=Culvert** (Barrel Controls 1.62 cfs @ 2.54 fps)

Pond P1: Pond 1



Summary for Pond P10: Wetland Ditch

Inflow Area = 827,347 sf, 40.98% Impervious, Inflow Depth = 1.12" for 2YR - 24HR event
Inflow = 5.88 cfs @ 12.26 hrs, Volume= 77,559 cf
Outflow = 5.67 cfs @ 12.36 hrs, Volume= 77,559 cf, Atten= 4%, Lag= 5.8 min
Primary = 5.67 cfs @ 12.36 hrs, Volume= 77,559 cf
Routed to Reach 1R : WQS Segment 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.13' @ 12.36 hrs Surf.Area= 3,027 sf Storage= 1,703 cf

Plug-Flow detention time= 6.6 min calculated for 77,559 cf (100% of inflow)
Center-of-Mass det. time= 6.6 min (903.1 - 896.6)

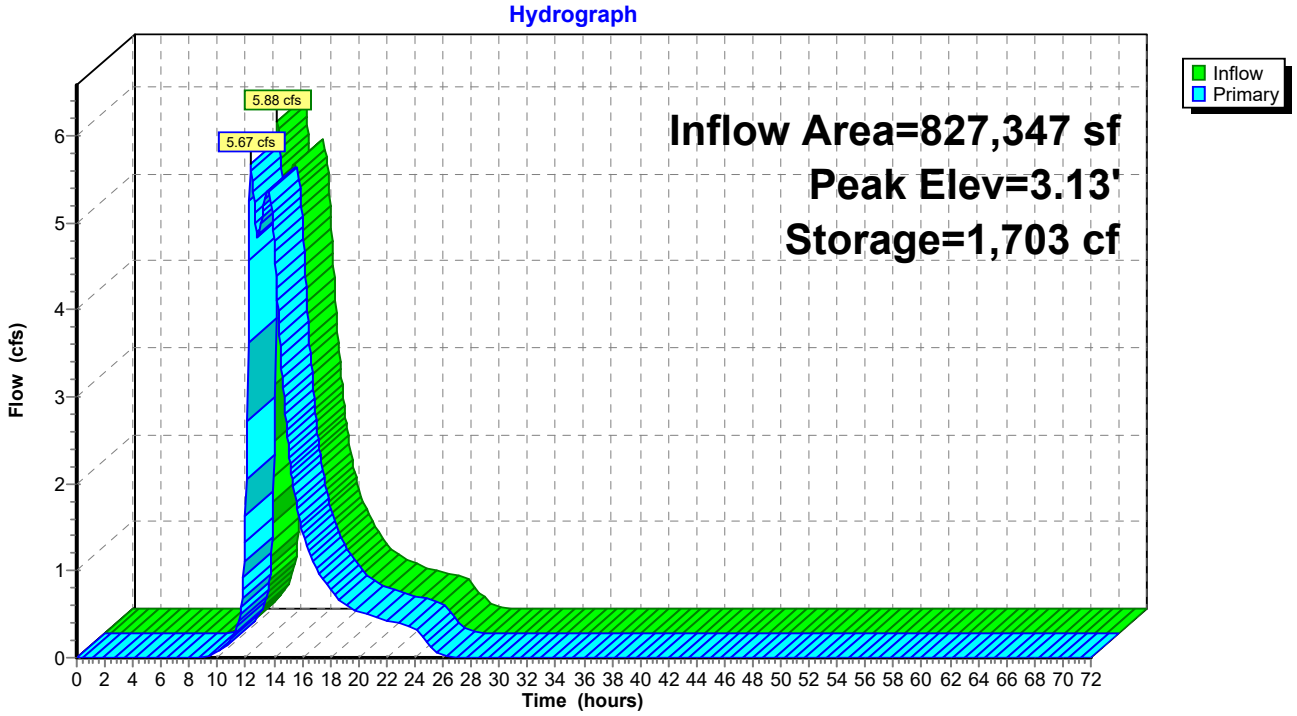
Volume	Invert	Avail.Storage	Storage Description
#1	2.33'	34,944 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.33	0	0.0	0	0	0
2.50	2,079	556.0	118	118	24,600
3.00	2,792	564.0	1,213	1,331	25,366
3.50	3,765	606.0	1,633	2,964	29,288
4.00	5,218	646.0	2,236	5,200	33,285
4.50	26,868	1,785.0	7,321	12,521	253,629
5.00	65,665	1,908.0	22,423	34,944	289,788

Device	Routing	Invert	Outlet Devices
#1	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf

Primary OutFlow Max=5.67 cfs @ 12.36 hrs HW=3.13' (Free Discharge)
- **1=RCP_Round 21"** (Barrel Controls 1.89 cfs @ 2.60 fps)
- **2=RCP_Round 21"** (Barrel Controls 1.89 cfs @ 2.60 fps)
- **3=RCP_Round 21"** (Barrel Controls 1.89 cfs @ 2.60 fps)

Pond P10: Wetland Ditch



Summary for Pond P2: Pond 2

Inflow Area = 80,876 sf, 37.79% Impervious, Inflow Depth = 1.08" for 2YR - 24HR event
Inflow = 1.60 cfs @ 12.25 hrs, Volume= 7,279 cf
Outflow = 1.36 cfs @ 12.37 hrs, Volume= 7,279 cf, Atten= 15%, Lag= 7.1 min
Discarded = 0.06 cfs @ 12.37 hrs, Volume= 355 cf
Primary = 1.30 cfs @ 12.37 hrs, Volume= 6,924 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.99' @ 12.37 hrs Surf.Area= 1,988 sf Storage= 457 cf

Plug-Flow detention time= 3.3 min calculated for 7,274 cf (100% of inflow)
Center-of-Mass det. time= 3.3 min (875.6 - 872.3)

Volume	Invert	Avail.Storage	Storage Description
#1	3.35'	13,689 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

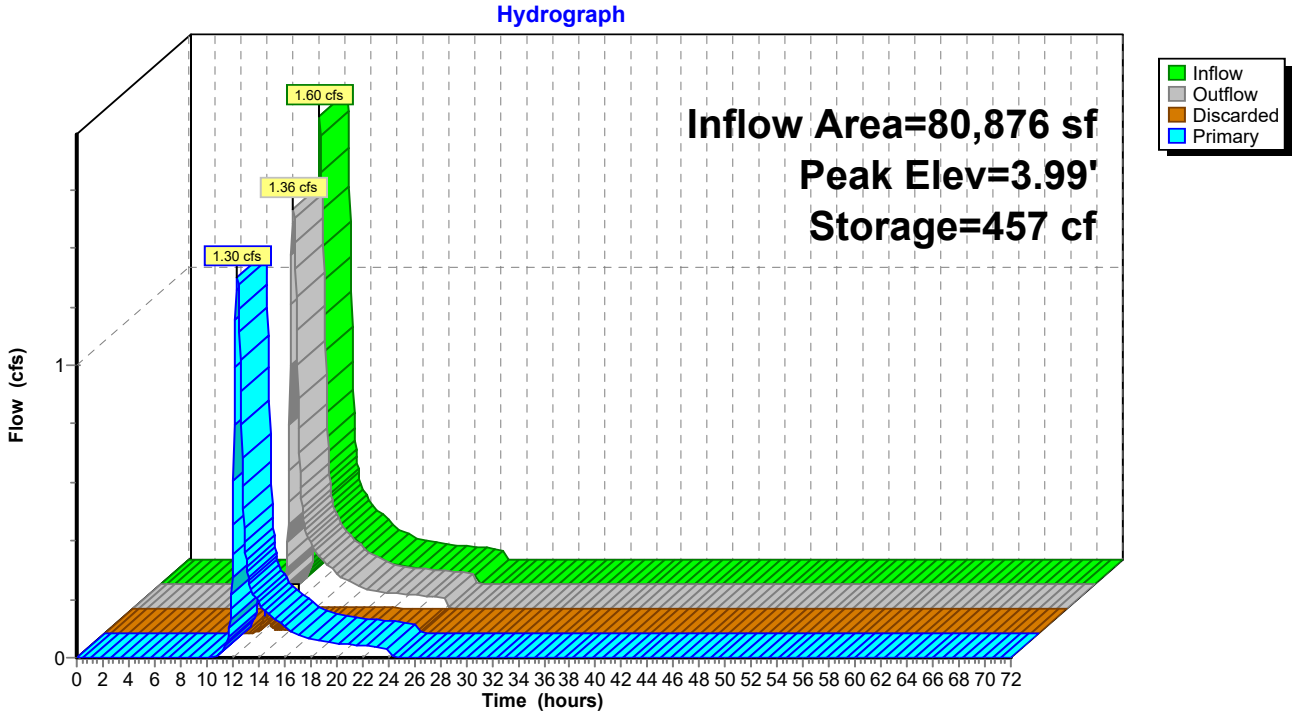
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.35	0	0.0	0	0	0
3.50	170	63.0	8	8	316
4.00	2,037	330.0	466	474	8,667
4.50	10,588	652.0	2,878	3,353	33,831
4.75	19,541	773.0	3,709	7,062	47,553
5.00	34,152	971.0	6,627	13,689	75,033

Device	Routing	Invert	Outlet Devices
#1	Primary	3.35'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 133.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.35' / 3.25' S= 0.0008 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.35'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.06 cfs @ 12.37 hrs HW=3.99' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.06 cfs)

Primary OutFlow Max=1.30 cfs @ 12.37 hrs HW=3.99' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.30 cfs @ 2.09 fps)

Pond P2: Pond 2



Summary for Pond P3: Pond 3

Inflow Area = 446,976 sf, 56.49% Impervious, Inflow Depth = 1.63" for 2YR - 24HR event
Inflow = 5.80 cfs @ 13.15 hrs, Volume= 60,705 cf
Outflow = 5.52 cfs @ 13.35 hrs, Volume= 60,705 cf, Atten= 5%, Lag= 12.0 min
Discarded = 0.41 cfs @ 13.35 hrs, Volume= 5,060 cf
Primary = 5.11 cfs @ 13.35 hrs, Volume= 55,644 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.41' @ 13.35 hrs Surf.Area= 9,359 sf Storage= 3,139 cf

Plug-Flow detention time= 6.7 min calculated for 60,663 cf (100% of inflow)
Center-of-Mass det. time= 6.7 min (902.4 - 895.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2.65'	46,661 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

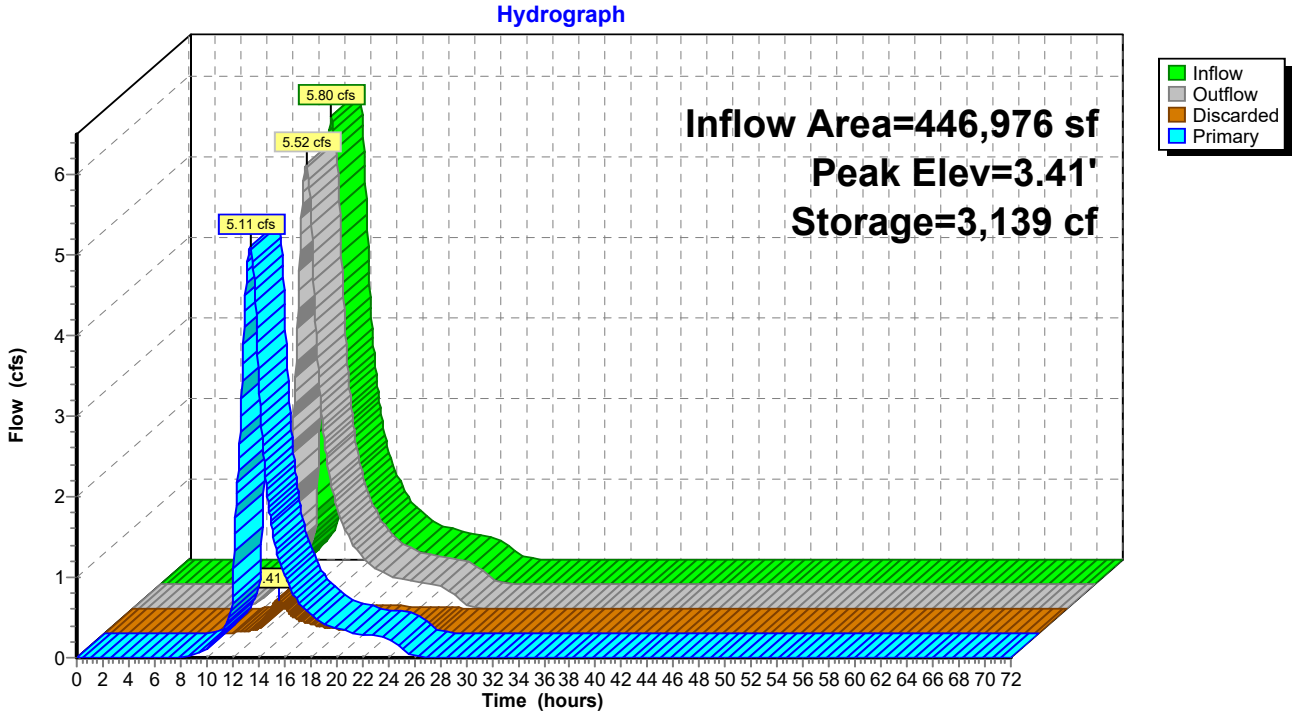
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.65	0	0.0	0	0	0
3.00	4,059	888.0	474	474	62,751
3.50	10,848	1,191.0	3,590	4,064	112,882
4.00	19,089	1,350.0	7,388	11,452	145,039
4.50	33,127	1,447.0	12,894	24,346	166,641
5.00	57,227	1,543.0	22,316	46,661	189,495

Device	Routing	Invert	Outlet Devices
#1	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#3	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#4	Discarded	2.65'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.55'

Discarded OutFlow Max=0.41 cfs @ 13.35 hrs HW=3.41' (Free Discharge)
└**4=Exfiltration** (Controls 0.41 cfs)

Primary OutFlow Max=5.11 cfs @ 13.35 hrs HW=3.41' (Free Discharge)
├**1=Culvert** (Barrel Controls 1.70 cfs @ 2.27 fps)
├**2=Culvert** (Barrel Controls 1.70 cfs @ 2.27 fps)
└**3=Culvert** (Barrel Controls 1.70 cfs @ 2.27 fps)

Pond P3: Pond 3



Summary for Pond P4: Pond 4

Inflow Area = 57,929 sf, 17.47% Impervious, Inflow Depth = 0.67" for 2YR - 24HR event
Inflow = 0.75 cfs @ 12.16 hrs, Volume= 3,257 cf
Outflow = 0.70 cfs @ 12.21 hrs, Volume= 3,257 cf, Atten= 7%, Lag= 2.8 min
Discarded = 0.02 cfs @ 12.21 hrs, Volume= 51 cf
Primary = 0.68 cfs @ 12.21 hrs, Volume= 3,206 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.65' @ 12.21 hrs Surf.Area= 547 sf Storage= 64 cf

Plug-Flow detention time= 0.7 min calculated for 3,255 cf (100% of inflow)
Center-of-Mass det. time= 0.7 min (894.6 - 893.9)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	12,438 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

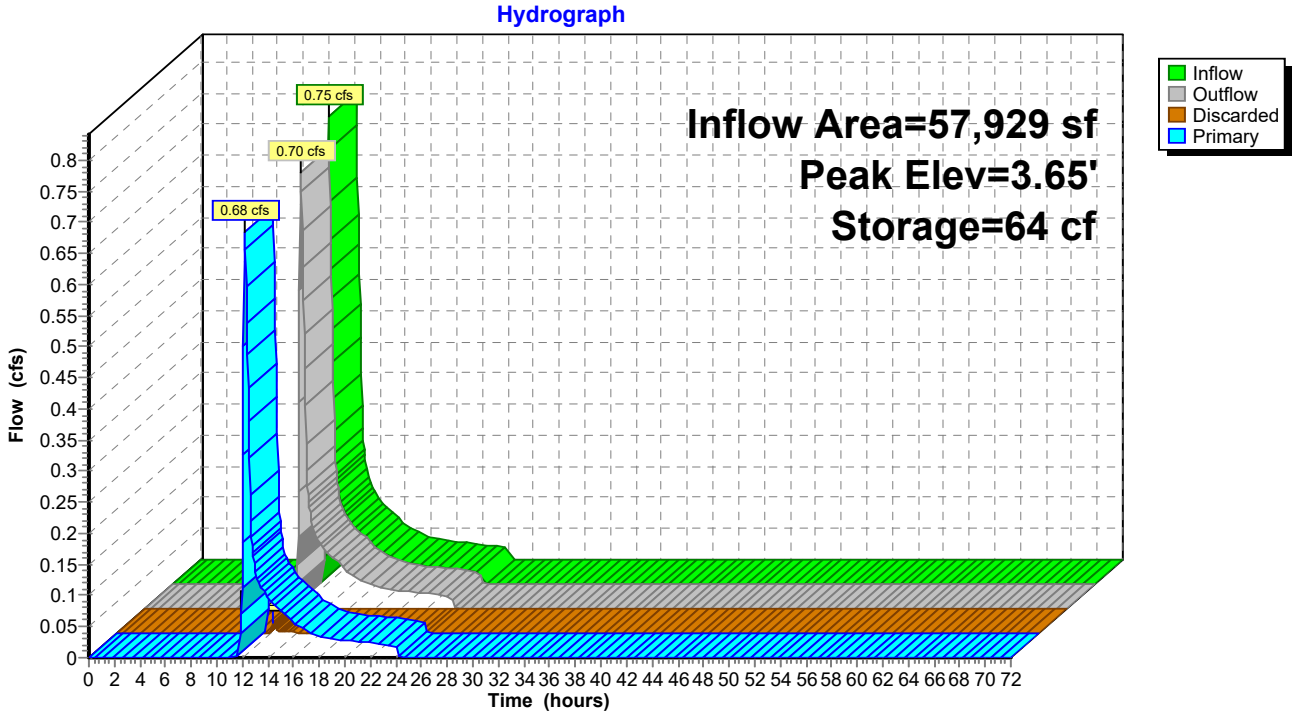
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.20	0	0.0	0	0	0
3.50	149	61.0	15	15	296
4.00	2,440	293.0	532	547	6,832
4.50	9,823	539.0	2,860	3,407	23,121
4.75	16,825	666.0	3,292	6,699	35,300
5.00	29,698	866.0	5,740	12,438	59,683

Device	Routing	Invert	Outlet Devices
#1	Primary	3.20'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 134.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.20' / 3.10' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.20'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.02 cfs @ 12.21 hrs HW=3.65' (Free Discharge)
↑**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=0.68 cfs @ 12.21 hrs HW=3.65' (Free Discharge)
↑**1=Culvert** (Barrel Controls 0.68 cfs @ 1.67 fps)

Pond P4: Pond 4



Summary for Pond P5: Pond 5

Inflow Area = 52,606 sf, 20.20% Impervious, Inflow Depth = 0.55" for 2YR - 24HR event
Inflow = 0.51 cfs @ 12.15 hrs, Volume= 2,397 cf
Outflow = 0.50 cfs @ 12.17 hrs, Volume= 2,397 cf, Atten= 1%, Lag= 0.9 min
Discarded = 0.00 cfs @ 12.17 hrs, Volume= 22 cf
Primary = 0.50 cfs @ 12.17 hrs, Volume= 2,375 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.24' @ 12.17 hrs Surf.Area= 147 sf Storage= 19 cf

Plug-Flow detention time= 0.3 min calculated for 2,395 cf (100% of inflow)
Center-of-Mass det. time= 0.3 min (906.3 - 905.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2.85'	12,246 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

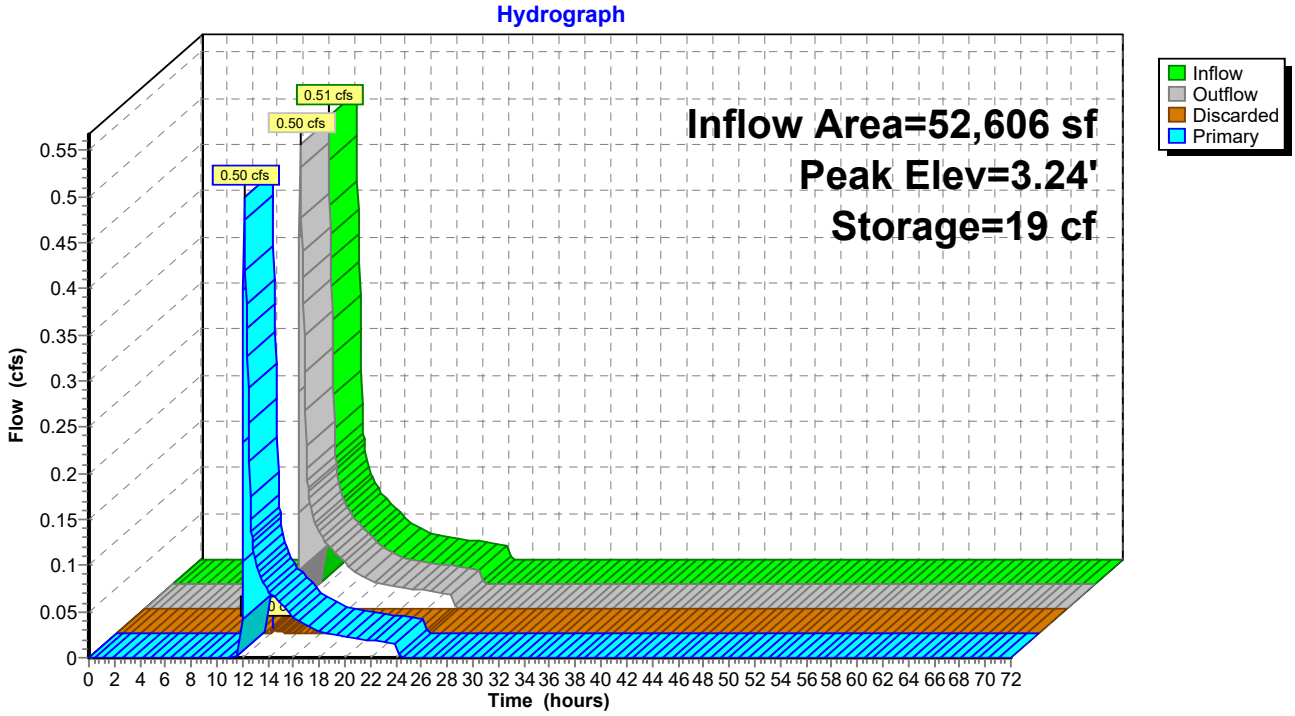
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.85	0	0.0	0	0	0
3.00	22	19.0	1	1	29
3.50	418	102.0	89	90	829
4.00	2,904	284.0	737	828	6,420
4.50	9,309	476.0	2,902	3,730	18,033
4.90	21,881	695.0	6,062	9,791	38,442
5.00	27,310	796.0	2,455	12,246	50,426

Device	Routing	Invert	Outlet Devices
#1	Primary	2.85'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 142.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.85' / 2.75' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.85'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.75'

Discarded OutFlow Max=0.00 cfs @ 12.17 hrs HW=3.23' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.49 cfs @ 12.17 hrs HW=3.23' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.49 cfs @ 1.46 fps)

Pond P5: Pond 5



Summary for Pond P6: Pond 6

Inflow Area = 252,442 sf, 27.23% Impervious, Inflow Depth = 0.80" for 2YR - 24HR event
Inflow = 2.46 cfs @ 12.43 hrs, Volume= 16,786 cf
Outflow = 2.46 cfs @ 12.43 hrs, Volume= 16,786 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.43 hrs, Volume= 1 cf
Primary = 2.46 cfs @ 12.43 hrs, Volume= 16,785 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.51' @ 12.43 hrs Surf.Area= 2 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 16,774 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (898.8 - 898.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	48,739 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

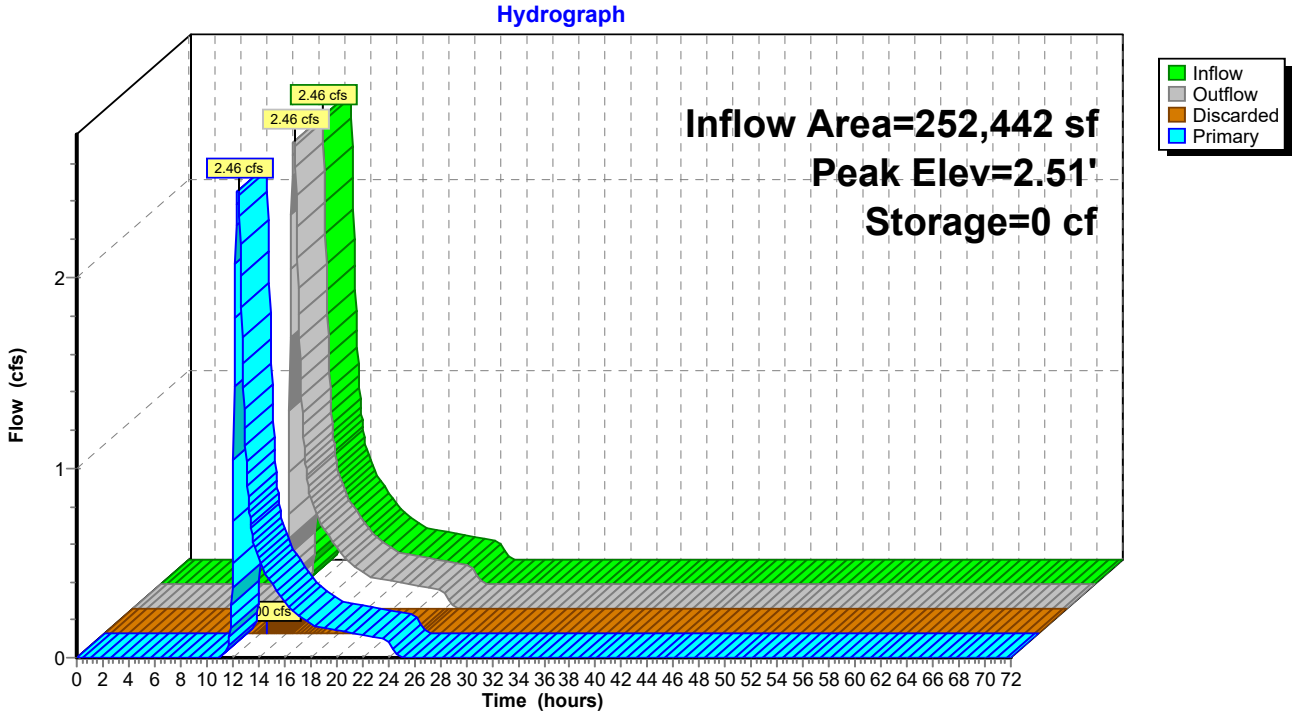
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
3.00	3,571	520.0	595	595	21,518
3.50	9,437	727.0	3,136	3,731	42,062
4.00	24,344	1,116.0	8,156	11,887	99,115
4.50	57,812	1,402.0	19,945	31,832	156,426
4.75	77,941	1,580.0	16,907	48,739	198,667

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**15.0" Round CMP_Round 15"** L= 265.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 0.50' / -0.40' S= 0.0034 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	2.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.40'

Discarded OutFlow Max=0.00 cfs @ 12.43 hrs HW=2.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=4.88 cfs @ 12.43 hrs HW=2.51' (Free Discharge)
↑—**1=CMP_Round 15"** (Barrel Controls 4.88 cfs @ 3.98 fps)

Pond P6: Pond 6



Summary for Pond P7: Pond 7

Inflow Area = 67,118 sf, 34.62% Impervious, Inflow Depth = 1.02" for 2YR - 24HR event
Inflow = 1.36 cfs @ 12.20 hrs, Volume= 5,728 cf
Outflow = 1.28 cfs @ 12.25 hrs, Volume= 5,728 cf, Atten= 6%, Lag= 3.3 min
Discarded = 0.02 cfs @ 12.25 hrs, Volume= 65 cf
Primary = 1.25 cfs @ 12.25 hrs, Volume= 5,663 cf
Routed to Pond P6 : Pond 6

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.41' @ 12.25 hrs Surf.Area= 743 sf Storage= 139 cf

Plug-Flow detention time= 0.7 min calculated for 5,724 cf (100% of inflow)
Center-of-Mass det. time= 0.7 min (872.9 - 872.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2.75'	16,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

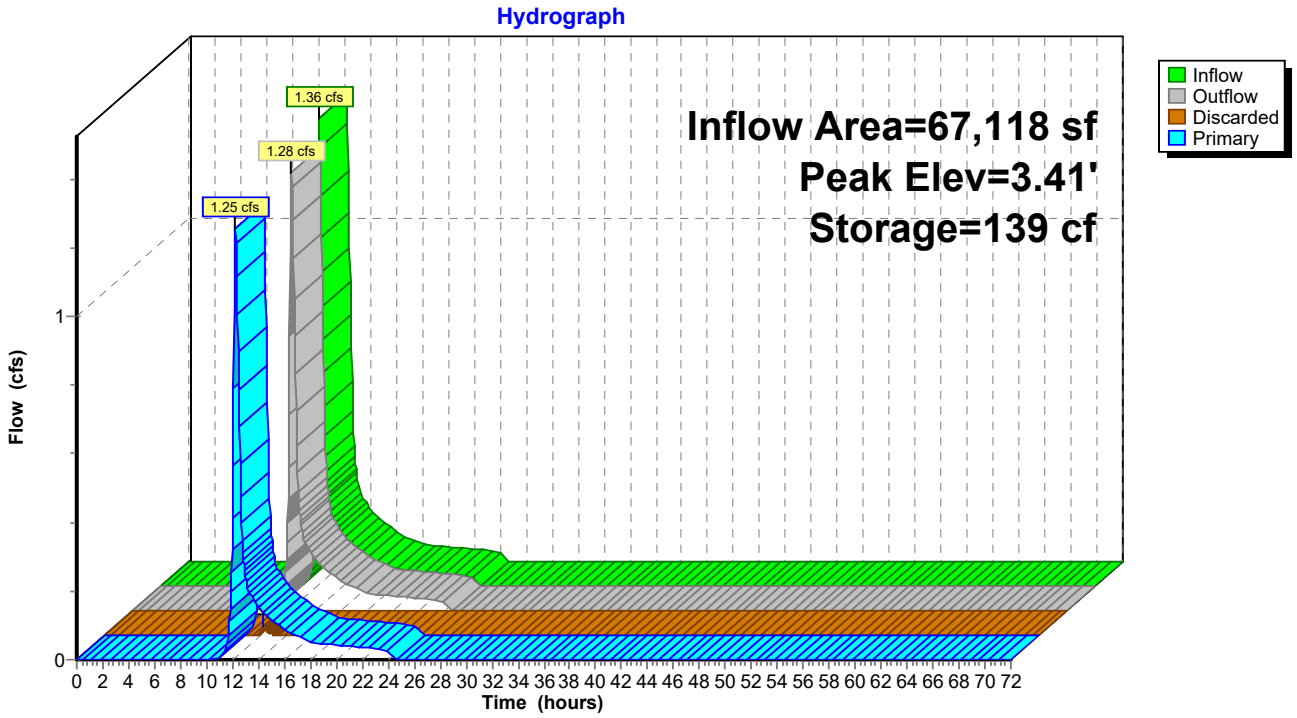
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.75	0	0.0	0	0	0
3.00	47	29.0	4	4	67
3.50	992	154.0	209	213	1,888
4.00	4,809	305.0	1,331	1,544	7,405
4.50	13,313	480.0	4,354	5,898	18,338
4.90	25,536	679.0	7,638	13,536	36,694
5.00	29,518	743.0	2,750	16,286	43,936

Device	Routing	Invert	Outlet Devices
#1	Primary	2.75'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 180.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.75' / 2.65' S= 0.0006 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.75'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.65'

Discarded OutFlow Max=0.02 cfs @ 12.25 hrs HW=3.41' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.02 cfs)

Primary OutFlow Max=1.25 cfs @ 12.25 hrs HW=3.41' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.25 cfs @ 1.93 fps)

Pond P7: Pond 7



Summary for Pond P8: Pond 8

Inflow Area = 366,659 sf, 30.00% Impervious, Inflow Depth = 0.88" for 2YR - 24HR event
Inflow = 4.28 cfs @ 12.28 hrs, Volume= 26,899 cf
Outflow = 4.26 cfs @ 12.31 hrs, Volume= 26,899 cf, Atten= 0%, Lag= 2.0 min
Primary = 4.26 cfs @ 12.31 hrs, Volume= 26,899 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.39' @ 12.31 hrs Surf.Area= 258 sf Storage= 75 cf

Plug-Flow detention time= 0.1 min calculated for 26,880 cf (100% of inflow)
Center-of-Mass det. time= 0.1 min (892.3 - 892.2)

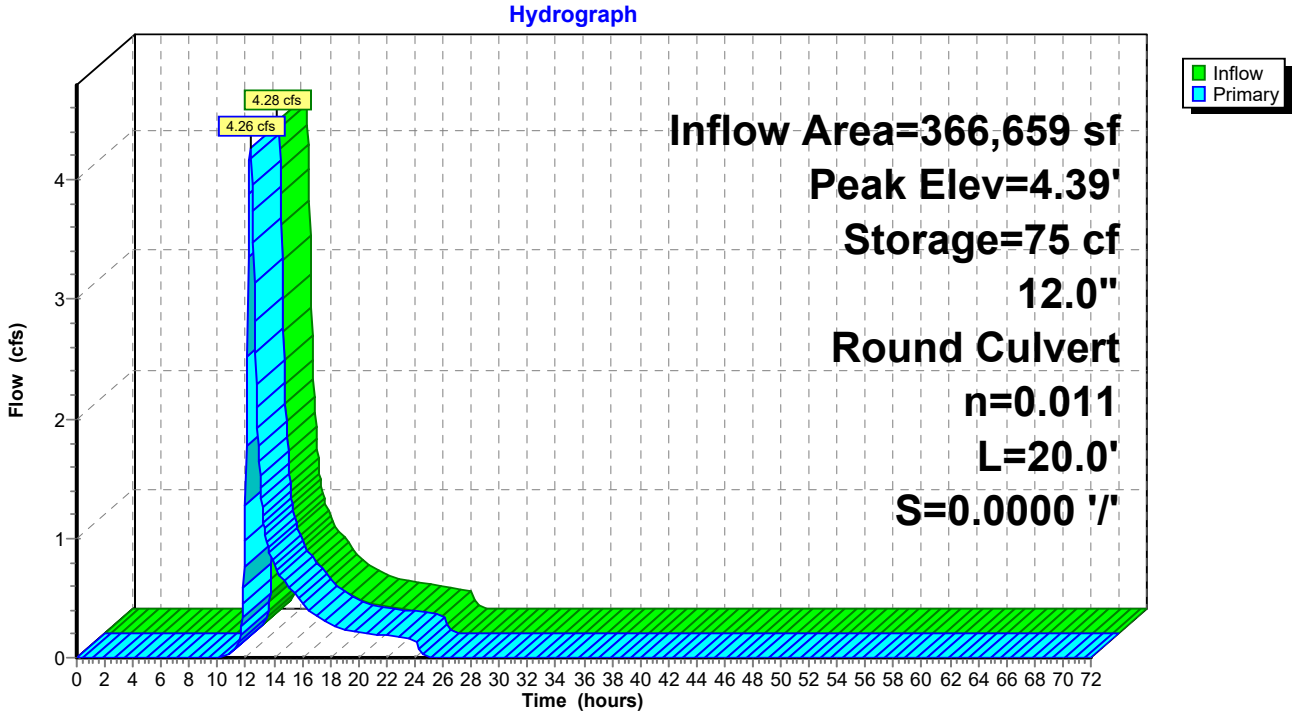
Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	4,397 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
4.00	44	40.0	22	22	131
4.50	348	192.0	86	108	2,938
5.00	5,358	771.0	1,179	1,287	47,309
5.25	21,292	781.0	3,111	4,397	48,559

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 2.50' / 2.50' S= 0.0000 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.25 cfs @ 12.31 hrs HW=4.39' (Free Discharge)
1=Culvert (Barrel Controls 4.25 cfs @ 5.42 fps)

Pond P8: Pond 8



Summary for Pond P9: Pond 9

Inflow Area = 18,401 sf, 28.03% Impervious, Inflow Depth = 0.63" for 2YR - 24HR event
Inflow = 0.19 cfs @ 12.22 hrs, Volume= 967 cf
Outflow = 0.03 cfs @ 14.65 hrs, Volume= 558 cf, Atten= 82%, Lag= 145.6 min
Primary = 0.03 cfs @ 14.65 hrs, Volume= 558 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.77' @ 14.65 hrs Surf.Area= 2,618 sf Storage= 532 cf

Plug-Flow detention time= 408.5 min calculated for 558 cf (58% of inflow)
Center-of-Mass det. time= 273.4 min (1,175.2 - 901.8)

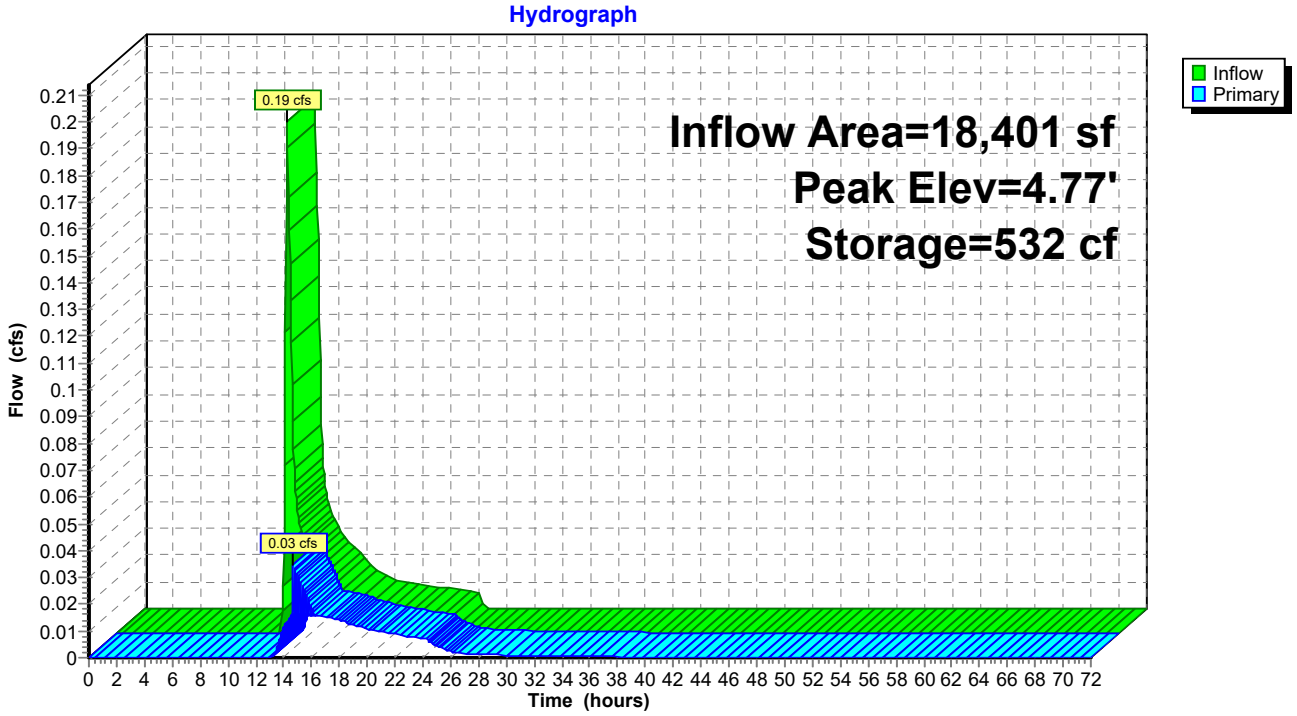
Volume	Invert	Avail.Storage	Storage Description
#1	1.60'	532 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1.60	12	12.0	0	0	12
4.45	12	12.0	34	34	46
4.50	1,258	168.0	23	57	2,281
4.75	2,618	234.0	474	532	4,393

Device	Routing	Invert	Outlet Devices
#1	Primary	4.70'	**12.0" Round Culvert** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	4.70'	**12.0" Round RCP_Round 12"** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 14.65 hrs HW=4.77' (Free Discharge)
1=Culvert (Barrel Controls 0.02 cfs @ 1.02 fps)
2=RCP_Round 12" (Barrel Controls 0.02 cfs @ 1.02 fps)

Pond P9: Pond 9

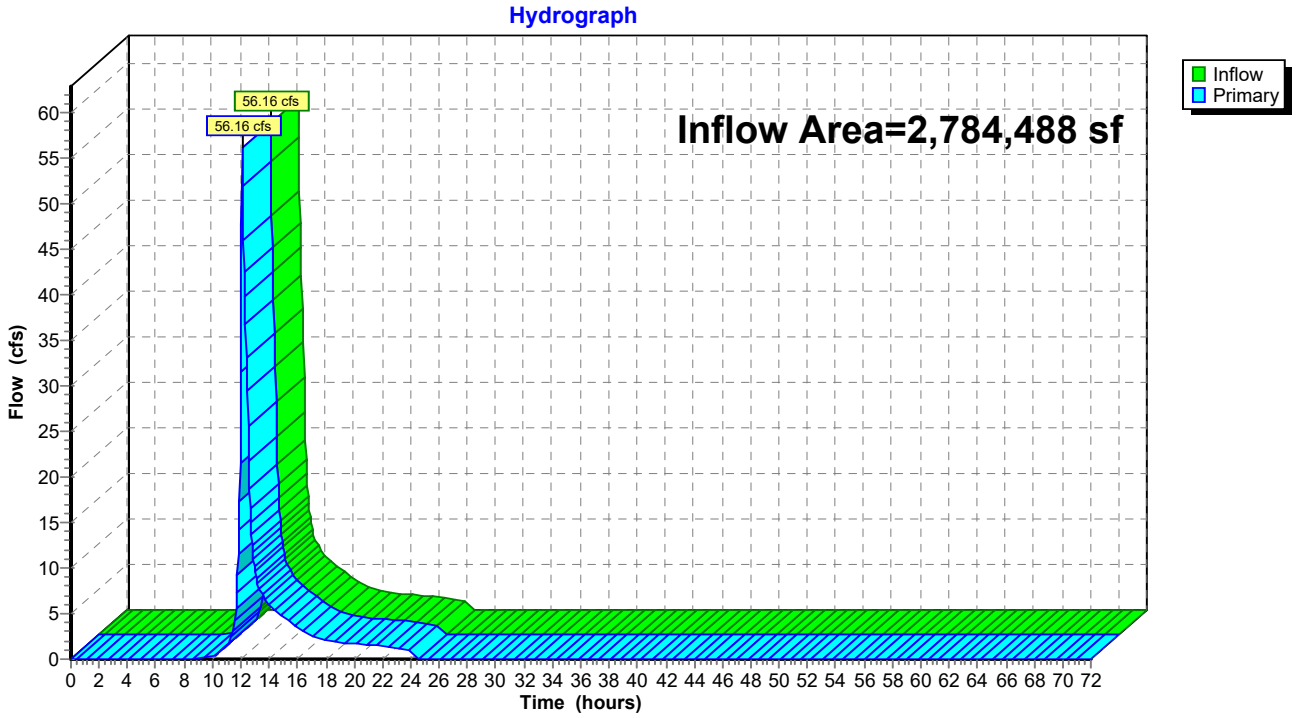


Summary for Link 1L: WEST WETL

Inflow Area = 2,784,488 sf, 39.12% Impervious, Inflow Depth = 1.04" for 2YR - 24HR event
Inflow = 56.16 cfs @ 12.11 hrs, Volume= 240,676 cf
Primary = 56.16 cfs @ 12.11 hrs, Volume= 240,676 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : TUTTLE BROOK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 1L: WEST WETL

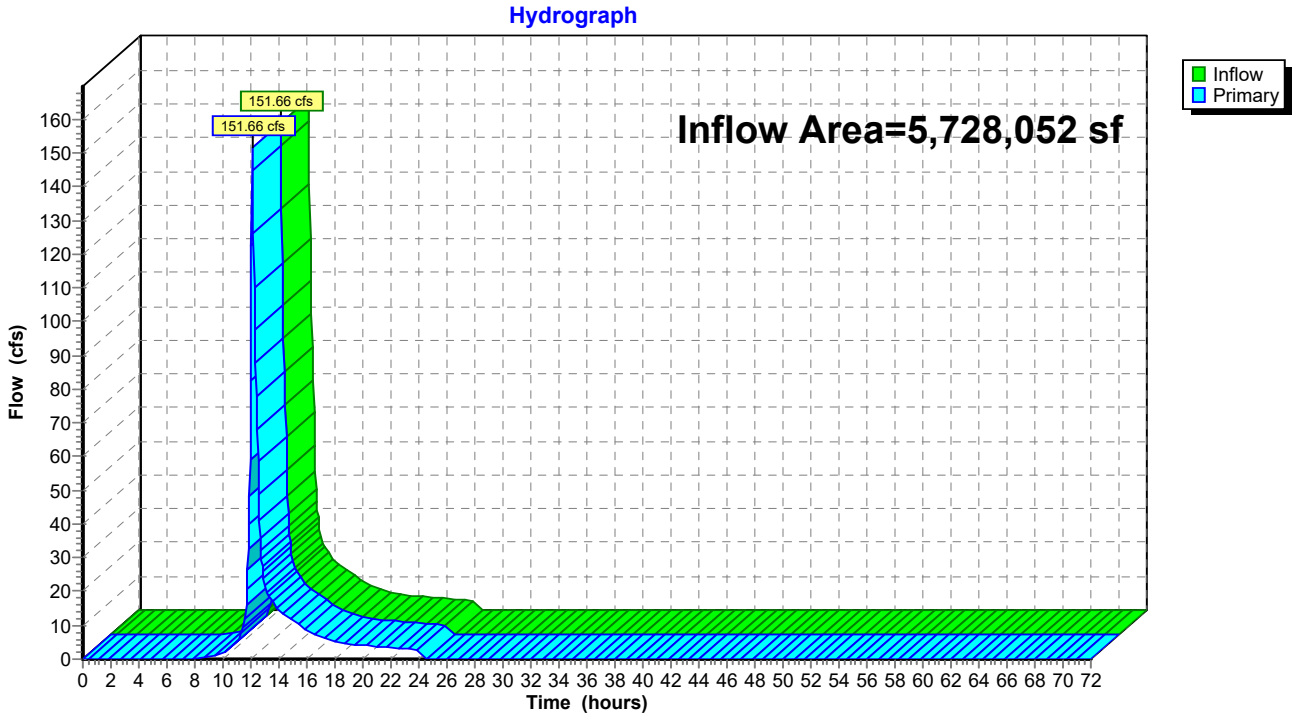


Summary for Link 2L: TUTTLE BROOK

Inflow Area = 5,728,052 sf, 28.97% Impervious, Inflow Depth = 1.29" for 2YR - 24HR event
Inflow = 151.66 cfs @ 12.12 hrs, Volume= 613,706 cf
Primary = 151.66 cfs @ 12.12 hrs, Volume= 613,706 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 2L: TUTTLE BROOK

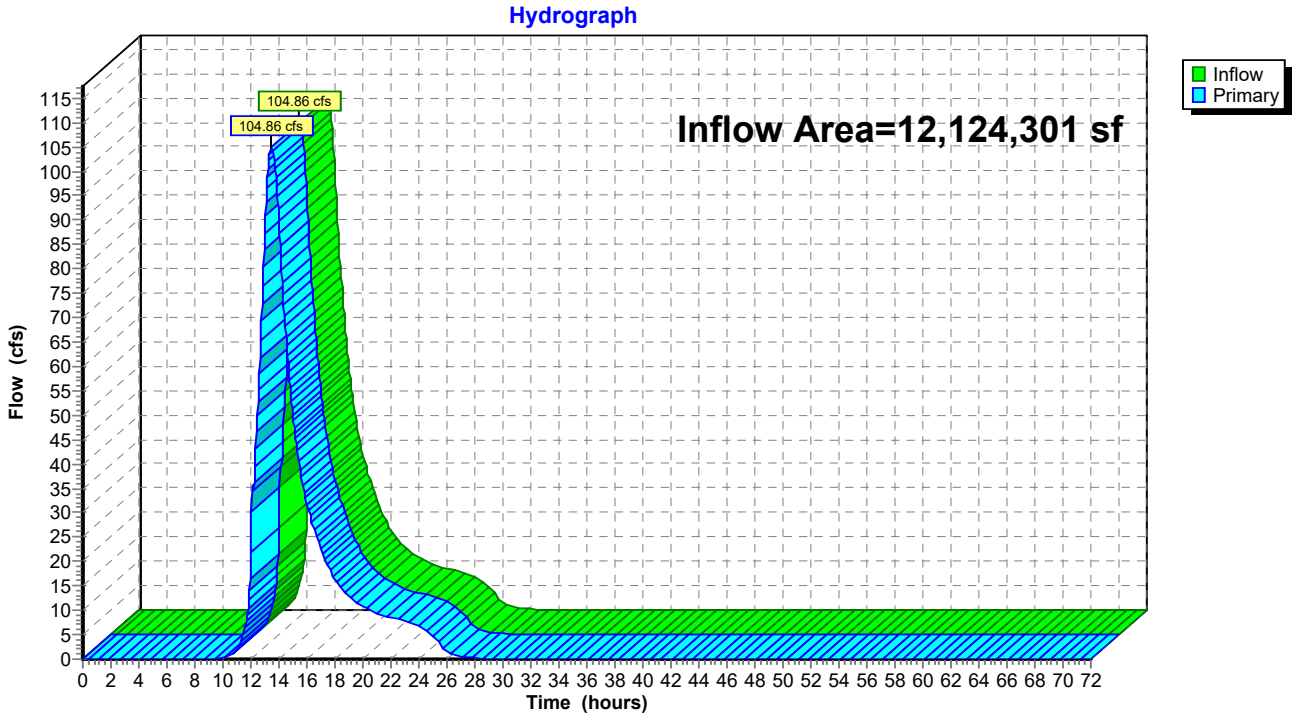


Summary for Link 3L: EAST WETL

Inflow Area = 12,124,301 sf, 40.20% Impervious, Inflow Depth = 1.37" for 2YR - 24HR event
Inflow = 104.86 cfs @ 13.48 hrs, Volume= 1,388,545 cf
Primary = 104.86 cfs @ 13.48 hrs, Volume= 1,388,545 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: EAST WETL

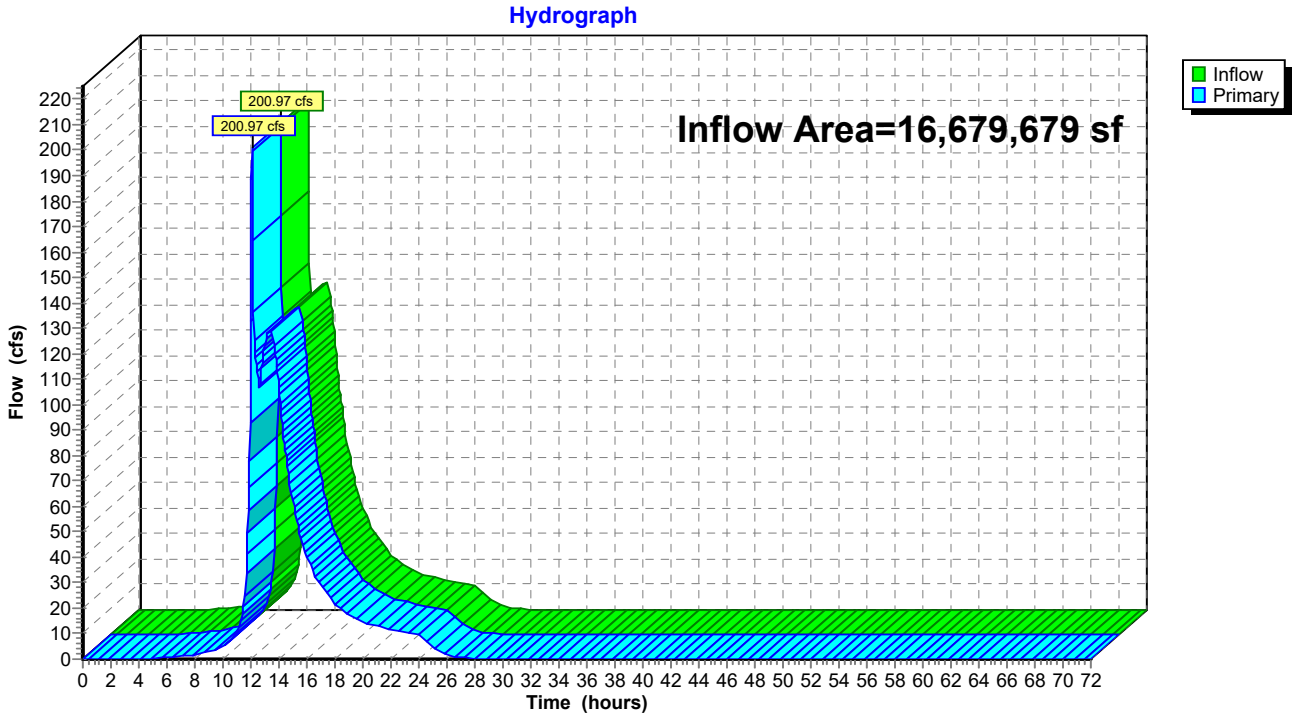


Summary for Link 4L: MORRIS CREEK

Inflow Area = 16,679,679 sf, 36.47% Impervious, Inflow Depth = 1.52" for 2YR - 24HR event
Inflow = 200.97 cfs @ 12.09 hrs, Volume= 2,113,124 cf
Primary = 200.97 cfs @ 12.09 hrs, Volume= 2,113,124 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: MORRIS CREEK



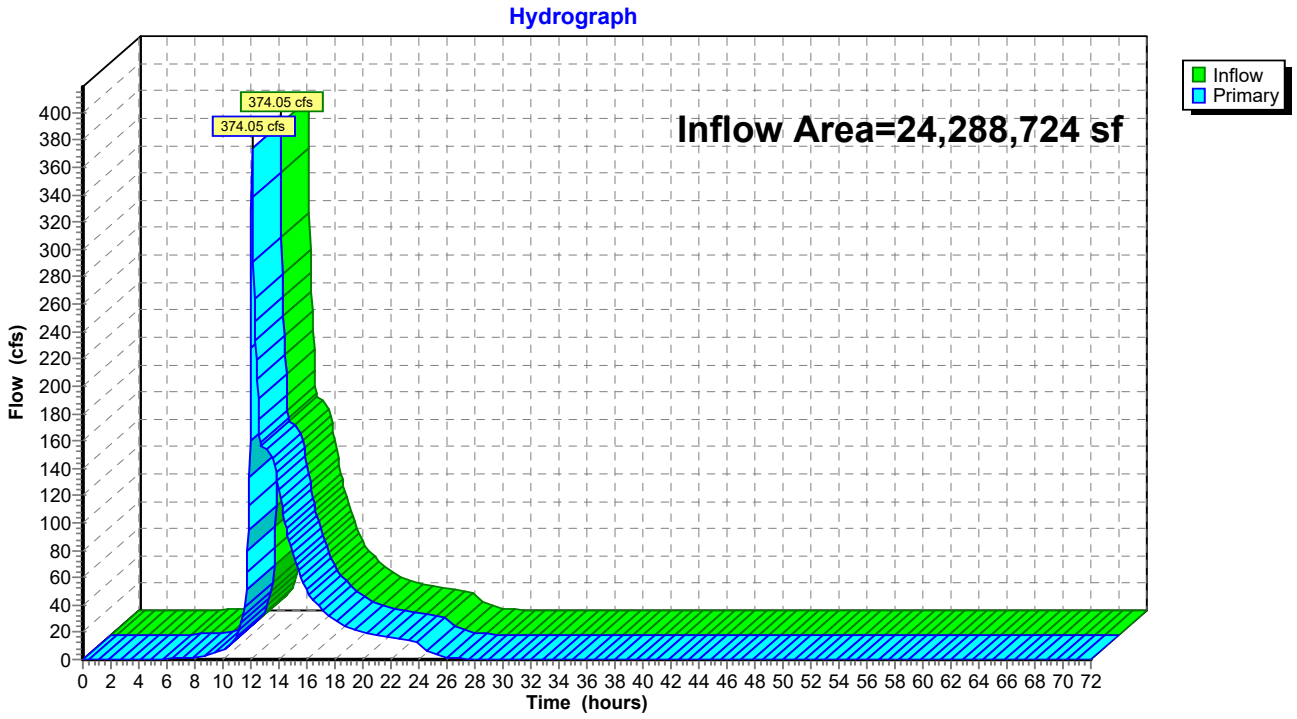
Summary for Link AP1: TIDE GATE

Inflow Area = 24,288,724 sf, 32.39% Impervious, Inflow Depth = 1.43" for 2YR - 24HR event
Inflow = 374.05 cfs @ 12.10 hrs, Volume= 2,888,861 cf
Primary = 374.05 cfs @ 12.10 hrs, Volume= 2,888,861 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 2.50'

Link AP1: TIDE GATE



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: SC 1 Runoff Area=2,006,120 sf 2.14% Impervious Runoff Depth=4.42"
Flow Length=162' Tc=5.0 min CN=93 Runoff=225.23 cfs 739,575 cf

Subcatchment2S: SC 2 Runoff Area=227,320 sf 45.94% Impervious Runoff Depth=2.91"
Flow Length=385' Tc=10.1 min CN=78 Runoff=15.33 cfs 55,088 cf

Subcatchment3S: SC 3 Runoff Area=574,521 sf 32.47% Impervious Runoff Depth=2.46"
Flow Length=294' Tc=8.0 min CN=73 Runoff=34.86 cfs 117,881 cf

Subcatchment4S: SC 4R Runoff Area=1,526,342 sf 49.57% Impervious Runoff Depth=3.00"
Tc=53.3 min CN=79 Runoff=52.02 cfs 381,668 cf

Subcatchment5S: SC 5 Runoff Area=118,275 sf 56.94% Impervious Runoff Depth=3.29"
Flow Length=256' Tc=5.0 min CN=82 Runoff=10.41 cfs 32,384 cf

Subcatchment6S: SC 6 Runoff Area=621,776 sf 28.09% Impervious Runoff Depth=2.91"
Flow Length=261' Tc=6.2 min UI Adjusted CN=78 Runoff=47.49 cfs 150,678 cf

Subcatchment7A: SC 7 Runoff Area=80,542 sf 58.79% Impervious Runoff Depth=3.38"
Flow Length=445' Tc=8.2 min CN=83 Runoff=6.67 cfs 22,706 cf

Subcatchment7S: SC 7 Runoff Area=341,390 sf 27.45% Impervious Runoff Depth=1.89"
Flow Length=383' Tc=9.9 min UI Adjusted CN=66 Runoff=14.47 cfs 53,658 cf

Subcatchment8A: SC 8A Runoff Area=239,688 sf 24.36% Impervious Runoff Depth=1.89"
Flow Length=292' Tc=8.2 min UI Adjusted CN=66 Runoff=10.60 cfs 37,673 cf

Subcatchment8S: SC 8 Runoff Area=122,063 sf 47.26% Impervious Runoff Depth=2.91"
Flow Length=134' Tc=5.0 min CN=78 Runoff=9.56 cfs 29,580 cf

Subcatchment9S: SC Culvert Runoff Area=212.980 ac 41.97% Impervious Runoff Depth=3.00"
Tc=110.6 min CN=79 Runoff=197.56 cfs 2,319,855 cf

Subcatchment14S: SC 14 Runoff Area=351,203 sf 11.14% Impervious Runoff Depth=0.37"
Flow Length=426' Tc=15.4 min UI Adjusted CN=42 Runoff=1.04 cfs 10,952 cf

Subcatchment15S: SC 15 Runoff Area=972,159 sf 37.92% Impervious Runoff Depth=2.21"
Flow Length=706' Tc=19.9 min CN=70 Runoff=38.18 cfs 178,912 cf

Subcatchment16A: SC 16A Runoff Area=591,011 sf 44.08% Impervious Runoff Depth=2.82"
Flow Length=629' Tc=6.5 min CN=77 Runoff=43.37 cfs 138,717 cf

Subcatchment16S: SC 16 Runoff Area=189,563 sf 36.68% Impervious Runoff Depth=2.64"
Flow Length=446' Tc=7.7 min CN=75 Runoff=12.51 cfs 41,657 cf

Subcatchment17S: SC 17 Runoff Area=428,788 sf 58.89% Impervious Runoff Depth=3.38"
Flow Length=297' Tc=5.0 min CN=83 Runoff=39.01 cfs 120,880 cf

Subcatchment18S: SC 18 Runoff Area=1,339,230 sf 14.98% Impervious Runoff Depth=3.58"
Flow Length=461' Tc=10.4 min UI Adjusted CN=85 Runoff=109.07 cfs 399,674 cf

Subcatchment19S: SC 19 Runoff Area=640,204 sf 11.38% Impervious Runoff Depth=3.38"
Flow Length=229' Tc=5.6 min UI Adjusted CN=83 Runoff=57.20 cfs 180,481 cf

Subcatchment20S: SC 20 Runoff Area=421,231 sf 20.14% Impervious Runoff Depth=2.46"
Flow Length=414' Tc=8.0 min UI Adjusted CN=73 Runoff=25.56 cfs 86,429 cf

Subcatchment21S: SC 21 Runoff Area=229,029 sf 10.34% Impervious Runoff Depth=2.46"
Flow Length=497' Tc=9.9 min UI Adjusted CN=73 Runoff=13.07 cfs 46,993 cf

Subcatchment22S: SC 22 Runoff Area=253,454 sf 5.23% Impervious Runoff Depth=2.29"
Flow Length=356' Tc=21.8 min UI Adjusted CN=71 Runoff=10.00 cfs 48,407 cf

Subcatchment23S: SC 23 Runoff Area=441,014 sf 0.00% Impervious Runoff Depth=2.64"
Flow Length=383' Tc=20.2 min CN=75 Runoff=20.87 cfs 96,915 cf

Subcatchment24S: SC 24 Runoff Area=328,915 sf 0.00% Impervious Runoff Depth=2.46"
Flow Length=381' Tc=31.5 min CN=73 Runoff=11.95 cfs 67,487 cf

Subcatchment27S: SC 27 Runoff Area=207,350 sf 1.82% Impervious Runoff Depth=1.58"
Flow Length=323' Tc=7.8 min CN=62 Runoff=7.62 cfs 27,340 cf

Subcatchment28S: SC 28 Runoff Area=22,258 sf 18.08% Impervious Runoff Depth=1.73"
Flow Length=54' Slope=0.0110 '/' Tc=7.5 min UI Adjusted CN=64 Runoff=0.92 cfs 3,212 cf

SubcatchmentDS1: Ditch Segment 1 Runoff Area=412,198 sf 28.62% Impervious Runoff Depth=2.13"
Flow Length=1,385' Tc=13.4 min UI Adjusted CN=69 Runoff=18.08 cfs 73,032 cf

SubcatchmentDS2: Ditch Segment 2 Runoff Area=366,199 sf 54.34% Impervious Runoff Depth=3.29"
Flow Length=790' Tc=16.5 min CN=82 Runoff=23.40 cfs 100,265 cf

SubcatchmentDS3: Ditch Segment 3 Runoff Area=252,713 sf 15.46% Impervious Runoff Depth=1.51"
Flow Length=680' Tc=34.0 min UI Adjusted CN=61 Runoff=5.04 cfs 31,784 cf

SubcatchmentN10: DA-N10 Runoff Area=18,401 sf 28.03% Impervious Runoff Depth=1.73"
Flow Length=137' Tc=13.2 min UI Adjusted CN=64 Runoff=0.64 cfs 2,656 cf

SubcatchmentN12: DA-N12 Runoff Area=176,144 sf 15.13% Impervious Runoff Depth=2.73"
Flow Length=630' Tc=15.0 min UI Adjusted CN=76 Runoff=9.73 cfs 40,017 cf

SubcatchmentN13: DA-N13 Runoff Area=82,503 sf 17.65% Impervious Runoff Depth=0.47"
Flow Length=665' Tc=19.3 min UI Adjusted CN=44 Runoff=0.34 cfs 3,215 cf

SubcatchmentN14: DA-N14 Runoff Area=185,324 sf 24.56% Impervious Runoff Depth=1.89"
Flow Length=609' Tc=32.7 min UI Adjusted CN=66 Runoff=4.91 cfs 29,129 cf

SubcatchmentN15: DA-N15 Runoff Area=95,816 sf 37.69% Impervious Runoff Depth=2.64"
Flow Length=438' Tc=14.7 min CN=75 Runoff=5.15 cfs 21,056 cf

Subcatchment N2: DA-N2 Runoff Area=169,261 sf 49.91% Impervious Runoff Depth=2.91"
Flow Length=644' Tc=11.0 min CN=78 Runoff=11.14 cfs 41,018 cf

Subcatchment N3: DA-N3 Runoff Area=80,876 sf 37.79% Impervious Runoff Depth=2.46"
Flow Length=425' Tc=16.6 min CN=73 Runoff=3.85 cfs 16,594 cf

Subcatchment N4: DA-N4 Runoff Area=57,929 sf 17.47% Impervious Runoff Depth=1.81"
Flow Length=122' Tc=9.2 min CN=65 Runoff=2.38 cfs 8,730 cf

Subcatchment N5: DA-N5 Runoff Area=260,989 sf 33.14% Impervious Runoff Depth=2.29"
Flow Length=985' Tc=166.5 min CN=71 Runoff=3.13 cfs 49,846 cf

Subcatchment N6: DA-N6 Runoff Area=52,606 sf 20.20% Impervious Runoff Depth=1.58"
Flow Length=181' Tc=7.9 min UI Adjusted CN=62 Runoff=1.92 cfs 6,936 cf

Subcatchment N7: DA-N7 Runoff Area=336,441 sf 68.89% Impervious Runoff Depth=3.68"
Flow Length=1,058' Tc=86.5 min CN=86 Runoff=10.38 cfs 103,237 cf

Subcatchment N8: DA-N8 Runoff Area=67,118 sf 34.62% Impervious Runoff Depth=2.38"
Flow Length=214' Tc=13.0 min CN=72 Runoff=3.36 cfs 13,292 cf

Subcatchment N9: DA-N9 Runoff Area=123,351 sf 23.76% Impervious Runoff Depth=1.66"
Flow Length=368' Tc=34.5 min UI Adjusted CN=63 Runoff=2.74 cfs 17,027 cf

Reach 1R: WQS Segment 1 Avg. Flow Depth=1.51' Max Vel=1.50 fps Inflow=29.89 cfs 237,615 cf
n=0.022 L=1,255.0' S=0.0005 '/' Capacity=98.41 cfs Outflow=23.82 cfs 237,615 cf

Reach 2R: WQS Segment 2 Avg. Flow Depth=1.96' Max Vel=1.74 fps Inflow=43.35 cfs 337,880 cf
n=0.022 L=760.0' S=0.0005 '/' Capacity=99.31 cfs Outflow=40.49 cfs 337,880 cf

Reach 3R: WQS Segment 3 Avg. Flow Depth=2.23' Max Vel=1.85 fps Inflow=56.51 cfs 434,867 cf
n=0.022 L=610.0' S=0.0005 '/' Capacity=98.14 cfs Outflow=52.50 cfs 434,867 cf

Pond CB1: Exist CB Peak Elev=2.70' Inflow=1.04 cfs 10,952 cf
36.0" Round Culvert n=0.013 L=845.0' S=0.0009 '/' Outflow=1.04 cfs 10,952 cf

Pond CB10: Exist CB Peak Elev=8.59' Inflow=41.53 cfs 140,587 cf
24.0" Round Culvert n=0.012 L=152.0' S=0.0013 '/' Outflow=41.53 cfs 140,587 cf

Pond CB11: Exist CB Peak Elev=5.01' Inflow=15.33 cfs 55,088 cf
18.0" Round Culvert n=0.012 L=148.0' S=0.0014 '/' Outflow=15.33 cfs 55,088 cf

Pond CB2: Exist CB Peak Elev=17.84' Inflow=11.18 cfs 44,233 cf
15.0" Round Culvert n=0.011 L=658.0' S=0.0014 '/' Outflow=11.18 cfs 44,233 cf

Pond CB3: Exist CB Peak Elev=259.10' Inflow=12.51 cfs 41,657 cf
10.0" Round Culvert n=0.025 L=200.0' S=0.0110 '/' Outflow=12.51 cfs 41,657 cf

Pond CB4: Exist CB Peak Elev=44.68' Inflow=43.37 cfs 138,717 cf
18.0" Round Culvert n=0.012 L=200.0' S=0.0244 '/' Outflow=43.37 cfs 138,717 cf

Pond CB5: Exist CB Peak Elev=15.41' Inflow=3.13 cfs 49,846 cf
12.0" Round Culvert n=0.025 L=497.0' S=0.0031 '/' Outflow=3.13 cfs 49,846 cf

Pond CB6: Exist CB Peak Elev=71.10' Inflow=9.56 cfs 29,580 cf
12.0" Round Culvert n=0.025 L=249.0' S=0.0010 '/' Outflow=9.56 cfs 29,580 cf

Pond CB7: Exist CB Peak Elev=40.66' Inflow=10.60 cfs 37,673 cf
15.0" Round Culvert n=0.025 L=380.0' S=0.0016 '/' Outflow=10.60 cfs 37,673 cf

Pond CB8: Exist CB Peak Elev=41.63' Inflow=24.93 cfs 91,332 cf
18.0" Round Culvert n=0.012 L=787.0' S=0.0021 '/' Outflow=24.93 cfs 91,332 cf

Pond CB9: Exist CB Peak Elev=1.08' Inflow=6.67 cfs 22,706 cf
24.0" Round Culvert n=0.012 L=1,029.0' S=0.0008 '/' Outflow=6.67 cfs 22,706 cf

Pond Cr-B: Robinson Driveway Peak Elev=3.38' Inflow=23.82 cfs 237,615 cf
Outflow=23.82 cfs 237,615 cf

Pond Cr-CD: Utility Crossing Peak Elev=3.42' Inflow=40.49 cfs 337,880 cf
Outflow=40.49 cfs 337,880 cf

Pond MH1: Exist MH Peak Elev=13.91' Inflow=9.72 cfs 79,426 cf
18.0" Round Culvert n=0.025 L=400.0' S=0.0021 '/' Outflow=9.72 cfs 79,426 cf

Pond P1: Pond 1 Peak Elev=3.41' Storage=9,190 cf Inflow=10.97 cfs 141,427 cf
Discarded=0.99 cfs 16,862 cf Primary=9.21 cfs 124,565 cf Outflow=10.20 cfs 141,427 cf

Pond P10: Wetland Ditch Peak Elev=3.57' Storage=3,244 cf Inflow=13.57 cfs 164,582 cf
Outflow=13.14 cfs 164,582 cf

Pond P2: Pond 2 Peak Elev=4.32' Storage=1,826 cf Inflow=3.85 cfs 16,594 cf
Discarded=0.21 cfs 936 cf Primary=2.42 cfs 15,658 cf Outflow=2.63 cfs 16,594 cf

Pond P3: Pond 3 Peak Elev=3.88' Storage=9,210 cf Inflow=10.93 cfs 118,640 cf
Discarded=0.81 cfs 9,899 cf Primary=8.44 cfs 108,741 cf Outflow=9.25 cfs 118,640 cf

Pond P4: Pond 4 Peak Elev=3.98' Storage=502 cf Inflow=2.38 cfs 8,730 cf
Discarded=0.07 cfs 191 cf Primary=1.79 cfs 8,539 cf Outflow=1.86 cfs 8,730 cf

Pond P5: Pond 5 Peak Elev=3.62' Storage=166 cf Inflow=1.92 cfs 6,936 cf
Discarded=0.03 cfs 71 cf Primary=1.73 cfs 6,865 cf Outflow=1.76 cfs 6,936 cf

Pond P6: Pond 6 Peak Elev=3.19' Storage=1,423 cf Inflow=7.21 cfs 42,171 cf
Discarded=0.21 cfs 341 cf Primary=5.79 cfs 41,882 cf Outflow=6.00 cfs 42,224 cf

Pond P7: Pond 7 Peak Elev=3.83' Storage=855 cf Inflow=3.36 cfs 13,292 cf
Discarded=0.10 cfs 249 cf Primary=2.45 cfs 13,043 cf Outflow=2.55 cfs 13,292 cf

Pond P8: Pond 8 Peak Elev=12.07' Storage=4,397 cf Inflow=10.99 cfs 65,185 cf
12.0" Round Culvert n=0.011 L=20.0' S=0.0000 '/' Outflow=11.40 cfs 65,203 cf

Pond P9: Pond 9 Peak Elev=5.08' Storage=532 cf Inflow=0.64 cfs 2,656 cf
Outflow=0.91 cfs 2,247 cf

Link 1L: WEST WETL Inflow=124.67 cfs 535,353 cf
Primary=124.67 cfs 535,353 cf

Link 2L: TUTTLE BROOK Inflow=317.02 cfs 1,286,266 cf
Primary=317.02 cfs 1,286,266 cf

Link 3L: EAST WETL Inflow=225.13 cfs 2,905,400 cf
Primary=225.13 cfs 2,905,400 cf

Link 4L: MORRIS CREEK Inflow=388.79 cfs 4,257,914 cf
Primary=388.79 cfs 4,257,914 cf

Link AP1: TIDE GATE Inflow=767.51 cfs 5,917,751 cf
Primary=767.51 cfs 5,917,751 cf

Total Runoff Area = 24,288,724 sf Runoff Volume = 5,946,640 cf Average Runoff Depth = 2.94"
67.61% Pervious = 16,420,958 sf 32.39% Impervious = 7,867,766 sf

Summary for Subcatchment 1S: SC 1

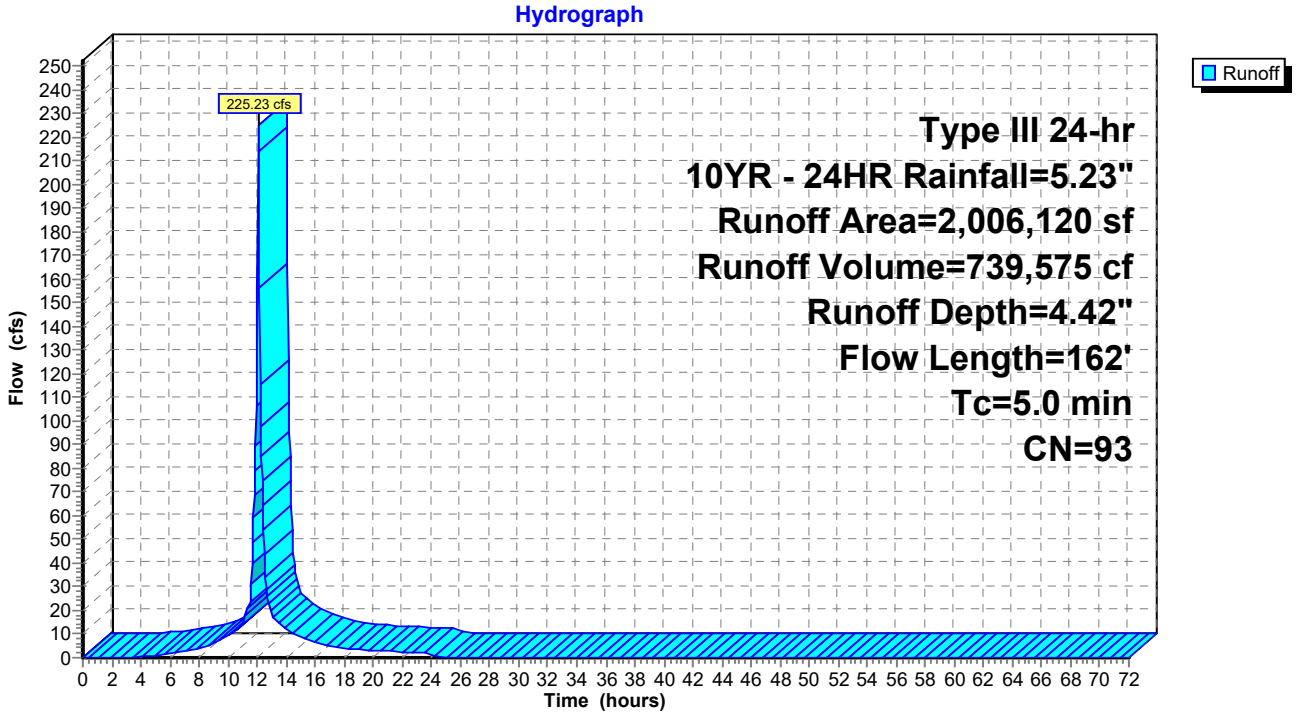
Runoff = 225.23 cfs @ 12.07 hrs, Volume= 739,575 cf, Depth= 4.42"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	220,568	80	>75% Grass cover, Good, HSG D
	42,541	96	Gravel surface, HSG D
	176,389	98	Water Surface, 0% imp, HSG D
	0	98	Unconnected pavement, HSG A
	43,007	98	Unconnected pavement, HSG D
	248,525	77	Woods, Good, HSG D
*	1,275,090	98	Wetland/Water Surface, 0% imp, HSG D
	2,006,120	93	Weighted Average
	1,963,113		97.86% Pervious Area
	43,007		2.14% Impervious Area
	43,007		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	23	0.0130	0.88		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	34	0.0289	1.19		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.5	105	0.0197	0.70		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.6					**Direct Entry, Minimum**
5.0	162	Total			

Subcatchment 1S: SC 1



Summary for Subcatchment 2S: SC 2

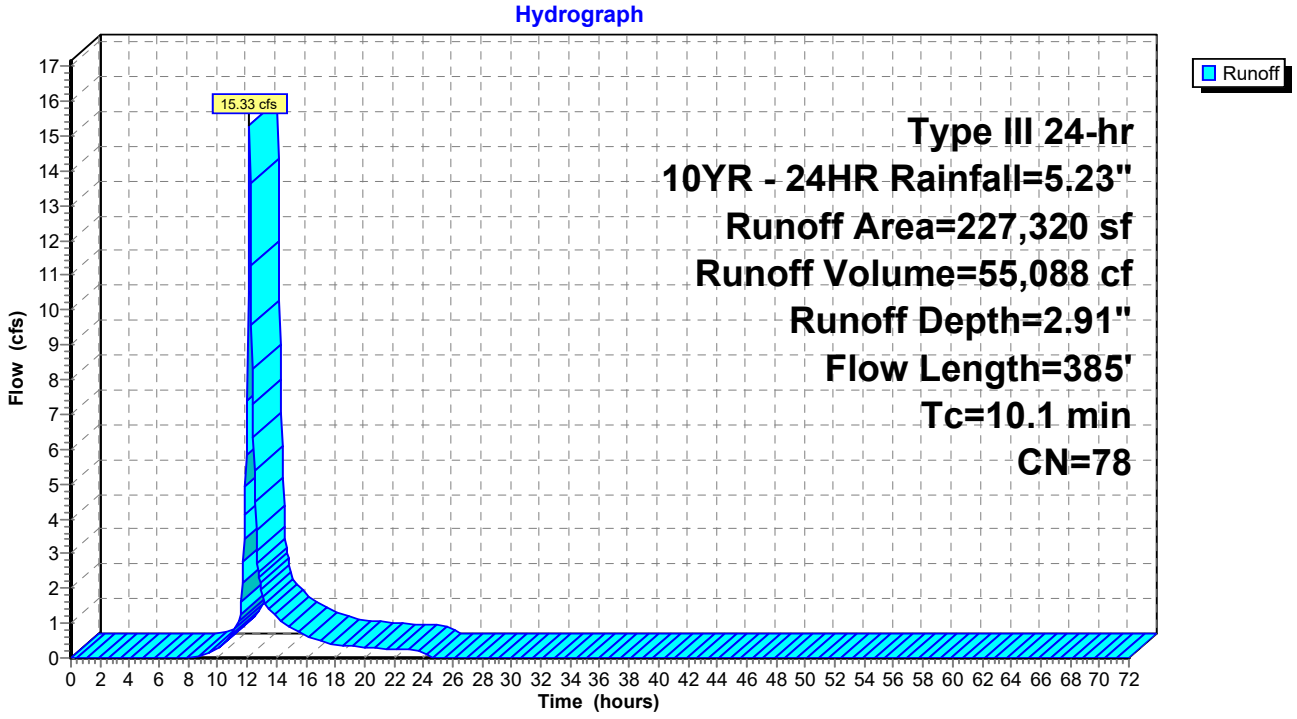
Runoff = 15.33 cfs @ 12.15 hrs, Volume= 55,088 cf, Depth= 2.91"
Routed to Pond CB11 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
122,890	61	>75% Grass cover, Good, HSG B
104,430	98	Unconnected pavement, HSG B
227,320	78	Weighted Average
122,890		54.06% Pervious Area
104,430		45.94% Impervious Area
104,430		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	67	0.0119	1.05		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.0	318	0.0070	0.59		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
10.1	385	Total			

Subcatchment 2S: SC 2



Summary for Subcatchment 3S: SC 3

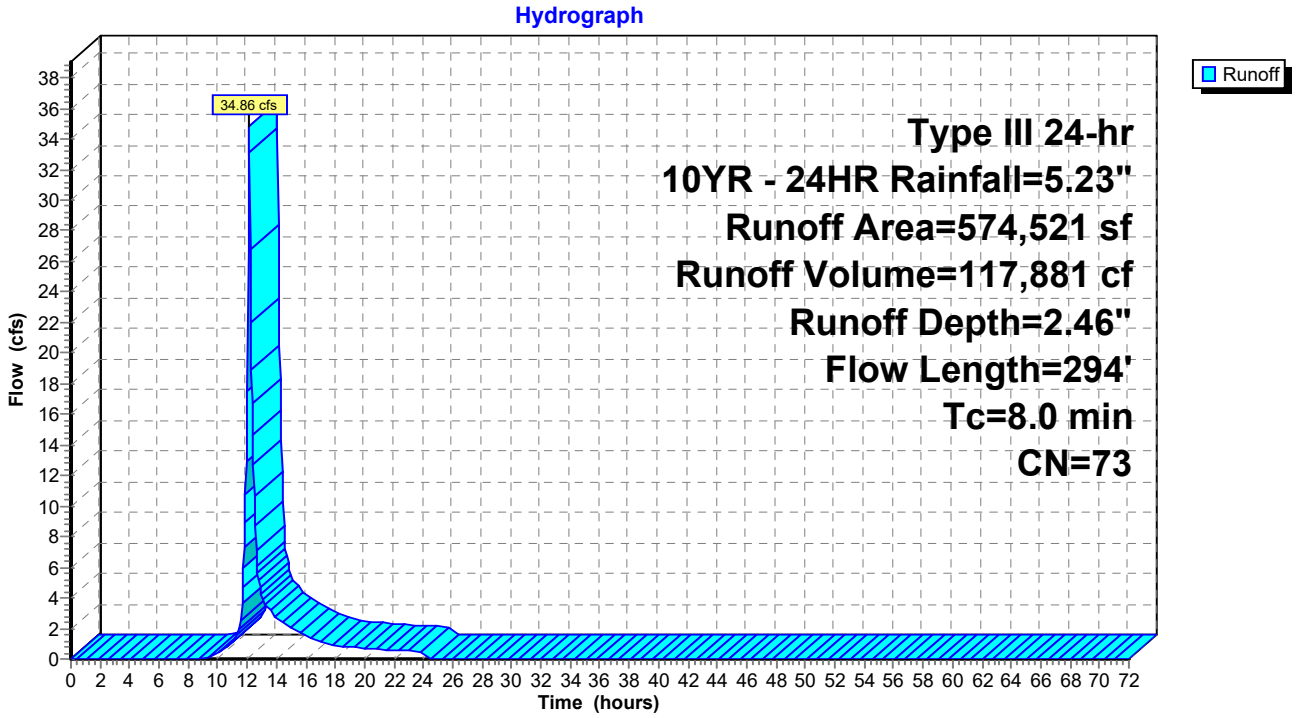
Runoff = 34.86 cfs @ 12.12 hrs, Volume= 117,881 cf, Depth= 2.46"
Routed to Pond CB10 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
388,000	61	>75% Grass cover, Good, HSG B
186,521	98	Unconnected pavement, HSG B
574,521	73	Weighted Average
388,000		67.53% Pervious Area
186,521		32.47% Impervious Area
186,521		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0122	1.15		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.0	6	0.0176	2.69		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.5	188	0.0048	0.48		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
8.0	294	Total			

Subcatchment 3S: SC 3



Summary for Subcatchment 4S: SC 4R

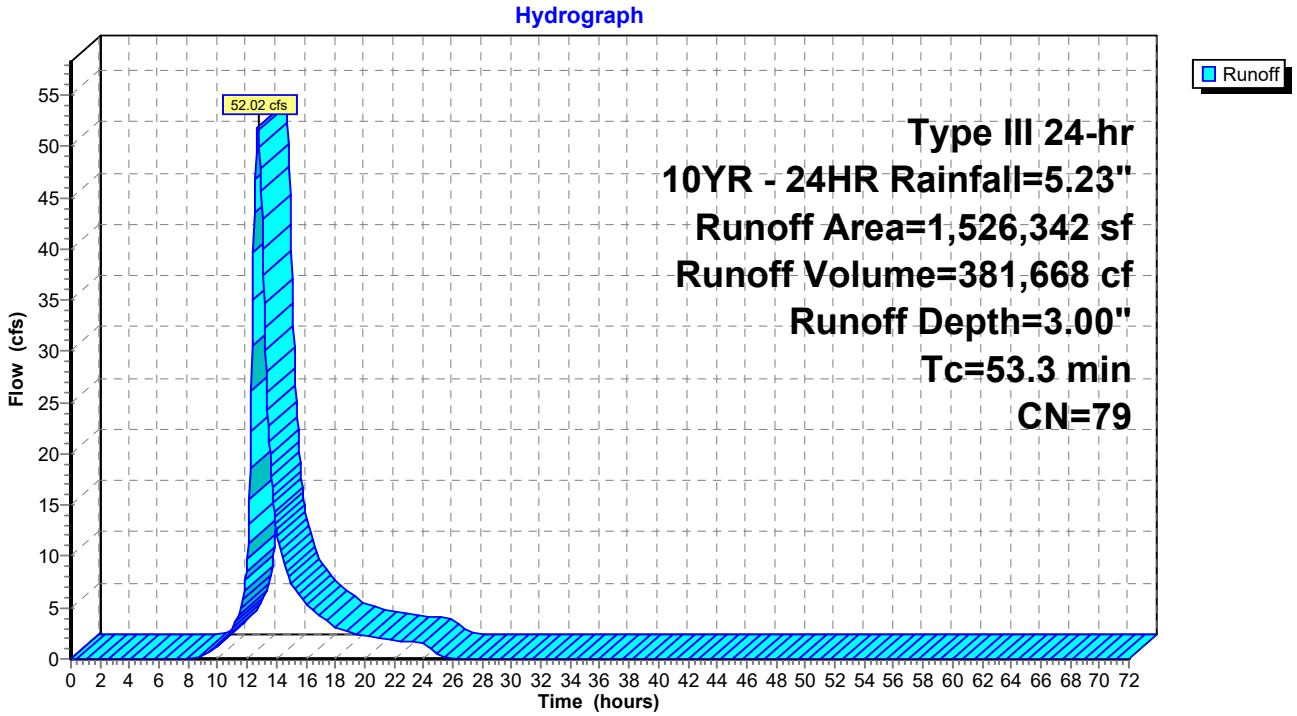
Runoff = 52.02 cfs @ 12.73 hrs, Volume= 381,668 cf, Depth= 3.00"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	769,705	61	>75% Grass cover, Good, HSG B
	22,651	98	Unconnected pavement, HSG B
*	284,447	98	Wetland/Water Surface, HSG B
*	449,539	98	Wetland/Water Surface. HSG D
	1,526,342	79	Weighted Average
	769,705		50.43% Pervious Area
	756,637		49.57% Impervious Area
	22,651		2.99% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.3					**Direct Entry, See Calculation Sheet**

Subcatchment 4S: SC 4R



Summary for Subcatchment 5S: SC 5

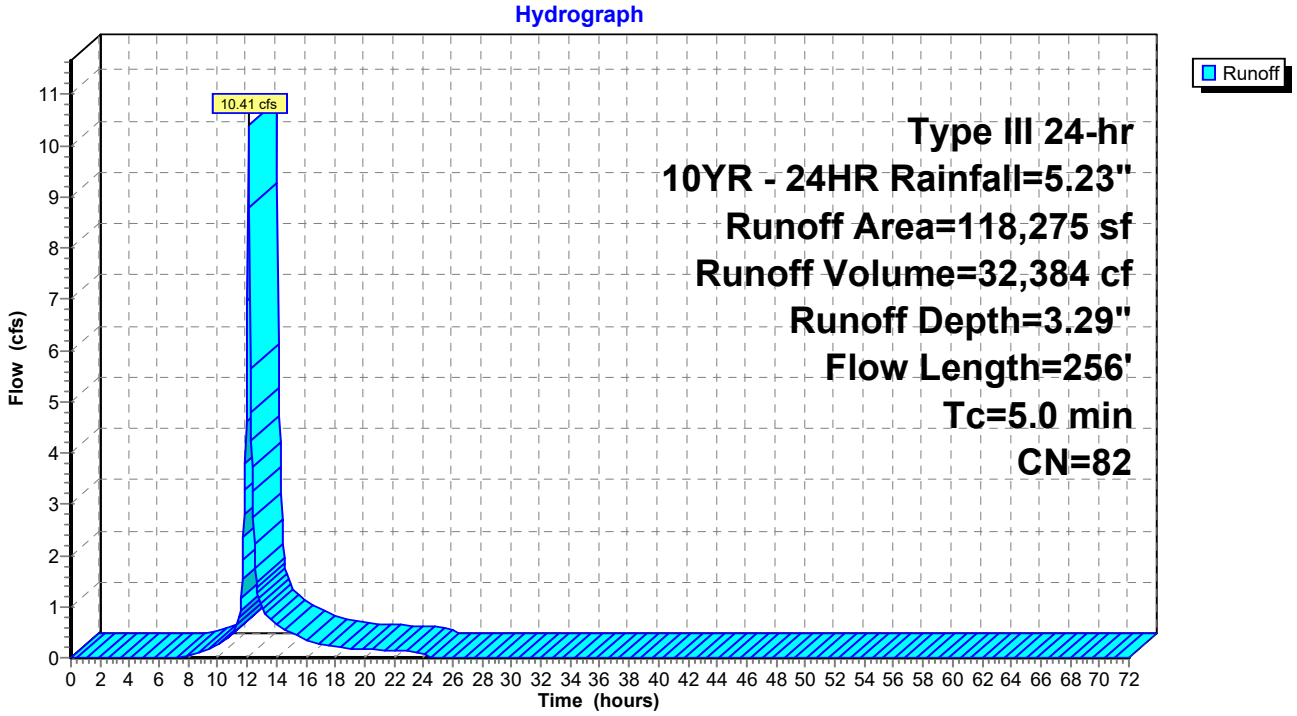
Runoff = 10.41 cfs @ 12.08 hrs, Volume= 32,384 cf, Depth= 3.29"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
50,931	61	>75% Grass cover, Good, HSG B
617	98	Unconnected pavement, HSG B
66,727	98	Unconnected pavement, HSG D
118,275	82	Weighted Average
50,931		43.06% Pervious Area
67,344		56.94% Impervious Area
67,344		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0073	0.93		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.1	12	0.0120	2.22		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.4	32	0.0434	1.46		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
2.5	112	0.0014	0.76		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
0.2					**Direct Entry, Minimum**
5.0	256	Total			

Subcatchment 5S: SC 5



Summary for Subcatchment 6S: SC 6

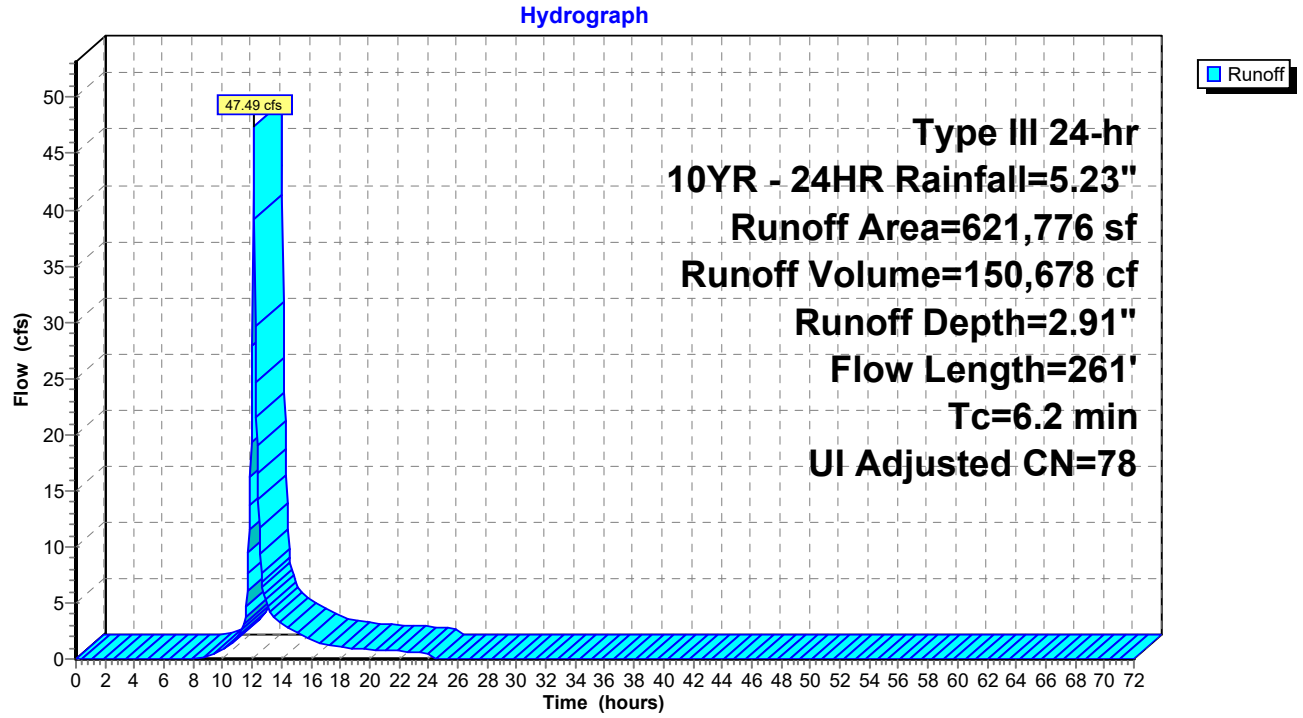
Runoff = 47.49 cfs @ 12.10 hrs, Volume= 150,678 cf, Depth= 2.91"
Routed to Link 3L : EAST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	282,812	61		>75% Grass cover, Good, HSG B
	0	98		Unconnected pavement, HSG A
	174,659	98		Unconnected pavement, HSG D
*	164,305	98		Wetland/Water Surface, 0% imp, HSG B
	621,776	81	78	Weighted Average, UI Adjusted
	447,117			71.91% Pervious Area
	174,659			28.09% Impervious Area
	174,659			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	78	0.0101	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.9	183	0.0080	0.63		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	261	Total			

Subcatchment 6S: SC 6



Summary for Subcatchment 7A: SC 7

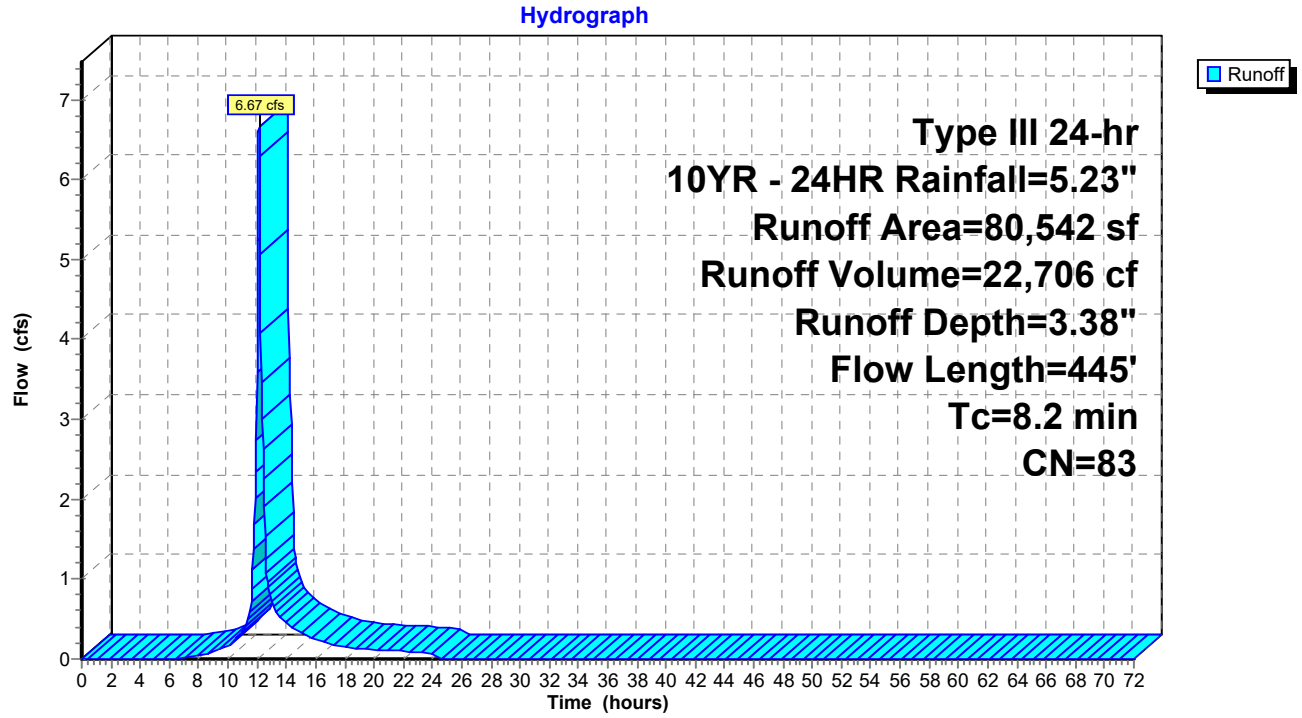
Runoff = 6.67 cfs @ 12.12 hrs, Volume= 22,706 cf, Depth= 3.38"
Routed to Pond CB9 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
33,190	61	>75% Grass cover, Good, HSG B
47,352	98	Unconnected pavement, HSG D
80,542	83	Weighted Average
33,190		41.21% Pervious Area
47,352		58.79% Impervious Area
47,352		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	75	0.0095	0.98		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.3	20	0.0255	1.12		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.6	350	0.0019	0.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	445	Total			

Subcatchment 7A: SC 7



Summary for Subcatchment 7S: SC 7

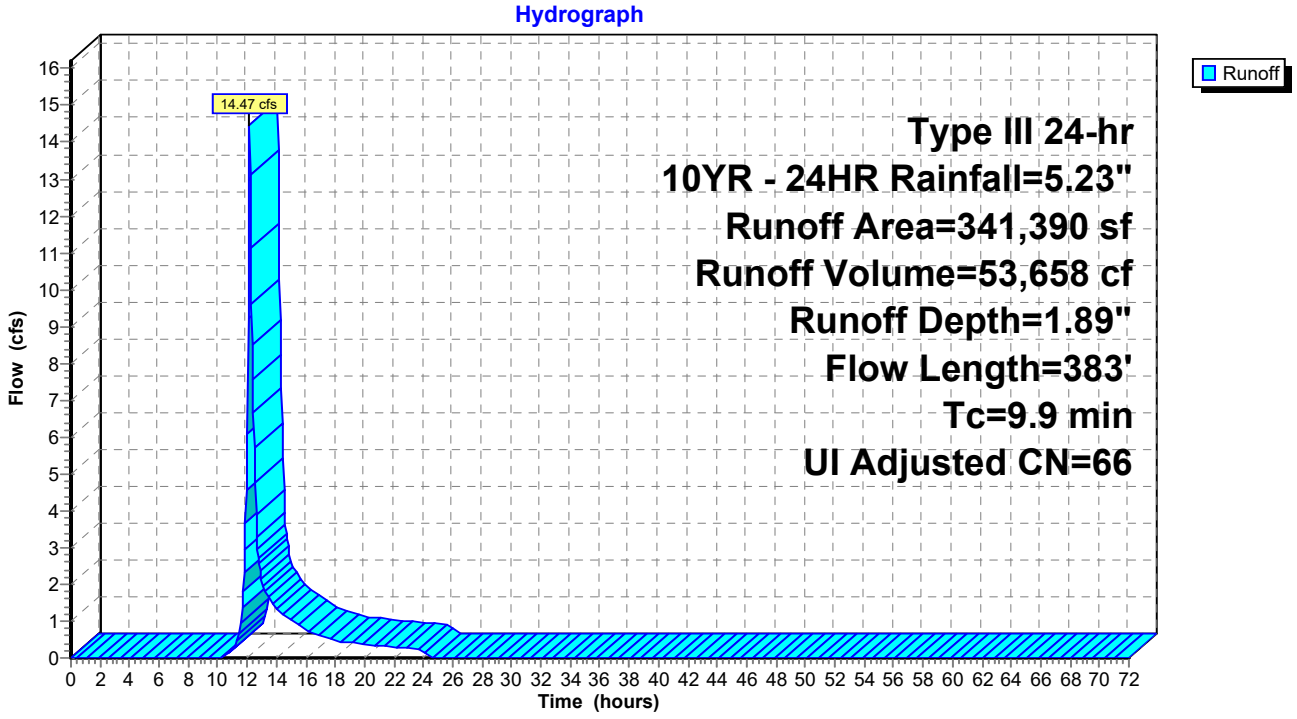
Runoff = 14.47 cfs @ 12.15 hrs, Volume= 53,658 cf, Depth= 1.89"
Routed to Pond CB8 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
247,681	61		>75% Grass cover, Good, HSG B
93,709	98		Unconnected pavement, HSG D
341,390	71	66	Weighted Average, UI Adjusted
247,681			72.55% Pervious Area
93,709			27.45% Impervious Area
93,709			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	72	0.0041	0.69		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
8.2	311	0.0081	0.63		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.9	383	Total			

Subcatchment 7S: SC 7



Summary for Subcatchment 8A: SC 8A

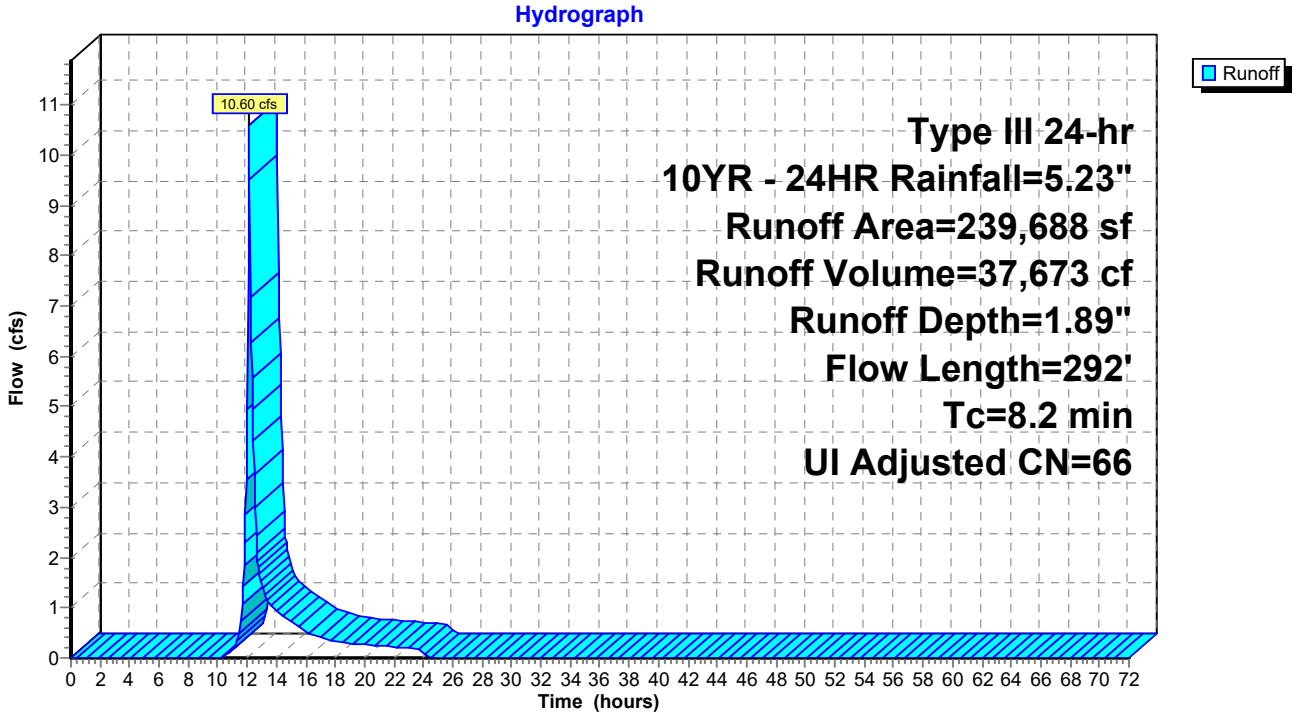
Runoff = 10.60 cfs @ 12.13 hrs, Volume= 37,673 cf, Depth= 1.89"
Routed to Pond CB7 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
181,295	61		>75% Grass cover, Good, HSG B
58,393	98		Unconnected pavement, HSG D
239,688	70	66	Weighted Average, UI Adjusted
181,295			75.64% Pervious Area
58,393			24.36% Impervious Area
58,393			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0101	0.93		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	240	0.0061	0.55		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.2	292	Total			

Subcatchment 8A: SC 8A



Summary for Subcatchment 8S: SC 8

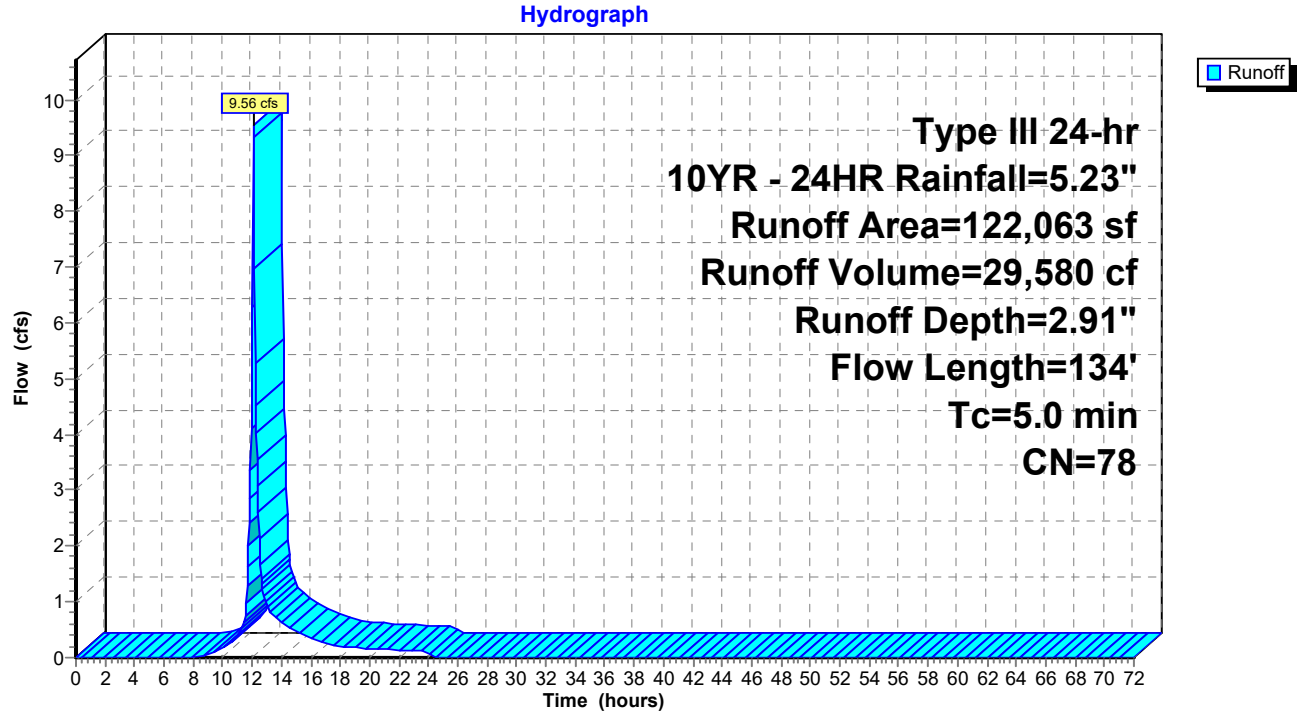
Runoff = 9.56 cfs @ 12.08 hrs, Volume= 29,580 cf, Depth= 2.91"
Routed to Pond CB6 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
64,371	61	>75% Grass cover, Good, HSG B
57,692	98	Unconnected pavement, HSG D
122,063	78	Weighted Average
64,371		52.74% Pervious Area
57,692		47.26% Impervious Area
57,692		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	69	0.0036	0.65		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.1	65	0.0217	1.03		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.1					**Direct Entry, min Tc**
5.0	134	Total			

Subcatchment 8S: SC 8



Summary for Subcatchment 9S: SC Culvert

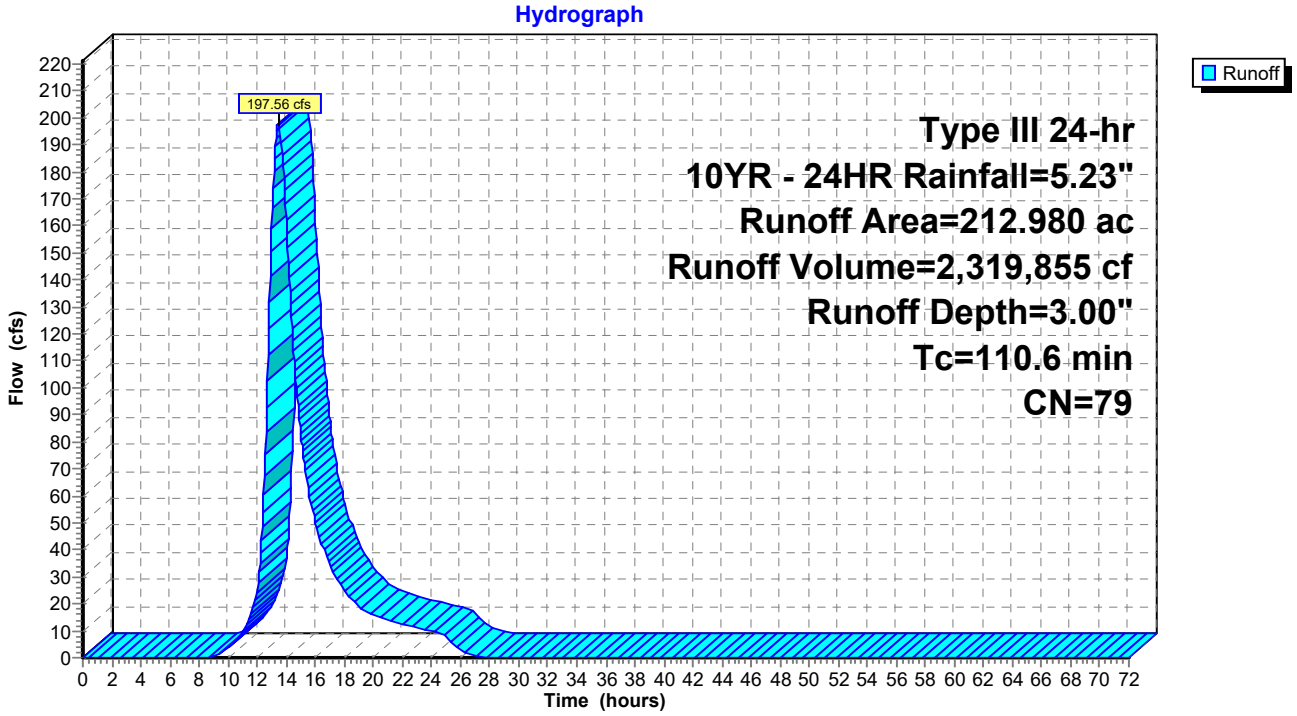
Runoff = 197.56 cfs @ 13.42 hrs, Volume= 2,319,855 cf, Depth= 3.00"
Routed to Link 3L : EAST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (ac)	CN	Description
	8.600	54	1/2 acre lots, 25% imp, HSG A
	2.340	85	1/2 acre lots, 25% imp, HSG D
	12.290	61	1/4 acre lots, 38% imp, HSG A
	0.360	75	1/4 acre lots, 38% imp, HSG B
	0.010	87	1/4 acre lots, 38% imp, HSG D
	55.170	77	1/8 acre lots, 65% imp, HSG A
	0.490	85	1/8 acre lots, 65% imp, HSG B
	0.010	92	1/8 acre lots, 65% imp, HSG D
	2.210	67	Brush, Poor, HSG B
	0.740	83	Brush, Poor, HSG D
	2.880	89	Urban commercial, 85% imp, HSG A
	11.260	92	Urban commercial, 85% imp, HSG B
	21.000	95	Urban commercial, 85% imp, HSG D
	2.430	39	>75% Grass cover, Good, HSG A
	11.890	61	>75% Grass cover, Good, HSG B
	1.240	80	>75% Grass cover, Good, HSG D
	0.180	81	Urban industrial, 72% imp, HSG A
	0.520	93	Urban industrial, 72% imp, HSG D
	10.260	98	Paved roads w/curbs & sewers, HSG A
	2.890	98	Paved roads w/curbs & sewers, HSG B
	1.410	98	Paved roads w/curbs & sewers, HSG D
*	0.010	98	Wetland/Water Surface, 0% imp, HSG A
*	10.010	98	Wetland/Water Surface, 0% imp, HSG B
*	28.580	98	Wetland/Water Surface, 0% imp, HSG D
	4.690	30	Woods, Good, HSG A
	15.580	55	Woods, Good, HSG B
	5.100	77	Woods, Good, HSG D
	0.100	82	Dirt roads, HSG B
*	0.730	98	Unconnected Pavement, HSG B
	212.980	79	Weighted Average
	123.586		58.03% Pervious Area
	89.394		41.97% Impervious Area
	0.730		0.82% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.6					**Direct Entry, See Calculation Sheet**

Subcatchment 9S: SC Culvert



Summary for Subcatchment 14S: SC 14

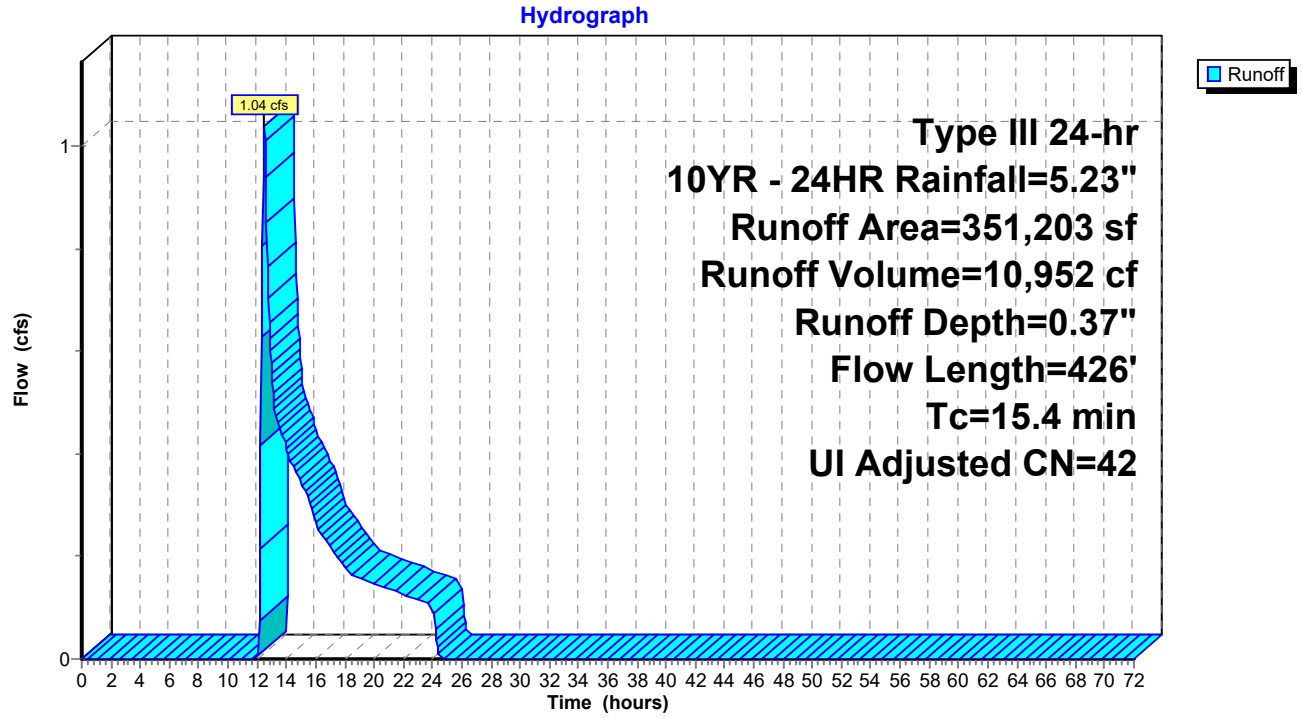
Runoff = 1.04 cfs @ 12.50 hrs, Volume= 10,952 cf, Depth= 0.37"
Routed to Pond CB1 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
311,900	39		>75% Grass cover, Good, HSG A
170	96		Gravel surface, HSG A
26,561	98		Unconnected pavement, HSG A
12,572	98		Unconnected pavement, HSG D
351,203	46	42	Weighted Average, UI Adjusted
312,070			88.86% Pervious Area
39,133			11.14% Impervious Area
39,133			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0427	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
5.0	326	0.0238	1.08		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
15.4	426	Total			

Subcatchment 14S: SC 14



Summary for Subcatchment 15S: SC 15

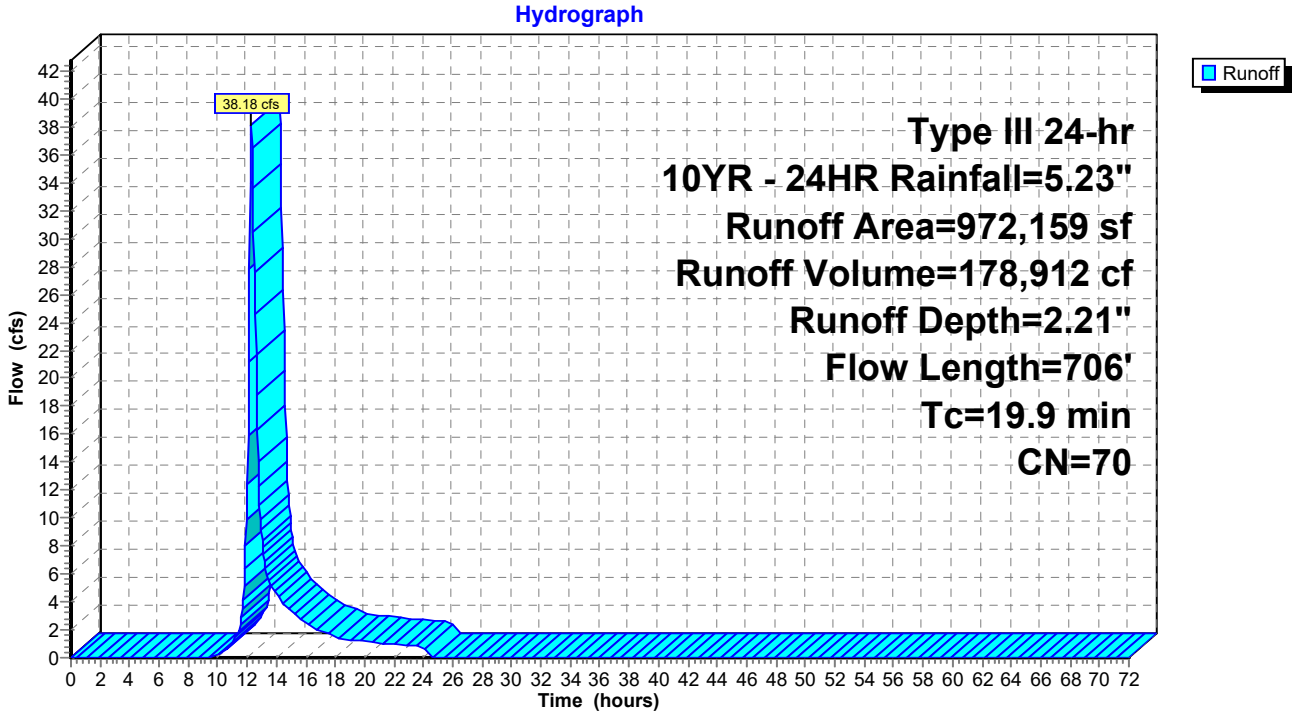
Runoff = 38.18 cfs @ 12.29 hrs, Volume= 178,912 cf, Depth= 2.21"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	450,354	39	>75% Grass cover, Good, HSG A
	1,164	76	Gravel roads, HSG A
	33,083	98	Water Surface, 0% imp, HSG A
	24,397	98	Unconnected pavement, HSG A
	344,271	98	Unconnected pavement, HSG D
	11,248	30	Woods, Good, HSG A
*	107,642	98	Wetland/water Surface, 0% imp, HSG A
	972,159	70	Weighted Average
	603,491		62.08% Pervious Area
	368,668		37.92% Impervious Area
	368,668		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0634	0.19		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
10.5	564	0.0164	0.90		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.3	16	0.0025	1.02		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.2	26	0.1222	2.45		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
19.9	706	Total			

Subcatchment 15S: SC 15



Summary for Subcatchment 16A: SC 16A

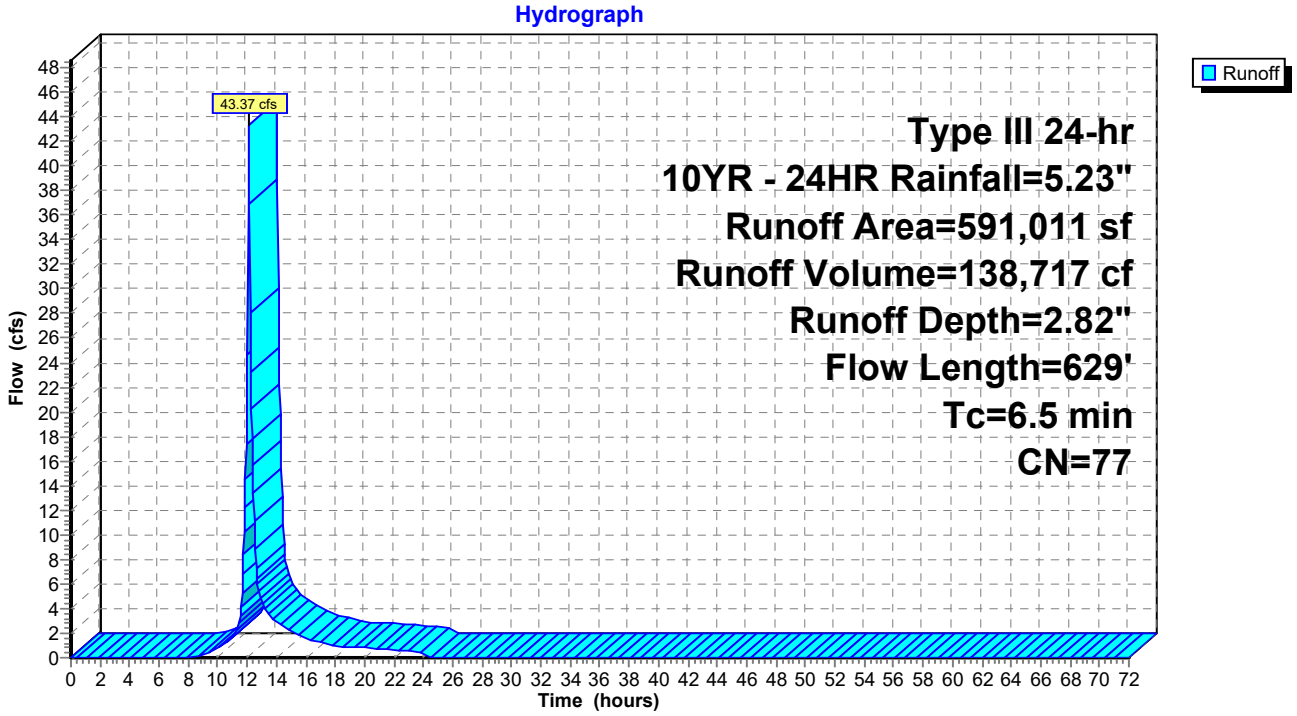
Runoff = 43.37 cfs @ 12.10 hrs, Volume= 138,717 cf, Depth= 2.82"
Routed to Pond CB4 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
330,483	61	>75% Grass cover, Good, HSG B
260,528	98	Unconnected pavement, HSG A
591,011	77	Weighted Average
330,483		55.92% Pervious Area
260,528		44.08% Impervious Area
260,528		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0107	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.0	157	0.0160	0.89		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	372	0.0030	3.09	110.88	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
6.5	629	Total			

Subcatchment 16A: SC 16A



Summary for Subcatchment 16S: SC 16

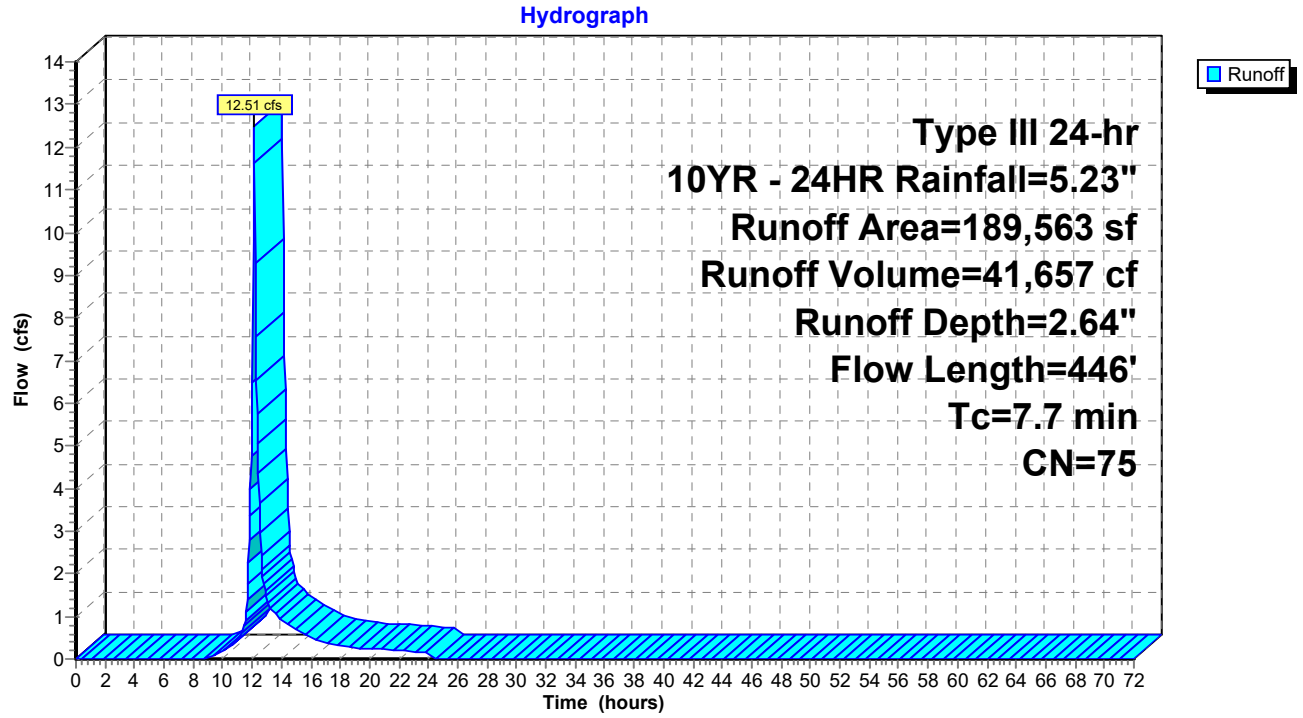
Runoff = 12.51 cfs @ 12.11 hrs, Volume= 41,657 cf, Depth= 2.64"
Routed to Pond CB3 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
120,029	61	>75% Grass cover, Good, HSG B
69,534	98	Unconnected pavement, HSG D
189,563	75	Weighted Average
120,029		63.32% Pervious Area
69,534		36.68% Impervious Area
69,534		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0139	1.21		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.2	39	0.0187	2.78		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.1	307	0.0142	0.83		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
7.7	446	Total			

Subcatchment 16S: SC 16



Summary for Subcatchment 17S: SC 17

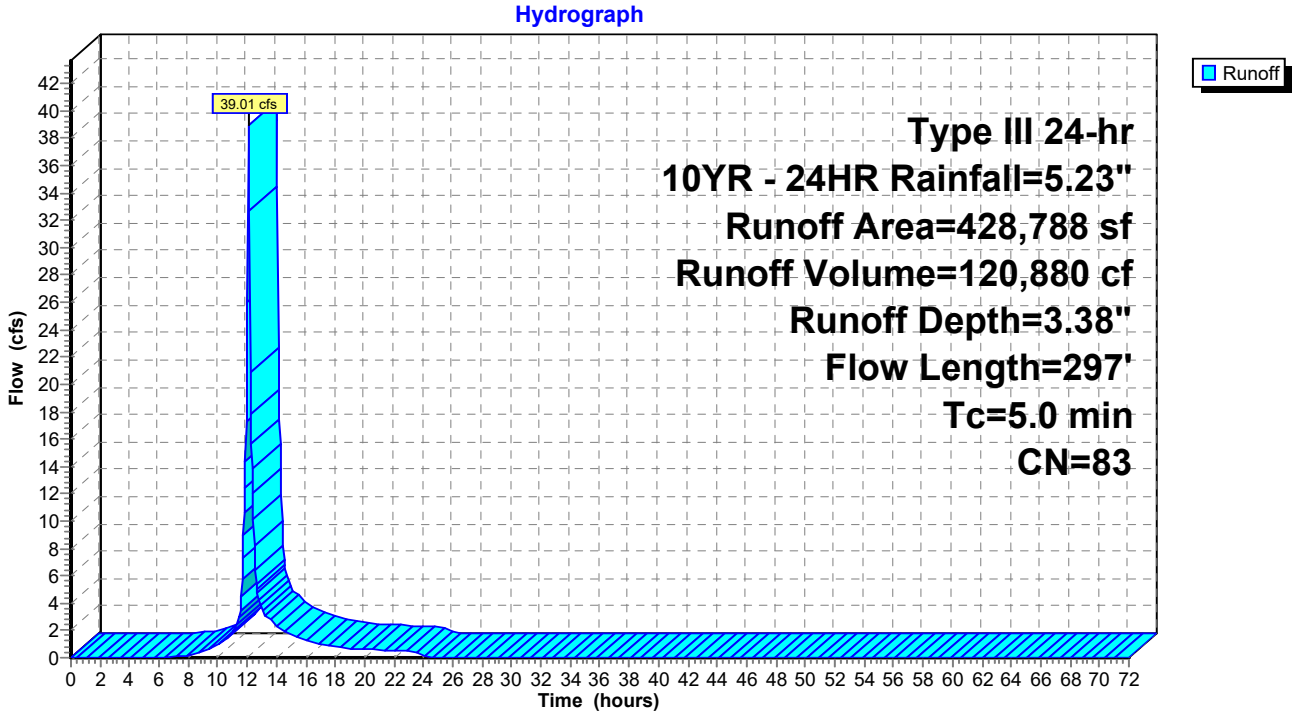
Runoff = 39.01 cfs @ 12.07 hrs, Volume= 120,880 cf, Depth= 3.38"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
176,294	61	>75% Grass cover, Good, HSG B
57,032	98	Unconnected pavement, HSG A
195,462	98	Unconnected pavement, HSG D
428,788	83	Weighted Average
176,294		41.11% Pervious Area
252,494		58.89% Impervious Area
252,494		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	22	0.0103	0.79		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.9	106	0.0170	0.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	169	0.0049	1.42		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.6					**Direct Entry, Minimum**
5.0	297	Total			

Subcatchment 17S: SC 17



Summary for Subcatchment 18S: SC 18

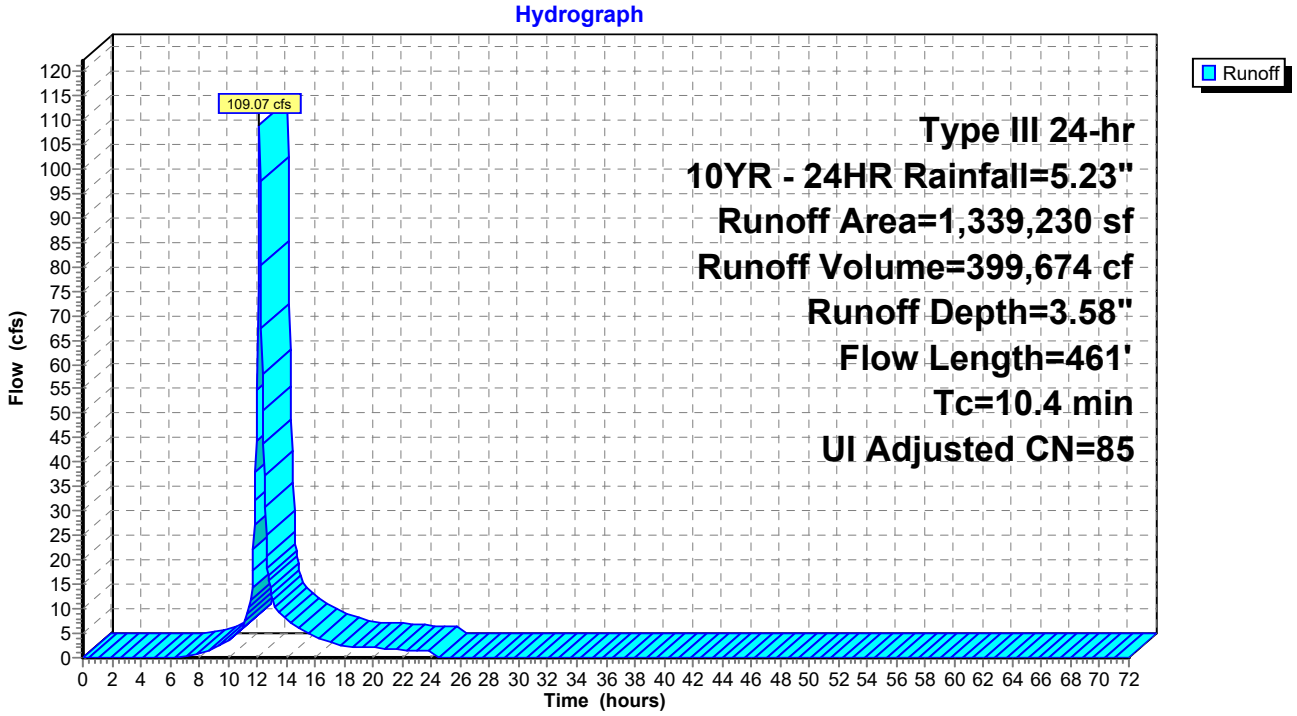
Runoff = 109.07 cfs @ 12.15 hrs, Volume= 399,674 cf, Depth= 3.58"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	379,958	61		>75% Grass cover, Good, HSG B
	171,281	98		Water Surface, 0% imp, HSG D
	0	98		Unconnected pavement, HSG A
	200,633	98		Unconnected pavement, HSG D
	84,918	70		Woods, Good, HSG C
*	502,440	98		Wetland/water Surface, 0% imp, HSG D
	1,339,230	86	85	Weighted Average, UI Adjusted
	1,138,597			85.02% Pervious Area
	200,633			14.98% Impervious Area
	200,633			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0035	0.70		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.1	12	0.0093	1.96		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
7.9	349	0.0111	0.74		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
10.4	461	Total			

Subcatchment 18S: SC 18



Summary for Subcatchment 19S: SC 19

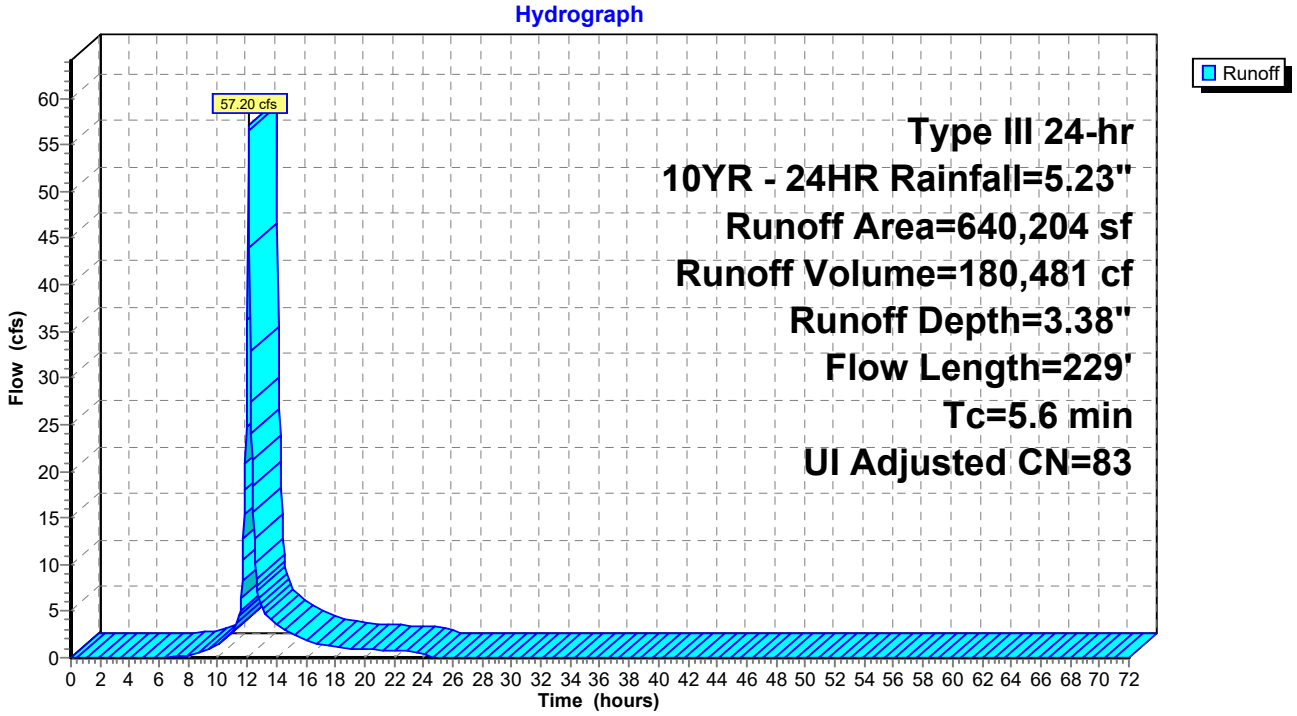
Runoff = 57.20 cfs @ 12.09 hrs, Volume= 180,481 cf, Depth= 3.38"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	227,240	61		>75% Grass cover, Good, HSG B
	60,140	98		Water Surface, 0% imp, HSG D
	72,866	98		Unconnected pavement, HSG D
	5,422	30		Woods, Good, HSG A
*	274,536	98		Wetland/water Surface, 0% imp, HSG D
	640,204	84	83	Weighted Average, UI Adjusted
	567,338			88.62% Pervious Area
	72,866			11.38% Impervious Area
	72,866			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0126	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.5	155	0.0067	0.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
5.6	229	Total			

Subcatchment 19S: SC 19



Summary for Subcatchment 20S: SC 20

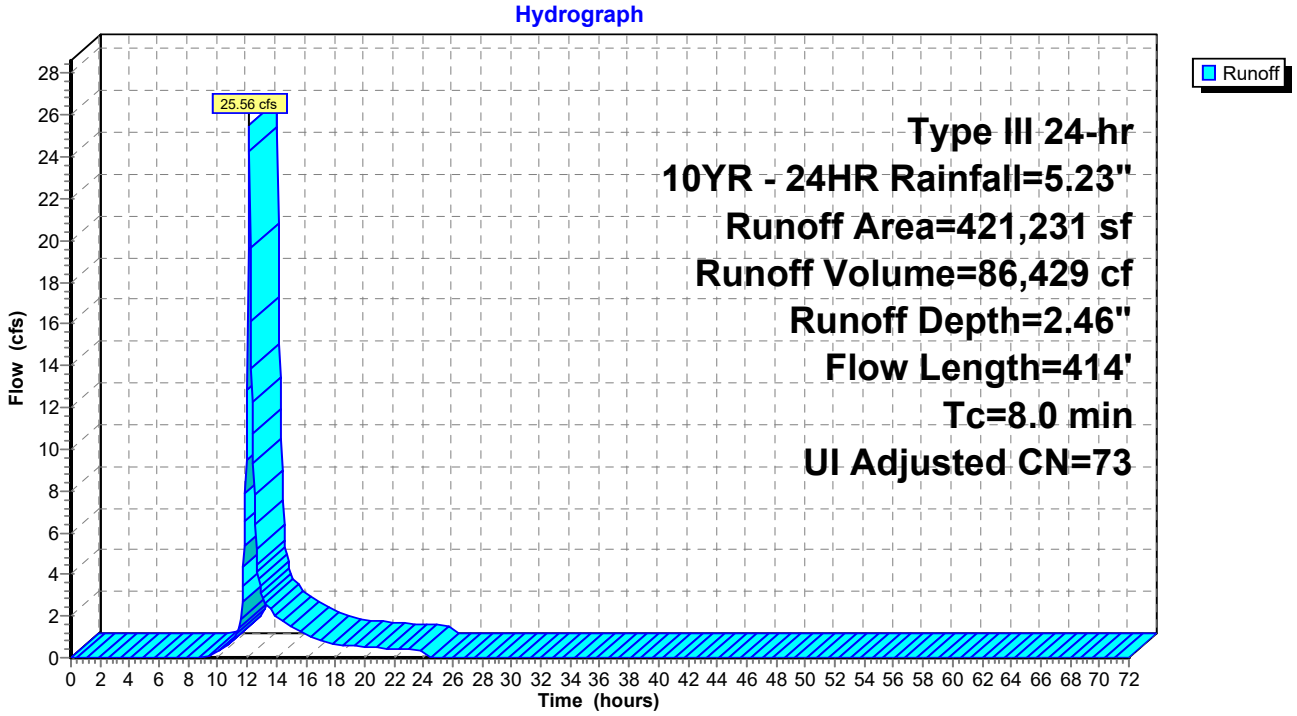
Runoff = 25.56 cfs @ 12.12 hrs, Volume= 86,429 cf, Depth= 2.46"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	248,488	61		>75% Grass cover, Good, HSG B
	2,322	96		Gravel surface, HSG B
	21,627	98		Water Surface, 0% imp, HSG D
	84,822	98		Unconnected pavement, HSG D
	0	30		Woods, Good, HSG A
*	63,972	98		Wetland/water Surface, 0% imp, HSG D
	421,231	76	73	Weighted Average, UI Adjusted
	336,409			79.86% Pervious Area
	84,822			20.14% Impervious Area
	84,822			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	83	0.0118	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
6.7	331	0.0140	0.83		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.0	414	Total			

Subcatchment 20S: SC 20



Summary for Subcatchment 21S: SC 21

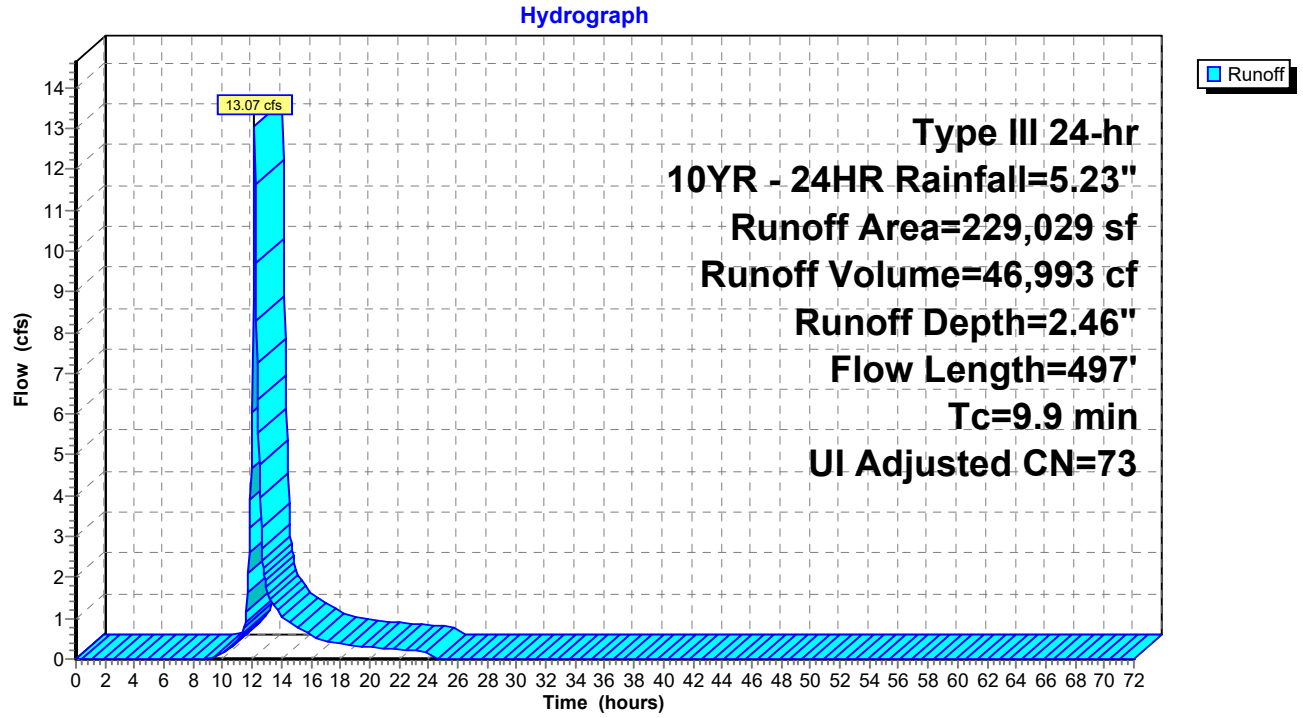
Runoff = 13.07 cfs @ 12.15 hrs, Volume= 46,993 cf, Depth= 2.46"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	144,689	61		>75% Grass cover, Good, HSG B
	14,490	98		Water Surface, 0% imp, HSG D
	23,677	98		Unconnected pavement, HSG D
*	46,173	98		Wetland/water Surface, 0% imp, HSG D
	229,029	75	73	Weighted Average, UI Adjusted
	205,352			89.66% Pervious Area
	23,677			10.34% Impervious Area
	23,677			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	73	0.0118	1.06		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
8.8	424	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.9	497	Total			

Subcatchment 21S: SC 21



Summary for Subcatchment 22S: SC 22

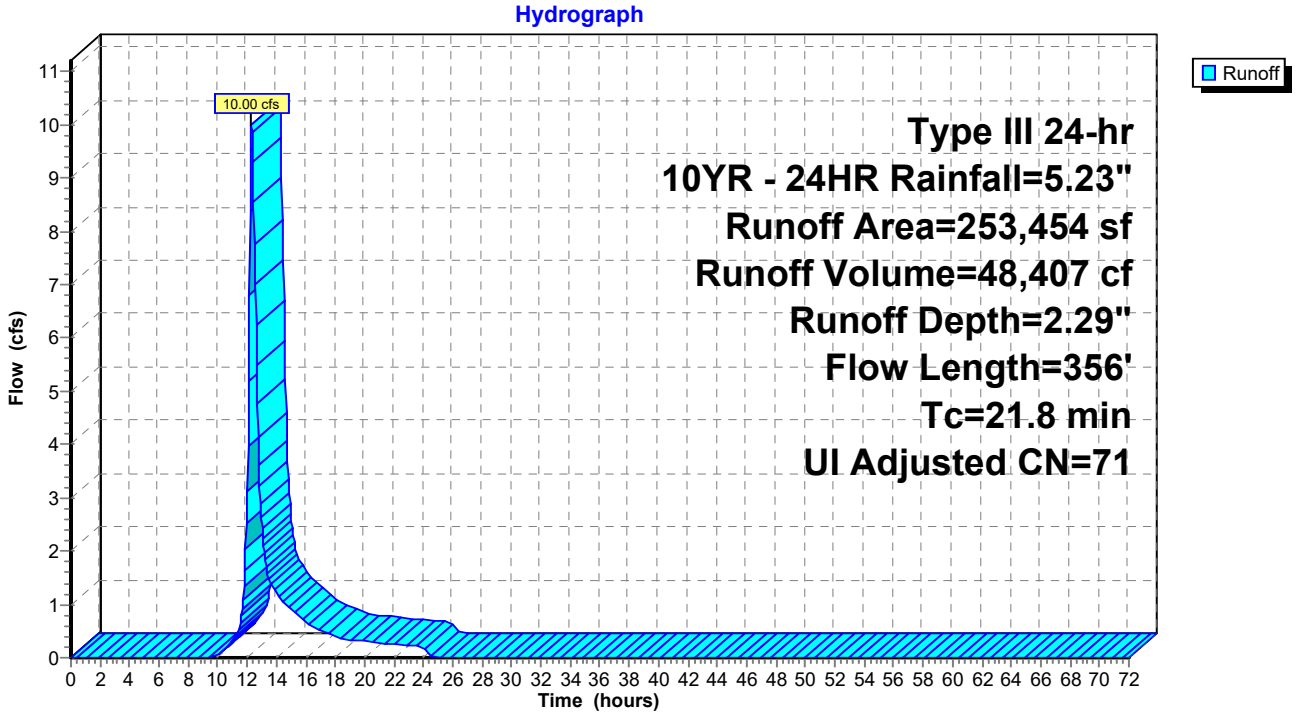
Runoff = 10.00 cfs @ 12.31 hrs, Volume= 48,407 cf, Depth= 2.29"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	178,497	61		>75% Grass cover, Good, HSG B
	9,087	96		Gravel surface, HSG B
	25,499	98		Water Surface, 0% imp, HSG D
	13,257	98		Unconnected pavement, HSG D
*	27,114	98		Wetland/water Surface, 0% imp, HSG D
	253,454	72	71	Weighted Average, UI Adjusted
	240,197			94.77% Pervious Area
	13,257			5.23% Impervious Area
	13,257			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0044	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.1	256	0.0218	1.03		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
21.8	356	Total			

Subcatchment 22S: SC 22



Summary for Subcatchment 23S: SC 23

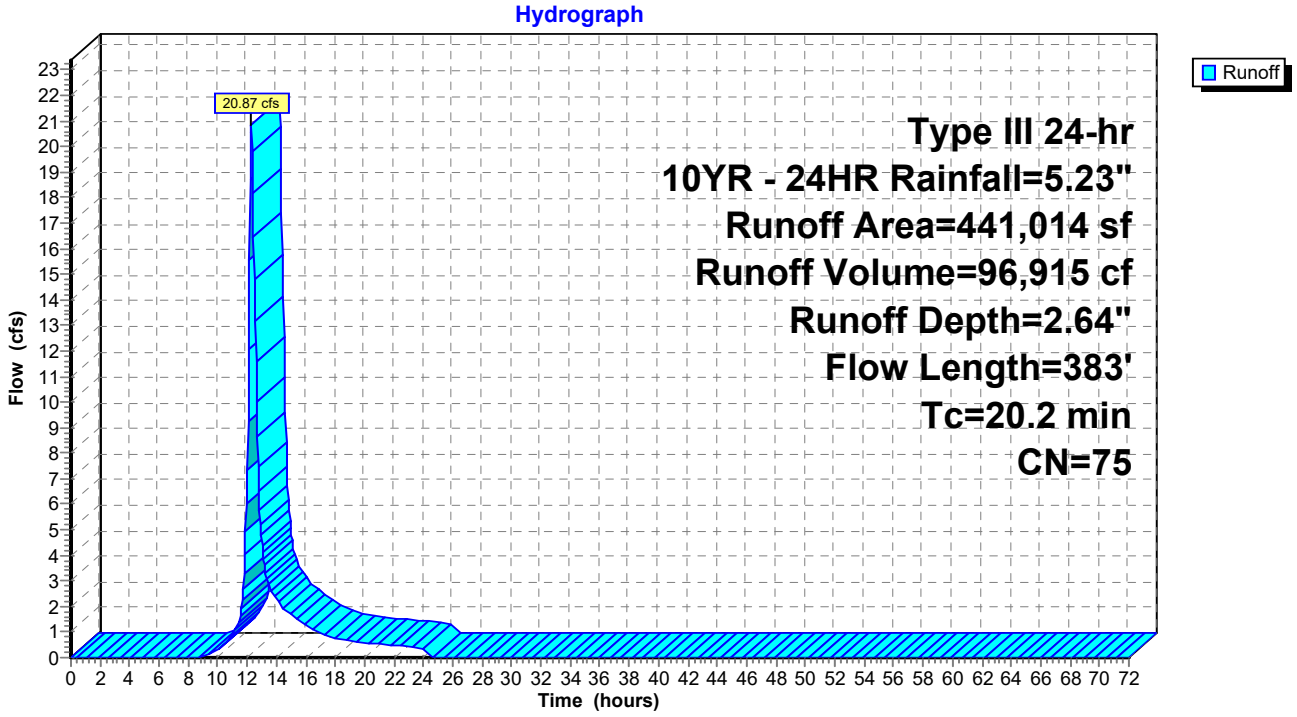
Runoff = 20.87 cfs @ 12.29 hrs, Volume= 96,915 cf, Depth= 2.64"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	200,568	61	>75% Grass cover, Good, HSG B
	18,545	96	Gravel surface, HSG B
	45,671	98	Water Surface, 0% imp, HSG D
	66,364	55	Woods, Good, HSG B
*	109,866	98	Wetland/water Surface, 0% imp, HSG D
	441,014	75	Weighted Average
	441,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0062	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.8	283	0.0198	0.98		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
20.2	383	Total			

Subcatchment 23S: SC 23



Summary for Subcatchment 24S: SC 24

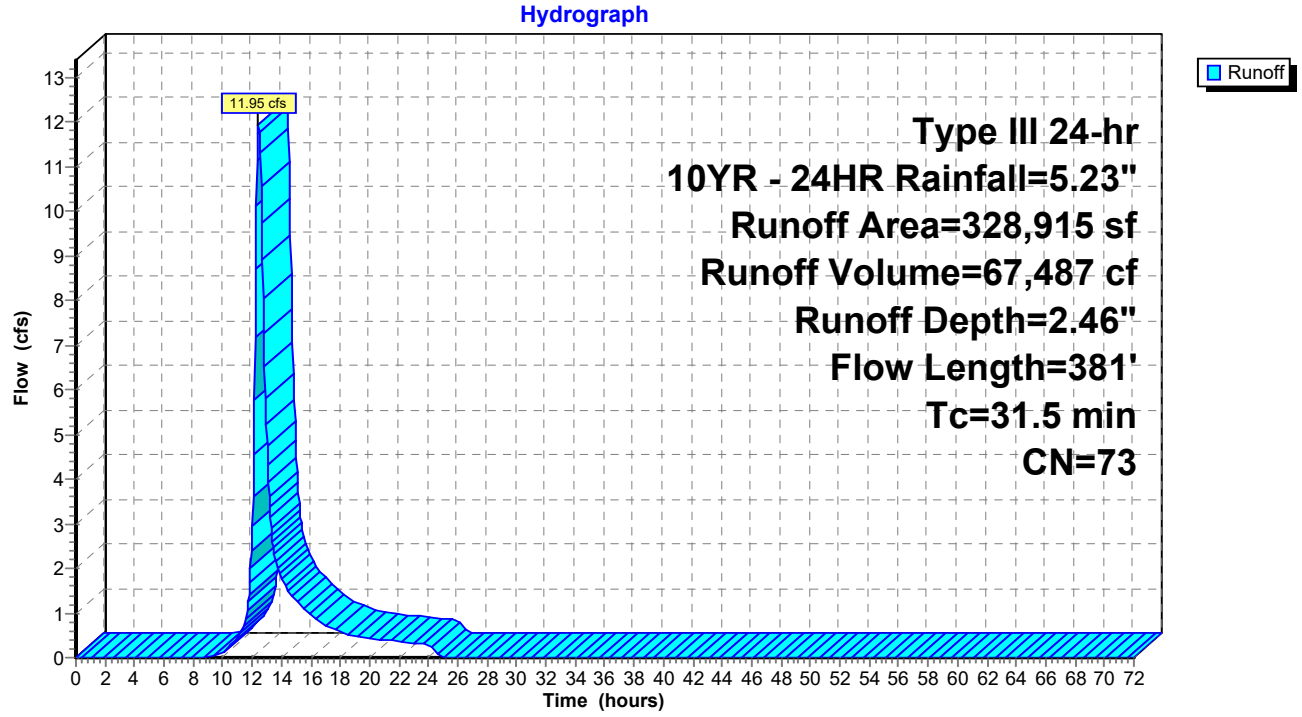
Runoff = 11.95 cfs @ 12.45 hrs, Volume= 67,487 cf, Depth= 2.46"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	70,558	61	>75% Grass cover, Good, HSG B
	14,252	96	Gravel surface, HSG B
	54,296	98	Water Surface, 0% imp, HSG D
	132,846	55	Woods, Good, HSG B
*	56,963	98	Wetland/water Surface, 0% imp, HSG D
	328,915	73	Weighted Average
	328,915		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0048	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
6.6	281	0.0103	0.71		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
31.5	381	Total			

Subcatchment 24S: SC 24



Summary for Subcatchment 27S: SC 27

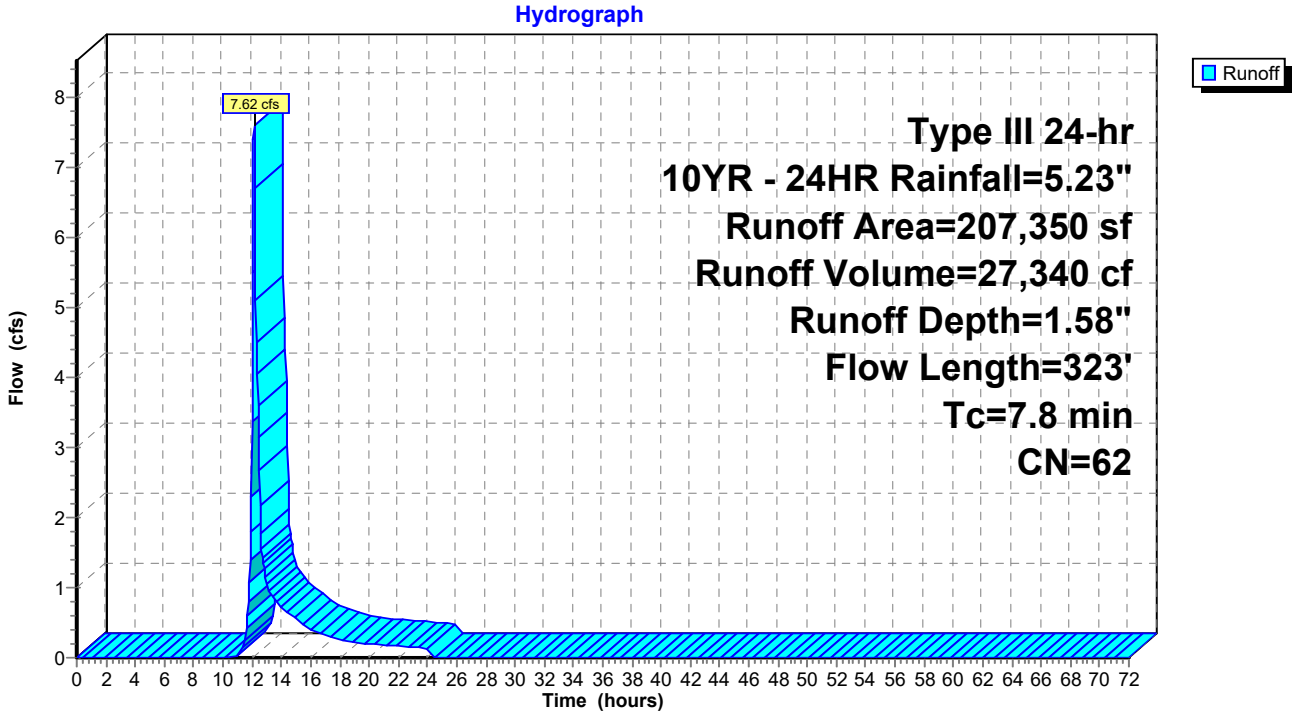
Runoff = 7.62 cfs @ 12.12 hrs, Volume= 27,340 cf, Depth= 1.58"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	198,922	61	>75% Grass cover, Good, HSG B
	4,606	96	Gravel surface, HSG B
	0	98	Unconnected pavement, HSG A
	3,765	98	Unconnected pavement, HSG D
*	57	98	Wetland/Water Surface, 0% imp, HSG A
	207,350	62	Weighted Average
	203,585		98.18% Pervious Area
	3,765		1.82% Impervious Area
	3,765		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	17	0.0048	0.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	306	0.0099	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.8	323	Total			

Subcatchment 27S: SC 27



Summary for Subcatchment 28S: SC 28

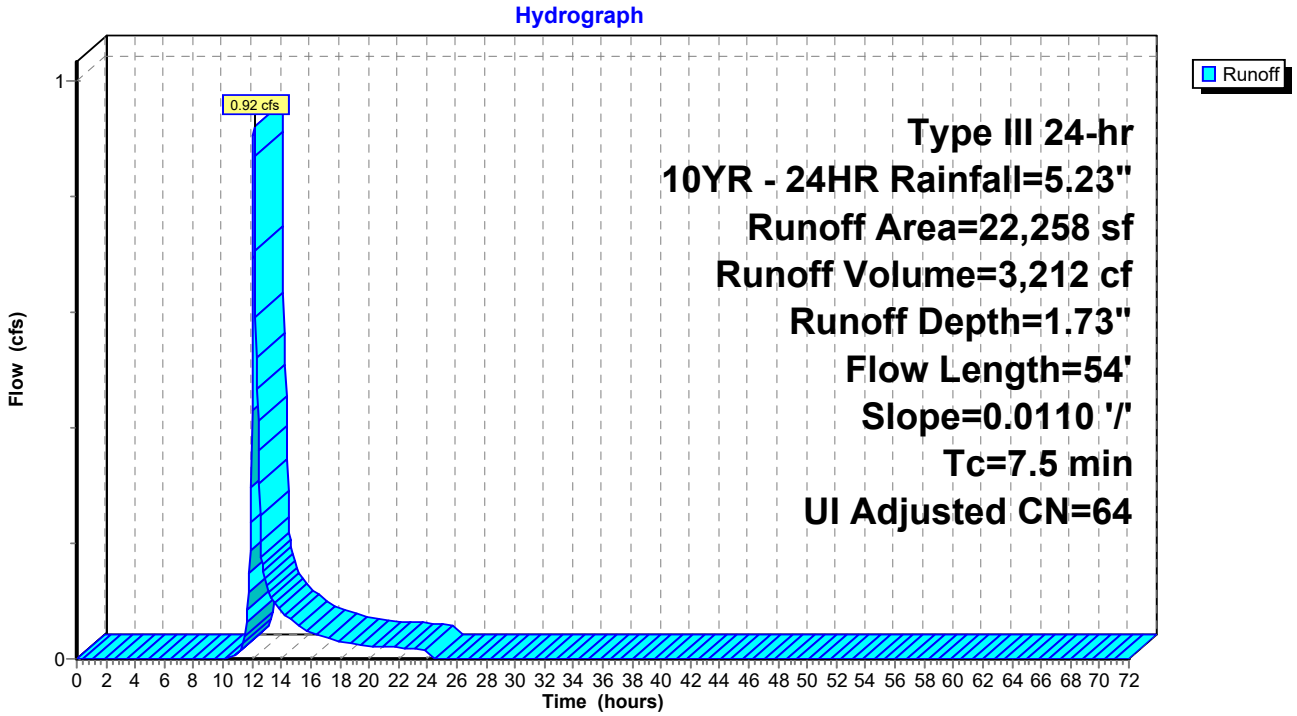
Runoff = 0.92 cfs @ 12.12 hrs, Volume= 3,212 cf, Depth= 1.73"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
18,224	61		>75% Grass cover, Good, HSG B
10	96		Gravel surface, HSG B
4,024	98		Unconnected pavement, HSG D
22,258	68	64	Weighted Average, UI Adjusted
18,234			81.92% Pervious Area
4,024			18.08% Impervious Area
4,024			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	54	0.0110	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"

Subcatchment 28S: SC 28



Summary for Subcatchment DS1: Ditch Segment 1

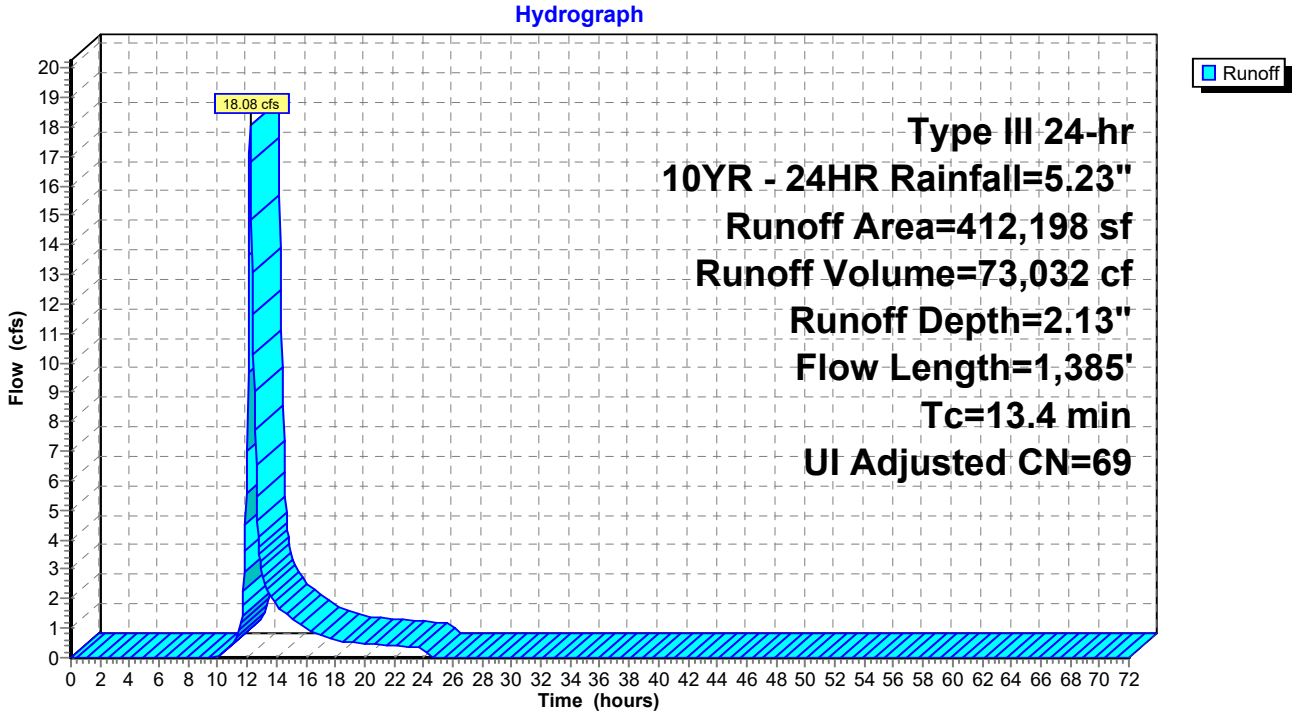
Runoff = 18.08 cfs @ 12.20 hrs, Volume= 73,032 cf, Depth= 2.13"
Routed to Reach 1R : WQS Segment 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	242,115	61		>75% Grass cover, Good, HSG B
	2,212	76		Gravel roads, HSG A
	0	98		Water Surface, 0% imp, HSG A
	0	98		Unconnected pavement, HSG A
	117,963	98		Unconnected pavement, HSG D
	20,768	55		Woods, Good, HSG B
*	29,140	98		Wetland/Water Surface, 0% imp, HSG A
	412,198	74	69	Weighted Average, UI Adjusted
	294,235			71.38% Pervious Area
	117,963			28.62% Impervious Area
	117,963			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	110	0.0200	1.42		**Sheet Flow, Pavement**
					Smooth surfaces n= 0.011 P2= 3.30"
0.8	65	0.0400	1.40		**Shallow Concentrated Flow, Grass**
					Short Grass Pasture Kv= 7.0 fps
11.3	1,210	0.0005	1.79	48.22	**Channel Flow, Ditch**
					Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
13.4	1,385	Total			

Subcatchment DS1: Ditch Segment 1



Summary for Subcatchment DS2: Ditch Segment 2

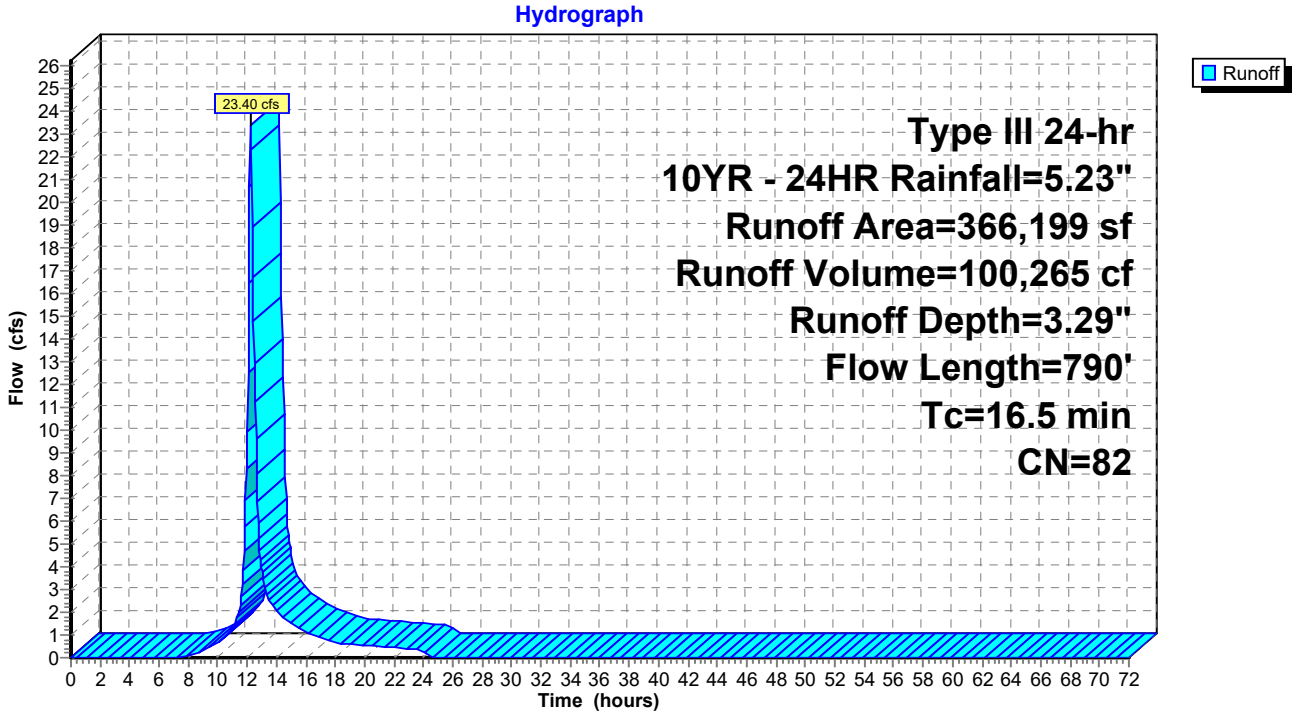
Runoff = 23.40 cfs @ 12.23 hrs, Volume= 100,265 cf, Depth= 3.29"
Routed to Reach 2R : WQS Segment 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
158,039	61	>75% Grass cover, Good, HSG B
9,172	98	Water Surface, 0% imp, HSG A
198,988	98	Unconnected pavement, HSG D
366,199	82	Weighted Average
167,211		45.66% Pervious Area
198,988		54.34% Impervious Area
198,988		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	140	0.0050	0.86		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
10.3	280	0.0005	0.45		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	370	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
16.5	790	Total			

Subcatchment DS2: Ditch Segment 2



Summary for Subcatchment DS3: Ditch Segment 3

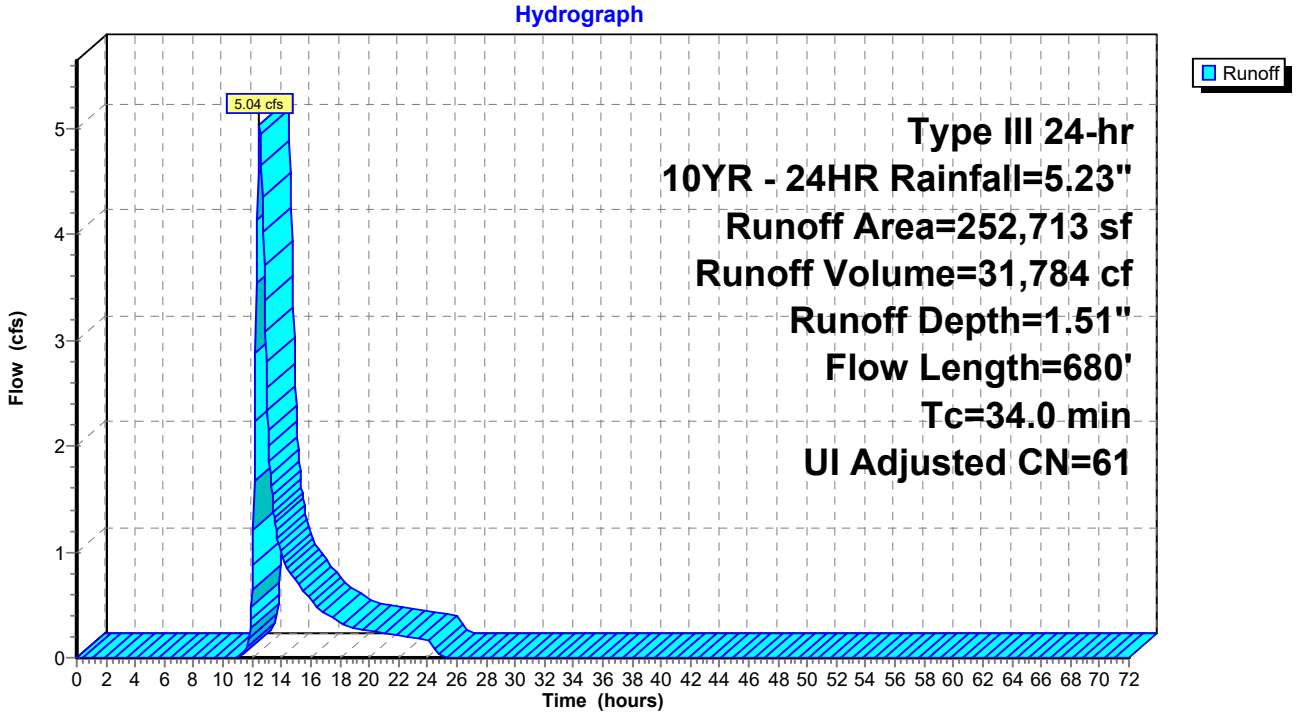
Runoff = 5.04 cfs @ 12.52 hrs, Volume= 31,784 cf, Depth= 1.51"
Routed to Reach 3R : WQS Segment 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	83,059	61		>75% Grass cover, Good, HSG B
	11,554	76		Gravel roads, HSG A
	544	98		Water Surface, 0% imp, HSG A
	39,077	98		Unconnected pavement, HSG D
	77,113	30		Woods, Good, HSG A
*	41,366	98		Wetland/Water Surface, 0% imp, HSG B
	252,713	64	61	Weighted Average, UI Adjusted
	213,636			84.54% Pervious Area
	39,077			15.46% Impervious Area
	39,077			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	90	0.0050	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
16.3	345	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.3	245	0.0005	1.79	48.22	**Channel Flow,** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
34.0	680	Total			

Subcatchment DS3: Ditch Segment 3



Summary for Subcatchment N10: DA-N10

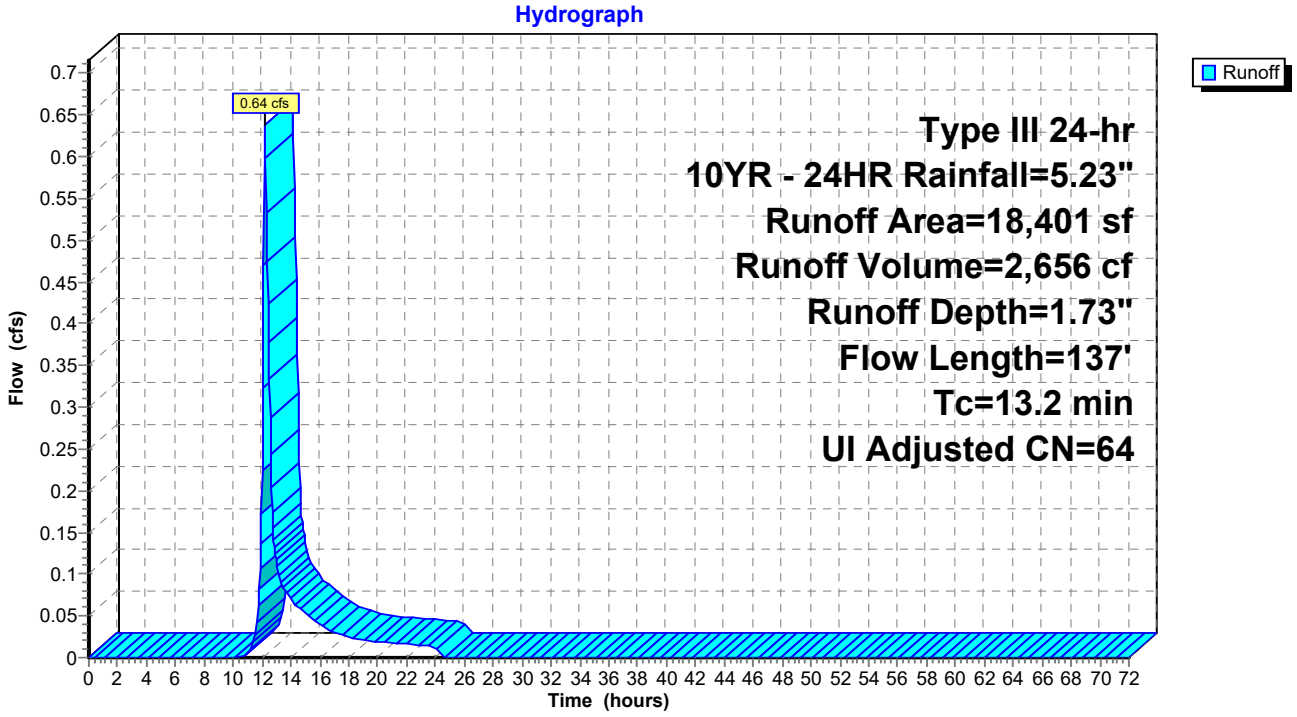
Runoff = 0.64 cfs @ 12.20 hrs, Volume= 2,656 cf, Depth= 1.73"
Routed to Pond P9 : Pond 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
13,244	58		Meadow, non-grazed, HSG B
0	98		Unconnected pavement, HSG A
5,157	98		Unconnected pavement, HSG D
18,401	69	64	Weighted Average, UI Adjusted
13,244			71.97% Pervious Area
5,157			28.03% Impervious Area
5,157			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	79	0.0709	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
8.4	58	0.0095	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
13.2	137	Total			

Subcatchment N10: DA-N10



Summary for Subcatchment N12: DA-N12

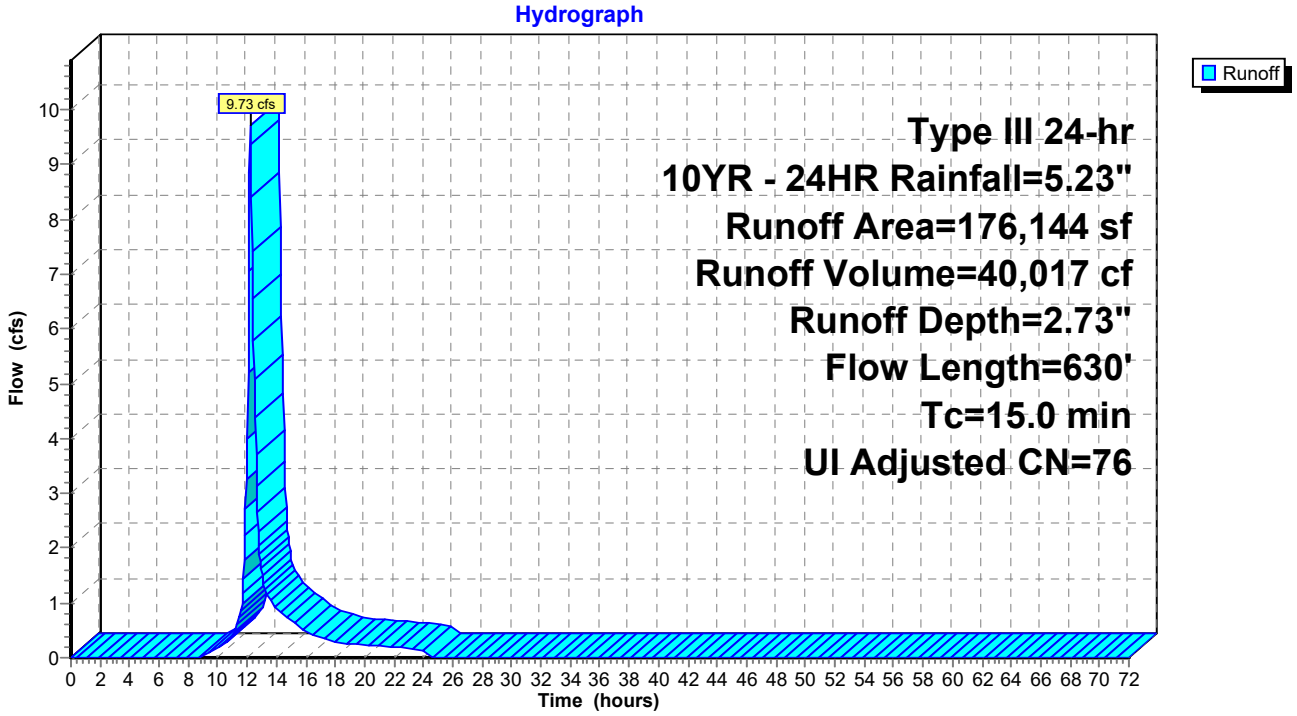
Runoff = 9.73 cfs @ 12.21 hrs, Volume= 40,017 cf, Depth= 2.73"
Routed to Pond P10 : Wetland Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	31,174	61		>75% Grass cover, Good, HSG B
	22,034	98		Unconnected pavement, HSG A
	4,614	98		Unconnected pavement, HSG D
	54,750	55		Woods, Good, HSG B
*	63,572	98		Wetland/Water Surface, 0% imp, HSG D
	176,144	78	76	Weighted Average, UI Adjusted
	149,496			84.87% Pervious Area
	26,648			15.13% Impervious Area
	26,648			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	152	0.0105	1.17		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
8.1	251	0.0054	0.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	227	0.0029	0.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	630	Total			

Subcatchment N12: DA-N12



Summary for Subcatchment N13: DA-N13

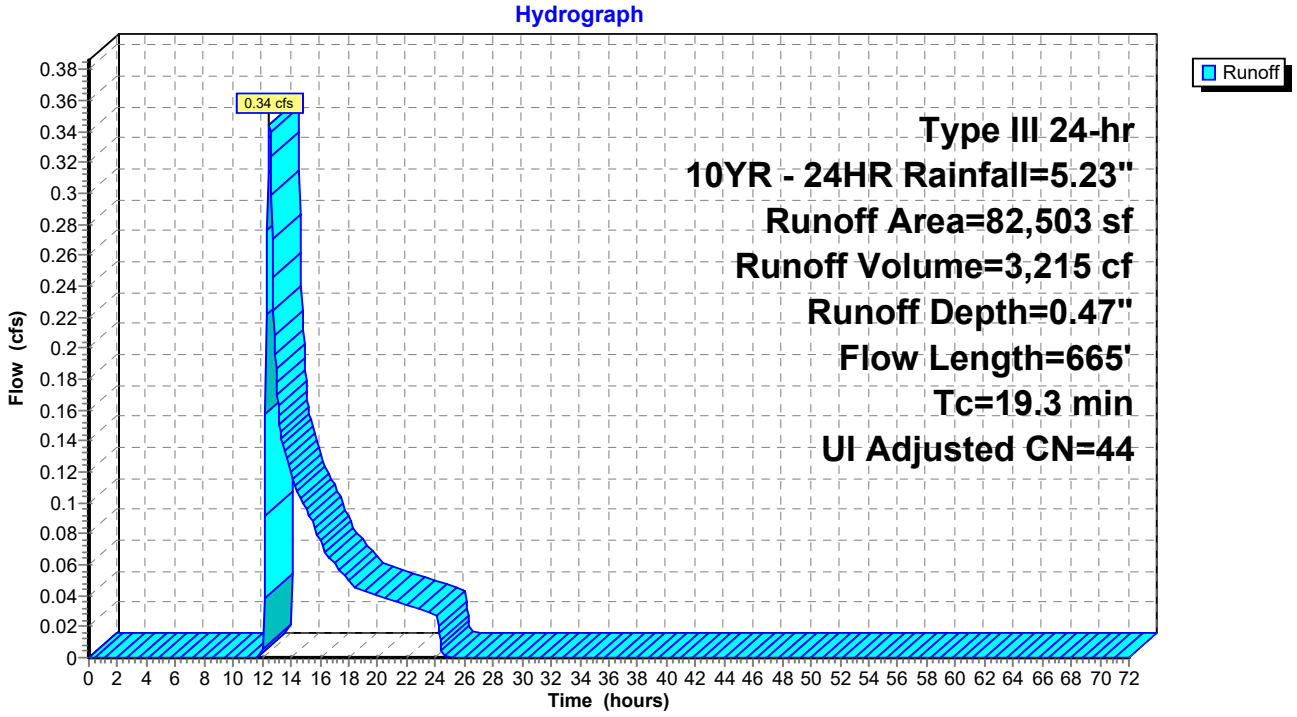
Runoff = 0.34 cfs @ 12.51 hrs, Volume= 3,215 cf, Depth= 0.47"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
183	98		Unconnected pavement, HSG A
14,377	98		Unconnected pavement, HSG D
67,943	39		>75% Grass cover, Good, HSG A
82,503	49	44	Weighted Average, UI Adjusted
67,943			82.35% Pervious Area
14,560			17.65% Impervious Area
14,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	115	0.0391	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
11.0	550	0.0141	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	665	Total			

Subcatchment N13: DA-N13



Summary for Subcatchment N14: DA-N14

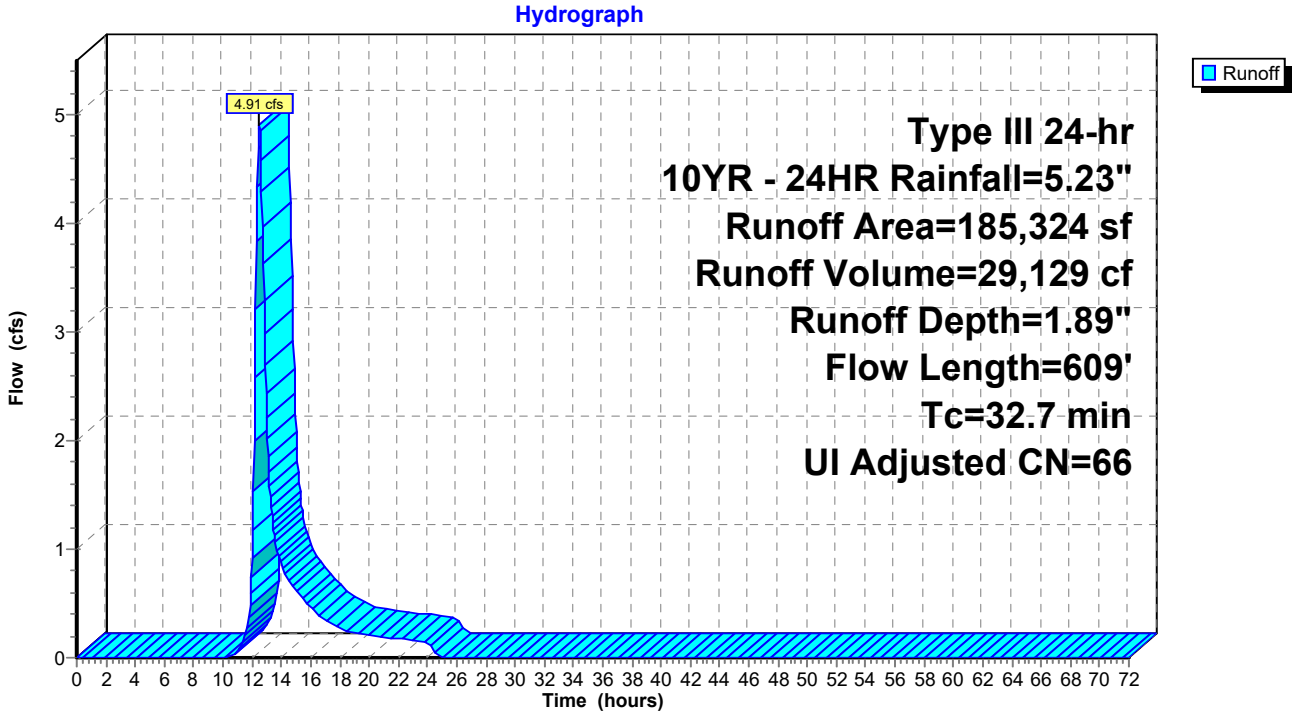
Runoff = 4.91 cfs @ 12.49 hrs, Volume= 29,129 cf, Depth= 1.89"
Routed to Pond P6 : Pond 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
139,813	61		>75% Grass cover, Good, HSG B
45,511	98		Unconnected pavement, HSG A
185,324	70	66	Weighted Average, UI Adjusted
139,813			75.44% Pervious Area
45,511			24.56% Impervious Area
45,511			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0122	1.08		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
13.2	122	0.0135	0.15		**Sheet Flow, Grasss** Grass: Short n= 0.150 P2= 3.30"
18.4	413	0.0036	0.37	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
32.7	609	Total			

Subcatchment N14: DA-N14



Summary for Subcatchment N15: DA-N15

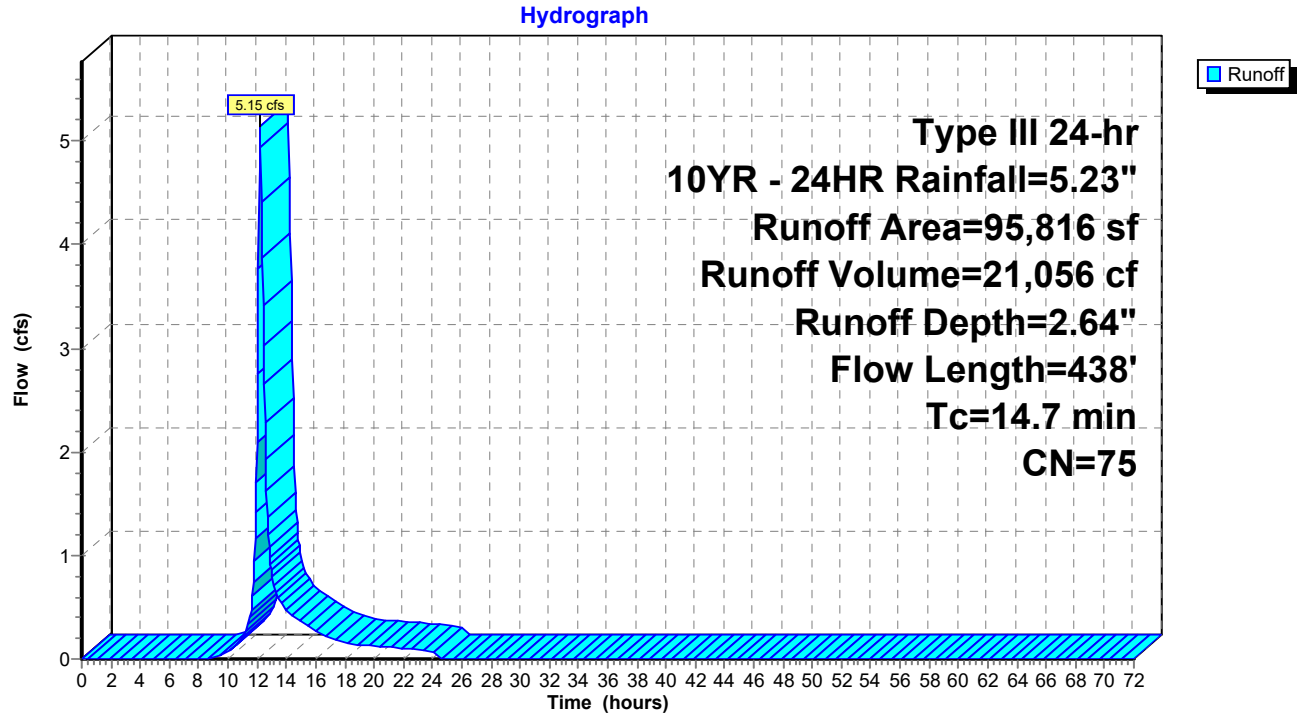
Runoff = 5.15 cfs @ 12.21 hrs, Volume= 21,056 cf, Depth= 2.64"
Routed to Pond P8 : Pond 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
59,706	61	>75% Grass cover, Good, HSG B
36,110	98	Unconnected pavement, HSG D
95,816	75	Weighted Average
59,706		62.31% Pervious Area
36,110		37.69% Impervious Area
36,110		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0783	0.27		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
6.9	60	0.0166	0.14		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.30"
4.1	318	0.0075	1.30		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
14.7	438	Total			

Subcatchment N15: DA-N15



Summary for Subcatchment N2: DA-N2

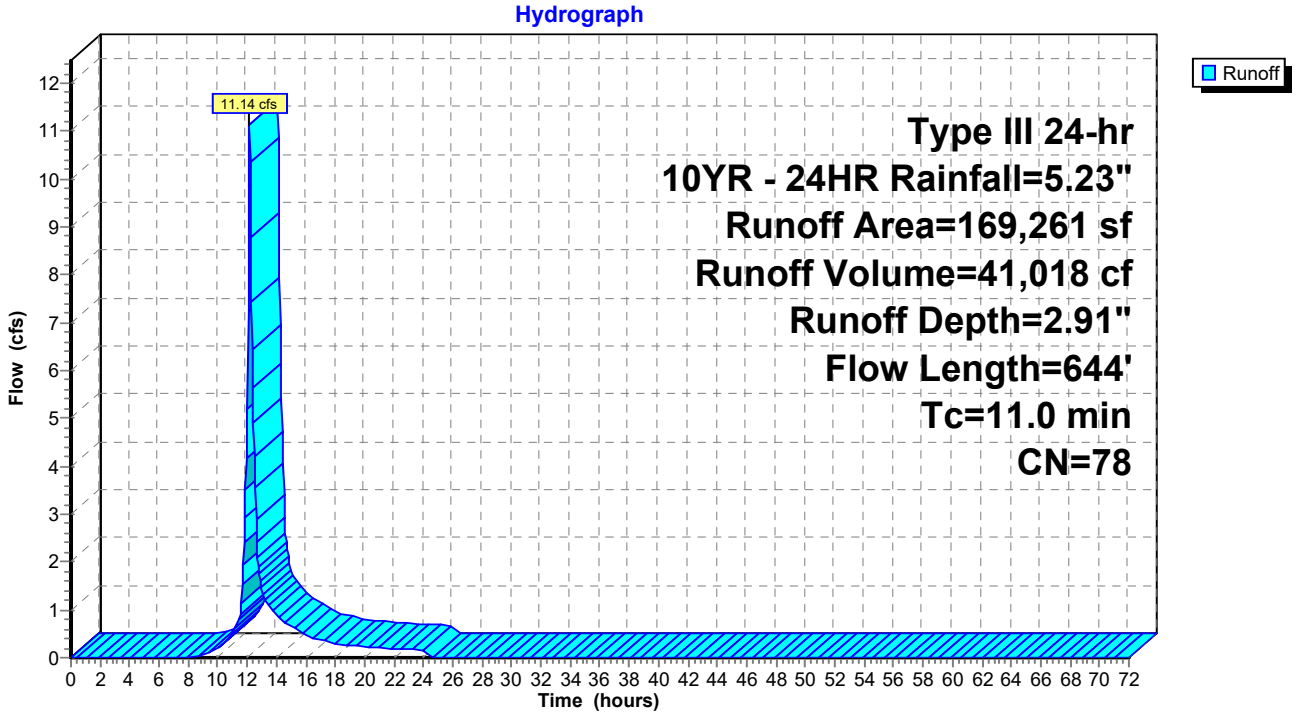
Runoff = 11.14 cfs @ 12.16 hrs, Volume= 41,018 cf, Depth= 2.91"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
84,479	98	Paved parking, HSG B
84,782	58	Meadow, non-grazed, HSG B
169,261	78	Weighted Average
84,782		50.09% Pervious Area
84,479		49.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	146	0.0137	1.30		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
9.1	498	0.0169	0.91		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.0	644	Total			

Subcatchment N2: DA-N2



Summary for Subcatchment N3: DA-N3

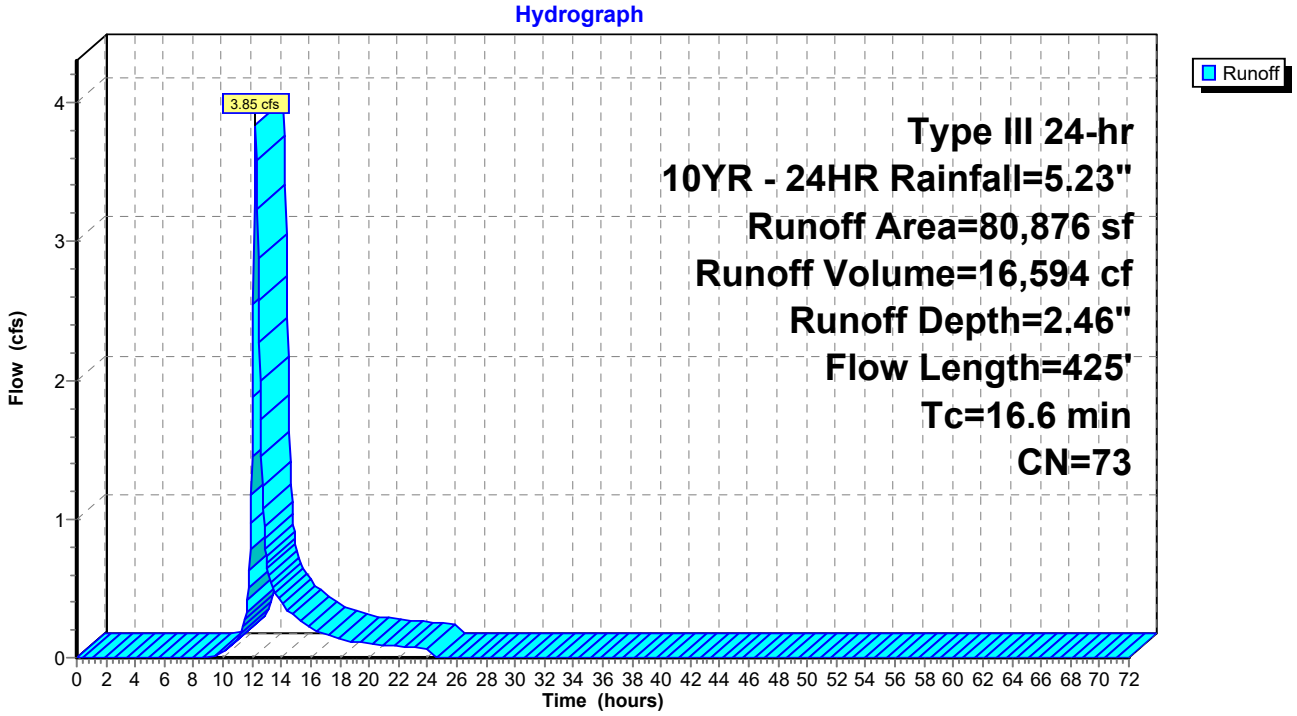
Runoff = 3.85 cfs @ 12.24 hrs, Volume= 16,594 cf, Depth= 2.46"
Routed to Pond P2 : Pond 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
50,316	58	Meadow, non-grazed, HSG B
29,045	98	Unconnected pavement, HSG A
1,515	98	Unconnected pavement, HSG D
80,876	73	Weighted Average
50,316		62.21% Pervious Area
30,560		37.79% Impervious Area
30,560		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	118	0.0127	1.20		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
6.7	69	0.0239	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
8.3	238	0.0059	0.48	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
16.6	425	Total			

Subcatchment N3: DA-N3



Summary for Subcatchment N4: DA-N4

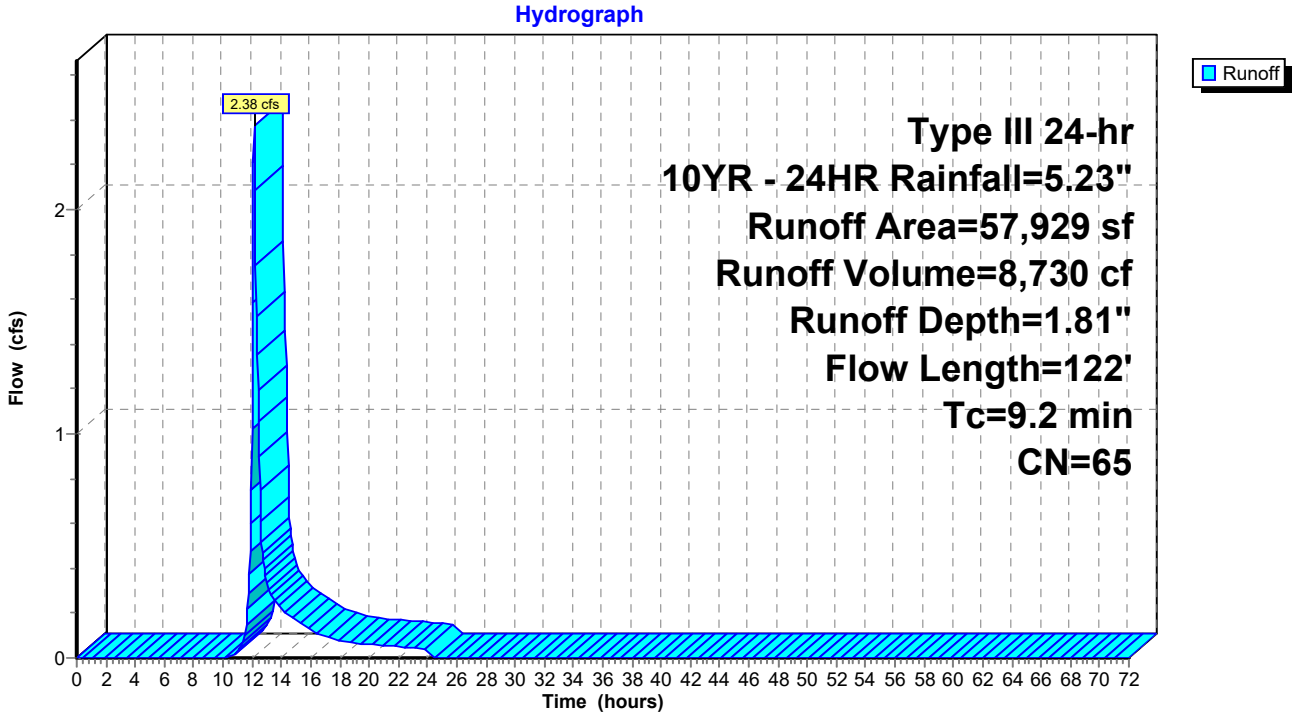
Runoff = 2.38 cfs @ 12.14 hrs, Volume= 8,730 cf, Depth= 1.81"
Routed to Pond P4 : Pond 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
47,807	58	Meadow, non-grazed, HSG B
10,122	98	Paved parking, HSG B
57,929	65	Weighted Average
47,807		82.53% Pervious Area
10,122		17.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	79	0.0190	0.16		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
1.0	43	0.0128	0.71	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
9.2	122	Total			

Subcatchment N4: DA-N4



Summary for Subcatchment N5: DA-N5

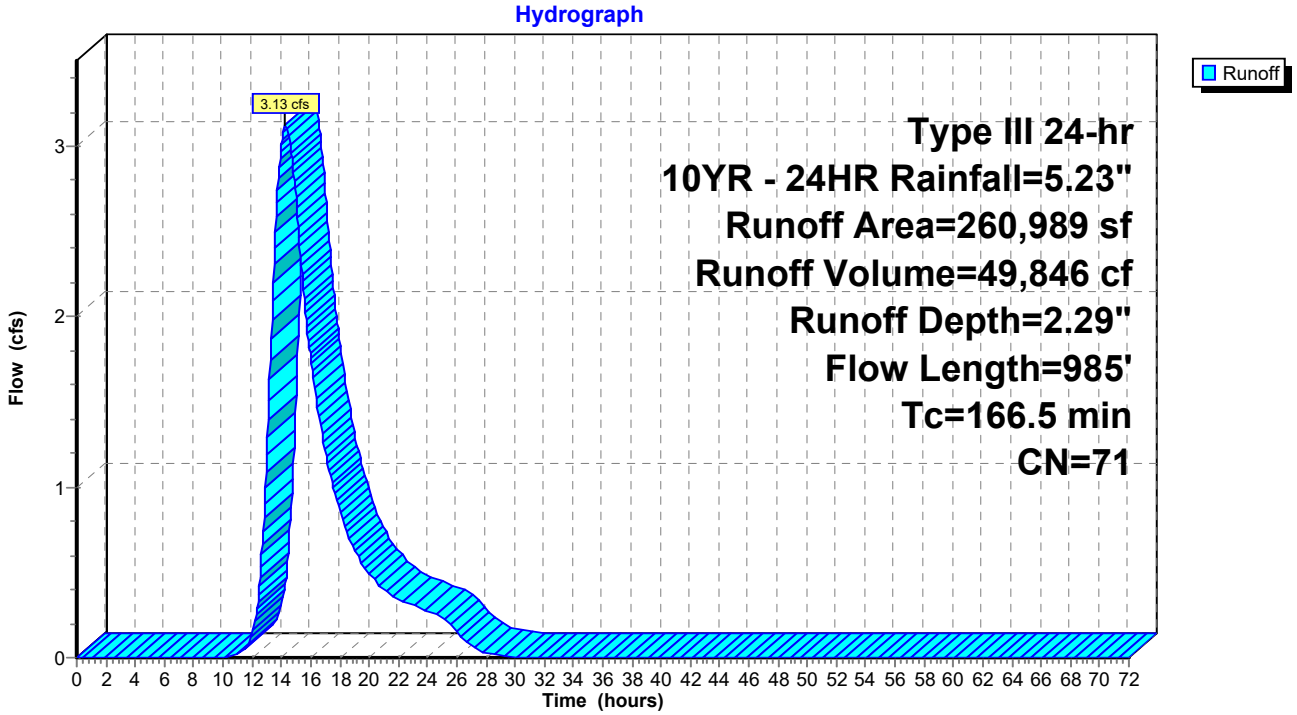
Runoff = 3.13 cfs @ 14.26 hrs, Volume= 49,846 cf, Depth= 2.29"
Routed to Pond CB5 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
86,498	98	Paved parking, HSG B
174,491	58	Meadow, non-grazed, HSG B
260,989	71	Weighted Average
174,491		66.86% Pervious Area
86,498		33.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	115	0.0043	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
146.5	870	0.0002	0.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
166.5	985	Total			

Subcatchment N5: DA-N5



Summary for Subcatchment N6: DA-N6

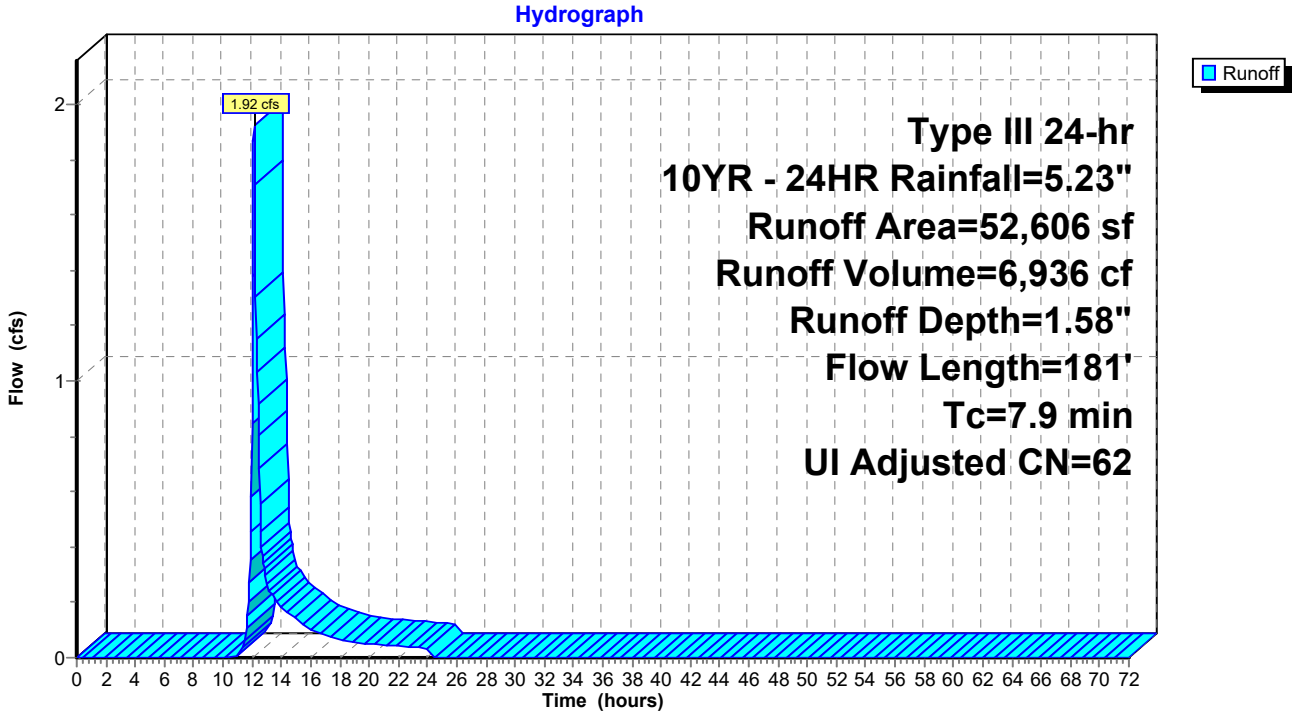
Runoff = 1.92 cfs @ 12.12 hrs, Volume= 6,936 cf, Depth= 1.58"
Routed to Pond P5 : Pond 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
41,980	58		Meadow, non-grazed, HSG B
9,109	98		Unconnected pavement, HSG A
1,517	98		Unconnected pavement, HSG D
52,606	66	62	Weighted Average, UI Adjusted
41,980			79.80% Pervious Area
10,626			20.20% Impervious Area
10,626			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	63	0.0238	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.4	59	0.0153	2.51		**Shallow Concentrated Flow, PCC Channel** Paved Kv= 20.3 fps
1.3	59	0.0153	0.77	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
7.9	181	Total			

Subcatchment N6: DA-N6



Summary for Subcatchment N7: DA-N7

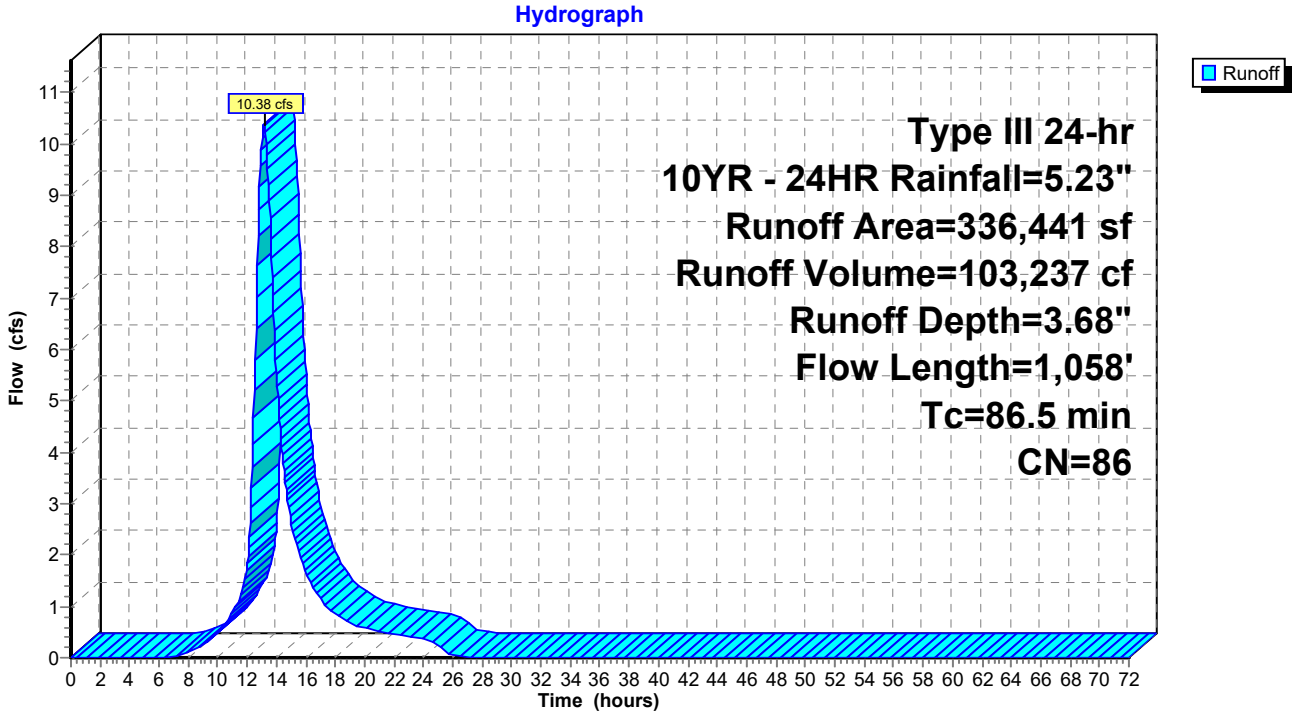
Runoff = 10.38 cfs @ 13.14 hrs, Volume= 103,237 cf, Depth= 3.68"
Routed to Pond P3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
104,683	58	Meadow, non-grazed, HSG B
231,758	98	Paved parking, HSG B
336,441	86	Weighted Average
104,683		31.11% Pervious Area
231,758		68.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	300	0.0043	0.94		**Sheet Flow, Apron** Smooth surfaces n= 0.011 P2= 3.30"
4.0	318	0.0043	1.33		**Shallow Concentrated Flow, Apron** Paved Kv= 20.3 fps
0.4	33	0.0424	1.44		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
76.8	407	0.0002	0.09	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
86.5	1,058	Total			

Subcatchment N7: DA-N7



Summary for Subcatchment N8: DA-N8

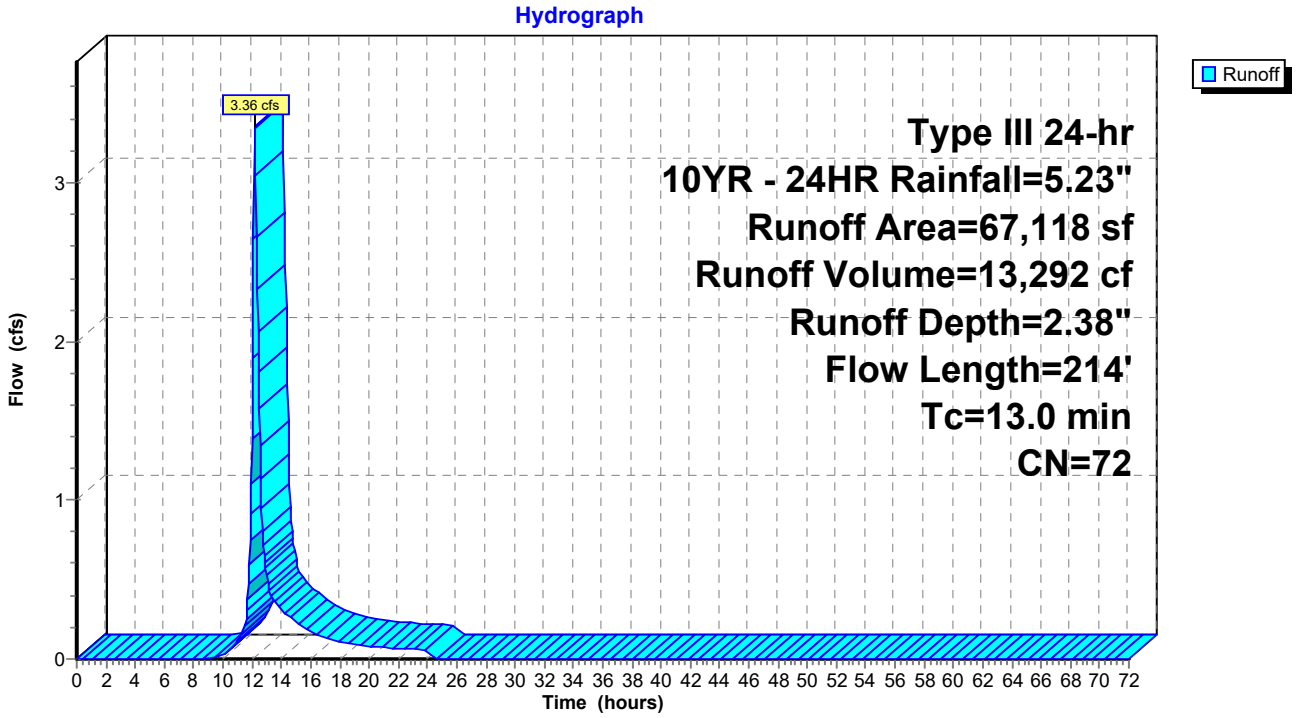
Runoff = 3.36 cfs @ 12.19 hrs, Volume= 13,292 cf, Depth= 2.38"
Routed to Pond P7 : Pond 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
43,882	58	Meadow, non-grazed, HSG B
23,236	98	Paved parking, HSG B
67,118	72	Weighted Average
43,882		65.38% Pervious Area
23,236		34.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0133	0.93		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
11.0	112	0.0179	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
1.5	72	0.0174	0.82	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
13.0	214	Total			

Subcatchment N8: DA-N8



Summary for Subcatchment N9: DA-N9

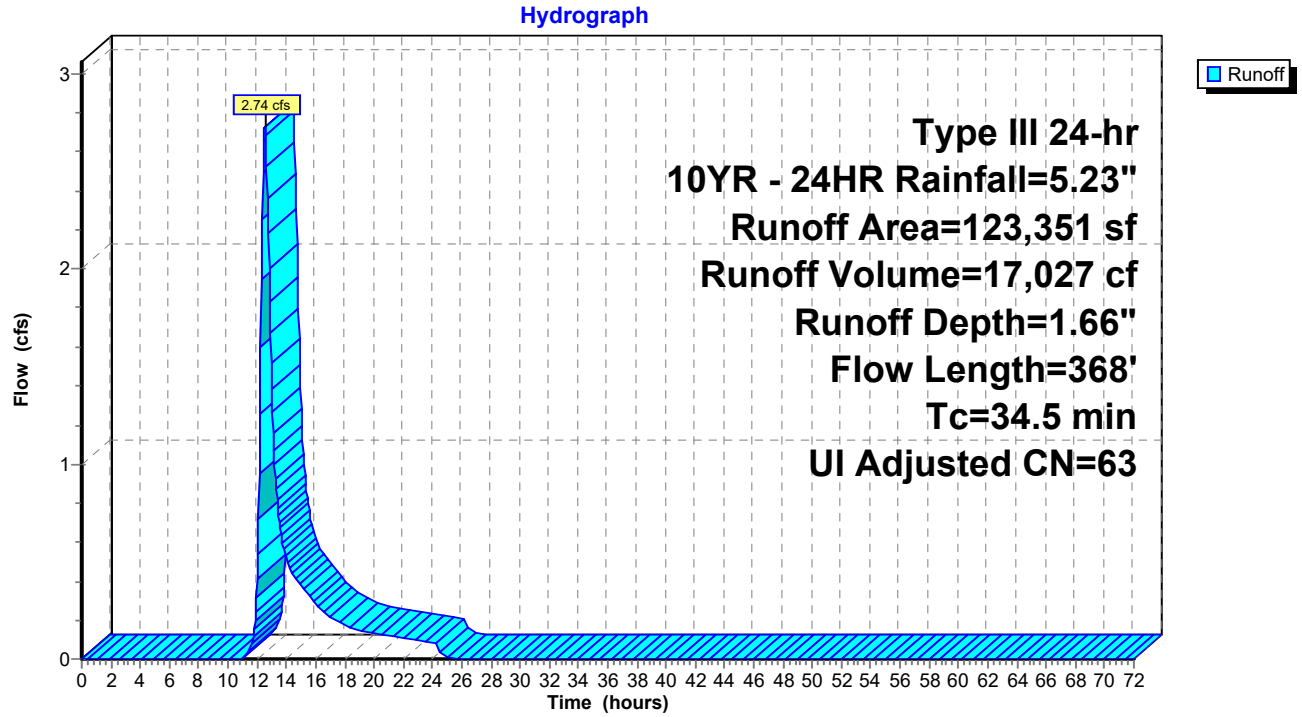
Runoff = 2.74 cfs @ 12.53 hrs, Volume= 17,027 cf, Depth= 1.66"
Routed to Pond P1 : Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
94,039	58		Meadow, non-grazed, HSG B
26,441	98		Unconnected pavement, HSG A
2,871	98		Unconnected pavement, HSG D
123,351	68	63	Weighted Average, UI Adjusted
94,039			76.24% Pervious Area
29,312			23.76% Impervious Area
29,312			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	214	0.0201	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
16.8	154	0.0006	0.15	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
34.5	368	Total			

Subcatchment N9: DA-N9



Summary for Reach 1R: WQS Segment 1

Inflow Area = 1,239,545 sf, 36.87% Impervious, Inflow Depth = 2.30" for 10YR - 24HR event
Inflow = 29.89 cfs @ 12.22 hrs, Volume= 237,615 cf
Outflow = 23.82 cfs @ 12.42 hrs, Volume= 237,615 cf, Atten= 20%, Lag= 11.9 min
Routed to Pond Cr-B : Robinson Driveway

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.50 fps, Min. Travel Time= 14.0 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 53.2 min

Peak Storage= 19,945 cf @ 12.42 hrs
Average Depth at Peak Storage= 1.51' , Surface Width= 15.06'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 239.23 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.41 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 1,255.0' Slope= 0.0005 '/'
Inlet Invert= 2.32', Outlet Invert= 1.72'



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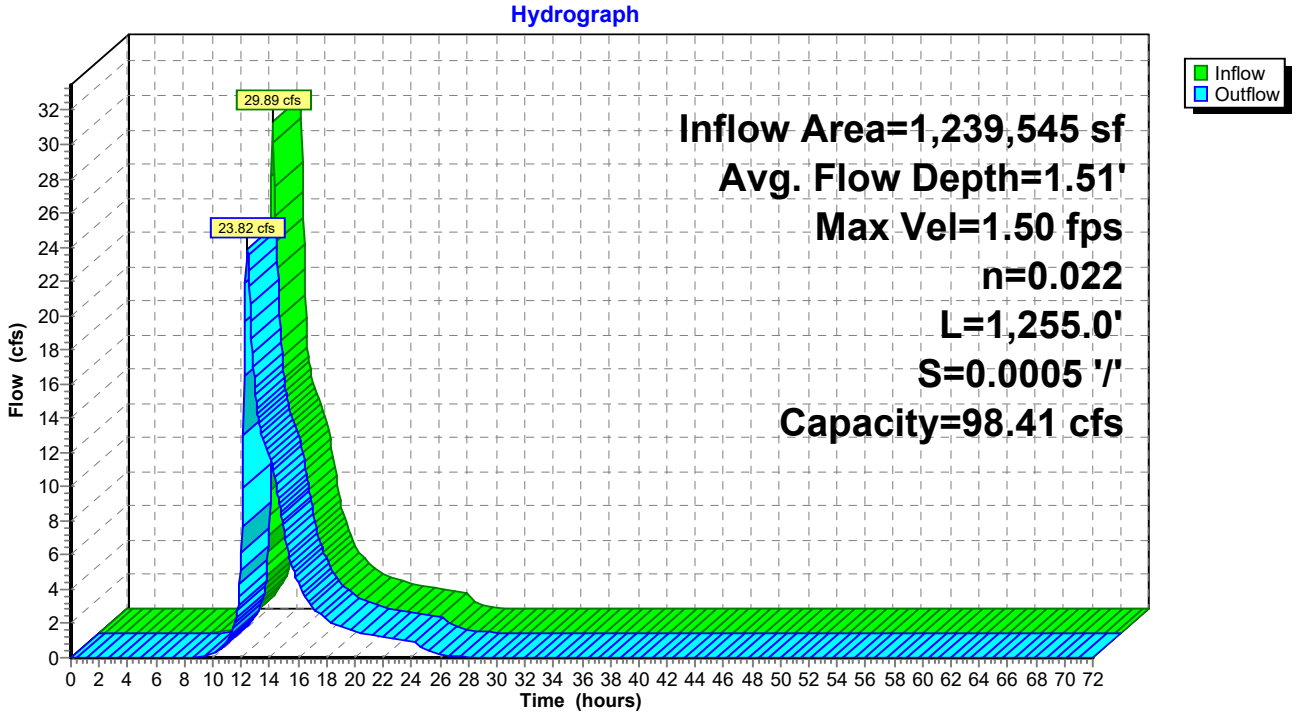
Reach 1R: WQS Segment 1



Summary for Reach 2R: WQS Segment 2

Inflow Area = 1,605,744 sf, 40.85% Impervious, Inflow Depth = 2.53" for 10YR - 24HR event
Inflow = 43.35 cfs @ 12.29 hrs, Volume= 337,880 cf
Outflow = 40.49 cfs @ 12.40 hrs, Volume= 337,880 cf, Atten= 7%, Lag= 6.9 min
Routed to Pond Cr-CD : Utility Crossing

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.74 fps, Min. Travel Time= 7.3 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 29.6 min

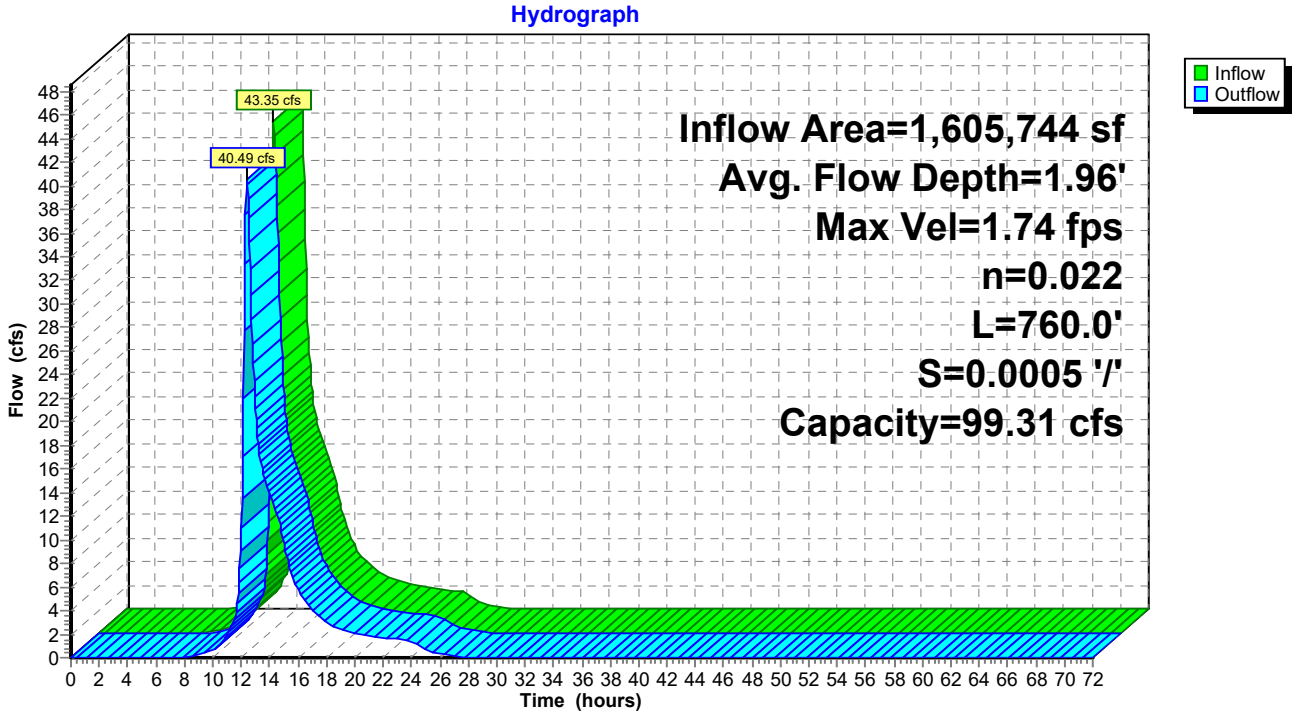
Peak Storage= 17,659 cf @ 12.40 hrs
Average Depth at Peak Storage= 1.96' , Surface Width= 17.74'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 241.41 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 99.31 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 760.0' Slope= 0.0005 '/'
Inlet Invert= 1.70', Outlet Invert= 1.33'



‡

Reach 2R: WQS Segment 2



Summary for Reach 3R: WQS Segment 3

Inflow Area = 2,225,116 sf, 36.18% Impervious, Inflow Depth = 2.35" for 10YR - 24HR event
Inflow = 56.51 cfs @ 12.41 hrs, Volume= 434,867 cf
Outflow = 52.50 cfs @ 12.51 hrs, Volume= 434,867 cf, Atten= 7%, Lag= 6.1 min
Routed to Link 3L : EAST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 5.5 min
Avg. Velocity = 0.37 fps, Avg. Travel Time= 27.4 min

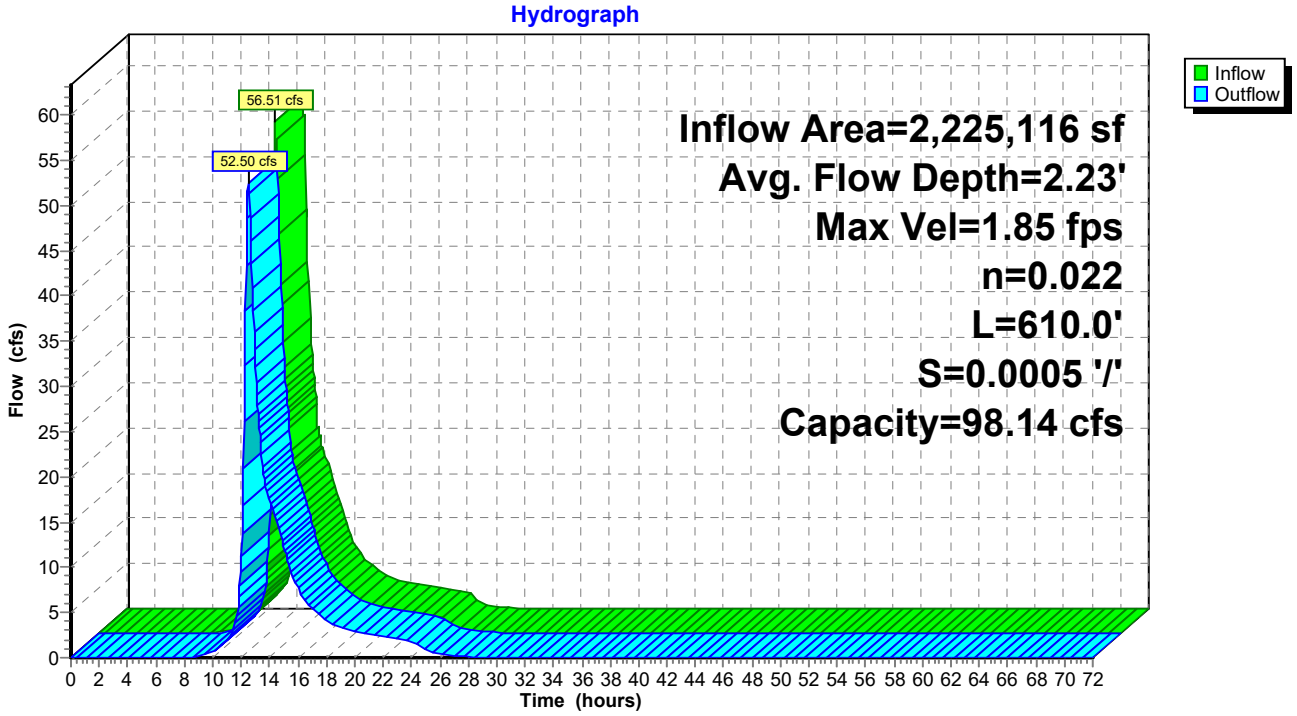
Peak Storage= 17,300 cf @ 12.51 hrs
Average Depth at Peak Storage= 2.23' , Surface Width= 19.40'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 238.55 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.14 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 610.0' Slope= 0.0005 '/'
Inlet Invert= 1.28', Outlet Invert= 0.99'



‡

Reach 3R: WQS Segment 3



Summary for Pond CB1: Exist CB

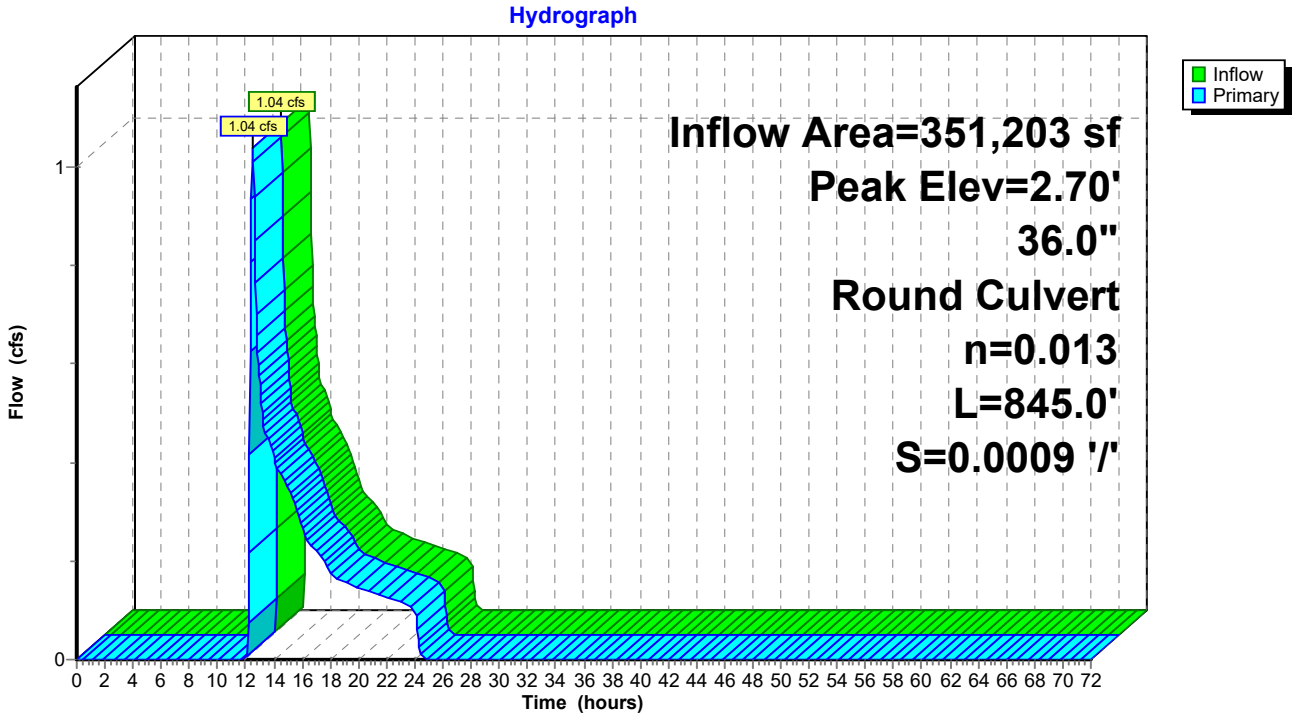
Inflow Area = 351,203 sf, 11.14% Impervious, Inflow Depth = 0.37" for 10YR - 24HR event
Inflow = 1.04 cfs @ 12.50 hrs, Volume= 10,952 cf
Outflow = 1.04 cfs @ 12.50 hrs, Volume= 10,952 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.04 cfs @ 12.50 hrs, Volume= 10,952 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.70' @ 12.50 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.10'	**36.0" Round Culvert** L= 845.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 2.10' / 1.32' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf

Primary OutFlow Max=1.04 cfs @ 12.50 hrs HW=2.70' (Free Discharge)
1=Culvert (Barrel Controls 1.04 cfs @ 1.56 fps)

Pond CB1: Exist CB



Summary for Pond CB10: Exist CB

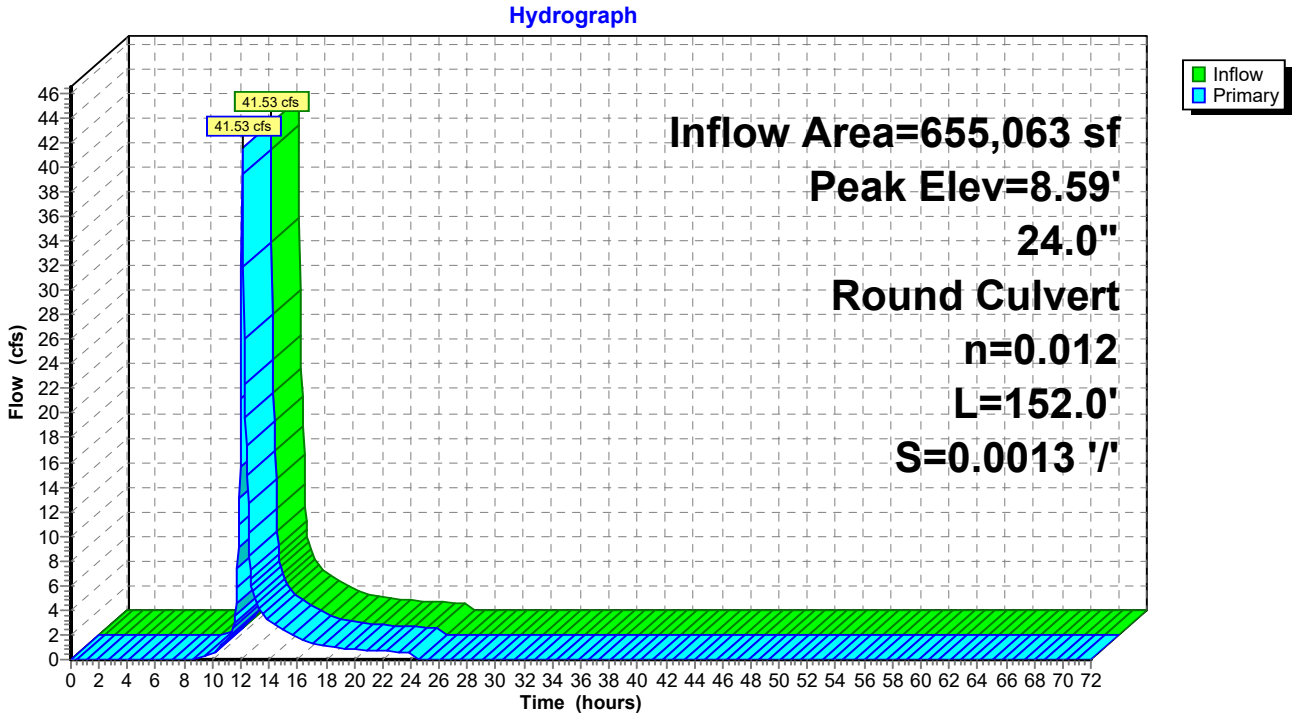
Inflow Area = 655,063 sf, 35.70% Impervious, Inflow Depth = 2.58" for 10YR - 24HR event
Inflow = 41.53 cfs @ 12.12 hrs, Volume= 140,587 cf
Outflow = 41.53 cfs @ 12.12 hrs, Volume= 140,587 cf, Atten= 0%, Lag= 0.0 min
Primary = 41.53 cfs @ 12.12 hrs, Volume= 140,587 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 8.59' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.62'	**24.0" Round Culvert** L= 152.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -1.62' / -1.82' S= 0.0013 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=40.33 cfs @ 12.12 hrs HW=8.15' (Free Discharge)
1=Culvert (Barrel Controls 40.33 cfs @ 12.84 fps)

Pond CB10: Exist CB



Summary for Pond CB11: Exist CB

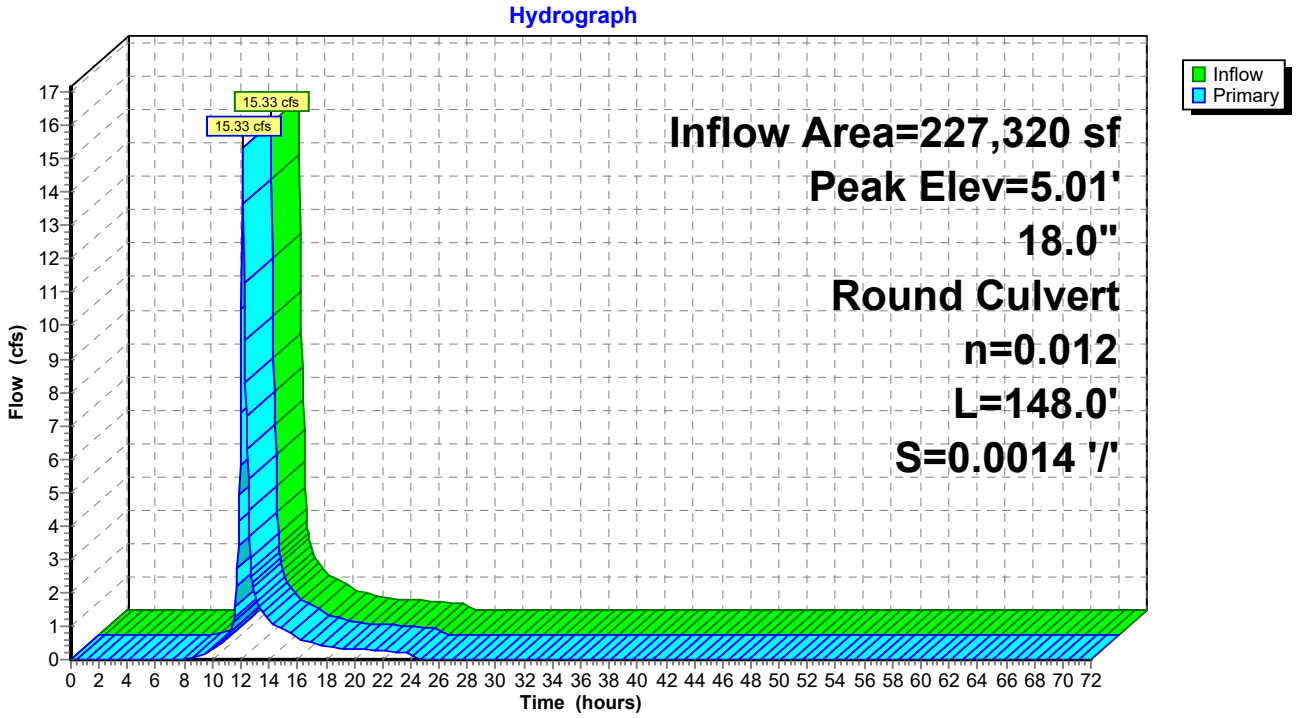
Inflow Area = 227,320 sf, 45.94% Impervious, Inflow Depth = 2.91" for 10YR - 24HR event
Inflow = 15.33 cfs @ 12.15 hrs, Volume= 55,088 cf
Outflow = 15.33 cfs @ 12.15 hrs, Volume= 55,088 cf, Atten= 0%, Lag= 0.0 min
Primary = 15.33 cfs @ 12.15 hrs, Volume= 55,088 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.01' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.73'	**18.0" Round RCP_Round 18"** L= 148.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.73' / -0.93' S= 0.0014 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=15.22 cfs @ 12.15 hrs HW=4.95' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 15.22 cfs @ 8.61 fps)

Pond CB11: Exist CB



Summary for Pond CB2: Exist CB

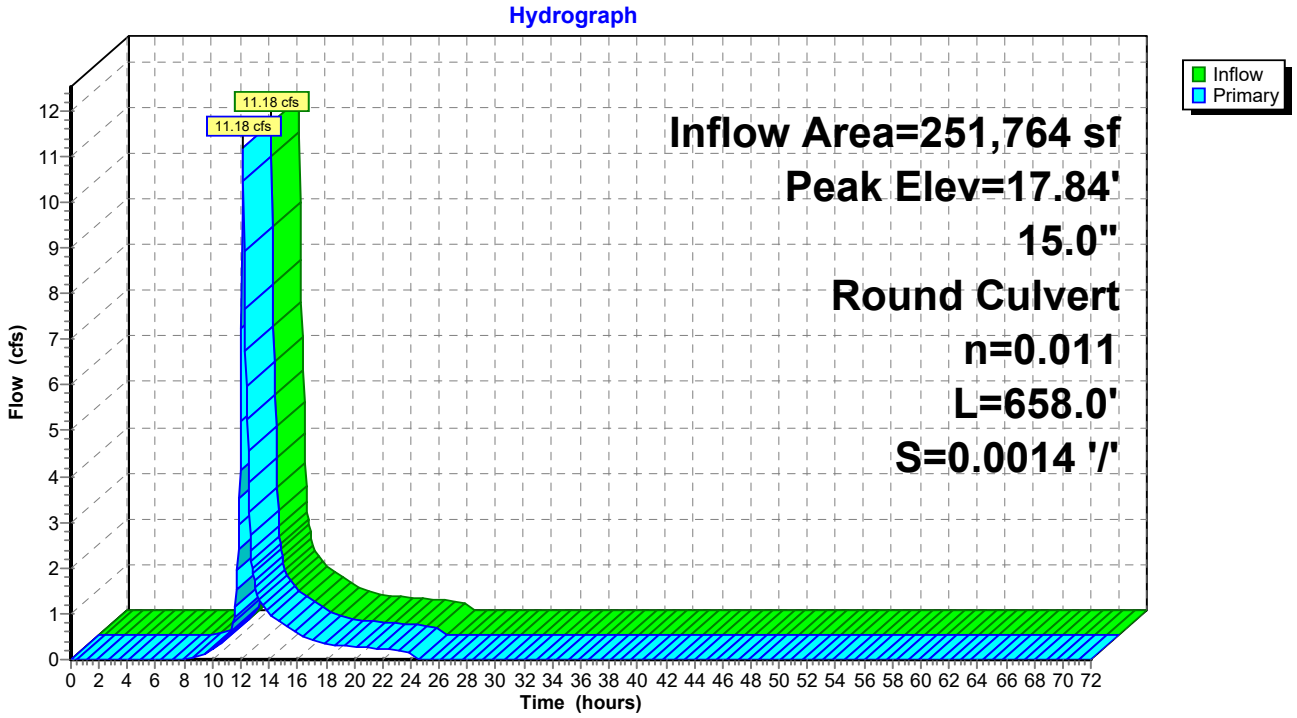
Inflow Area = 251,764 sf, 39.34% Impervious, Inflow Depth = 2.11" for 10YR - 24HR event
Inflow = 11.18 cfs @ 12.16 hrs, Volume= 44,233 cf
Outflow = 11.18 cfs @ 12.16 hrs, Volume= 44,233 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.18 cfs @ 12.16 hrs, Volume= 44,233 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 17.84' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.40'	**15.0" Round Culvert** L= 658.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.40' / 0.50' S= 0.0014 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=11.06 cfs @ 12.16 hrs HW=17.49' (Free Discharge)
1=Culvert (Barrel Controls 11.06 cfs @ 9.01 fps)

Pond CB2: Exist CB



Summary for Pond CB3: Exist CB

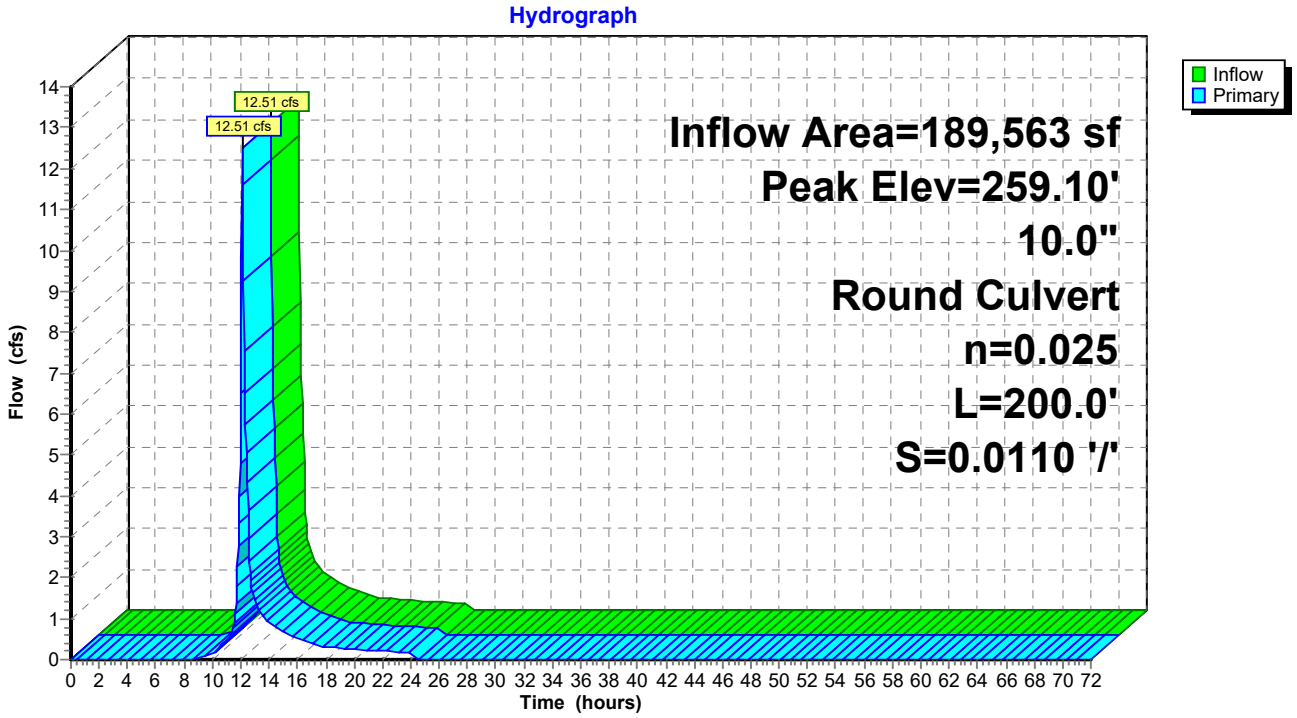
Inflow Area = 189,563 sf, 36.68% Impervious, Inflow Depth = 2.64" for 10YR - 24HR event
Inflow = 12.51 cfs @ 12.11 hrs, Volume= 41,657 cf
Outflow = 12.51 cfs @ 12.11 hrs, Volume= 41,657 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.51 cfs @ 12.11 hrs, Volume= 41,657 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 259.10' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.14'	**10.0" Round CMP_Round 10"** L= 200.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 4.14' / 1.94' S= 0.0110 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.55 sf

Primary OutFlow Max=12.18 cfs @ 12.11 hrs HW=246.91' (Free Discharge)
1=CMP_Round 10" (Barrel Controls 12.18 cfs @ 22.34 fps)

Pond CB3: Exist CB



Summary for Pond CB4: Exist CB

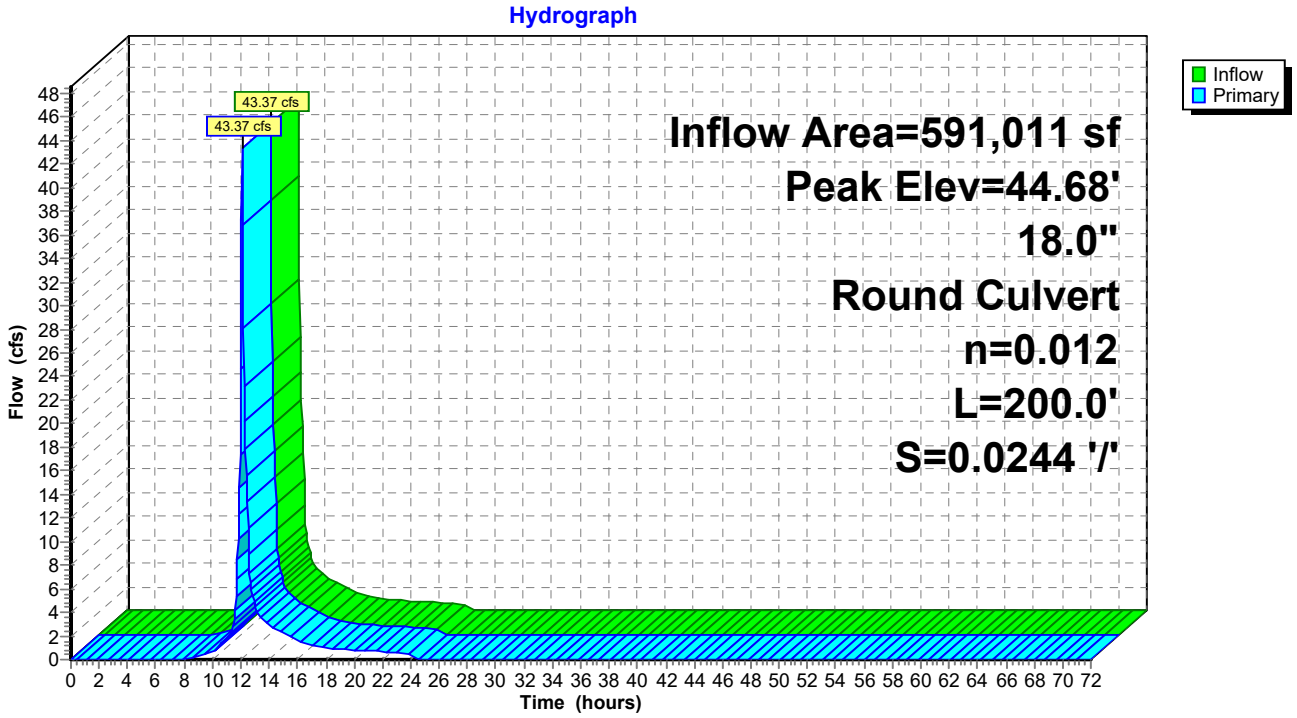
Inflow Area = 591,011 sf, 44.08% Impervious, Inflow Depth = 2.82" for 10YR - 24HR event
Inflow = 43.37 cfs @ 12.10 hrs, Volume= 138,717 cf
Outflow = 43.37 cfs @ 12.10 hrs, Volume= 138,717 cf, Atten= 0%, Lag= 0.0 min
Primary = 43.37 cfs @ 12.10 hrs, Volume= 138,717 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 44.68' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.89'	**18.0" Round RCP_Round 18"** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.89' / 0.00' S= 0.0244 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=43.26 cfs @ 12.10 hrs HW=44.47' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 43.26 cfs @ 24.48 fps)

Pond CB4: Exist CB



Summary for Pond CB5: Exist CB

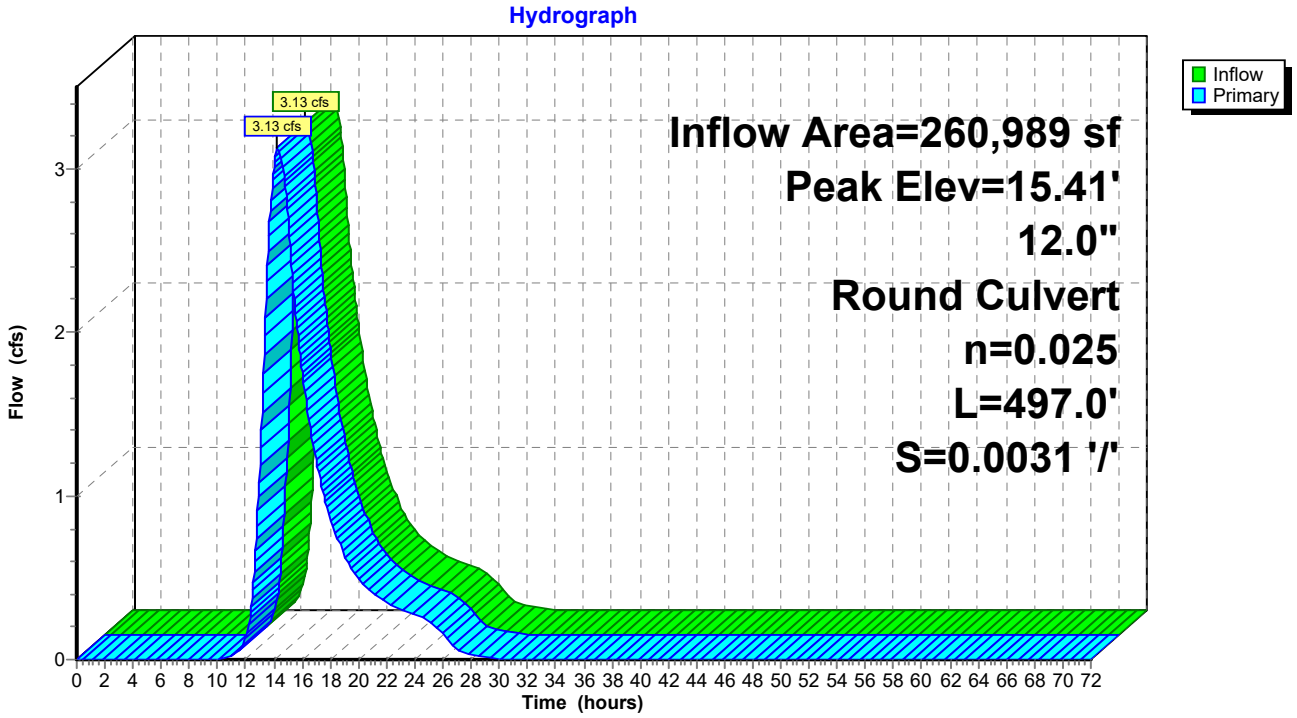
Inflow Area = 260,989 sf, 33.14% Impervious, Inflow Depth = 2.29" for 10YR - 24HR event
Inflow = 3.13 cfs @ 14.26 hrs, Volume= 49,846 cf
Outflow = 3.13 cfs @ 14.26 hrs, Volume= 49,846 cf, Atten= 0%, Lag= 0.0 min
Primary = 3.13 cfs @ 14.26 hrs, Volume= 49,846 cf
Routed to Pond MH1 : Exist MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.41' @ 14.26 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.30'	**12.0" Round CMP_Round 12"** L= 497.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1.30' / -0.25' S= 0.0031 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=3.12 cfs @ 14.26 hrs HW=15.40' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 3.12 cfs @ 3.98 fps)

Pond CB5: Exist CB



Summary for Pond CB6: Exist CB

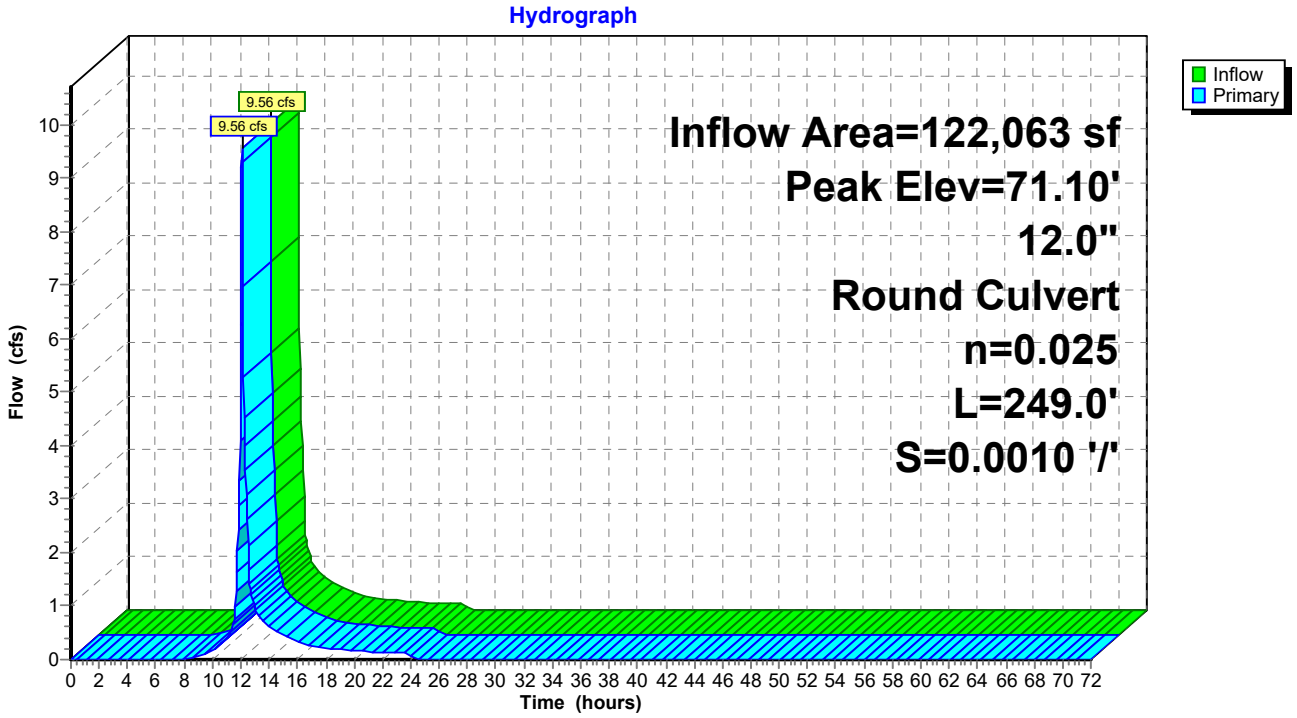
Inflow Area = 122,063 sf, 47.26% Impervious, Inflow Depth = 2.91" for 10YR - 24HR event
Inflow = 9.56 cfs @ 12.08 hrs, Volume= 29,580 cf
Outflow = 9.56 cfs @ 12.08 hrs, Volume= 29,580 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.56 cfs @ 12.08 hrs, Volume= 29,580 cf
Routed to Pond MH1 : Exist MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 71.10' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.01'	**12.0" Round CMP_Round 12"** L= 249.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.01' / -0.25' S= 0.0010 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=9.26 cfs @ 12.08 hrs HW=67.24' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 9.26 cfs @ 11.79 fps)

Pond CB6: Exist CB



Summary for Pond CB7: Exist CB

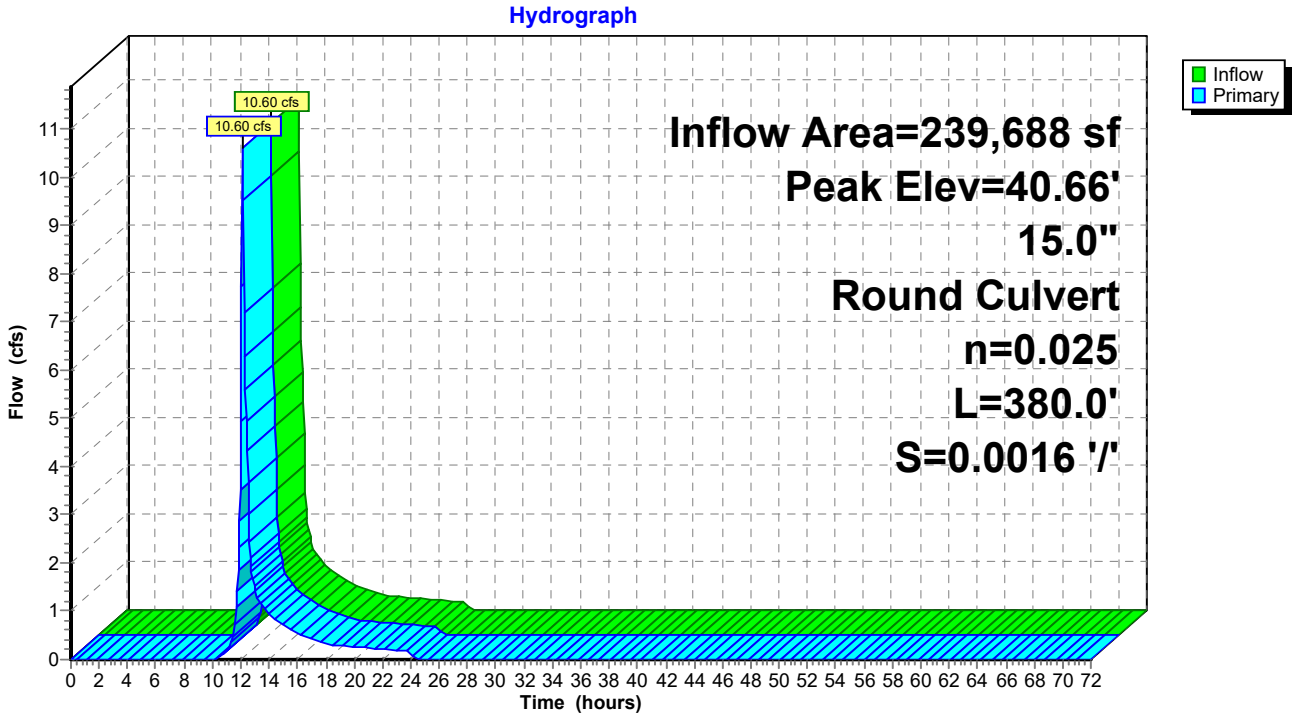
Inflow Area = 239,688 sf, 24.36% Impervious, Inflow Depth = 1.89" for 10YR - 24HR event
Inflow = 10.60 cfs @ 12.13 hrs, Volume= 37,673 cf
Outflow = 10.60 cfs @ 12.13 hrs, Volume= 37,673 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.60 cfs @ 12.13 hrs, Volume= 37,673 cf
Routed to Pond CB8 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 40.66' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**15.0" Round CMP_Round 15"** L= 380.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -0.62' S= 0.0016 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=10.38 cfs @ 12.13 hrs HW=39.18' (Free Discharge)
1=CMP_Round 15" (Barrel Controls 10.38 cfs @ 8.46 fps)

Pond CB7: Exist CB



Summary for Pond CB8: Exist CB

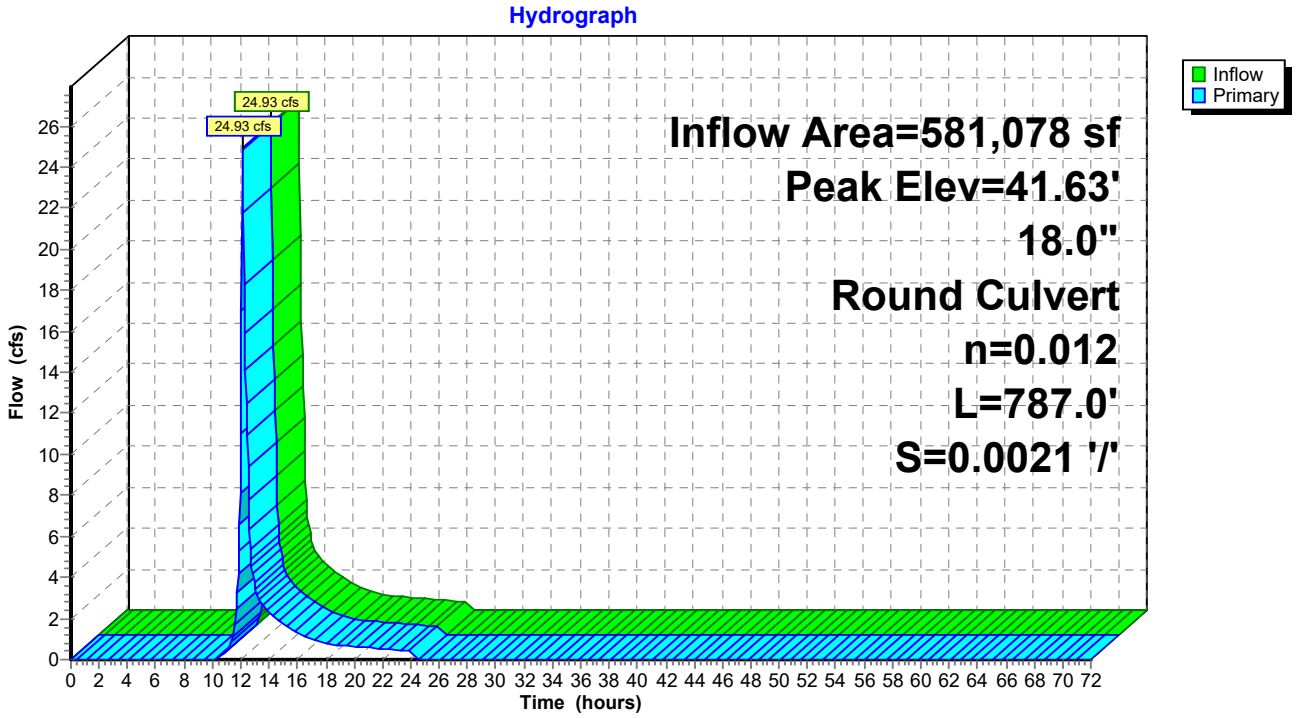
Inflow Area = 581,078 sf, 26.18% Impervious, Inflow Depth = 1.89" for 10YR - 24HR event
Inflow = 24.93 cfs @ 12.14 hrs, Volume= 91,332 cf
Outflow = 24.93 cfs @ 12.14 hrs, Volume= 91,332 cf, Atten= 0%, Lag= 0.0 min
Primary = 24.93 cfs @ 12.14 hrs, Volume= 91,332 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 41.63' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.72'	**18.0" Round RCP_Round 18"** L= 787.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.72' / -2.37' S= 0.0021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=24.61 cfs @ 12.14 hrs HW=40.57' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 24.61 cfs @ 13.93 fps)

Pond CB8: Exist CB



Summary for Pond CB9: Exist CB

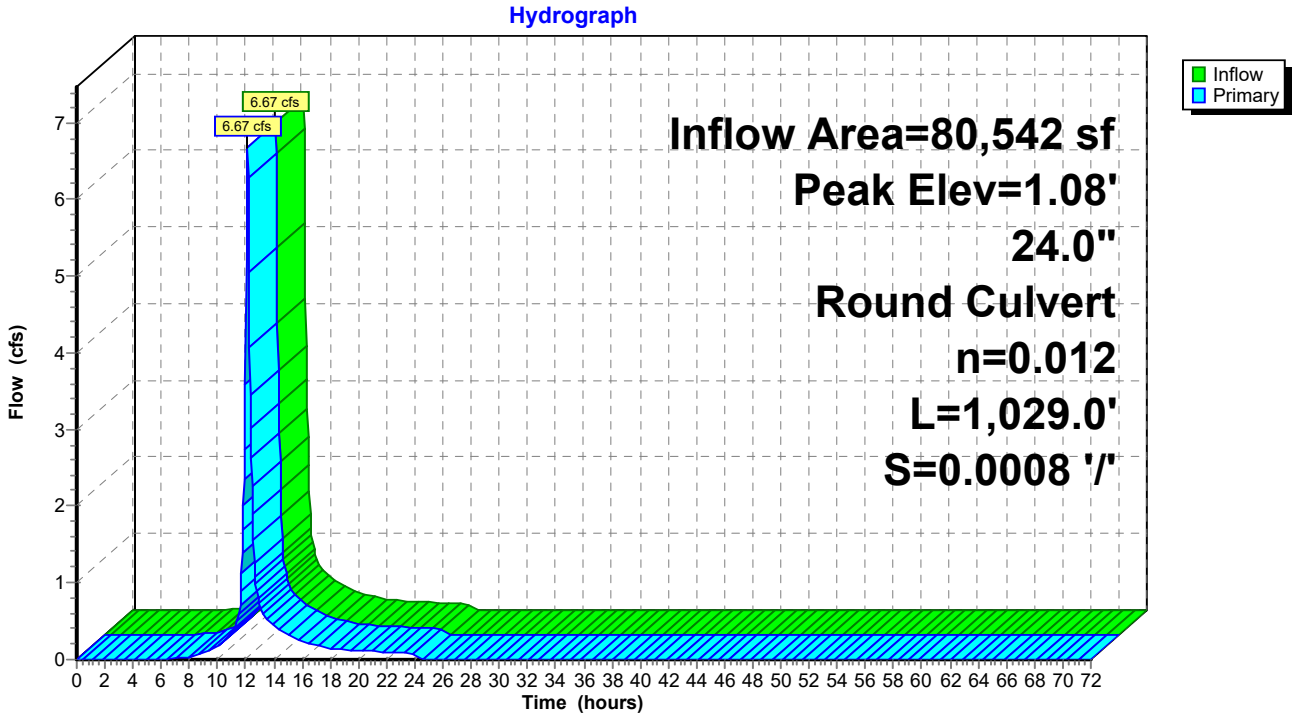
Inflow Area = 80,542 sf, 58.79% Impervious, Inflow Depth = 3.38" for 10YR - 24HR event
Inflow = 6.67 cfs @ 12.12 hrs, Volume= 22,706 cf
Outflow = 6.67 cfs @ 12.12 hrs, Volume= 22,706 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.67 cfs @ 12.12 hrs, Volume= 22,706 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.08' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.77'	**24.0" Round Culvert** L= 1,029.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.77' / -1.62' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=6.49 cfs @ 12.12 hrs HW=1.04' (Free Discharge)
1=Culvert (Barrel Controls 6.49 cfs @ 2.85 fps)

Pond CB9: Exist CB



Summary for Pond Cr-B: Robinson Driveway

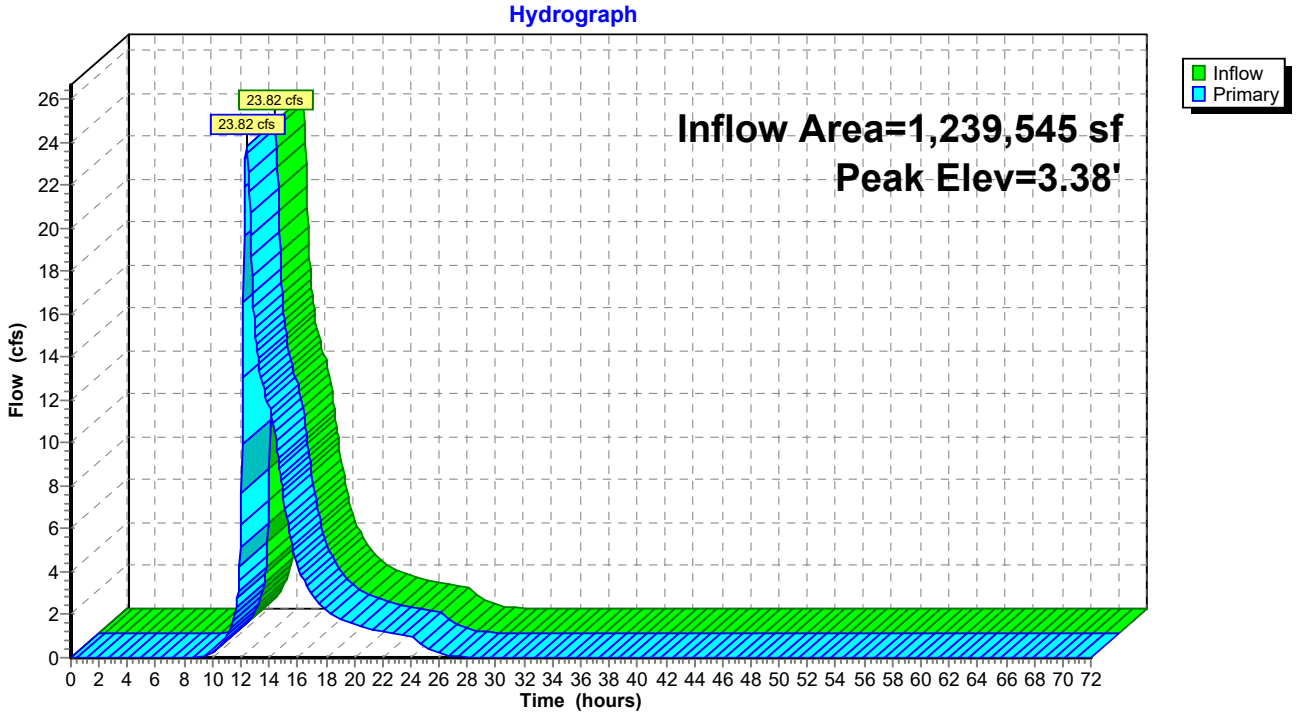
Inflow Area = 1,239,545 sf, 36.87% Impervious, Inflow Depth = 2.30" for 10YR - 24HR event
Inflow = 23.82 cfs @ 12.42 hrs, Volume= 237,615 cf
Outflow = 23.82 cfs @ 12.42 hrs, Volume= 237,615 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.82 cfs @ 12.42 hrs, Volume= 237,615 cf
Routed to Reach 2R : WQS Segment 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.38' @ 12.42 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=23.75 cfs @ 12.42 hrs HW=3.37' (Free Discharge)
- **1=RCP_Round 24"** (Barrel Controls 7.92 cfs @ 3.87 fps)
- **2=RCP_Round 24"** (Barrel Controls 7.92 cfs @ 3.87 fps)
- **3=RCP_Round 24"** (Barrel Controls 7.92 cfs @ 3.87 fps)

Pond Cr-B: Robinson Driveway



Summary for Pond Cr-CD: Utility Crossing

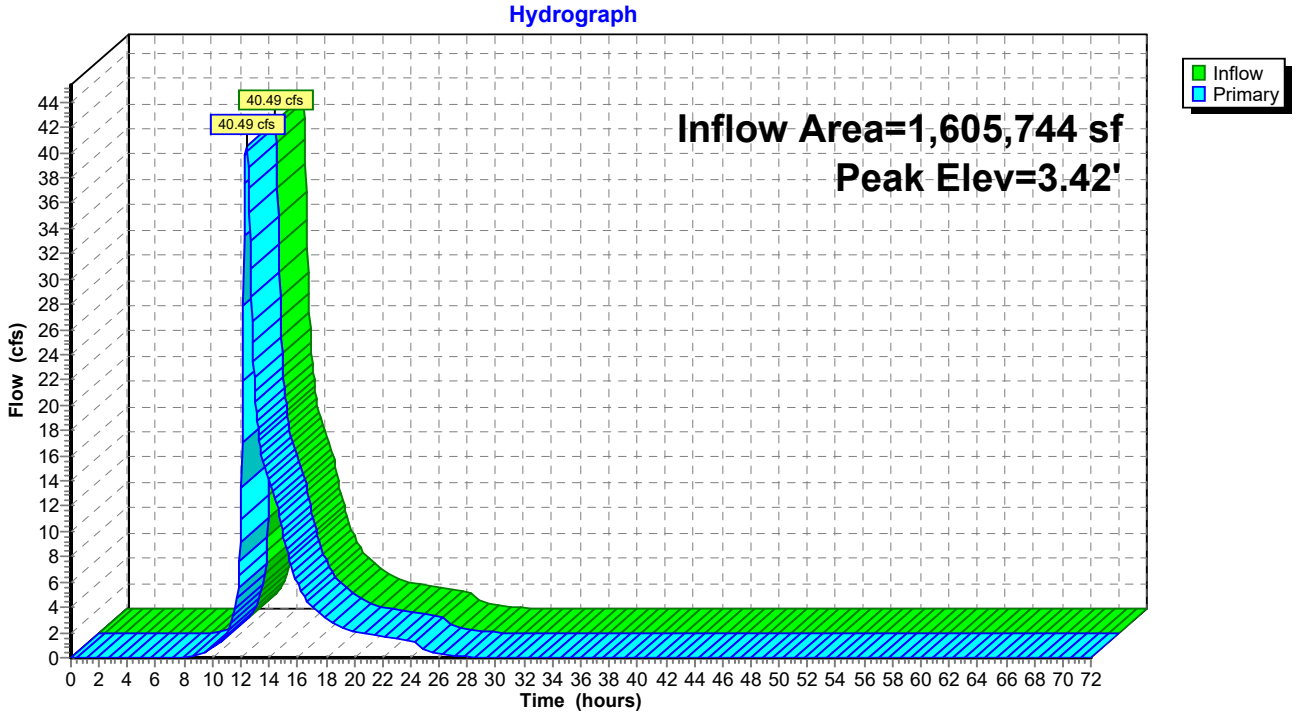
Inflow Area = 1,605,744 sf, 40.85% Impervious, Inflow Depth = 2.53" for 10YR - 24HR event
Inflow = 40.49 cfs @ 12.40 hrs, Volume= 337,880 cf
Outflow = 40.49 cfs @ 12.40 hrs, Volume= 337,880 cf, Atten= 0%, Lag= 0.0 min
Primary = 40.49 cfs @ 12.40 hrs, Volume= 337,880 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.42' @ 12.40 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#3	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=40.44 cfs @ 12.40 hrs HW=3.42' (Free Discharge)
- **1=RCP_Round 30"** (Barrel Controls 13.48 cfs @ 4.16 fps)
- **2=RCP_Round 30"** (Barrel Controls 13.48 cfs @ 4.16 fps)
- **3=RCP_Round 30"** (Barrel Controls 13.48 cfs @ 4.16 fps)

Pond Cr-CD: Utility Crossing



Summary for Pond MH1: Exist MH

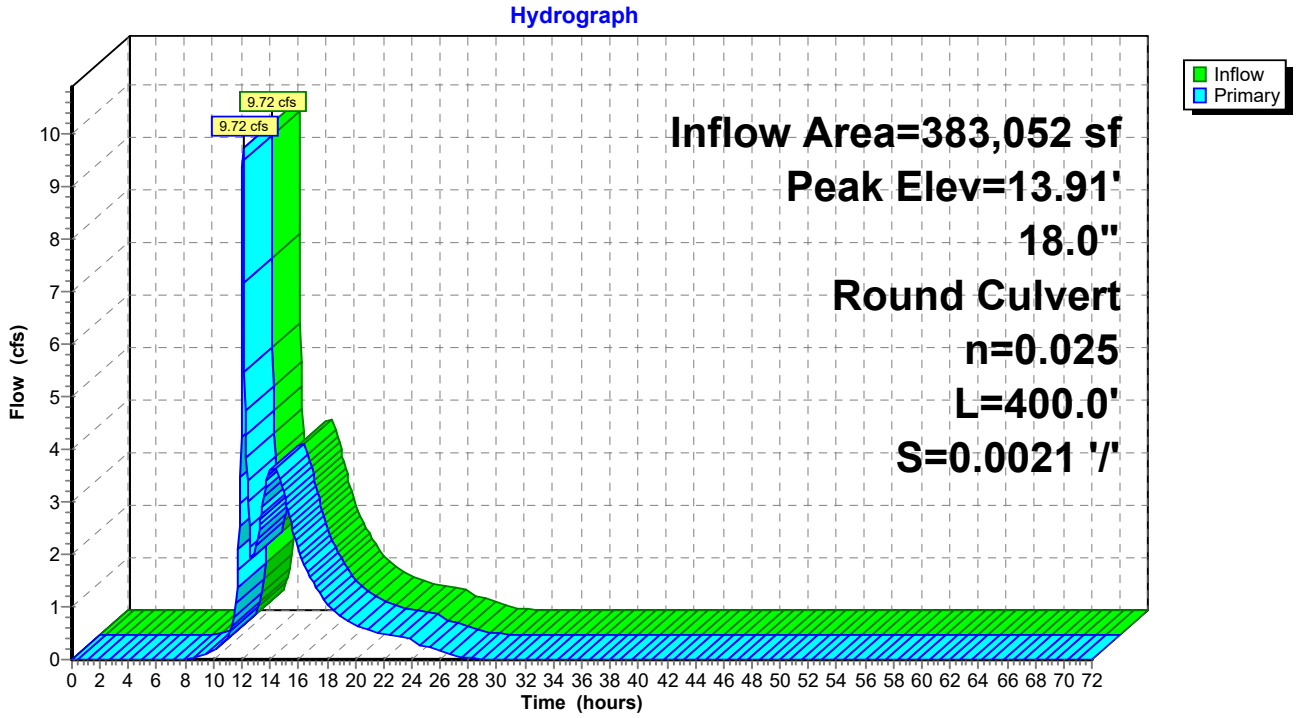
Inflow Area = 383,052 sf, 37.64% Impervious, Inflow Depth = 2.49" for 10YR - 24HR event
Inflow = 9.72 cfs @ 12.08 hrs, Volume= 79,426 cf
Outflow = 9.72 cfs @ 12.08 hrs, Volume= 79,426 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.72 cfs @ 12.08 hrs, Volume= 79,426 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 13.91' @ 12.08 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.25'	**18.0" Round CMP_Round 18"** L= 400.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= -0.25' / -1.09' S= 0.0021 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=9.42 cfs @ 12.08 hrs HW=13.18' (Free Discharge)
1=CMP_Round 18" (Barrel Controls 9.42 cfs @ 5.33 fps)

Pond MH1: Exist MH



Summary for Pond P1: Pond 1

Inflow Area = 651,203 sf, 47.97% Impervious, Inflow Depth = 2.61" for 10YR - 24HR event
Inflow = 10.97 cfs @ 12.63 hrs, Volume= 141,427 cf
Outflow = 10.20 cfs @ 13.10 hrs, Volume= 141,427 cf, Atten= 7%, Lag= 28.1 min
Discarded = 0.99 cfs @ 13.10 hrs, Volume= 16,862 cf
Primary = 9.21 cfs @ 13.10 hrs, Volume= 124,565 cf
Routed to Pond P10 : Wetland Ditch

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.41' @ 13.10 hrs Surf.Area= 20,007 sf Storage= 9,190 cf

Plug-Flow detention time= 12.7 min calculated for 141,329 cf (100% of inflow)
Center-of-Mass det. time= 12.7 min (894.9 - 882.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2.40'	69,114 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

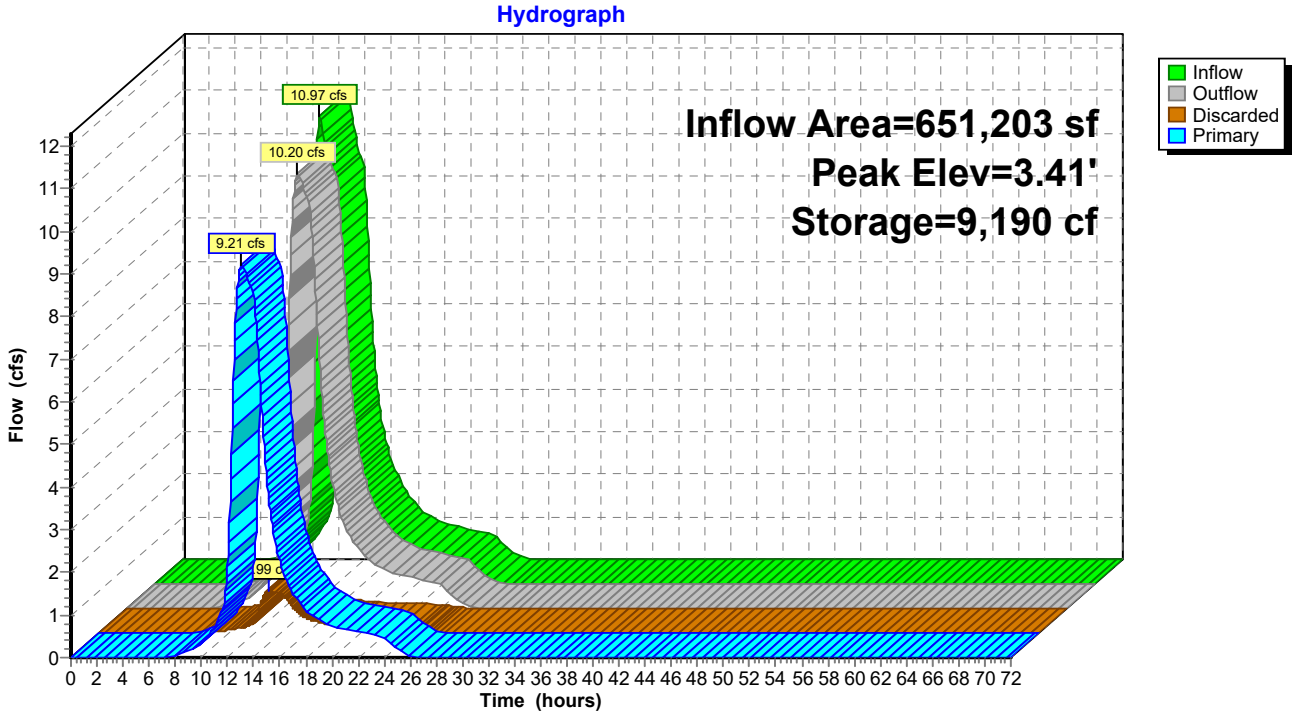
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.40	0	0.0	0	0	0
2.50	1,116	311.0	37	37	7,697
3.00	11,546	598.0	2,709	2,746	28,458
3.50	22,069	715.0	8,263	11,009	40,688
4.00	32,945	769.0	13,663	24,672	47,075
4.50	44,009	867.0	19,172	43,844	59,841
5.00	57,369	999.0	25,271	69,114	79,447

Device	Routing	Invert	Outlet Devices
#1	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#4	Discarded	2.40'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.30'

Discarded OutFlow Max=0.99 cfs @ 13.10 hrs HW=3.41' (Free Discharge)
└**4=Exfiltration** (Controls 0.99 cfs)

Primary OutFlow Max=9.21 cfs @ 13.10 hrs HW=3.41' (Free Discharge)
├**1=Culvert** (Barrel Controls 3.07 cfs @ 3.06 fps)
├**2=Culvert** (Barrel Controls 3.07 cfs @ 3.06 fps)
└**3=Culvert** (Barrel Controls 3.07 cfs @ 3.06 fps)

Pond P1: Pond 1



Summary for Pond P10: Wetland Ditch

Inflow Area = 827,347 sf, 40.98% Impervious, Inflow Depth = 2.39" for 10YR - 24HR event
Inflow = 13.57 cfs @ 12.24 hrs, Volume= 164,582 cf
Outflow = 13.14 cfs @ 12.32 hrs, Volume= 164,582 cf, Atten= 3%, Lag= 4.4 min
Primary = 13.14 cfs @ 12.32 hrs, Volume= 164,582 cf
Routed to Reach 1R : WQS Segment 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.57' @ 12.32 hrs Surf.Area= 3,961 sf Storage= 3,244 cf

Plug-Flow detention time= 5.5 min calculated for 164,468 cf (100% of inflow)
Center-of-Mass det. time= 5.5 min (884.3 - 878.8)

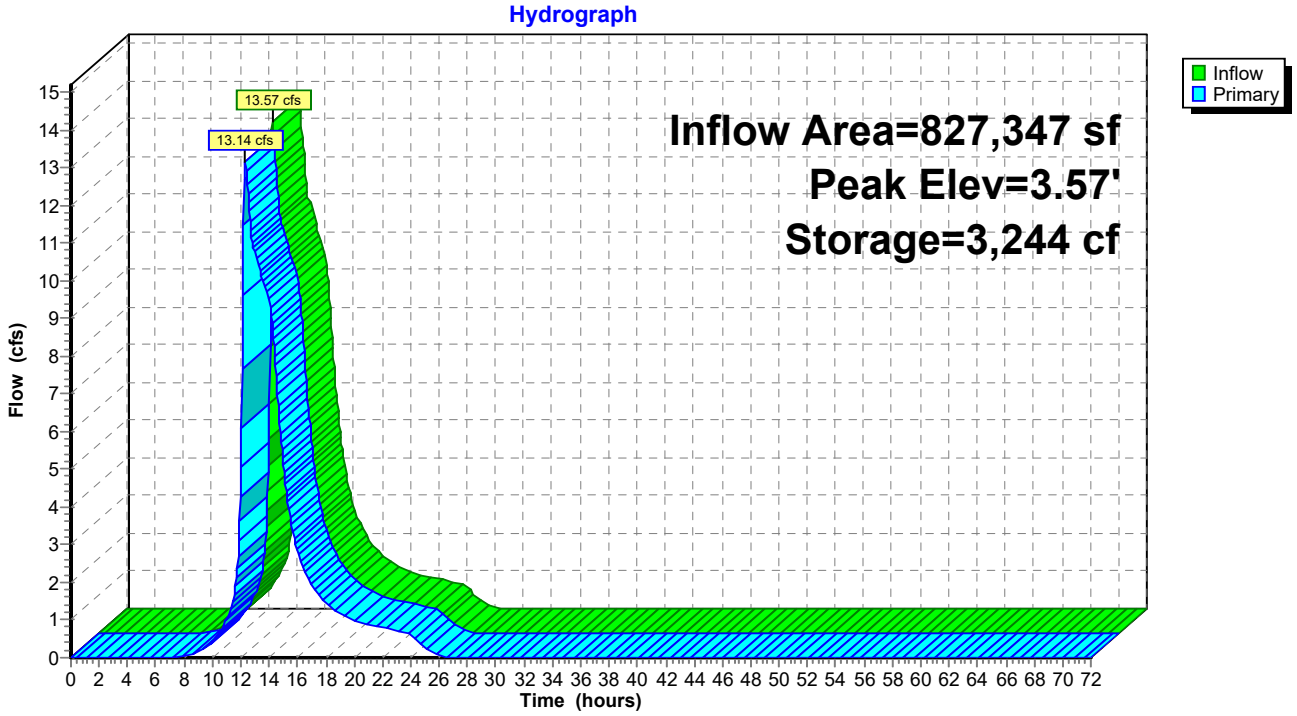
Volume	Invert	Avail.Storage	Storage Description
#1	2.33'	34,944 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.33	0	0.0	0	0	0
2.50	2,079	556.0	118	118	24,600
3.00	2,792	564.0	1,213	1,331	25,366
3.50	3,765	606.0	1,633	2,964	29,288
4.00	5,218	646.0	2,236	5,200	33,285
4.50	26,868	1,785.0	7,321	12,521	253,629
5.00	65,665	1,908.0	22,423	34,944	289,788

Device	Routing	Invert	Outlet Devices
#1	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf

Primary OutFlow Max=13.09 cfs @ 12.32 hrs HW=3.57' (Free Discharge)
- **1=RCP_Round 21"** (Barrel Controls 4.36 cfs @ 3.36 fps)
- **2=RCP_Round 21"** (Barrel Controls 4.36 cfs @ 3.36 fps)
- **3=RCP_Round 21"** (Barrel Controls 4.36 cfs @ 3.36 fps)

Pond P10: Wetland Ditch



Summary for Pond P2: Pond 2

Inflow Area = 80,876 sf, 37.79% Impervious, Inflow Depth = 2.46" for 10YR - 24HR event
Inflow = 3.85 cfs @ 12.24 hrs, Volume= 16,594 cf
Outflow = 2.63 cfs @ 12.44 hrs, Volume= 16,594 cf, Atten= 32%, Lag= 12.4 min
Discarded = 0.21 cfs @ 12.44 hrs, Volume= 936 cf
Primary = 2.42 cfs @ 12.44 hrs, Volume= 15,658 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.32' @ 12.44 hrs Surf.Area= 6,798 sf Storage= 1,826 cf

Plug-Flow detention time= 5.7 min calculated for 16,583 cf (100% of inflow)
Center-of-Mass det. time= 5.7 min (853.3 - 847.6)

Volume	Invert	Avail.Storage	Storage Description
#1	3.35'	13,689 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

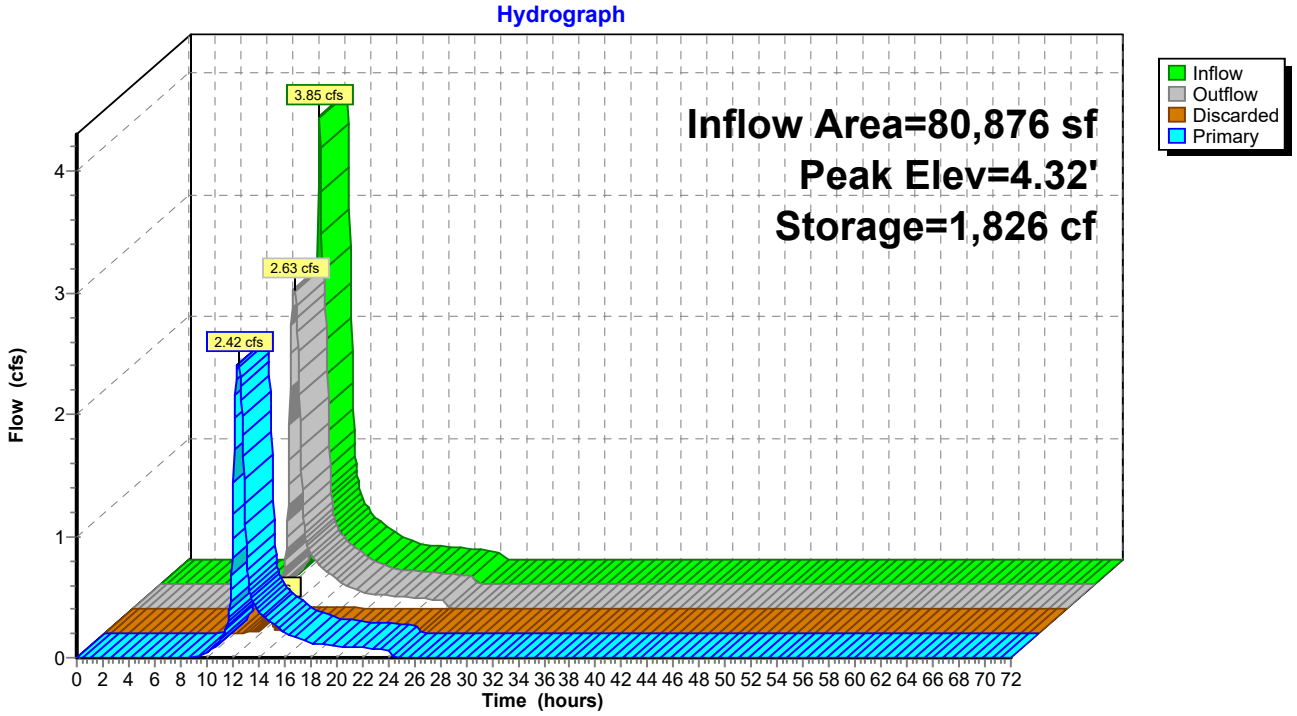
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.35	0	0.0	0	0	0
3.50	170	63.0	8	8	316
4.00	2,037	330.0	466	474	8,667
4.50	10,588	652.0	2,878	3,353	33,831
4.75	19,541	773.0	3,709	7,062	47,553
5.00	34,152	971.0	6,627	13,689	75,033

Device	Routing	Invert	Outlet Devices
#1	Primary	3.35'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 133.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.35' / 3.25' S= 0.0008 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.35'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.21 cfs @ 12.44 hrs HW=4.32' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.21 cfs)

Primary OutFlow Max=2.42 cfs @ 12.44 hrs HW=4.32' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.42 cfs @ 2.54 fps)

Pond P2: Pond 2



Summary for Pond P3: Pond 3

Inflow Area = 446,976 sf, 56.49% Impervious, Inflow Depth = 3.19" for 10YR - 24HR event
Inflow = 10.93 cfs @ 13.13 hrs, Volume= 118,640 cf
Outflow = 9.25 cfs @ 13.31 hrs, Volume= 118,640 cf, Atten= 15%, Lag= 10.6 min
Discarded = 0.81 cfs @ 13.31 hrs, Volume= 9,899 cf
Primary = 8.44 cfs @ 13.32 hrs, Volume= 108,741 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.88' @ 13.54 hrs Surf.Area= 16,813 sf Storage= 9,210 cf

Plug-Flow detention time= 9.7 min calculated for 118,558 cf (100% of inflow)
Center-of-Mass det. time= 9.7 min (885.7 - 876.0)

Volume	Invert	Avail.Storage	Storage Description
#1	2.65'	46,661 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

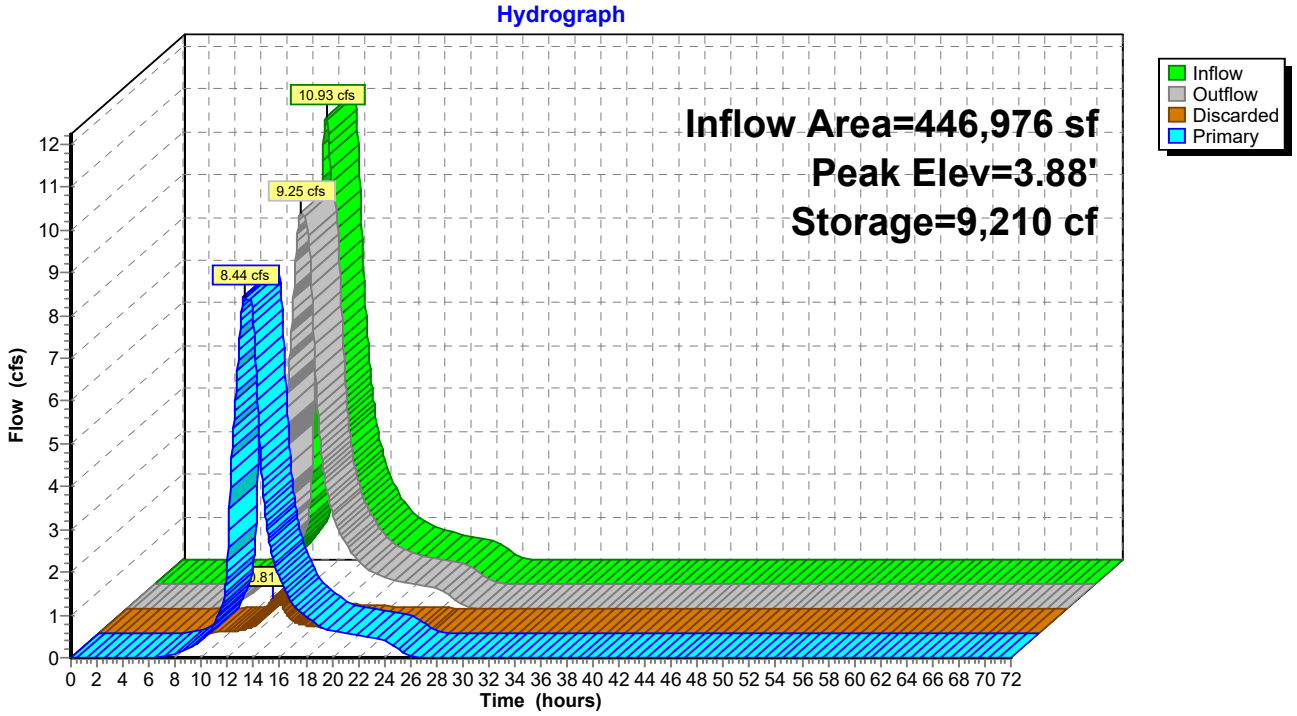
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.65	0	0.0	0	0	0
3.00	4,059	888.0	474	474	62,751
3.50	10,848	1,191.0	3,590	4,064	112,882
4.00	19,089	1,350.0	7,388	11,452	145,039
4.50	33,127	1,447.0	12,894	24,346	166,641
5.00	57,227	1,543.0	22,316	46,661	189,495

Device	Routing	Invert	Outlet Devices
#1	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#3	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#4	Discarded	2.65'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.55'

Discarded OutFlow Max=0.81 cfs @ 13.31 hrs HW=3.84' (Free Discharge)
└**4=Exfiltration** (Controls 0.81 cfs)

Primary OutFlow Max=8.45 cfs @ 13.32 hrs HW=3.84' (Free Discharge)
├**1=Culvert** (Barrel Controls 2.82 cfs @ 2.60 fps)
├**2=Culvert** (Barrel Controls 2.82 cfs @ 2.60 fps)
└**3=Culvert** (Barrel Controls 2.82 cfs @ 2.60 fps)

Pond P3: Pond 3



Summary for Pond P4: Pond 4

Inflow Area = 57,929 sf, 17.47% Impervious, Inflow Depth = 1.81" for 10YR - 24HR event
Inflow = 2.38 cfs @ 12.14 hrs, Volume= 8,730 cf
Outflow = 1.86 cfs @ 12.24 hrs, Volume= 8,730 cf, Atten= 22%, Lag= 5.7 min
Discarded = 0.07 cfs @ 12.24 hrs, Volume= 191 cf
Primary = 1.79 cfs @ 12.24 hrs, Volume= 8,539 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.98' @ 12.24 hrs Surf.Area= 2,303 sf Storage= 502 cf

Plug-Flow detention time= 1.7 min calculated for 8,724 cf (100% of inflow)
Center-of-Mass det. time= 1.7 min (862.8 - 861.1)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	12,438 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

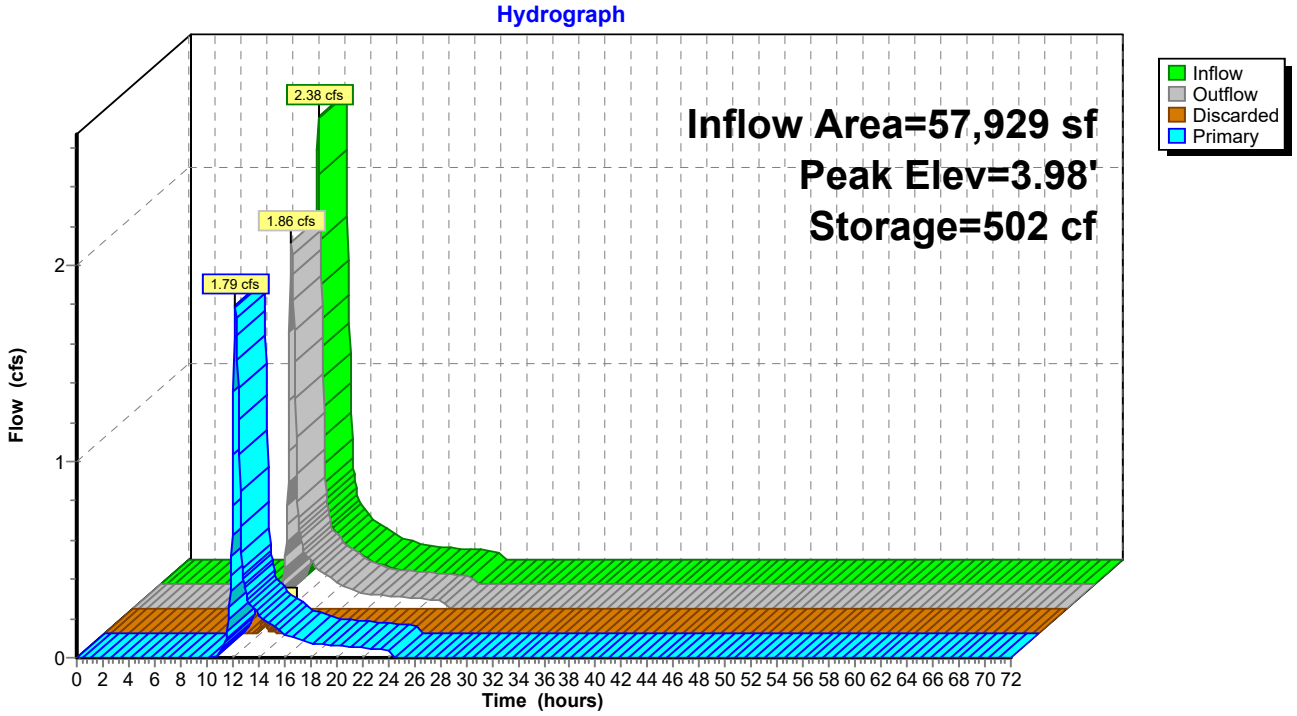
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.20	0	0.0	0	0	0
3.50	149	61.0	15	15	296
4.00	2,440	293.0	532	547	6,832
4.50	9,823	539.0	2,860	3,407	23,121
4.75	16,825	666.0	3,292	6,699	35,300
5.00	29,698	866.0	5,740	12,438	59,683

Device	Routing	Invert	Outlet Devices
#1	Primary	3.20'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 134.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.20' / 3.10' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.20'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.07 cfs @ 12.24 hrs HW=3.98' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=1.78 cfs @ 12.24 hrs HW=3.98' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.78 cfs @ 2.31 fps)

Pond P4: Pond 4



Summary for Pond P5: Pond 5

Inflow Area = 52,606 sf, 20.20% Impervious, Inflow Depth = 1.58" for 10YR - 24HR event
Inflow = 1.92 cfs @ 12.12 hrs, Volume= 6,936 cf
Outflow = 1.76 cfs @ 12.17 hrs, Volume= 6,936 cf, Atten= 9%, Lag= 2.8 min
Discarded = 0.03 cfs @ 12.17 hrs, Volume= 71 cf
Primary = 1.73 cfs @ 12.17 hrs, Volume= 6,865 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.62' @ 12.17 hrs Surf.Area= 824 sf Storage= 166 cf

Plug-Flow detention time= 0.6 min calculated for 6,932 cf (100% of inflow)
Center-of-Mass det. time= 0.6 min (868.7 - 868.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2.85'	12,246 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

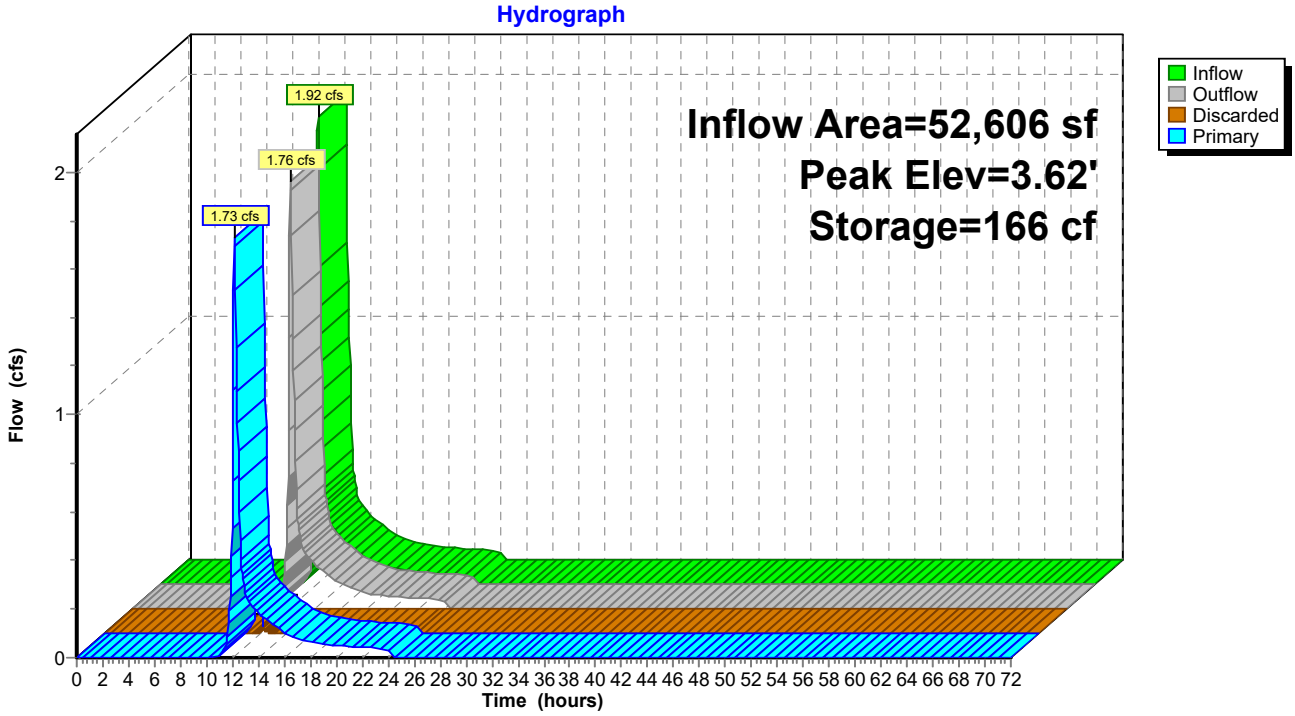
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.85	0	0.0	0	0	0
3.00	22	19.0	1	1	29
3.50	418	102.0	89	90	829
4.00	2,904	284.0	737	828	6,420
4.50	9,309	476.0	2,902	3,730	18,033
4.90	21,881	695.0	6,062	9,791	38,442
5.00	27,310	796.0	2,455	12,246	50,426

Device	Routing	Invert	Outlet Devices
#1	Primary	2.85'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 142.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.85' / 2.75' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.85'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.75'

Discarded OutFlow Max=0.03 cfs @ 12.17 hrs HW=3.62' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.03 cfs)

Primary OutFlow Max=1.71 cfs @ 12.17 hrs HW=3.62' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.71 cfs @ 2.26 fps)

Pond P5: Pond 5



Summary for Pond P6: Pond 6

Inflow Area = 252,442 sf, 27.23% Impervious, Inflow Depth = 2.00" for 10YR - 24HR event
Inflow = 7.21 cfs @ 12.45 hrs, Volume= 42,171 cf
Outflow = 6.00 cfs @ 12.63 hrs, Volume= 42,224 cf, Atten= 17%, Lag= 10.7 min
Discarded = 0.21 cfs @ 12.63 hrs, Volume= 341 cf
Primary = 5.79 cfs @ 12.63 hrs, Volume= 41,882 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.19' @ 12.63 hrs Surf.Area= 5,421 sf Storage= 1,423 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.2 min (872.1 - 870.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	48,739 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

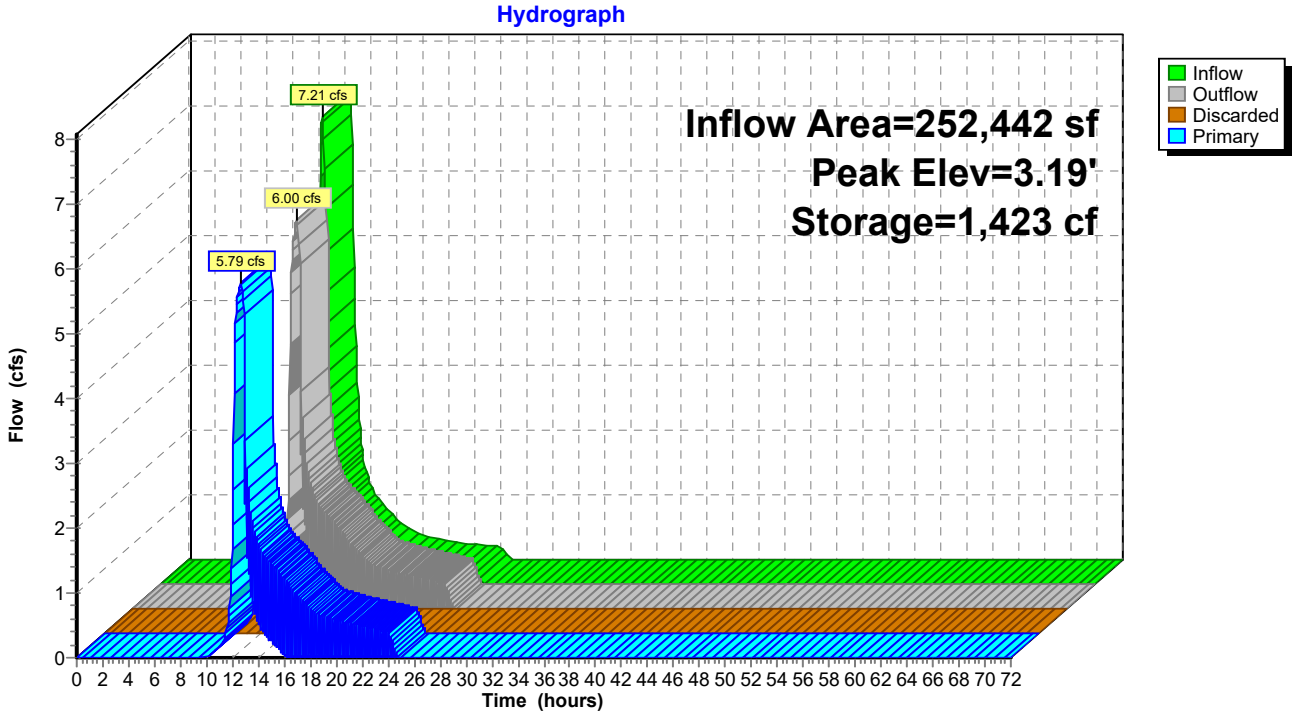
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
3.00	3,571	520.0	595	595	21,518
3.50	9,437	727.0	3,136	3,731	42,062
4.00	24,344	1,116.0	8,156	11,887	99,115
4.50	57,812	1,402.0	19,945	31,832	156,426
4.75	77,941	1,580.0	16,907	48,739	198,667

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**15.0" Round CMP_Round 15"** L= 265.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 0.50' / -0.40' S= 0.0034 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	2.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.40'

Discarded OutFlow Max=0.21 cfs @ 12.63 hrs HW=3.18' (Free Discharge)
↑**2=Exfiltration** (Controls 0.21 cfs)

Primary OutFlow Max=5.78 cfs @ 12.63 hrs HW=3.18' (Free Discharge)
↑**1=CMP_Round 15"** (Barrel Controls 5.78 cfs @ 4.71 fps)

Pond P6: Pond 6



Summary for Pond P7: Pond 7

Inflow Area = 67,118 sf, 34.62% Impervious, Inflow Depth = 2.38" for 10YR - 24HR event
Inflow = 3.36 cfs @ 12.19 hrs, Volume= 13,292 cf
Outflow = 2.55 cfs @ 12.32 hrs, Volume= 13,292 cf, Atten= 24%, Lag= 7.8 min
Discarded = 0.10 cfs @ 12.32 hrs, Volume= 249 cf
Primary = 2.45 cfs @ 12.32 hrs, Volume= 13,043 cf
Routed to Pond P6 : Pond 6

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.83' @ 12.32 hrs Surf.Area= 3,152 sf Storage= 855 cf

Plug-Flow detention time= 1.9 min calculated for 13,283 cf (100% of inflow)
Center-of-Mass det. time= 1.9 min (848.7 - 846.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2.75'	16,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

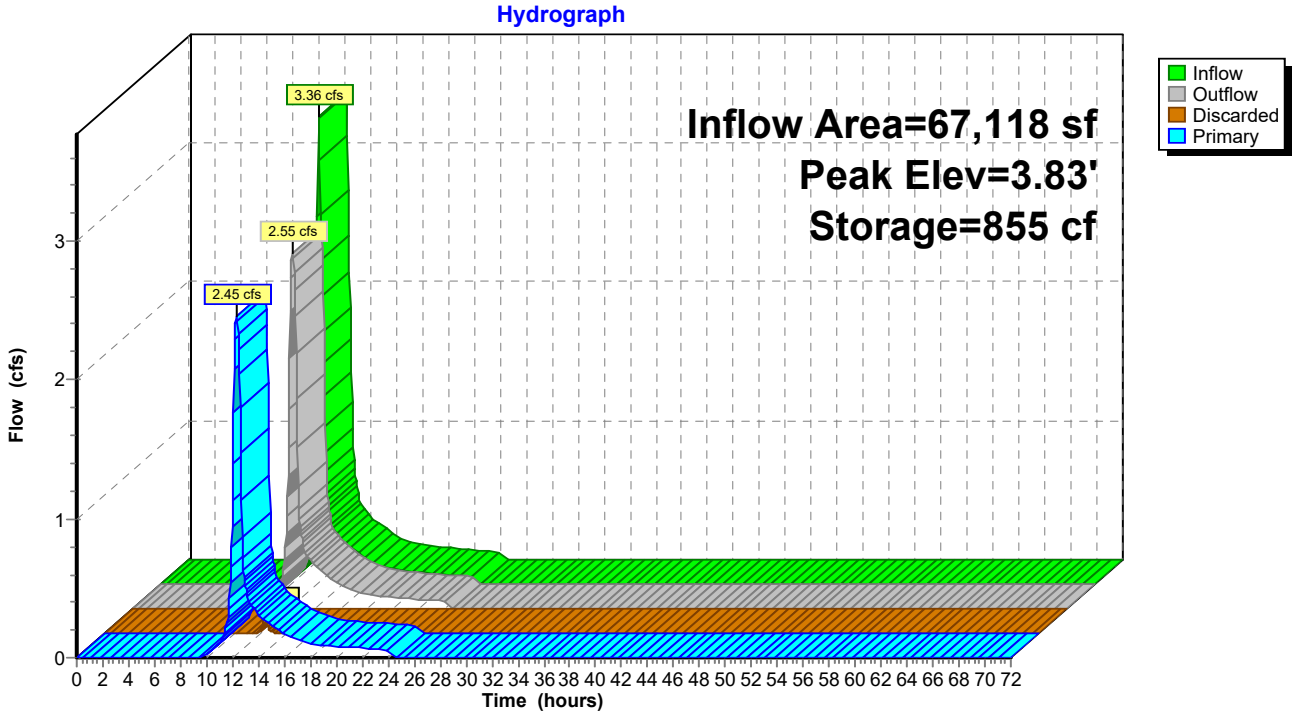
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.75	0	0.0	0	0	0
3.00	47	29.0	4	4	67
3.50	992	154.0	209	213	1,888
4.00	4,809	305.0	1,331	1,544	7,405
4.50	13,313	480.0	4,354	5,898	18,338
4.90	25,536	679.0	7,638	13,536	36,694
5.00	29,518	743.0	2,750	16,286	43,936

Device	Routing	Invert	Outlet Devices
#1	Primary	2.75'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 180.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.75' / 2.65' S= 0.0006 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.75'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.65'

Discarded OutFlow Max=0.10 cfs @ 12.32 hrs HW=3.82' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.10 cfs)

Primary OutFlow Max=2.44 cfs @ 12.32 hrs HW=3.82' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.44 cfs @ 2.39 fps)

Pond P7: Pond 7



Summary for Pond P8: Pond 8

Inflow Area = 366,659 sf, 30.00% Impervious, Inflow Depth = 2.13" for 10YR - 24HR event
Inflow = 10.99 cfs @ 12.25 hrs, Volume= 65,185 cf
Outflow = 11.40 cfs @ 12.40 hrs, Volume= 65,203 cf, Atten= 0%, Lag= 9.3 min
Primary = 11.40 cfs @ 12.40 hrs, Volume= 65,203 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 12.07' @ 12.40 hrs Surf.Area= 21,292 sf Storage= 4,397 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.0 min (869.2 - 865.2)

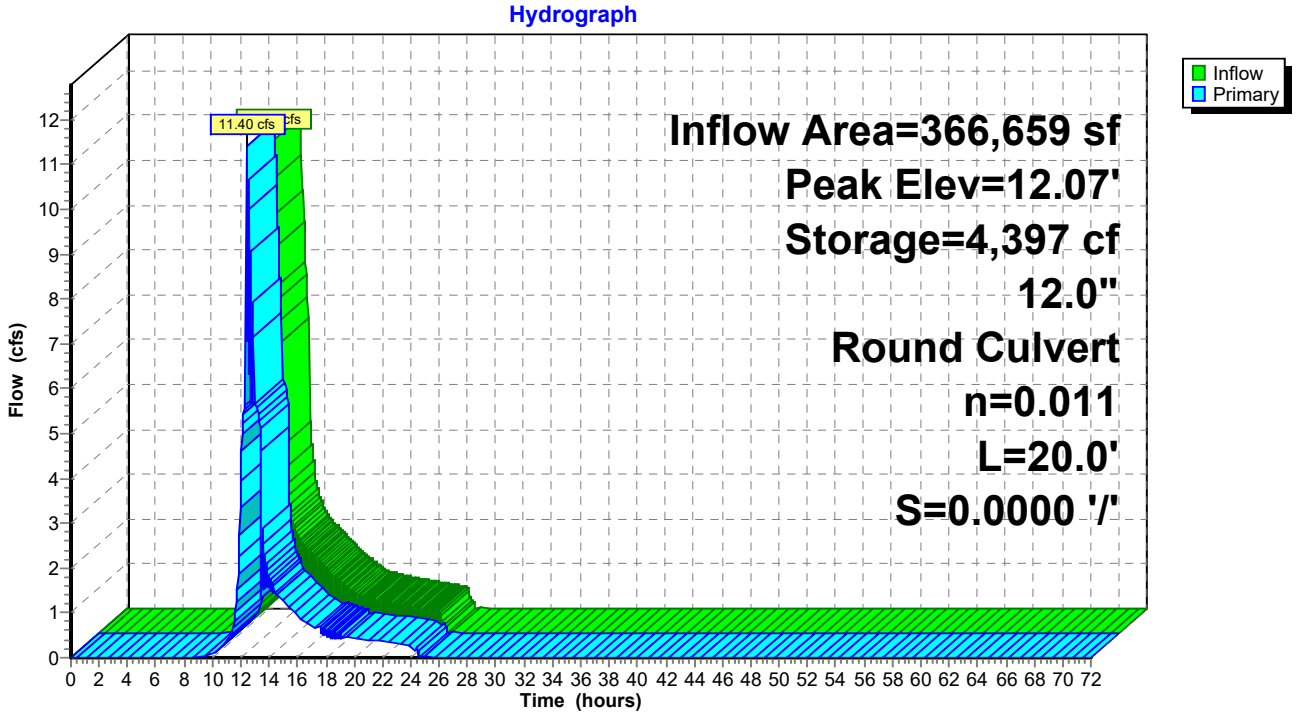
Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	4,397 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
4.00	44	40.0	22	22	131
4.50	348	192.0	86	108	2,938
5.00	5,358	771.0	1,179	1,287	47,309
5.25	21,292	781.0	3,111	4,397	48,559

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 2.50' / 2.50' S= 0.0000 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=11.13 cfs @ 12.40 hrs HW=11.67' (Free Discharge)
1=Culvert (Inlet Controls 11.13 cfs @ 14.18 fps)

Pond P8: Pond 8



Summary for Pond P9: Pond 9

Inflow Area = 18,401 sf, 28.03% Impervious, Inflow Depth = 1.73" for 10YR - 24HR event
Inflow = 0.64 cfs @ 12.20 hrs, Volume= 2,656 cf
Outflow = 0.91 cfs @ 12.25 hrs, Volume= 2,247 cf, Atten= 0%, Lag= 3.2 min
Primary = 0.91 cfs @ 12.25 hrs, Volume= 2,247 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.08' @ 12.26 hrs Surf.Area= 2,618 sf Storage= 532 cf

Plug-Flow detention time= 147.0 min calculated for 2,245 cf (85% of inflow)
Center-of-Mass det. time= 80.5 min (948.0 - 867.5)

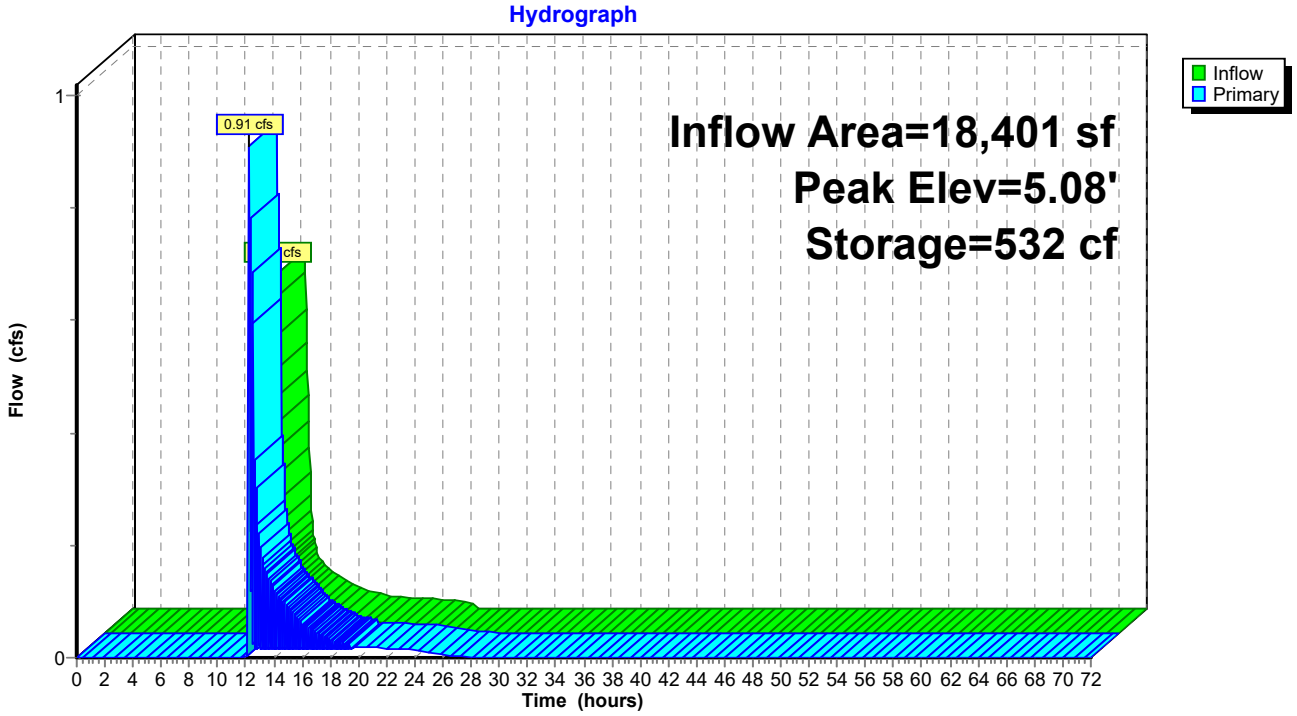
Volume	Invert	Avail.Storage	Storage Description
#1	1.60'	532 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1.60	12	12.0	0	0	12
4.45	12	12.0	34	34	46
4.50	1,258	168.0	23	57	2,281
4.75	2,618	234.0	474	532	4,393

Device	Routing	Invert	Outlet Devices
#1	Primary	4.70'	**12.0" Round Culvert** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	4.70'	**12.0" Round RCP_Round 12"** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 12.25 hrs HW=5.06' (Free Discharge)
1=Culvert (Barrel Controls 0.42 cfs @ 2.47 fps)
2=RCP_Round 12" (Barrel Controls 0.42 cfs @ 2.47 fps)

Pond P9: Pond 9

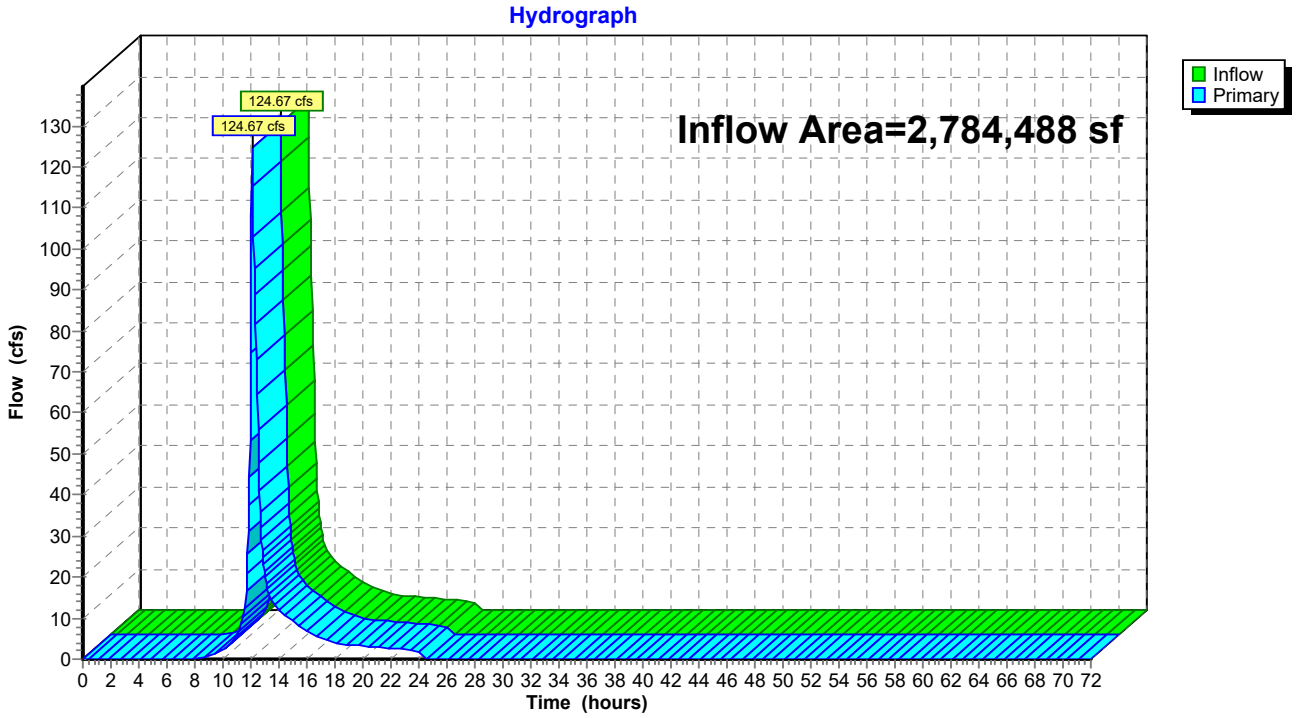


Summary for Link 1L: WEST WETL

Inflow Area = 2,784,488 sf, 39.12% Impervious, Inflow Depth = 2.31" for 10YR - 24HR event
Inflow = 124.67 cfs @ 12.11 hrs, Volume= 535,353 cf
Primary = 124.67 cfs @ 12.11 hrs, Volume= 535,353 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : TUTTLE BROOK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 1L: WEST WETL

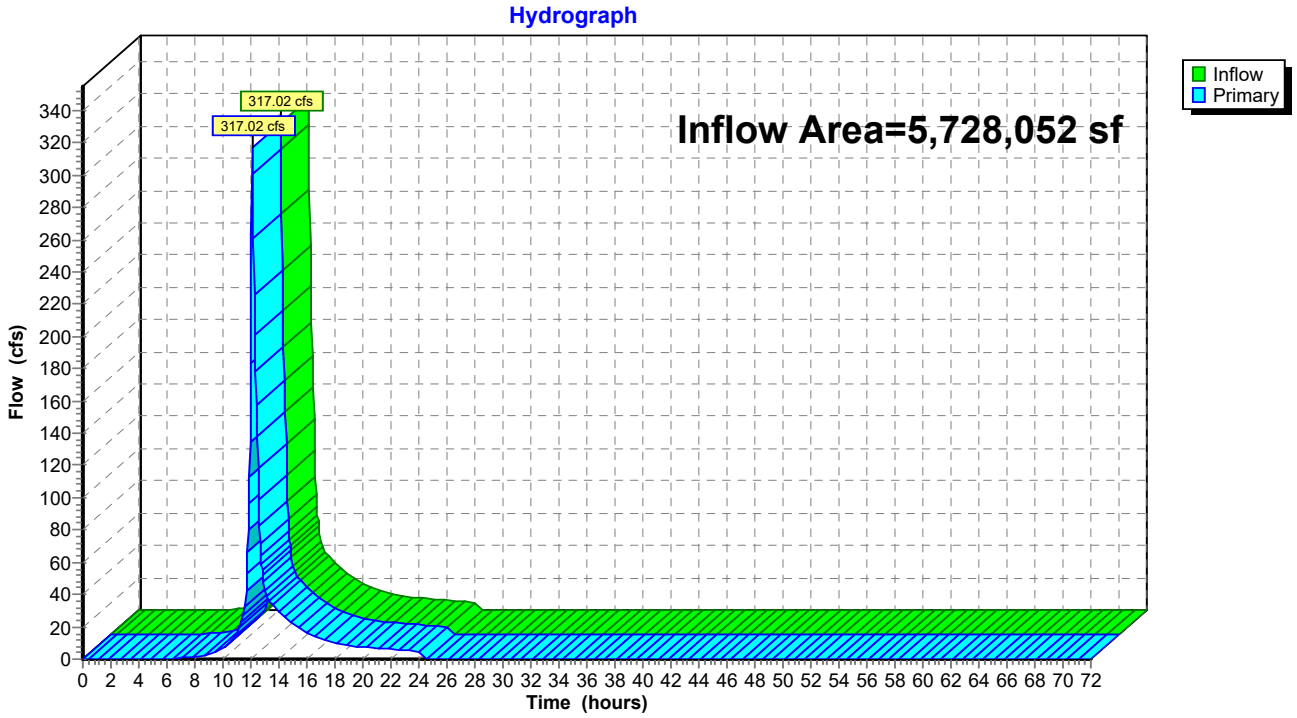


Summary for Link 2L: TUTTLE BROOK

Inflow Area = 5,728,052 sf, 28.97% Impervious, Inflow Depth = 2.69" for 10YR - 24HR event
Inflow = 317.02 cfs @ 12.11 hrs, Volume= 1,286,266 cf
Primary = 317.02 cfs @ 12.11 hrs, Volume= 1,286,266 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 2L: TUTTLE BROOK

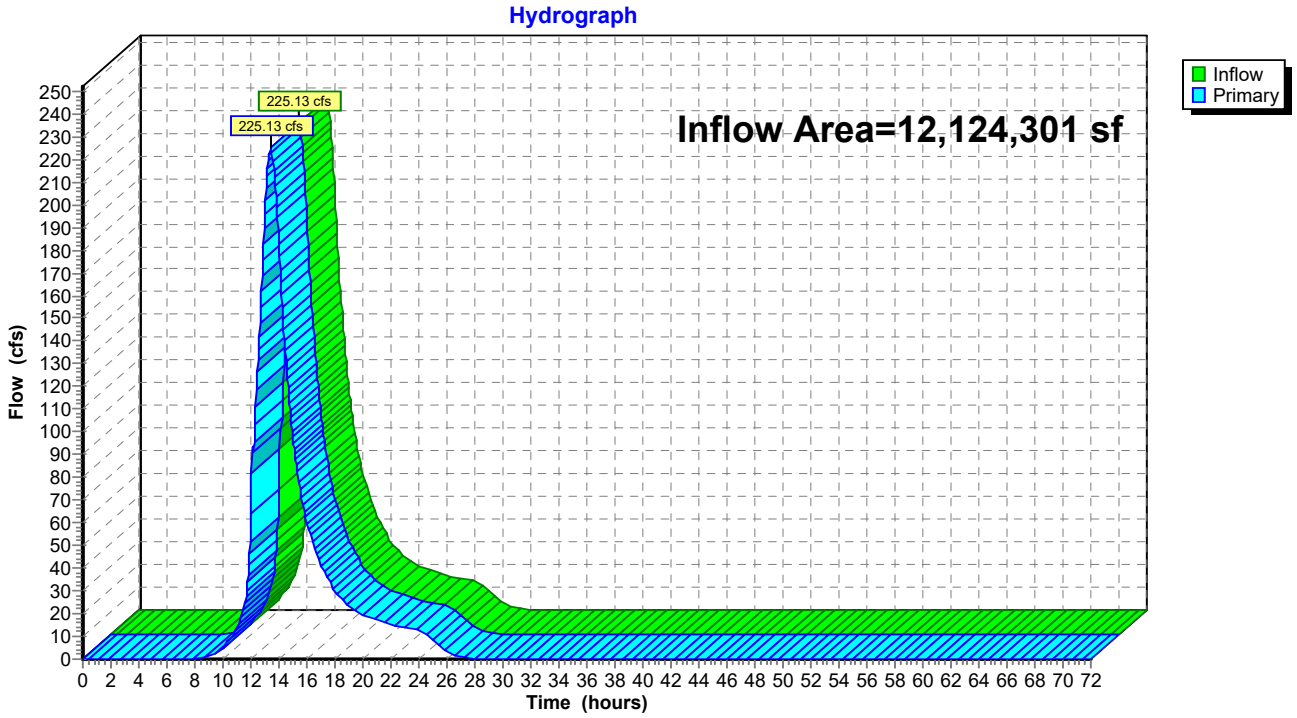


Summary for Link 3L: EAST WETL

Inflow Area = 12,124,301 sf, 40.20% Impervious, Inflow Depth = 2.88" for 10YR - 24HR event
Inflow = 225.13 cfs @ 13.40 hrs, Volume= 2,905,400 cf
Primary = 225.13 cfs @ 13.40 hrs, Volume= 2,905,400 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: EAST WETL

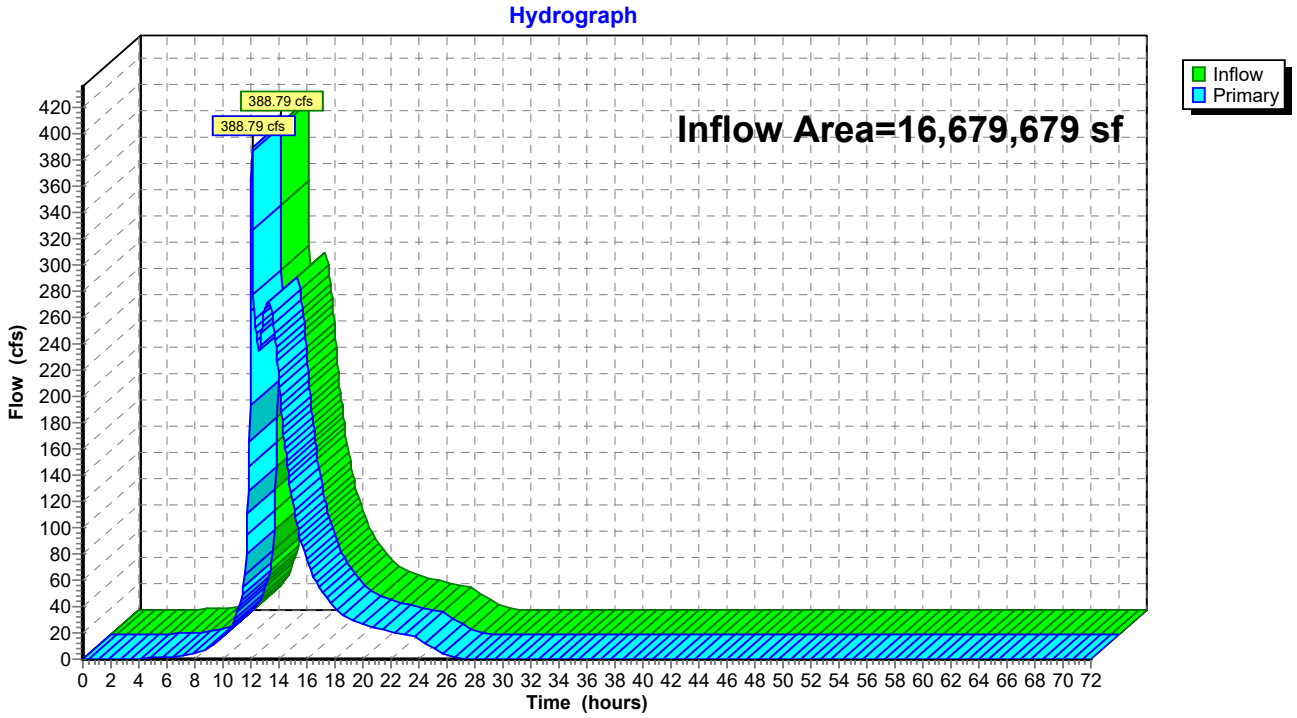


Summary for Link 4L: MORRIS CREEK

Inflow Area = 16,679,679 sf, 36.47% Impervious, Inflow Depth = 3.06" for 10YR - 24HR event
Inflow = 388.79 cfs @ 12.09 hrs, Volume= 4,257,914 cf
Primary = 388.79 cfs @ 12.09 hrs, Volume= 4,257,914 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: MORRIS CREEK



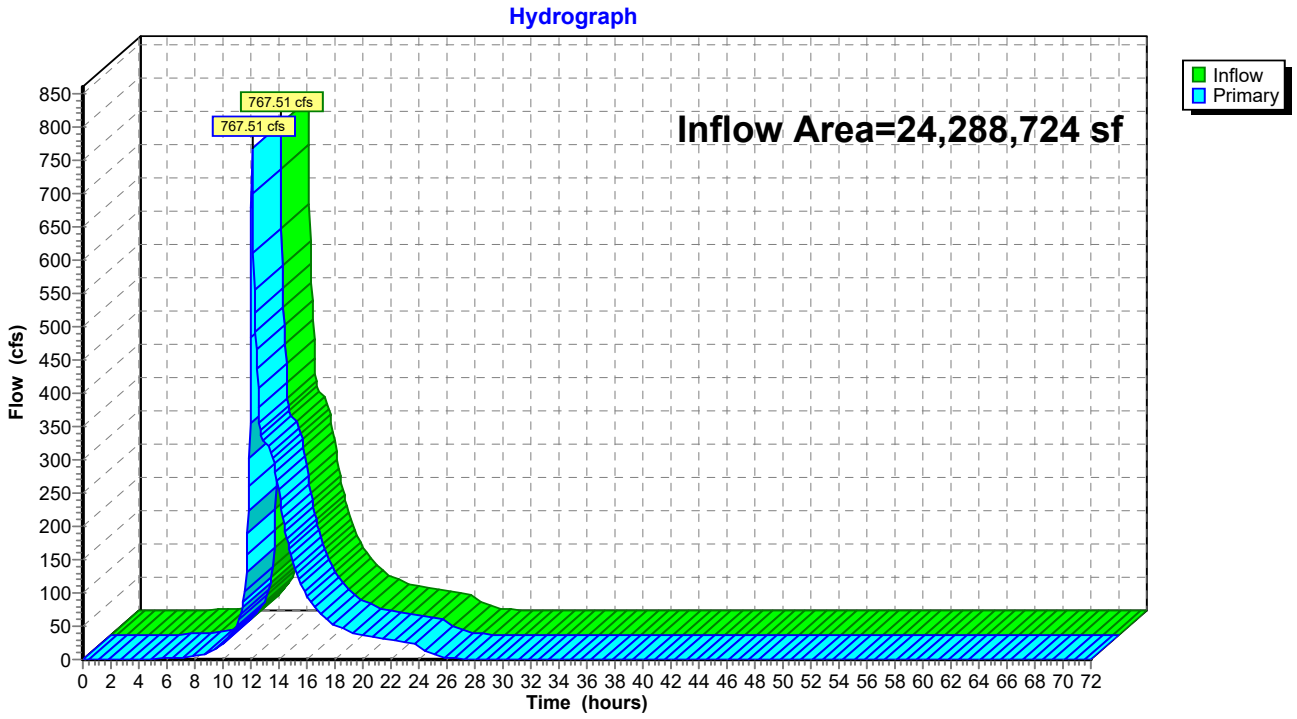
Summary for Link AP1: TIDE GATE

Inflow Area = 24,288,724 sf, 32.39% Impervious, Inflow Depth = 2.92" for 10YR - 24HR event
Inflow = 767.51 cfs @ 12.10 hrs, Volume= 5,917,751 cf
Primary = 767.51 cfs @ 12.10 hrs, Volume= 5,917,751 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 2.50'

Link AP1: TIDE GATE



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1S: SC 1 Runoff Area=2,006,120 sf 2.14% Impervious Runoff Depth=7.39"
Flow Length=162' Tc=5.0 min CN=93 Runoff=365.65 cfs 1,235,589 cf

Subcatchment2S: SC 2 Runoff Area=227,320 sf 45.94% Impervious Runoff Depth=5.60"
Flow Length=385' Tc=10.1 min CN=78 Runoff=29.21 cfs 106,159 cf

Subcatchment3S: SC 3 Runoff Area=574,521 sf 32.47% Impervious Runoff Depth=5.01"
Flow Length=294' Tc=8.0 min CN=73 Runoff=71.32 cfs 240,067 cf

Subcatchment4S: SC 4R Runoff Area=1,526,342 sf 49.57% Impervious Runoff Depth=5.72"
Tc=53.3 min CN=79 Runoff=98.32 cfs 727,864 cf

Subcatchment5S: SC 5 Runoff Area=118,275 sf 56.94% Impervious Runoff Depth=6.08"
Flow Length=256' Tc=5.0 min CN=82 Runoff=18.99 cfs 59,910 cf

Subcatchment6S: SC 6 Runoff Area=621,776 sf 28.09% Impervious Runoff Depth=5.60"
Flow Length=261' Tc=6.2 min UI Adjusted CN=78 Runoff=90.31 cfs 290,370 cf

Subcatchment7A: SC 7 Runoff Area=80,542 sf 58.79% Impervious Runoff Depth=6.20"
Flow Length=445' Tc=8.2 min CN=83 Runoff=11.96 cfs 41,595 cf

Subcatchment7S: SC 7 Runoff Area=341,390 sf 27.45% Impervious Runoff Depth=4.20"
Flow Length=383' Tc=9.9 min UI Adjusted CN=66 Runoff=33.33 cfs 119,396 cf

Subcatchment8A: SC 8A Runoff Area=239,688 sf 24.36% Impervious Runoff Depth=4.20"
Flow Length=292' Tc=8.2 min UI Adjusted CN=66 Runoff=24.72 cfs 83,827 cf

Subcatchment8S: SC 8 Runoff Area=122,063 sf 47.26% Impervious Runoff Depth=5.60"
Flow Length=134' Tc=5.0 min CN=78 Runoff=18.30 cfs 57,004 cf

Subcatchment9S: SC Culvert Runoff Area=212.980 ac 41.97% Impervious Runoff Depth=5.72"
Tc=110.6 min CN=79 Runoff=376.68 cfs 4,424,099 cf

Subcatchment14S: SC 14 Runoff Area=351,203 sf 11.14% Impervious Runoff Depth=1.55"
Flow Length=426' Tc=15.4 min UI Adjusted CN=42 Runoff=8.47 cfs 45,394 cf

Subcatchment15S: SC 15 Runoff Area=972,159 sf 37.92% Impervious Runoff Depth=4.66"
Flow Length=706' Tc=19.9 min CN=70 Runoff=82.29 cfs 377,731 cf

Subcatchment16A: SC 16A Runoff Area=591,011 sf 44.08% Impervious Runoff Depth=5.49"
Flow Length=629' Tc=6.5 min CN=77 Runoff=83.62 cfs 270,178 cf

Subcatchment16S: SC 16 Runoff Area=189,563 sf 36.68% Impervious Runoff Depth=5.25"
Flow Length=446' Tc=7.7 min CN=75 Runoff=24.83 cfs 82,929 cf

Subcatchment17S: SC 17 Runoff Area=428,788 sf 58.89% Impervious Runoff Depth=6.20"
Flow Length=297' Tc=5.0 min CN=83 Runoff=69.89 cfs 221,443 cf

Subcatchment18S: SC 18 Runoff Area=1,339,230 sf 14.98% Impervious Runoff Depth=6.44"
Flow Length=461' Tc=10.4 min UI Adjusted CN=85 Runoff=191.12 cfs 718,200 cf

Subcatchment19S: SC 19 Runoff Area=640,204 sf 11.38% Impervious Runoff Depth=6.20"
Flow Length=229' Tc=5.6 min UI Adjusted CN=83 Runoff=102.28 cfs 330,626 cf

Subcatchment20S: SC 20 Runoff Area=421,231 sf 20.14% Impervious Runoff Depth=5.01"
Flow Length=414' Tc=8.0 min UI Adjusted CN=73 Runoff=52.29 cfs 176,014 cf

Subcatchment21S: SC 21 Runoff Area=229,029 sf 10.34% Impervious Runoff Depth=5.01"
Flow Length=497' Tc=9.9 min UI Adjusted CN=73 Runoff=26.70 cfs 95,701 cf

Subcatchment22S: SC 22 Runoff Area=253,454 sf 5.23% Impervious Runoff Depth=4.78"
Flow Length=356' Tc=21.8 min UI Adjusted CN=71 Runoff=21.16 cfs 100,951 cf

Subcatchment23S: SC 23 Runoff Area=441,014 sf 0.00% Impervious Runoff Depth=5.25"
Flow Length=383' Tc=20.2 min CN=75 Runoff=41.55 cfs 192,932 cf

Subcatchment24S: SC 24 Runoff Area=328,915 sf 0.00% Impervious Runoff Depth=5.01"
Flow Length=381' Tc=31.5 min CN=73 Runoff=24.48 cfs 137,439 cf

Subcatchment27S: SC 27 Runoff Area=207,350 sf 1.82% Impervious Runoff Depth=3.74"
Flow Length=323' Tc=7.8 min CN=62 Runoff=19.18 cfs 64,546 cf

Subcatchment28S: SC 28 Runoff Area=22,258 sf 18.08% Impervious Runoff Depth=3.97"
Flow Length=54' Slope=0.0110 '/' Tc=7.5 min UI Adjusted CN=64 Runoff=2.22 cfs 7,355 cf

SubcatchmentDS1: Ditch Segment 1 Runoff Area=412,198 sf 28.62% Impervious Runoff Depth=4.55"
Flow Length=1,385' Tc=13.4 min UI Adjusted CN=69 Runoff=39.47 cfs 156,147 cf

SubcatchmentDS2: Ditch Segment 2 Runoff Area=366,199 sf 54.34% Impervious Runoff Depth=6.08"
Flow Length=790' Tc=16.5 min CN=82 Runoff=42.69 cfs 185,491 cf

SubcatchmentDS3: Ditch Segment 3 Runoff Area=252,713 sf 15.46% Impervious Runoff Depth=3.62"
Flow Length=680' Tc=34.0 min UI Adjusted CN=61 Runoff=12.95 cfs 76,255 cf

SubcatchmentN10: DA-N10 Runoff Area=18,401 sf 28.03% Impervious Runoff Depth=3.97"
Flow Length=137' Tc=13.2 min UI Adjusted CN=64 Runoff=1.54 cfs 6,081 cf

SubcatchmentN12: DA-N12 Runoff Area=176,144 sf 15.13% Impervious Runoff Depth=5.37"
Flow Length=630' Tc=15.0 min UI Adjusted CN=76 Runoff=19.09 cfs 78,790 cf

SubcatchmentN13: DA-N13 Runoff Area=82,503 sf 17.65% Impervious Runoff Depth=1.76"
Flow Length=665' Tc=19.3 min UI Adjusted CN=44 Runoff=2.20 cfs 12,067 cf

SubcatchmentN14: DA-N14 Runoff Area=185,324 sf 24.56% Impervious Runoff Depth=4.20"
Flow Length=609' Tc=32.7 min UI Adjusted CN=66 Runoff=11.34 cfs 64,814 cf

SubcatchmentN15: DA-N15 Runoff Area=95,816 sf 37.69% Impervious Runoff Depth=5.25"
Flow Length=438' Tc=14.7 min CN=75 Runoff=10.24 cfs 41,917 cf

SubcatchmentN2: DA-N2 Runoff Area=169,261 sf 49.91% Impervious Runoff Depth=5.60"
Flow Length=644' Tc=11.0 min CN=78 Runoff=21.25 cfs 79,045 cf

SubcatchmentN3: DA-N3 Runoff Area=80,876 sf 37.79% Impervious Runoff Depth=5.01"
Flow Length=425' Tc=16.6 min CN=73 Runoff=7.88 cfs 33,795 cf

SubcatchmentN4: DA-N4 Runoff Area=57,929 sf 17.47% Impervious Runoff Depth=4.08"
Flow Length=122' Tc=9.2 min CN=65 Runoff=5.59 cfs 19,701 cf

SubcatchmentN5: DA-N5 Runoff Area=260,989 sf 33.14% Impervious Runoff Depth=4.78"
Flow Length=985' Tc=166.5 min CN=71 Runoff=6.68 cfs 103,952 cf

SubcatchmentN6: DA-N6 Runoff Area=52,606 sf 20.20% Impervious Runoff Depth=3.74"
Flow Length=181' Tc=7.9 min UI Adjusted CN=62 Runoff=4.85 cfs 16,376 cf

SubcatchmentN7: DA-N7 Runoff Area=336,441 sf 68.89% Impervious Runoff Depth=6.55"
Flow Length=1,058' Tc=86.5 min CN=86 Runoff=18.13 cfs 183,767 cf

SubcatchmentN8: DA-N8 Runoff Area=67,118 sf 34.62% Impervious Runoff Depth=4.90"
Flow Length=214' Tc=13.0 min CN=72 Runoff=6.98 cfs 27,389 cf

SubcatchmentN9: DA-N9 Runoff Area=123,351 sf 23.76% Impervious Runoff Depth=3.85"
Flow Length=368' Tc=34.5 min UI Adjusted CN=63 Runoff=6.71 cfs 39,578 cf

Reach 1R: WQS Segment 1 Avg. Flow Depth=2.21' Max Vel=1.85 fps Inflow=62.19 cfs 474,799 cf
n=0.022 L=1,255.0' S=0.0005 '/' Capacity=98.41 cfs Outflow=51.52 cfs 474,799 cf

Reach 2R: WQS Segment 2 Avg. Flow Depth=2.78' Max Vel=2.12 fps Inflow=89.65 cfs 660,290 cf
n=0.022 L=760.0' S=0.0005 '/' Capacity=99.31 cfs Outflow=84.60 cfs 660,290 cf

Reach 3R: WQS Segment 3 Avg. Flow Depth=3.14' Max Vel=2.23 fps Inflow=116.20 cfs 870,470 cf
n=0.022 L=610.0' S=0.0005 '/' Capacity=98.14 cfs Outflow=108.28 cfs 870,470 cf

Pond CB1: Exist CB Peak Elev=3.79' Inflow=8.47 cfs 45,394 cf
36.0" Round Culvert n=0.013 L=845.0' S=0.0009 '/' Outflow=8.47 cfs 45,394 cf

Pond CB10: Exist CB Peak Elev=34.04' Inflow=83.28 cfs 281,662 cf
24.0" Round Culvert n=0.012 L=152.0' S=0.0013 '/' Outflow=83.28 cfs 281,662 cf

Pond CB11: Exist CB Peak Elev=16.71' Inflow=29.21 cfs 106,159 cf
18.0" Round Culvert n=0.012 L=148.0' S=0.0014 '/' Outflow=29.21 cfs 106,159 cf

Pond CB2: Exist CB Peak Elev=67.51' Inflow=22.61 cfs 91,112 cf
15.0" Round Culvert n=0.011 L=658.0' S=0.0014 '/' Outflow=22.61 cfs 91,112 cf

Pond CB3: Exist CB Peak Elev=1,015.02' Inflow=24.83 cfs 82,929 cf
10.0" Round Culvert n=0.025 L=200.0' S=0.0110 '/' Outflow=24.83 cfs 82,929 cf

Pond CB4: Exist CB Peak Elev=161.95' Inflow=83.62 cfs 270,178 cf
18.0" Round Culvert n=0.012 L=200.0' S=0.0244 '/' Outflow=83.62 cfs 270,178 cf

Pond CB5: Exist CB Peak Elev=67.76' Inflow=6.68 cfs 103,952 cf
12.0" Round Culvert n=0.025 L=497.0' S=0.0031 '/' Outflow=6.68 cfs 103,952 cf

Pond CB6: Exist CB Peak Elev=257.44' Inflow=18.30 cfs 57,004 cf
12.0" Round Culvert n=0.025 L=249.0' S=0.0010 '/' Outflow=18.30 cfs 57,004 cf

Pond CB7: Exist CB Peak Elev=217.77' Inflow=24.72 cfs 83,827 cf
15.0" Round Culvert n=0.025 L=380.0' S=0.0016 '/' Outflow=24.72 cfs 83,827 cf

Pond CB8: Exist CB Peak Elev=224.08' Inflow=57.39 cfs 203,223 cf
18.0" Round Culvert n=0.012 L=787.0' S=0.0021 '/' Outflow=57.39 cfs 203,223 cf

Pond CB9: Exist CB Peak Elev=3.17' Inflow=11.96 cfs 41,595 cf
24.0" Round Culvert n=0.012 L=1,029.0' S=0.0008 '/' Outflow=11.96 cfs 41,595 cf

Pond Cr-B: Robinson Driveway Peak Elev=4.59' Inflow=51.52 cfs 474,799 cf
Outflow=51.52 cfs 474,799 cf

Pond Cr-CD: Utility Crossing Peak Elev=4.94' Inflow=84.60 cfs 660,290 cf
Outflow=84.60 cfs 660,290 cf

Pond MH1: Exist MH Peak Elev=51.78' Inflow=19.00 cfs 160,956 cf
18.0" Round Culvert n=0.025 L=400.0' S=0.0021 '/' Outflow=19.00 cfs 160,956 cf

Pond P1: Pond 1 Peak Elev=3.78' Storage=18,039 cf Inflow=19.00 cfs 268,336 cf
Discarded=1.52 cfs 28,474 cf Primary=16.09 cfs 239,862 cf Outflow=17.61 cfs 268,336 cf

Pond P10: Wetland Ditch Peak Elev=4.15' Storage=6,289 cf Inflow=26.77 cfs 318,652 cf
Outflow=24.82 cfs 318,652 cf

Pond P2: Pond 2 Peak Elev=4.71' Storage=6,306 cf Inflow=7.88 cfs 33,795 cf
Discarded=0.55 cfs 2,769 cf Primary=3.19 cfs 31,025 cf Outflow=3.75 cfs 33,795 cf

Pond P3: Pond 3 Peak Elev=4.57' Storage=26,654 cf Inflow=19.30 cfs 218,805 cf
Discarded=1.81 cfs 21,072 cf Primary=13.53 cfs 197,733 cf Outflow=15.35 cfs 218,805 cf

Pond P4: Pond 4 Peak Elev=4.38' Storage=2,366 cf Inflow=5.59 cfs 19,701 cf
Discarded=0.24 cfs 732 cf Primary=2.83 cfs 18,969 cf Outflow=3.07 cfs 19,701 cf

Pond P5: Pond 5 Peak Elev=4.13' Storage=1,296 cf Inflow=4.85 cfs 16,376 cf
Discarded=0.14 cfs 307 cf Primary=2.89 cfs 16,068 cf Outflow=3.03 cfs 16,376 cf

Pond P6: Pond 6 Peak Elev=4.08' Storage=14,024 cf Inflow=14.74 cfs 91,165 cf
Discarded=1.14 cfs 4,977 cf Primary=6.81 cfs 86,306 cf Outflow=7.95 cfs 91,283 cf

Pond P7: Pond 7 Peak Elev=4.32' Storage=3,841 cf Inflow=6.98 cfs 27,389 cf
Discarded=0.32 cfs 1,038 cf Primary=3.40 cfs 26,351 cf Outflow=3.72 cfs 27,389 cf

Pond P8: Pond 8 Peak Elev=38.47' Storage=4,397 cf Inflow=17.82 cfs 133,895 cf
12.0" Round Culvert n=0.011 L=20.0' S=0.0000 '/' Outflow=22.53 cfs 133,924 cf

Pond P9: Pond 9 Peak Elev=5.26' Storage=532 cf Inflow=1.54 cfs 6,081 cf
Outflow=1.85 cfs 5,672 cf

Link 1L: WEST WETL Inflow=249.29 cfs 1,088,786 cf
Primary=249.29 cfs 1,088,786 cf

Link 2L: TUTTLE BROOK Inflow=604.73 cfs 2,501,791 cf
Primary=604.73 cfs 2,501,791 cf

Link 3L: EAST WETL Inflow=424.71 cfs 5,584,938 cf
Primary=424.71 cfs 5,584,938 cf

Link 4L: MORRIS CREEK Inflow=707.81 cfs 8,003,477 cf
Primary=707.81 cfs 8,003,477 cf

Link AP1: TIDE GATE Inflow=1,449.80 cfs 11,272,850 cf
Primary=1,449.80 cfs 11,272,850 cf

Total Runoff Area = 24,288,724 sf Runoff Volume = 11,332,481 cf Average Runoff Depth = 5.60"
67.61% Pervious = 16,420,958 sf 32.39% Impervious = 7,867,766 sf

Summary for Subcatchment 1S: SC 1

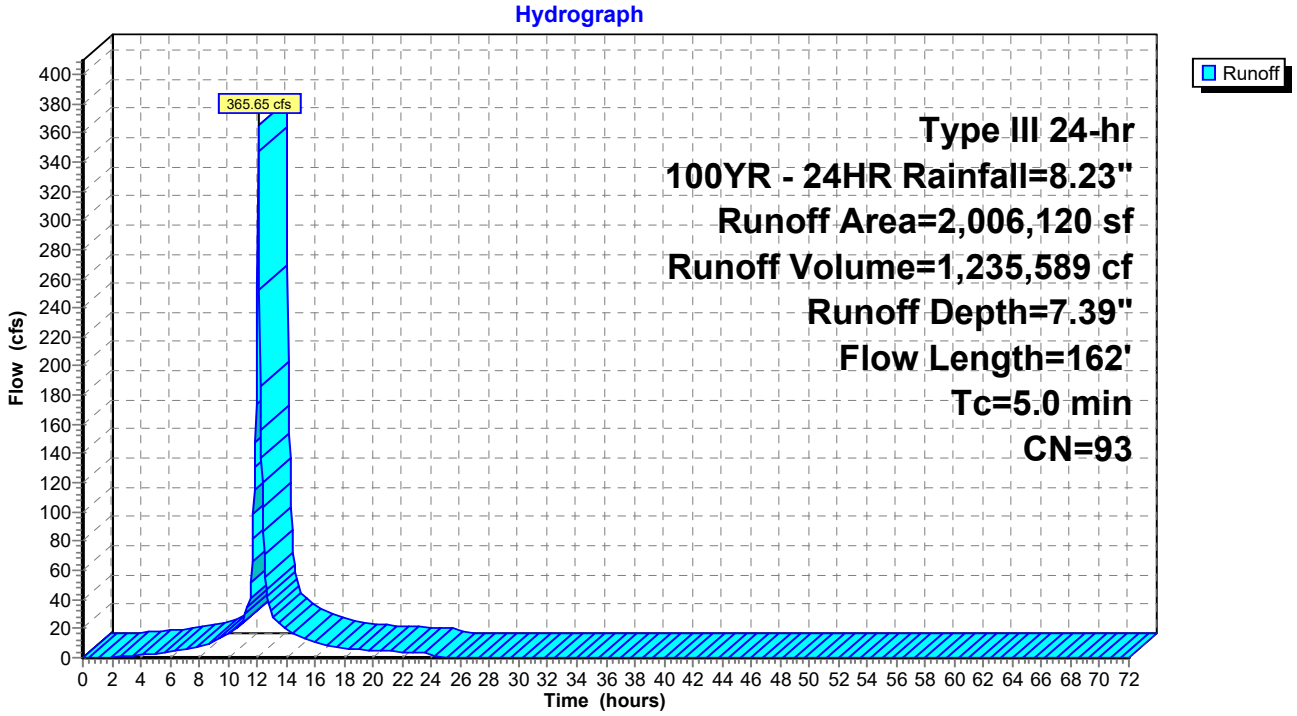
Runoff = 365.65 cfs @ 12.07 hrs, Volume= 1,235,589 cf, Depth= 7.39"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	220,568	80	>75% Grass cover, Good, HSG D
	42,541	96	Gravel surface, HSG D
	176,389	98	Water Surface, 0% imp, HSG D
	0	98	Unconnected pavement, HSG A
	43,007	98	Unconnected pavement, HSG D
	248,525	77	Woods, Good, HSG D
*	1,275,090	98	Wetland/Water Surface, 0% imp, HSG D
	2,006,120	93	Weighted Average
	1,963,113		97.86% Pervious Area
	43,007		2.14% Impervious Area
	43,007		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.4	23	0.0130	0.88		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	34	0.0289	1.19		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.5	105	0.0197	0.70		**Shallow Concentrated Flow, C-D** Woodland Kv= 5.0 fps
1.6					**Direct Entry, Minimum**
5.0	162	Total			

Subcatchment 1S: SC 1



Summary for Subcatchment 2S: SC 2

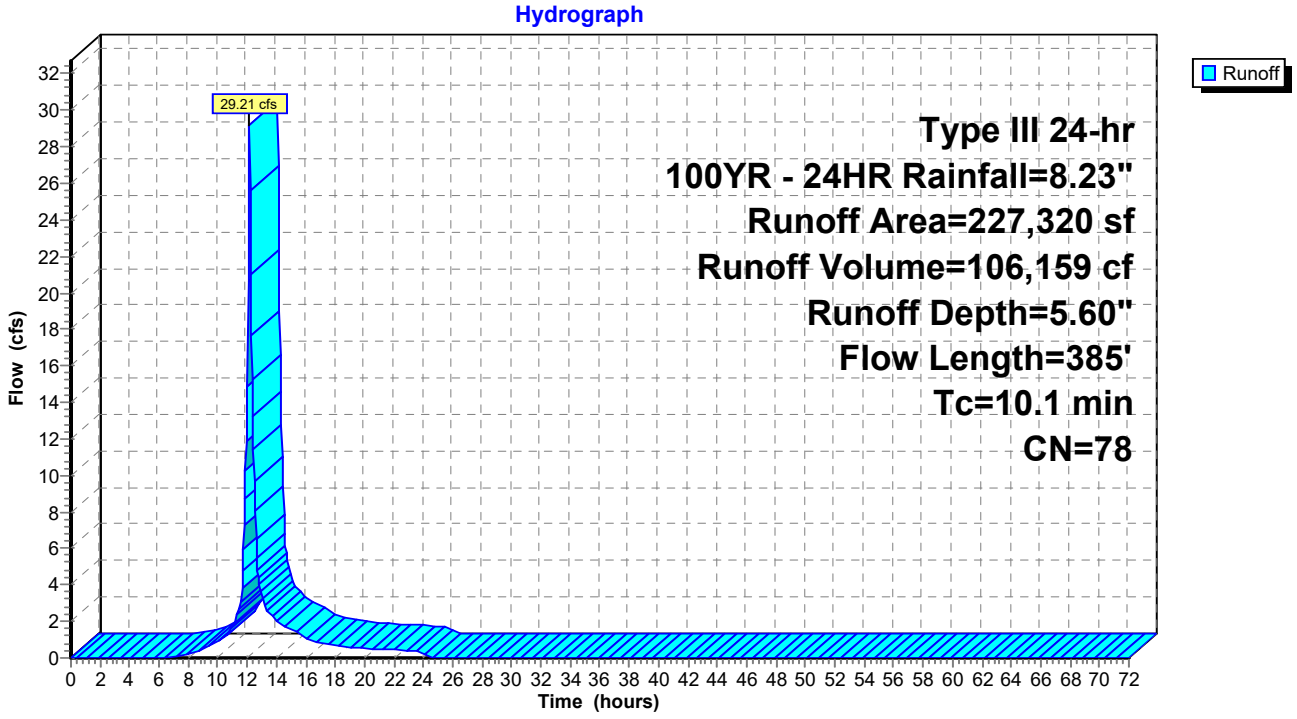
Runoff = 29.21 cfs @ 12.14 hrs, Volume= 106,159 cf, Depth= 5.60"
Routed to Pond CB11 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
122,890	61	>75% Grass cover, Good, HSG B
104,430	98	Unconnected pavement, HSG B
227,320	78	Weighted Average
122,890		54.06% Pervious Area
104,430		45.94% Impervious Area
104,430		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	67	0.0119	1.05		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.0	318	0.0070	0.59		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
10.1	385	Total			

Subcatchment 2S: SC 2



Summary for Subcatchment 3S: SC 3

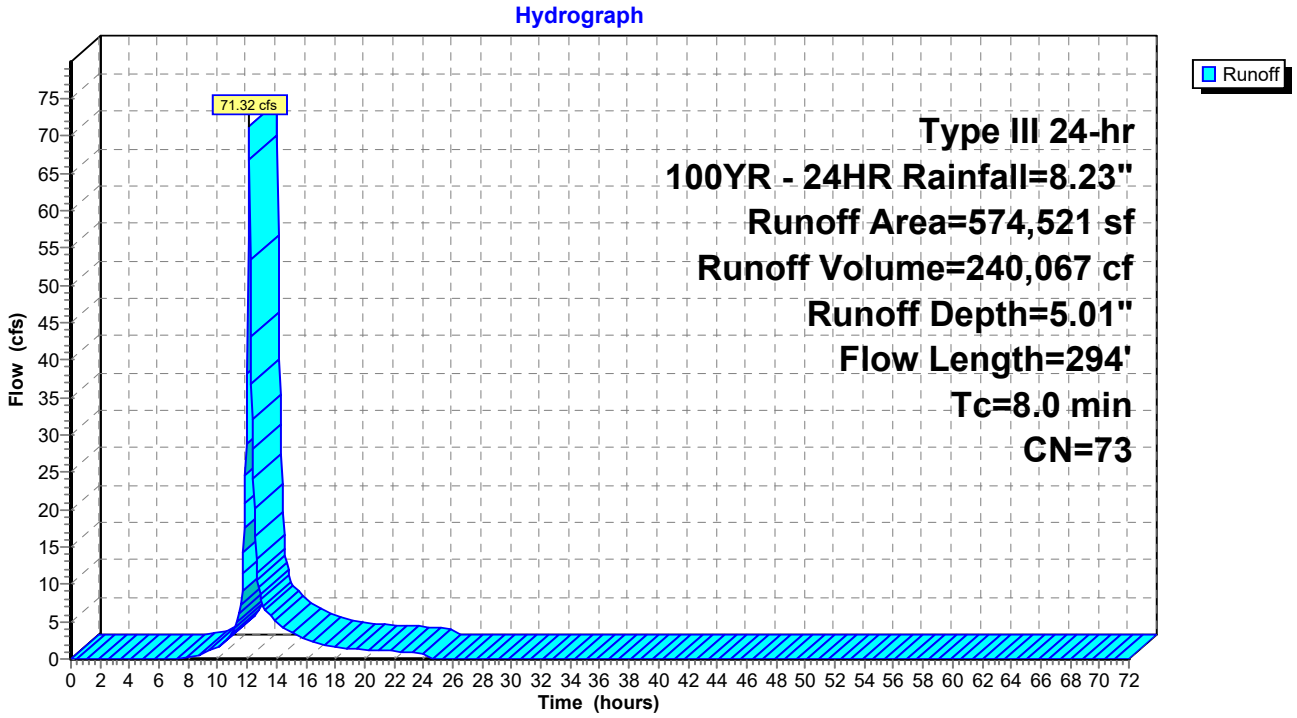
Runoff = 71.32 cfs @ 12.11 hrs, Volume= 240,067 cf, Depth= 5.01"
Routed to Pond CB10 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
388,000	61	>75% Grass cover, Good, HSG B
186,521	98	Unconnected pavement, HSG B
574,521	73	Weighted Average
388,000		67.53% Pervious Area
186,521		32.47% Impervious Area
186,521		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0122	1.15		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.0	6	0.0176	2.69		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.5	188	0.0048	0.48		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
8.0	294	Total			

Subcatchment 3S: SC 3



Summary for Subcatchment 4S: SC 4R

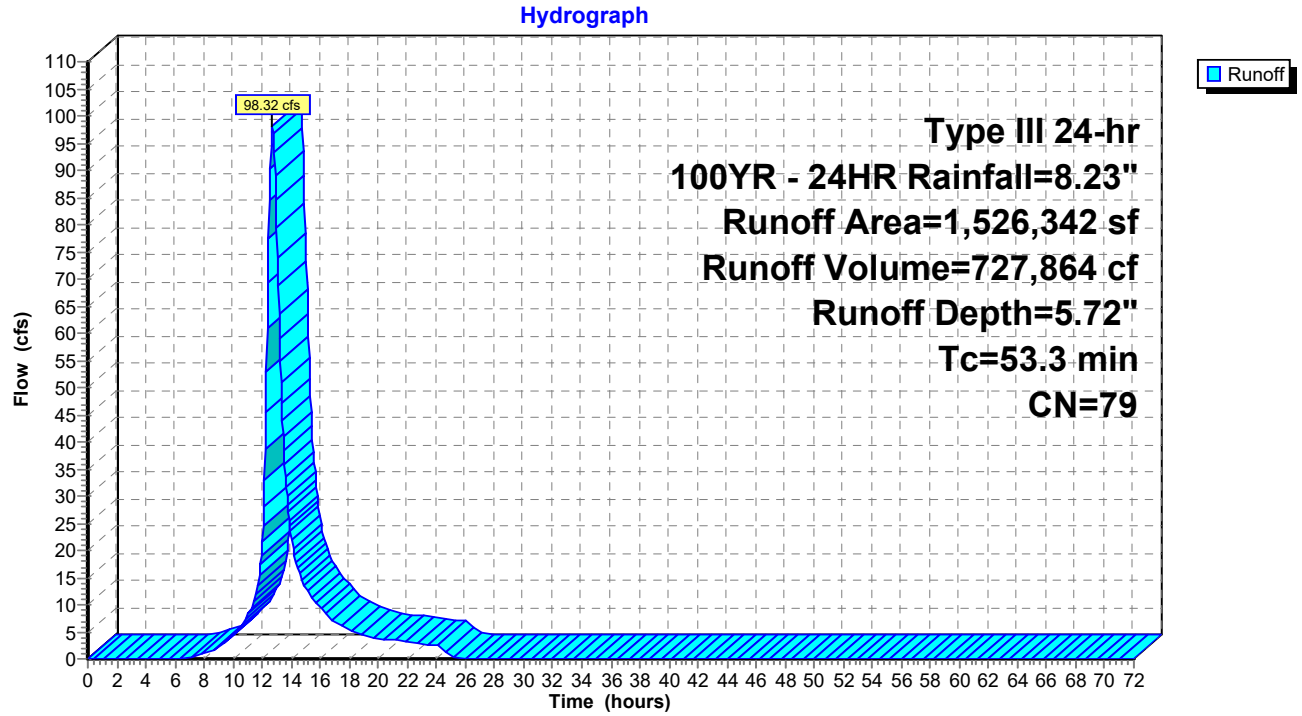
Runoff = 98.32 cfs @ 12.71 hrs, Volume= 727,864 cf, Depth= 5.72"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	769,705	61	>75% Grass cover, Good, HSG B
	22,651	98	Unconnected pavement, HSG B
*	284,447	98	Wetland/Water Surface, HSG B
*	449,539	98	Wetland/Water Surface. HSG D
	1,526,342	79	Weighted Average
	769,705		50.43% Pervious Area
	756,637		49.57% Impervious Area
	22,651		2.99% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
53.3					**Direct Entry, See Calculation Sheet**

Subcatchment 4S: SC 4R



Summary for Subcatchment 5S: SC 5

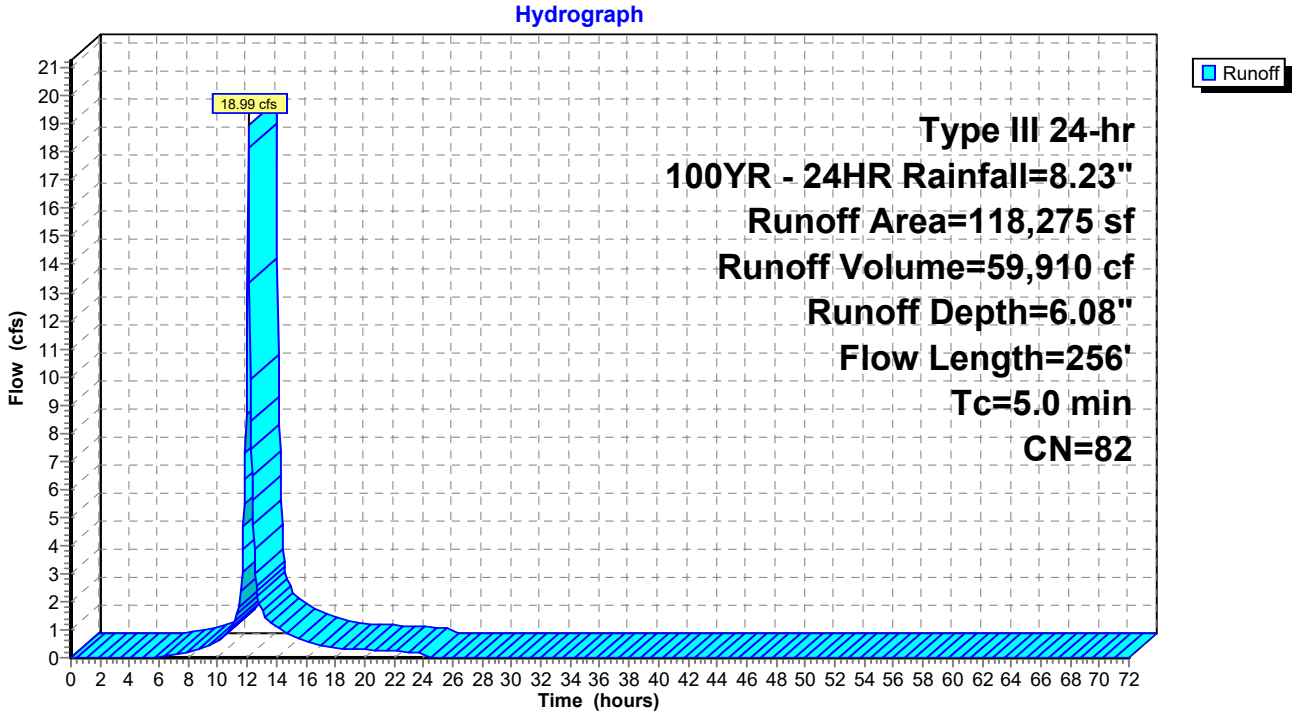
Runoff = 18.99 cfs @ 12.07 hrs, Volume= 59,910 cf, Depth= 6.08"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
50,931	61	>75% Grass cover, Good, HSG B
617	98	Unconnected pavement, HSG B
66,727	98	Unconnected pavement, HSG D
118,275	82	Weighted Average
50,931		43.06% Pervious Area
67,344		56.94% Impervious Area
67,344		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0073	0.93		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.1	12	0.0120	2.22		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
0.4	32	0.0434	1.46		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
2.5	112	0.0014	0.76		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
0.2					**Direct Entry, Minimum**
5.0	256	Total			

Subcatchment 5S: SC 5



Summary for Subcatchment 6S: SC 6

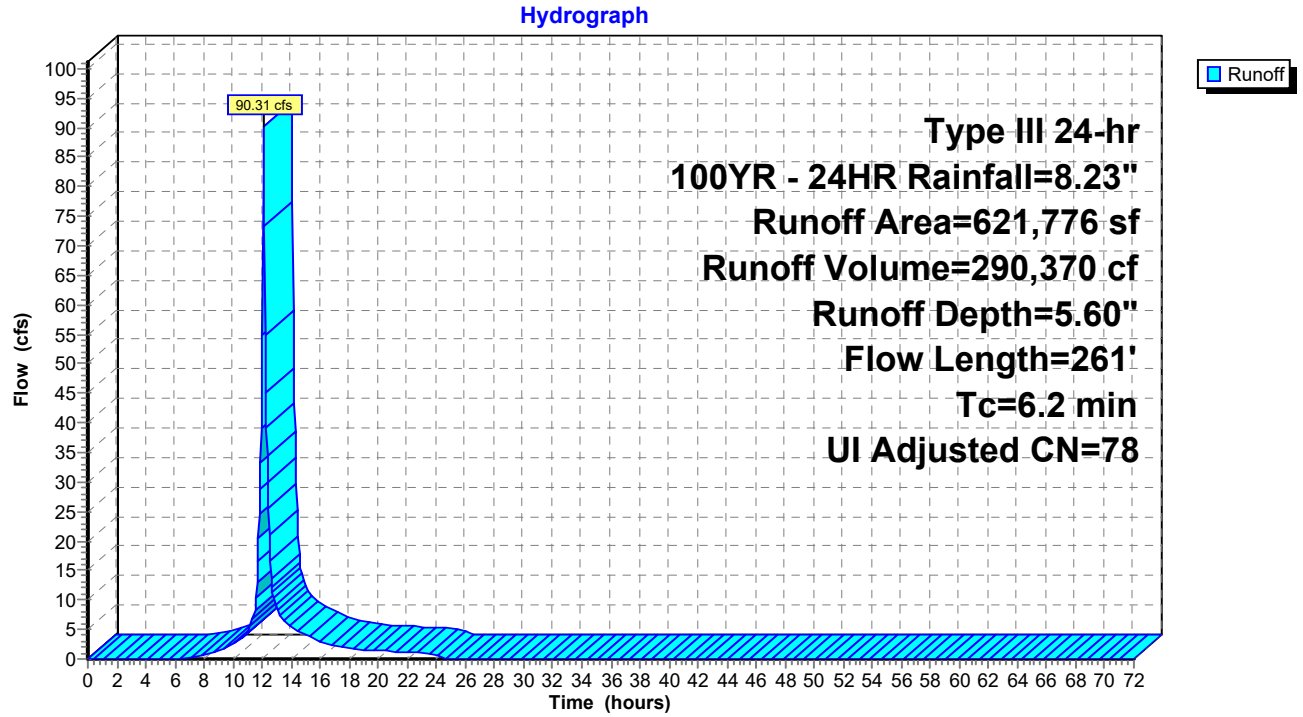
Runoff = 90.31 cfs @ 12.09 hrs, Volume= 290,370 cf, Depth= 5.60"
Routed to Link 3L : EAST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	282,812	61		>75% Grass cover, Good, HSG B
	0	98		Unconnected pavement, HSG A
	174,659	98		Unconnected pavement, HSG D
*	164,305	98		Wetland/Water Surface, 0% imp, HSG B
	621,776	81	78	Weighted Average, UI Adjusted
	447,117			71.91% Pervious Area
	174,659			28.09% Impervious Area
	174,659			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	78	0.0101	1.01		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.9	183	0.0080	0.63		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.2	261	Total			

Subcatchment 6S: SC 6



Summary for Subcatchment 7A: SC 7

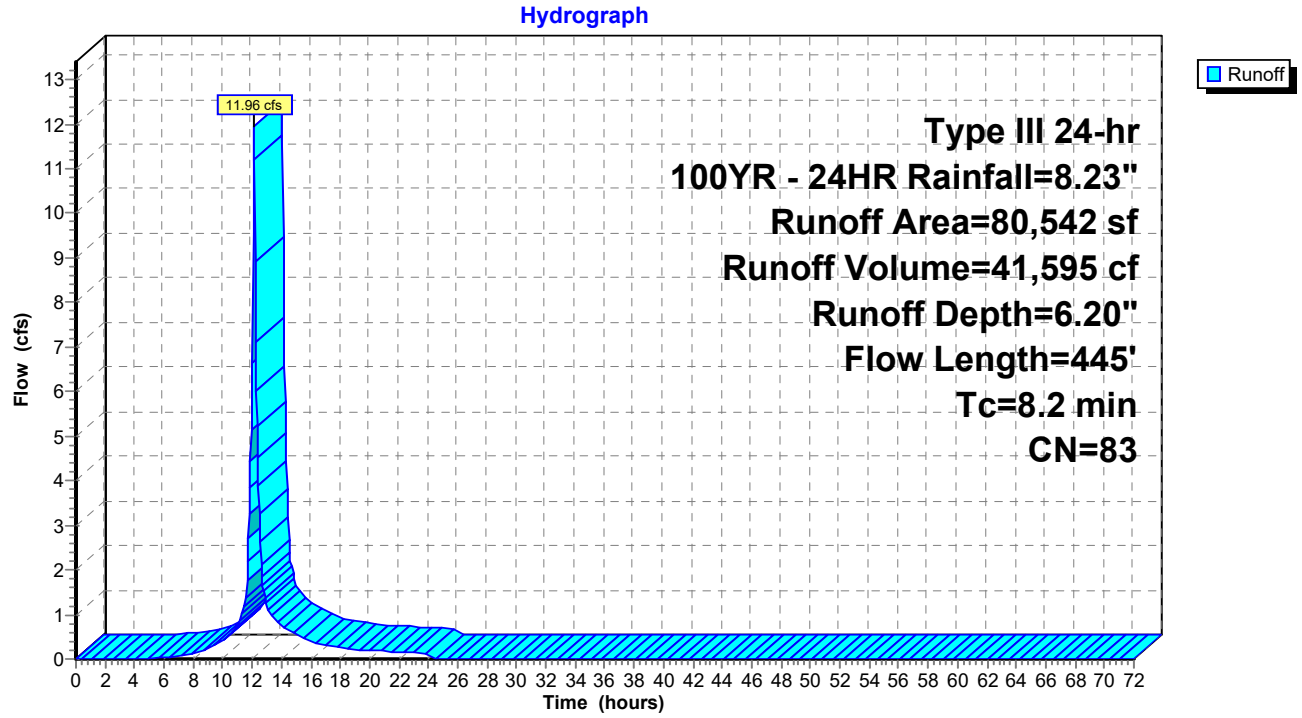
Runoff = 11.96 cfs @ 12.11 hrs, Volume= 41,595 cf, Depth= 6.20"
Routed to Pond CB9 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
33,190	61	>75% Grass cover, Good, HSG B
47,352	98	Unconnected pavement, HSG D
80,542	83	Weighted Average
33,190		41.21% Pervious Area
47,352		58.79% Impervious Area
47,352		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	75	0.0095	0.98		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.3	20	0.0255	1.12		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.6	350	0.0019	0.88		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
8.2	445	Total			

Subcatchment 7A: SC 7



Summary for Subcatchment 7S: SC 7

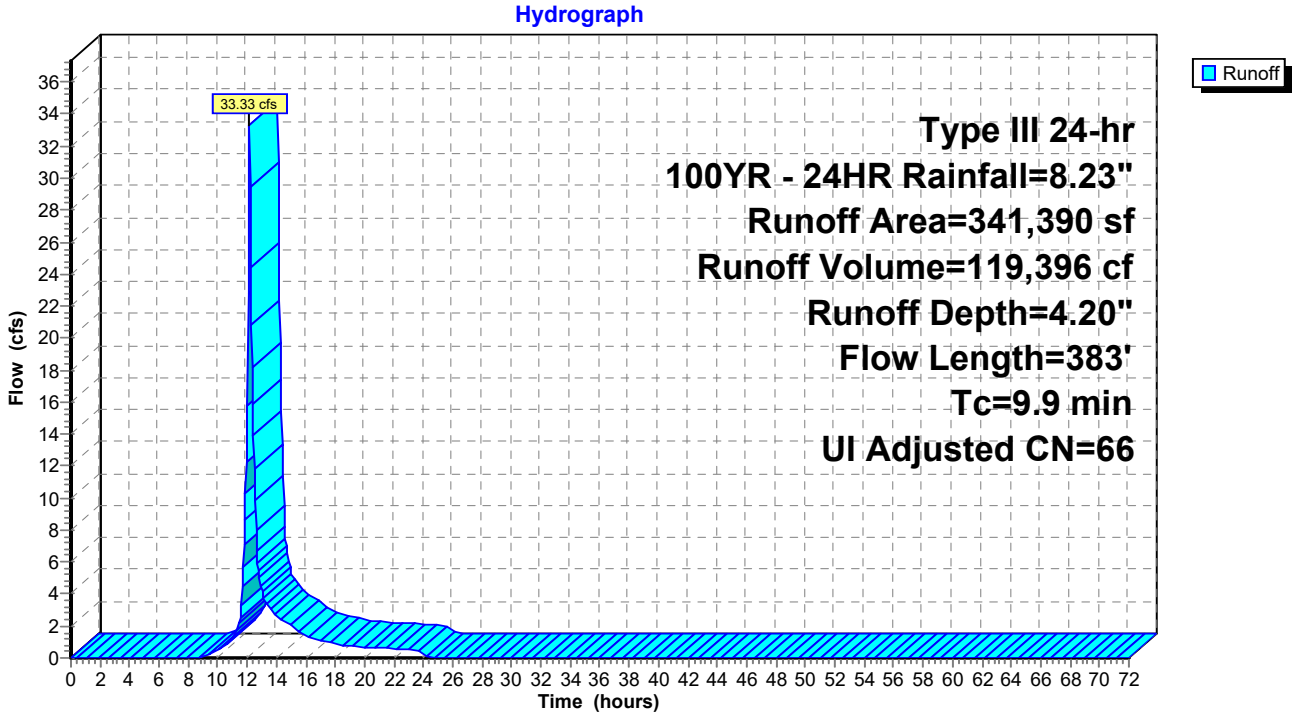
Runoff = 33.33 cfs @ 12.14 hrs, Volume= 119,396 cf, Depth= 4.20"
Routed to Pond CB8 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
247,681	61		>75% Grass cover, Good, HSG B
93,709	98		Unconnected pavement, HSG D
341,390	71	66	Weighted Average, UI Adjusted
247,681			72.55% Pervious Area
93,709			27.45% Impervious Area
93,709			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	72	0.0041	0.69		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
8.2	311	0.0081	0.63		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.9	383	Total			

Subcatchment 7S: SC 7



Summary for Subcatchment 8A: SC 8A

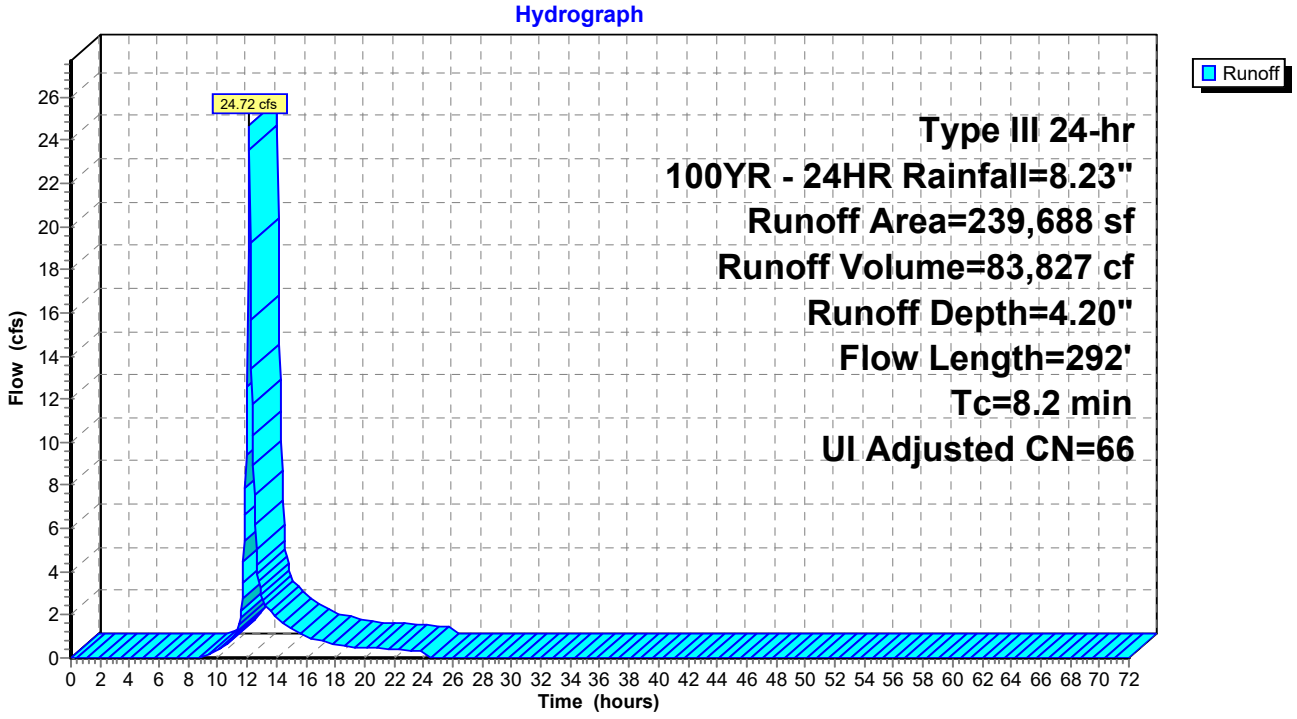
Runoff = 24.72 cfs @ 12.12 hrs, Volume= 83,827 cf, Depth= 4.20"
Routed to Pond CB7 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
181,295	61		>75% Grass cover, Good, HSG B
58,393	98		Unconnected pavement, HSG D
239,688	70	66	Weighted Average, UI Adjusted
181,295			75.64% Pervious Area
58,393			24.36% Impervious Area
58,393			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.9	52	0.0101	0.93		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	240	0.0061	0.55		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.2	292	Total			

Subcatchment 8A: SC 8A



Summary for Subcatchment 8S: SC 8

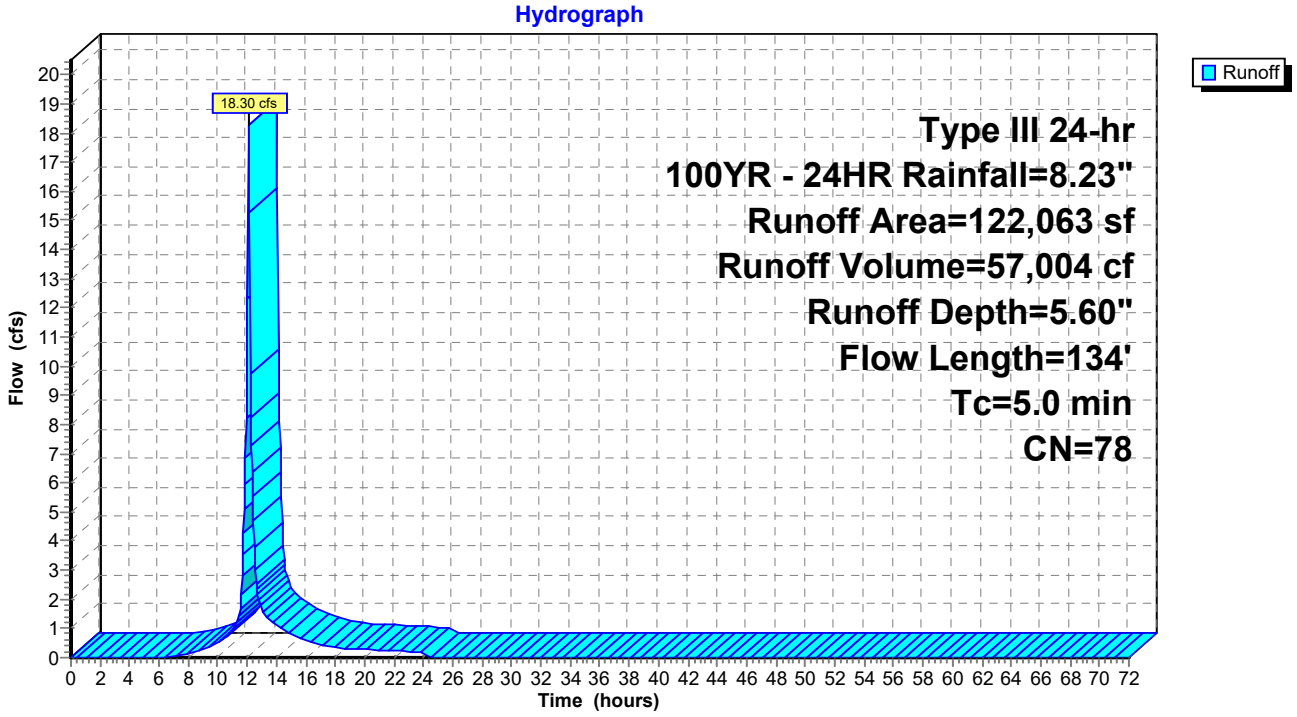
Runoff = 18.30 cfs @ 12.07 hrs, Volume= 57,004 cf, Depth= 5.60"
Routed to Pond CB6 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
64,371	61	>75% Grass cover, Good, HSG B
57,692	98	Unconnected pavement, HSG D
122,063	78	Weighted Average
64,371		52.74% Pervious Area
57,692		47.26% Impervious Area
57,692		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	69	0.0036	0.65		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.1	65	0.0217	1.03		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.1					**Direct Entry, min Tc**
5.0	134	Total			

Subcatchment 8S: SC 8



Summary for Subcatchment 9S: SC Culvert

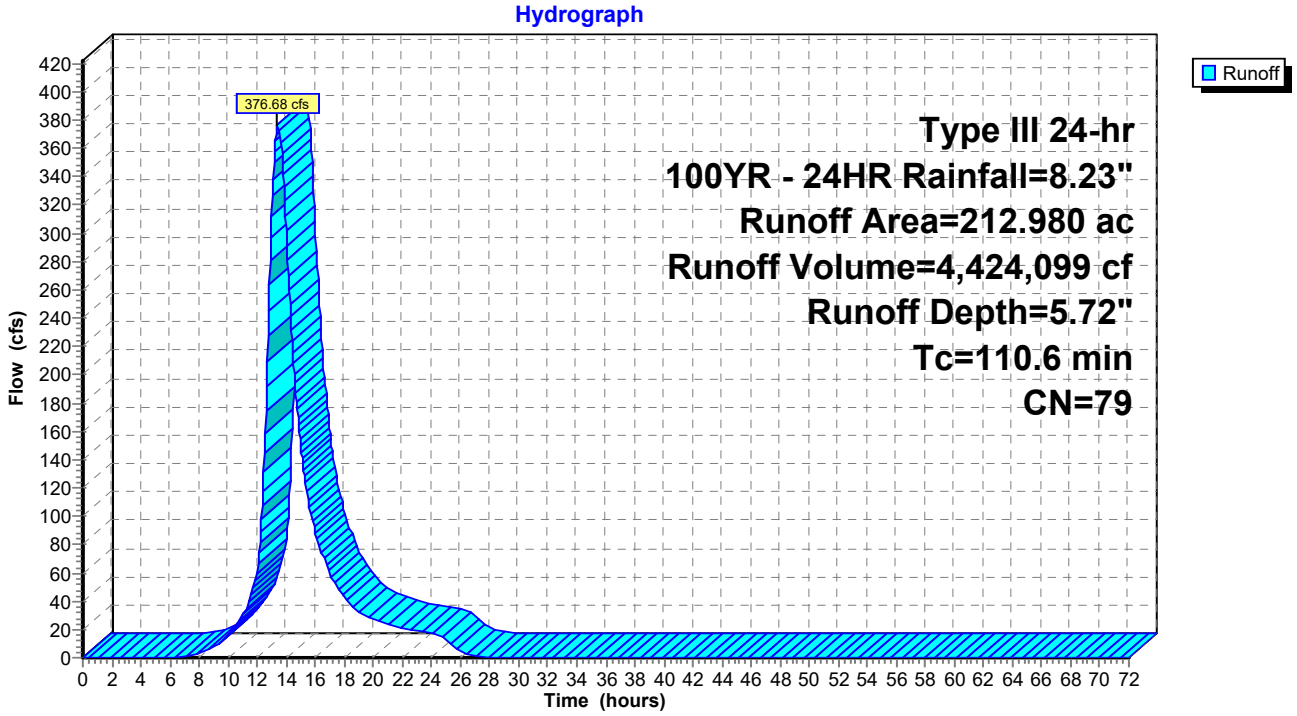
Runoff = 376.68 cfs @ 13.41 hrs, Volume= 4,424,099 cf, Depth= 5.72"
Routed to Link 3L : EAST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (ac)	CN	Description
	8.600	54	1/2 acre lots, 25% imp, HSG A
	2.340	85	1/2 acre lots, 25% imp, HSG D
	12.290	61	1/4 acre lots, 38% imp, HSG A
	0.360	75	1/4 acre lots, 38% imp, HSG B
	0.010	87	1/4 acre lots, 38% imp, HSG D
	55.170	77	1/8 acre lots, 65% imp, HSG A
	0.490	85	1/8 acre lots, 65% imp, HSG B
	0.010	92	1/8 acre lots, 65% imp, HSG D
	2.210	67	Brush, Poor, HSG B
	0.740	83	Brush, Poor, HSG D
	2.880	89	Urban commercial, 85% imp, HSG A
	11.260	92	Urban commercial, 85% imp, HSG B
	21.000	95	Urban commercial, 85% imp, HSG D
	2.430	39	>75% Grass cover, Good, HSG A
	11.890	61	>75% Grass cover, Good, HSG B
	1.240	80	>75% Grass cover, Good, HSG D
	0.180	81	Urban industrial, 72% imp, HSG A
	0.520	93	Urban industrial, 72% imp, HSG D
	10.260	98	Paved roads w/curbs & sewers, HSG A
	2.890	98	Paved roads w/curbs & sewers, HSG B
	1.410	98	Paved roads w/curbs & sewers, HSG D
*	0.010	98	Wetland/Water Surface, 0% imp, HSG A
*	10.010	98	Wetland/Water Surface, 0% imp, HSG B
*	28.580	98	Wetland/Water Surface, 0% imp, HSG D
	4.690	30	Woods, Good, HSG A
	15.580	55	Woods, Good, HSG B
	5.100	77	Woods, Good, HSG D
	0.100	82	Dirt roads, HSG B
*	0.730	98	Unconnected Pavement, HSG B
	212.980	79	Weighted Average
	123.586		58.03% Pervious Area
	89.394		41.97% Impervious Area
	0.730		0.82% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.6					**Direct Entry, See Calculation Sheet**

Subcatchment 9S: SC Culvert



Summary for Subcatchment 14S: SC 14

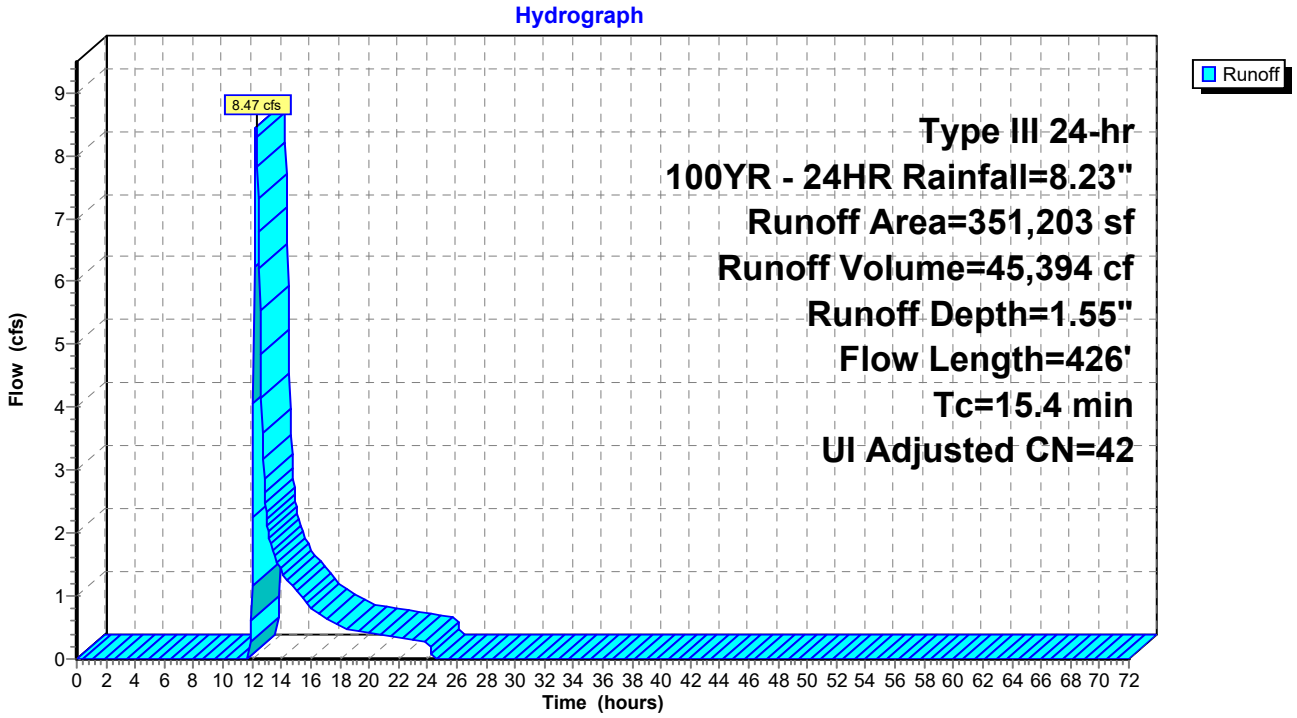
Runoff = 8.47 cfs @ 12.26 hrs, Volume= 45,394 cf, Depth= 1.55"
Routed to Pond CB1 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
311,900	39		>75% Grass cover, Good, HSG A
170	96		Gravel surface, HSG A
26,561	98		Unconnected pavement, HSG A
12,572	98		Unconnected pavement, HSG D
351,203	46	42	Weighted Average, UI Adjusted
312,070			88.86% Pervious Area
39,133			11.14% Impervious Area
39,133			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0427	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
5.0	326	0.0238	1.08		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
15.4	426	Total			

Subcatchment 14S: SC 14



Summary for Subcatchment 15S: SC 15

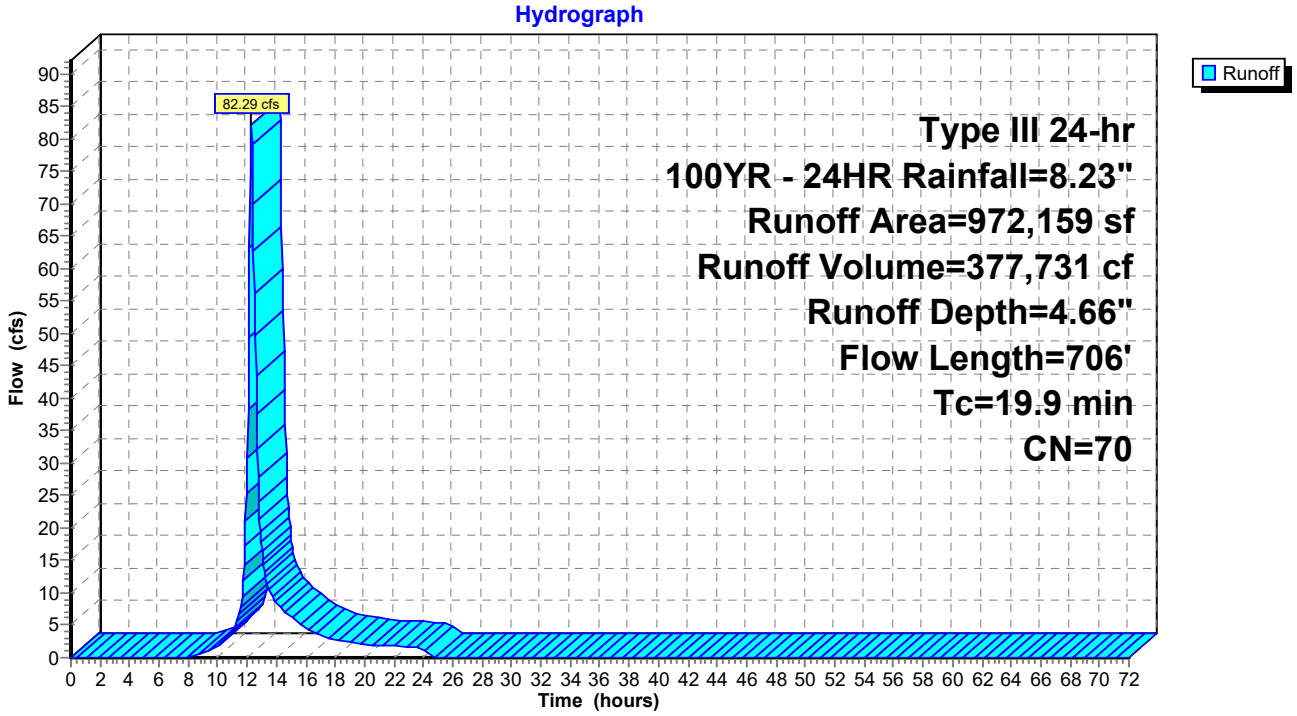
Runoff = 82.29 cfs @ 12.27 hrs, Volume= 377,731 cf, Depth= 4.66"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	450,354	39	>75% Grass cover, Good, HSG A
	1,164	76	Gravel roads, HSG A
	33,083	98	Water Surface, 0% imp, HSG A
	24,397	98	Unconnected pavement, HSG A
	344,271	98	Unconnected pavement, HSG D
	11,248	30	Woods, Good, HSG A
*	107,642	98	Wetland/water Surface, 0% imp, HSG A
	972,159	70	Weighted Average
	603,491		62.08% Pervious Area
	368,668		37.92% Impervious Area
	368,668		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0634	0.19		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
10.5	564	0.0164	0.90		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.3	16	0.0025	1.02		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.2	26	0.1222	2.45		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
19.9	706	Total			

Subcatchment 15S: SC 15



Summary for Subcatchment 16A: SC 16A

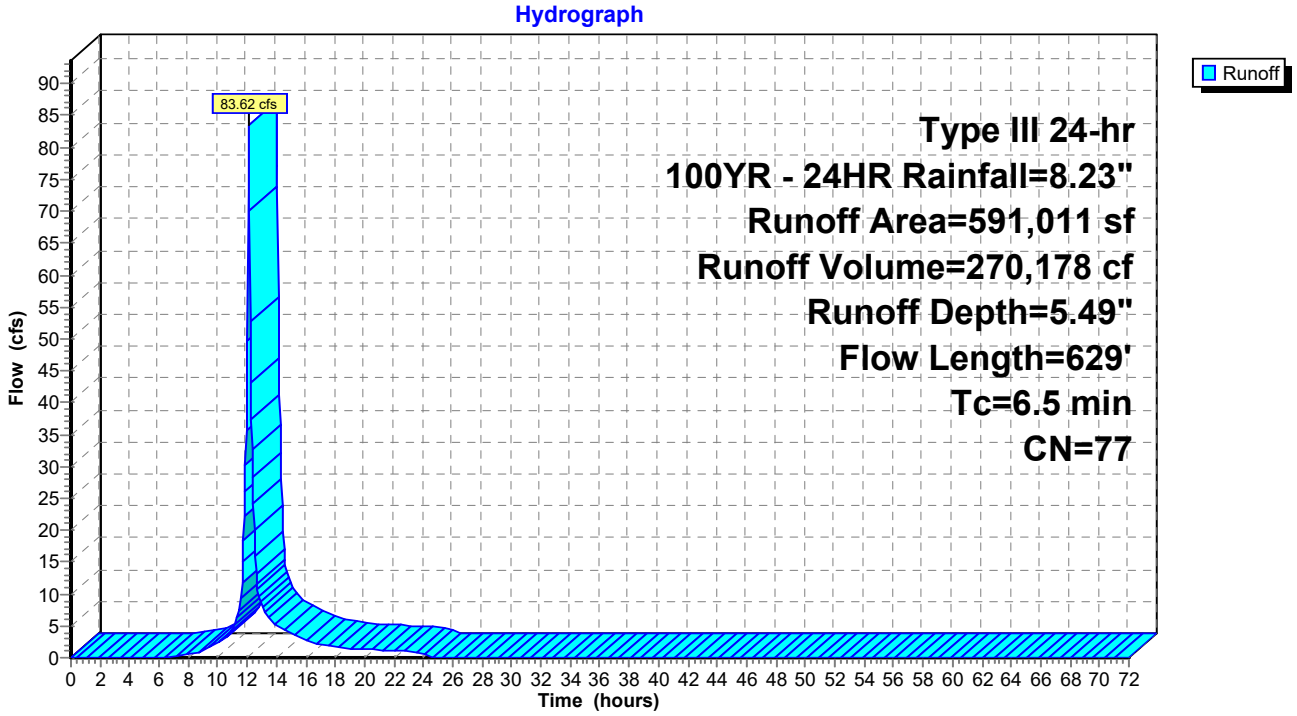
Runoff = 83.62 cfs @ 12.10 hrs, Volume= 270,178 cf, Depth= 5.49"
Routed to Pond CB4 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
330,483	61	>75% Grass cover, Good, HSG B
260,528	98	Unconnected pavement, HSG A
591,011	77	Weighted Average
330,483		55.92% Pervious Area
260,528		44.08% Impervious Area
260,528		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0107	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.0	157	0.0160	0.89		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	372	0.0030	3.09	110.88	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
6.5	629	Total			

Subcatchment 16A: SC 16A



Summary for Subcatchment 16S: SC 16

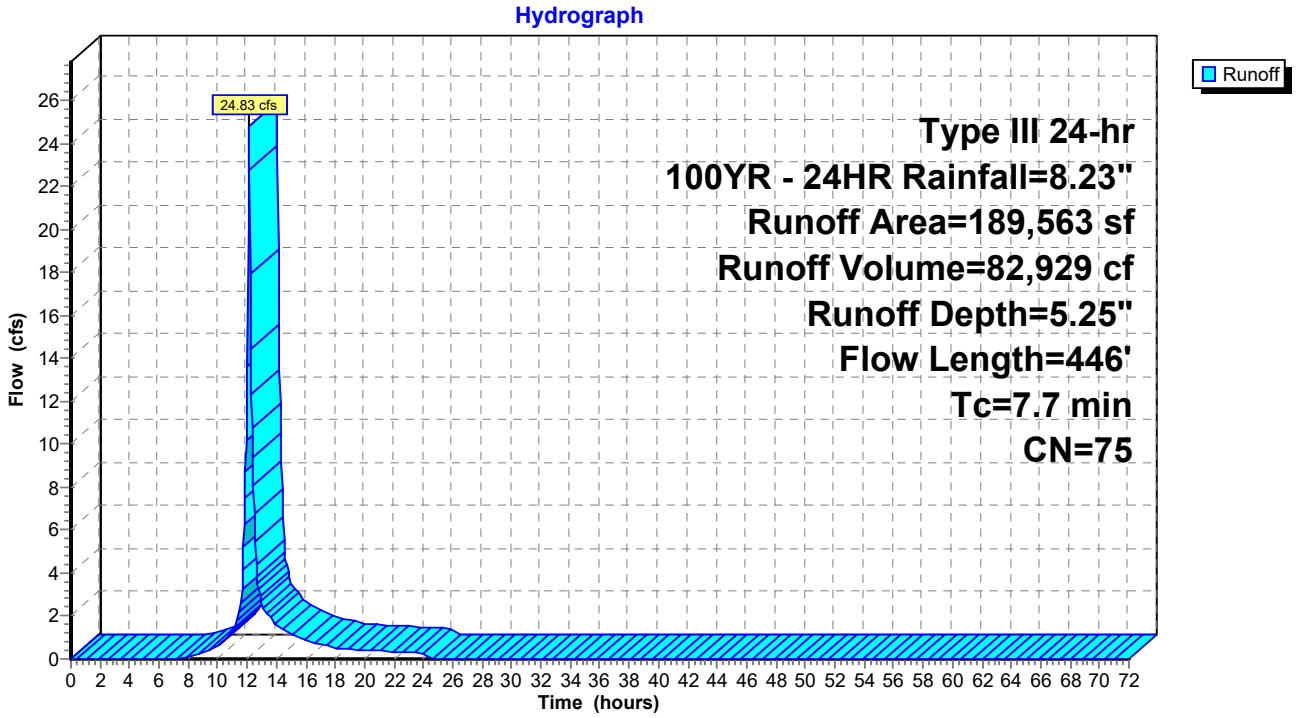
Runoff = 24.83 cfs @ 12.11 hrs, Volume= 82,929 cf, Depth= 5.25"
Routed to Pond CB3 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
120,029	61	>75% Grass cover, Good, HSG B
69,534	98	Unconnected pavement, HSG D
189,563	75	Weighted Average
120,029		63.32% Pervious Area
69,534		36.68% Impervious Area
69,534		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.4	100	0.0139	1.21		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.2	39	0.0187	2.78		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
6.1	307	0.0142	0.83		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
7.7	446	Total			

Subcatchment 16S: SC 16



Summary for Subcatchment 17S: SC 17

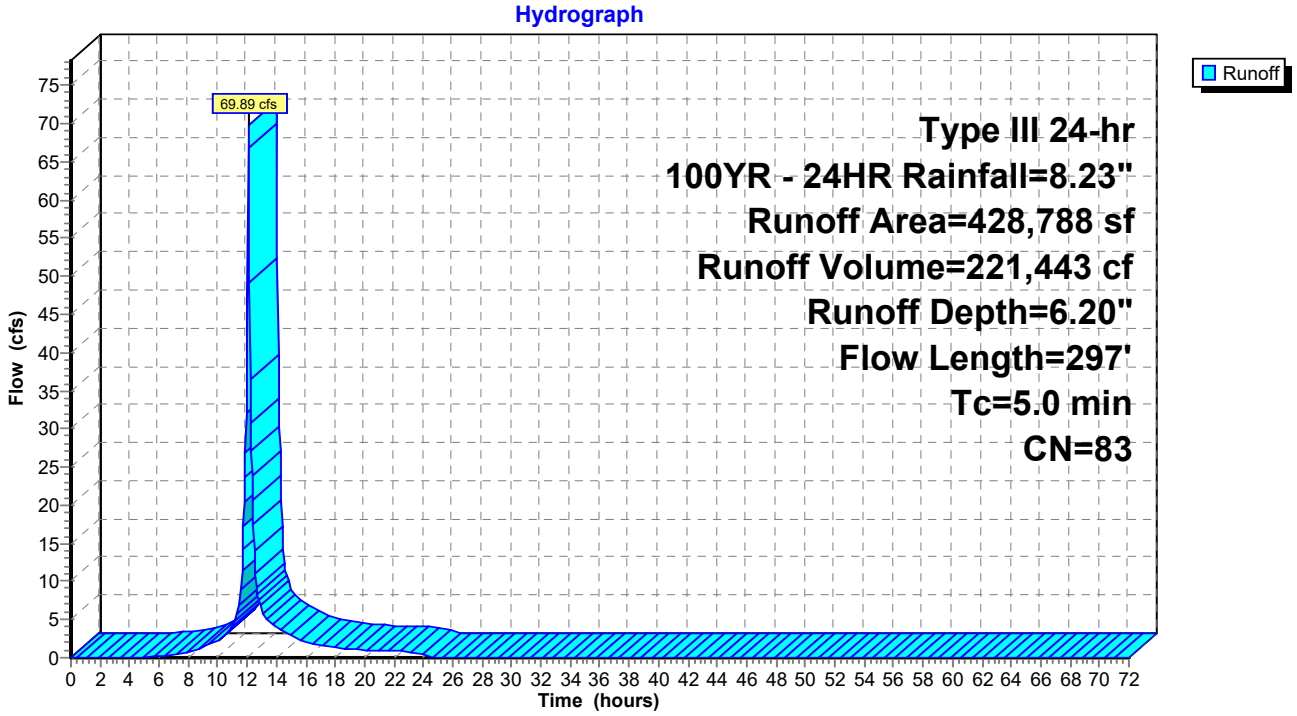
Runoff = 69.89 cfs @ 12.07 hrs, Volume= 221,443 cf, Depth= 6.20"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
176,294	61	>75% Grass cover, Good, HSG B
57,032	98	Unconnected pavement, HSG A
195,462	98	Unconnected pavement, HSG D
428,788	83	Weighted Average
176,294		41.11% Pervious Area
252,494		58.89% Impervious Area
252,494		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	22	0.0103	0.79		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.9	106	0.0170	0.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	169	0.0049	1.42		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.6					**Direct Entry, Minimum**
5.0	297	Total			

Subcatchment 17S: SC 17



Summary for Subcatchment 18S: SC 18

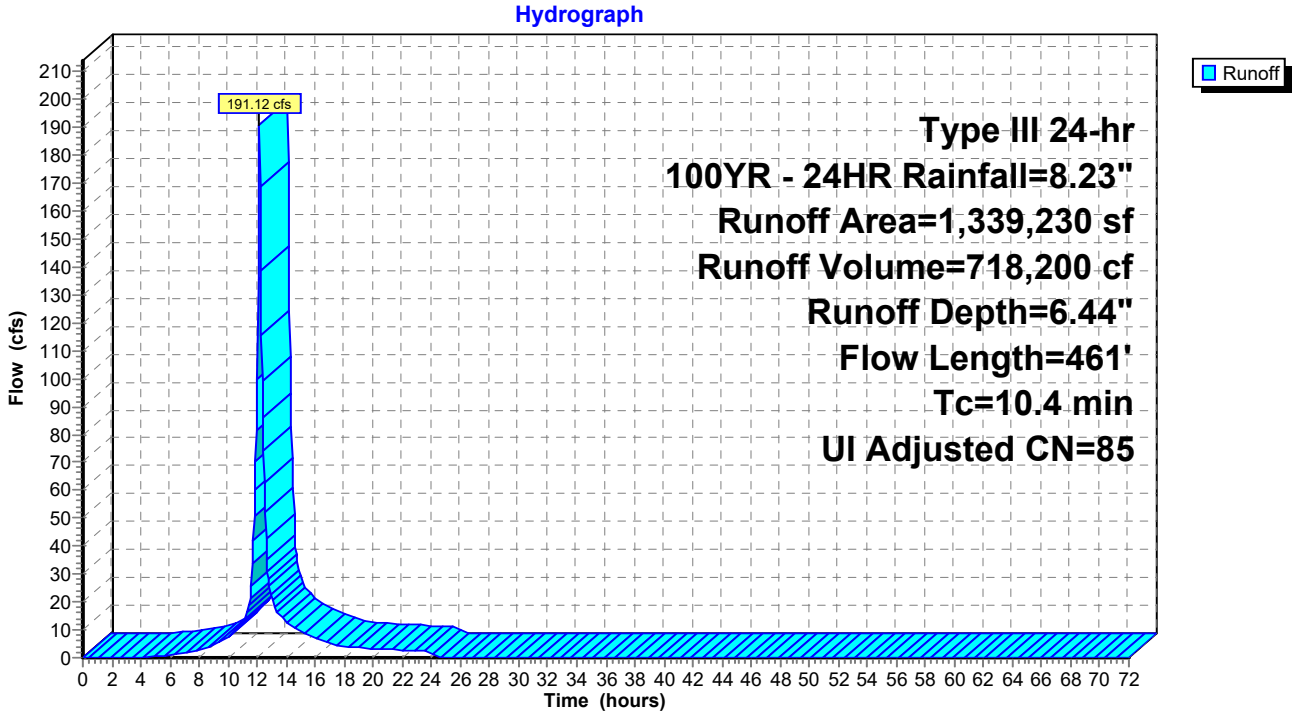
Runoff = 191.12 cfs @ 12.14 hrs, Volume= 718,200 cf, Depth= 6.44"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	379,958	61		>75% Grass cover, Good, HSG B
	171,281	98		Water Surface, 0% imp, HSG D
	0	98		Unconnected pavement, HSG A
	200,633	98		Unconnected pavement, HSG D
	84,918	70		Woods, Good, HSG C
*	502,440	98		Wetland/water Surface, 0% imp, HSG D
	1,339,230	86	85	Weighted Average, UI Adjusted
	1,138,597			85.02% Pervious Area
	200,633			14.98% Impervious Area
	200,633			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.4	100	0.0035	0.70		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.1	12	0.0093	1.96		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
7.9	349	0.0111	0.74		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
10.4	461	Total			

Subcatchment 18S: SC 18



Summary for Subcatchment 19S: SC 19

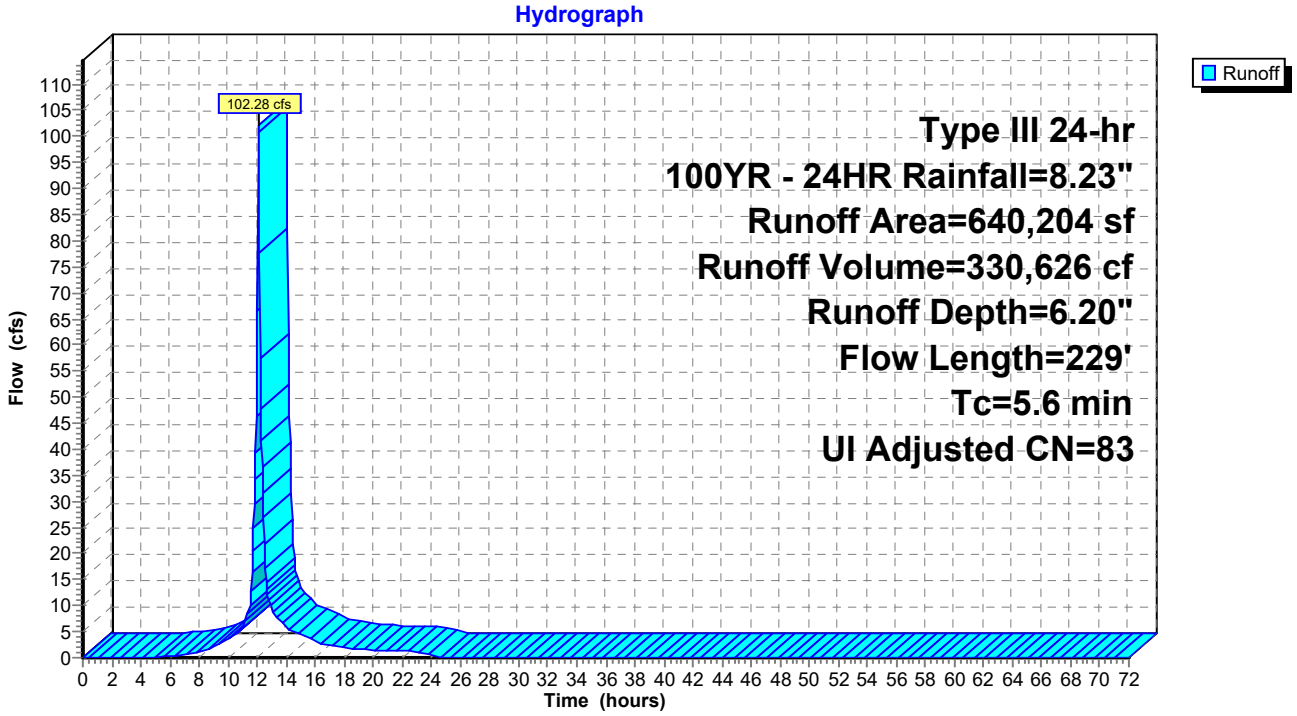
Runoff = 102.28 cfs @ 12.08 hrs, Volume= 330,626 cf, Depth= 6.20"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	227,240	61		>75% Grass cover, Good, HSG B
	60,140	98		Water Surface, 0% imp, HSG D
	72,866	98		Unconnected pavement, HSG D
	5,422	30		Woods, Good, HSG A
*	274,536	98		Wetland/water Surface, 0% imp, HSG D
	640,204	84	83	Weighted Average, UI Adjusted
	567,338			88.62% Pervious Area
	72,866			11.38% Impervious Area
	72,866			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0126	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.5	155	0.0067	0.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
5.6	229	Total			

Subcatchment 19S: SC 19



Summary for Subcatchment 20S: SC 20

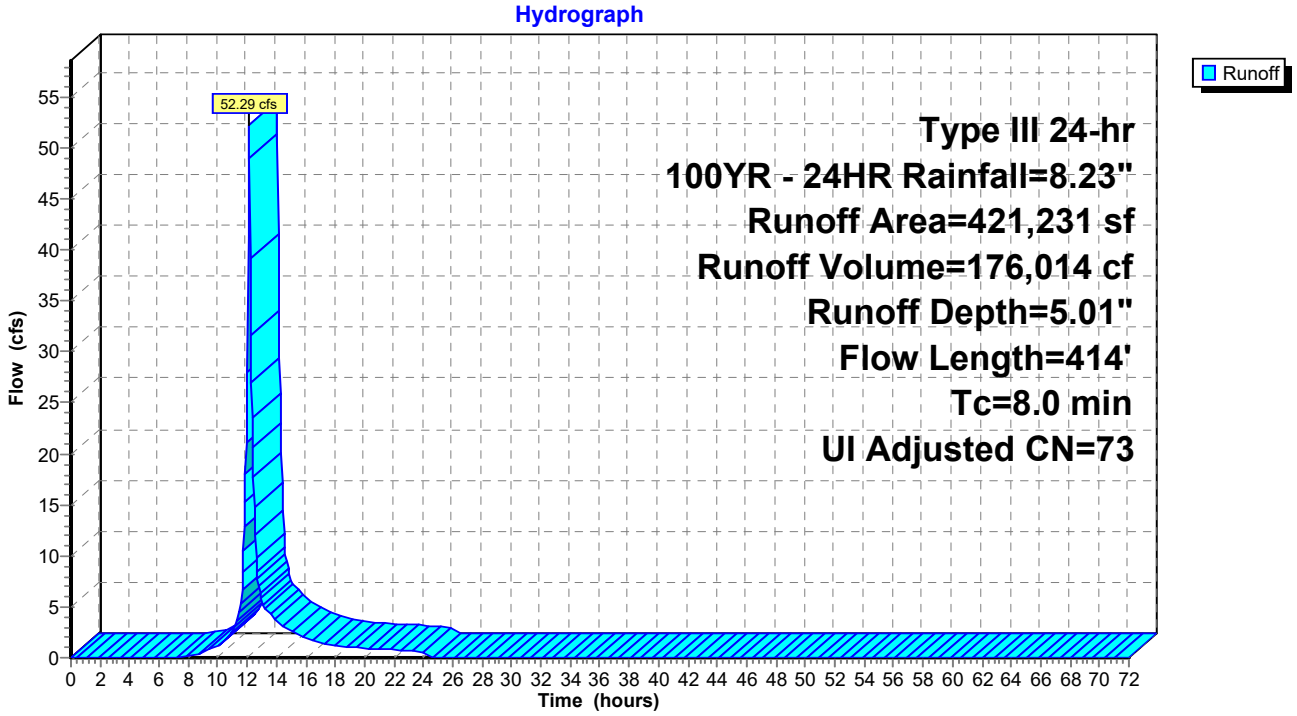
Runoff = 52.29 cfs @ 12.11 hrs, Volume= 176,014 cf, Depth= 5.01"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	248,488	61		>75% Grass cover, Good, HSG B
	2,322	96		Gravel surface, HSG B
	21,627	98		Water Surface, 0% imp, HSG D
	84,822	98		Unconnected pavement, HSG D
	0	30		Woods, Good, HSG A
*	63,972	98		Wetland/water Surface, 0% imp, HSG D
	421,231	76	73	Weighted Average, UI Adjusted
	336,409			79.86% Pervious Area
	84,822			20.14% Impervious Area
	84,822			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	83	0.0118	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
6.7	331	0.0140	0.83		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.0	414	Total			

Subcatchment 20S: SC 20



Summary for Subcatchment 21S: SC 21

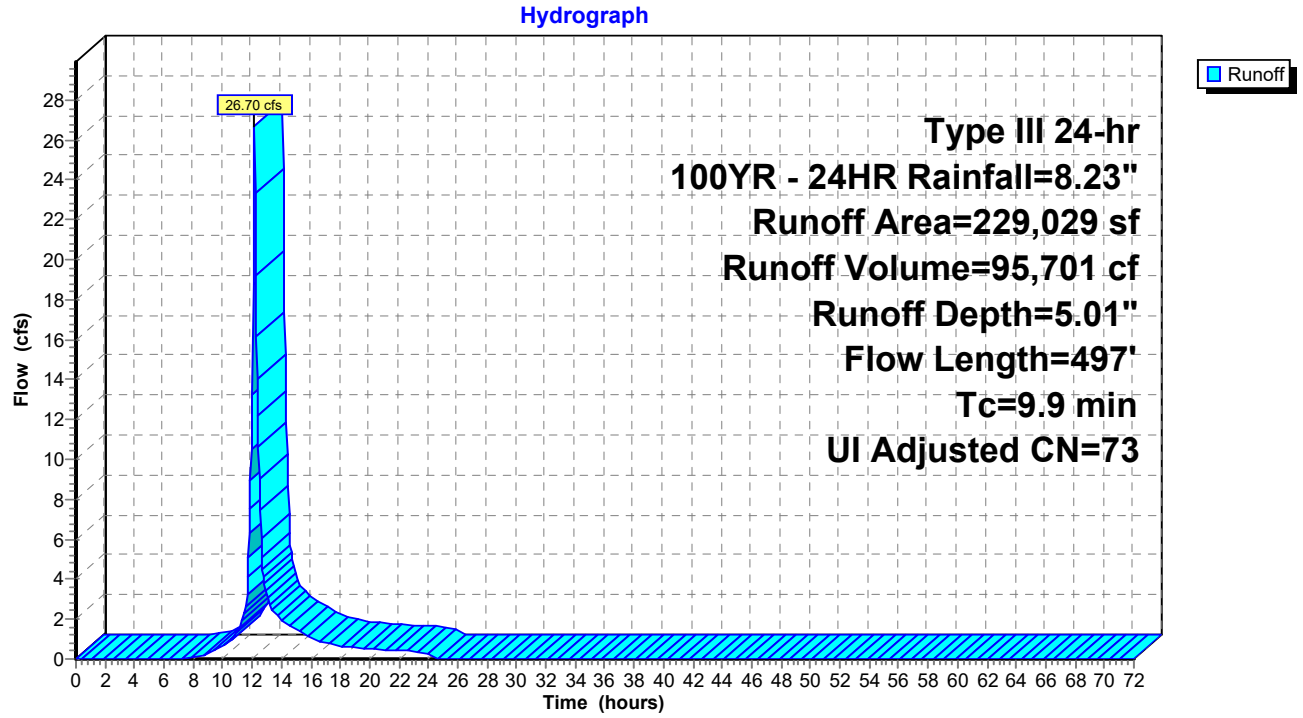
Runoff = 26.70 cfs @ 12.14 hrs, Volume= 95,701 cf, Depth= 5.01"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	144,689	61		>75% Grass cover, Good, HSG B
	14,490	98		Water Surface, 0% imp, HSG D
	23,677	98		Unconnected pavement, HSG D
*	46,173	98		Wetland/water Surface, 0% imp, HSG D
	229,029	75	73	Weighted Average, UI Adjusted
	205,352			89.66% Pervious Area
	23,677			10.34% Impervious Area
	23,677			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	73	0.0118	1.06		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
8.8	424	0.0133	0.81		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.9	497	Total			

Subcatchment 21S: SC 21



Summary for Subcatchment 22S: SC 22

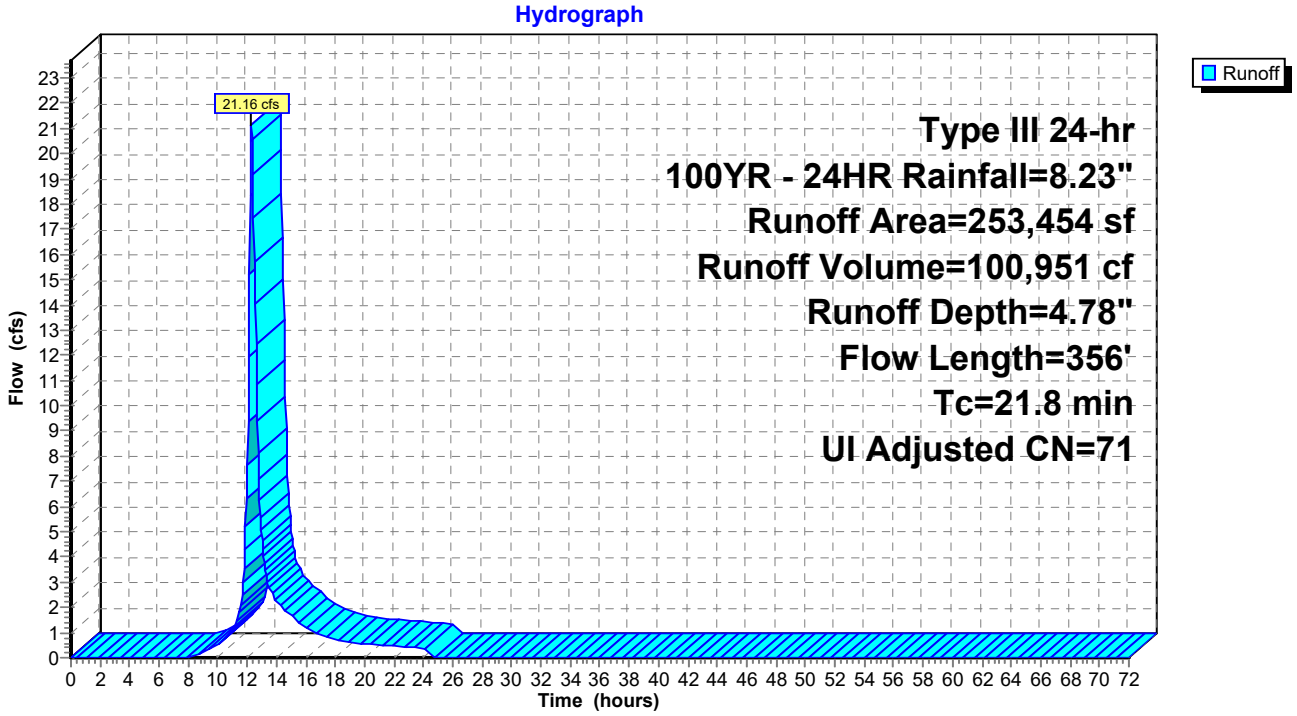
Runoff = 21.16 cfs @ 12.30 hrs, Volume= 100,951 cf, Depth= 4.78"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	178,497	61		>75% Grass cover, Good, HSG B
	9,087	96		Gravel surface, HSG B
	25,499	98		Water Surface, 0% imp, HSG D
	13,257	98		Unconnected pavement, HSG D
*	27,114	98		Wetland/water Surface, 0% imp, HSG D
	253,454	72	71	Weighted Average, UI Adjusted
	240,197			94.77% Pervious Area
	13,257			5.23% Impervious Area
	13,257			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	100	0.0044	0.09		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.1	256	0.0218	1.03		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
21.8	356	Total			

Subcatchment 22S: SC 22



Summary for Subcatchment 23S: SC 23

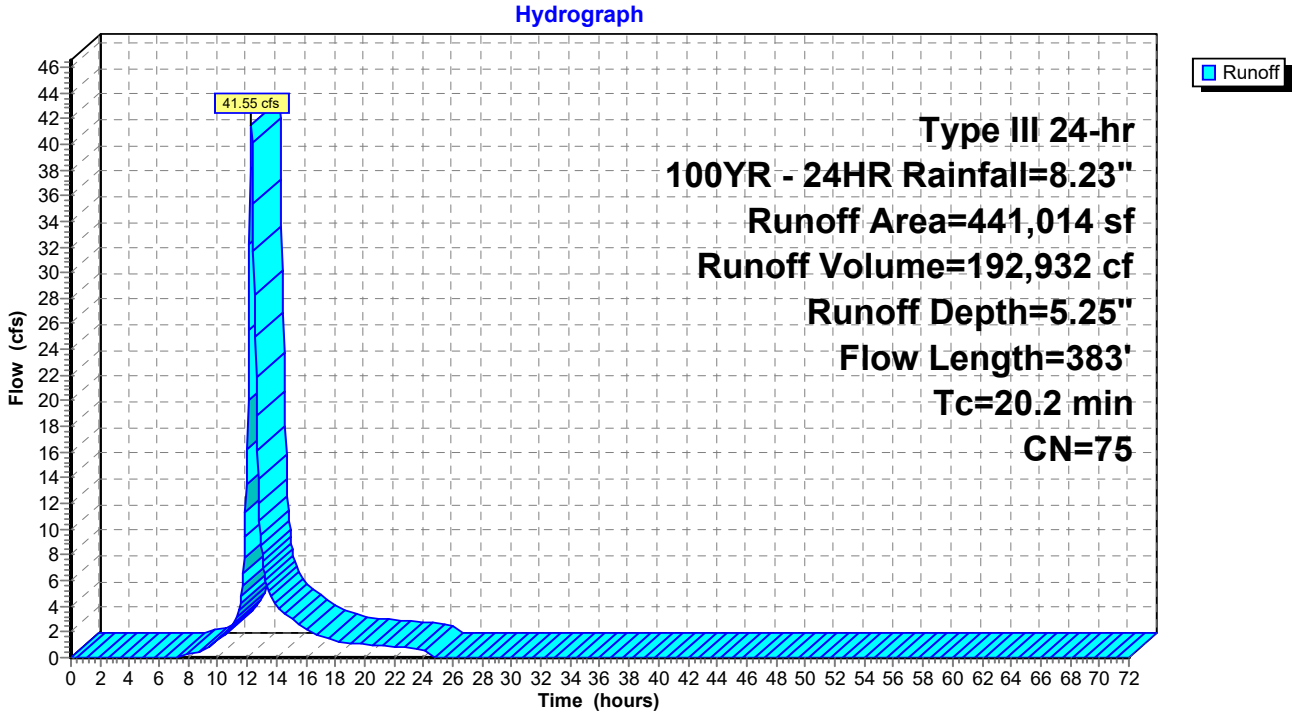
Runoff = 41.55 cfs @ 12.28 hrs, Volume= 192,932 cf, Depth= 5.25"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	200,568	61	>75% Grass cover, Good, HSG B
	18,545	96	Gravel surface, HSG B
	45,671	98	Water Surface, 0% imp, HSG D
	66,364	55	Woods, Good, HSG B
*	109,866	98	Wetland/water Surface, 0% imp, HSG D
	441,014	75	Weighted Average
	441,014		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	100	0.0062	0.11		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.8	283	0.0198	0.98		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
20.2	383	Total			

Subcatchment 23S: SC 23



Summary for Subcatchment 24S: SC 24

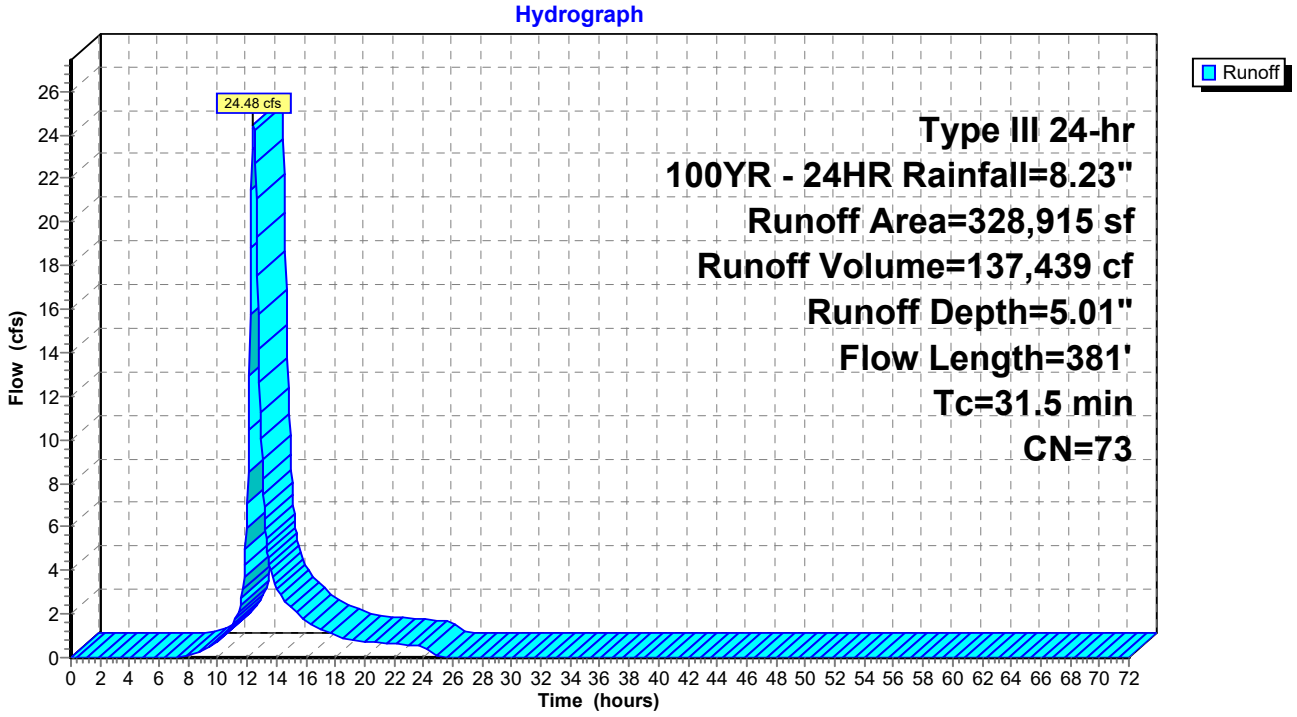
Runoff = 24.48 cfs @ 12.44 hrs, Volume= 137,439 cf, Depth= 5.01"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	70,558	61	>75% Grass cover, Good, HSG B
	14,252	96	Gravel surface, HSG B
	54,296	98	Water Surface, 0% imp, HSG D
	132,846	55	Woods, Good, HSG B
*	56,963	98	Wetland/water Surface, 0% imp, HSG D
	328,915	73	Weighted Average
	328,915		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.9	100	0.0048	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
6.6	281	0.0103	0.71		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
31.5	381	Total			

Subcatchment 24S: SC 24



Summary for Subcatchment 27S: SC 27

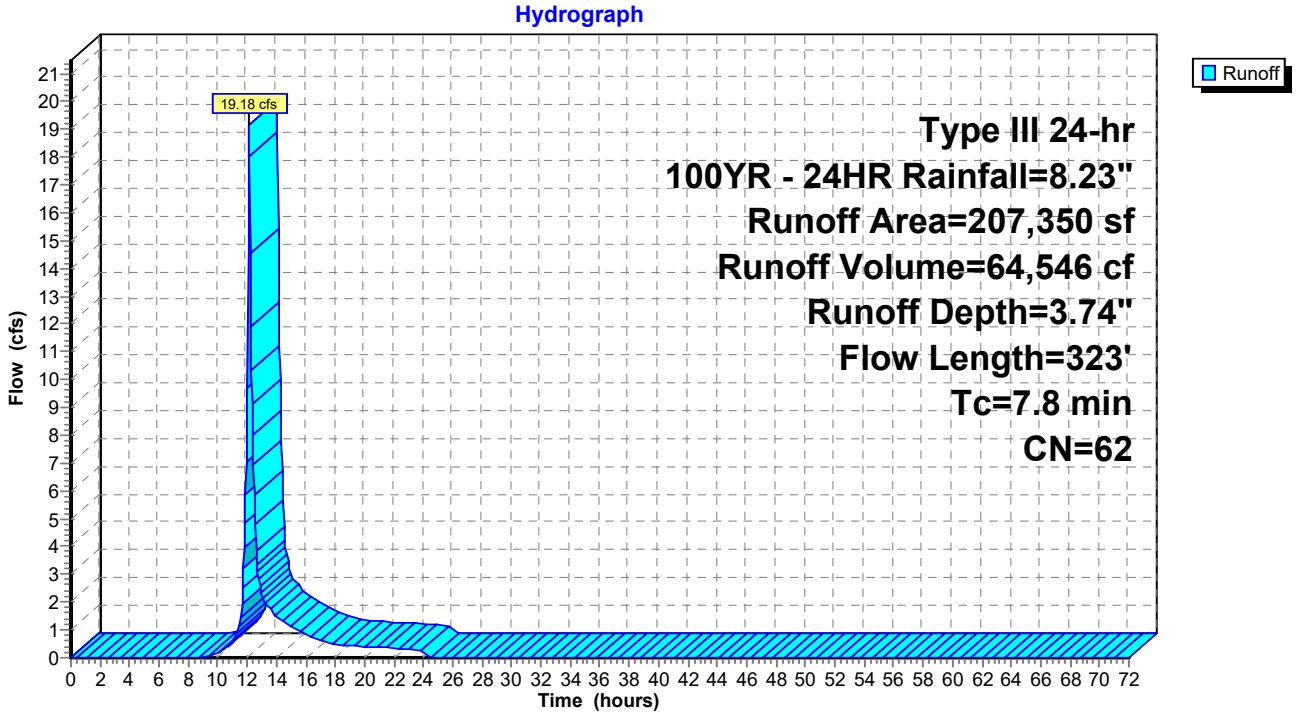
Runoff = 19.18 cfs @ 12.12 hrs, Volume= 64,546 cf, Depth= 3.74"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	198,922	61	>75% Grass cover, Good, HSG B
	4,606	96	Gravel surface, HSG B
	0	98	Unconnected pavement, HSG A
	3,765	98	Unconnected pavement, HSG D
*	57	98	Wetland/Water Surface, 0% imp, HSG A
	207,350	62	Weighted Average
	203,585		98.18% Pervious Area
	3,765		1.82% Impervious Area
	3,765		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	17	0.0048	0.55		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	306	0.0099	0.70		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.8	323	Total			

Subcatchment 27S: SC 27



Summary for Subcatchment 28S: SC 28

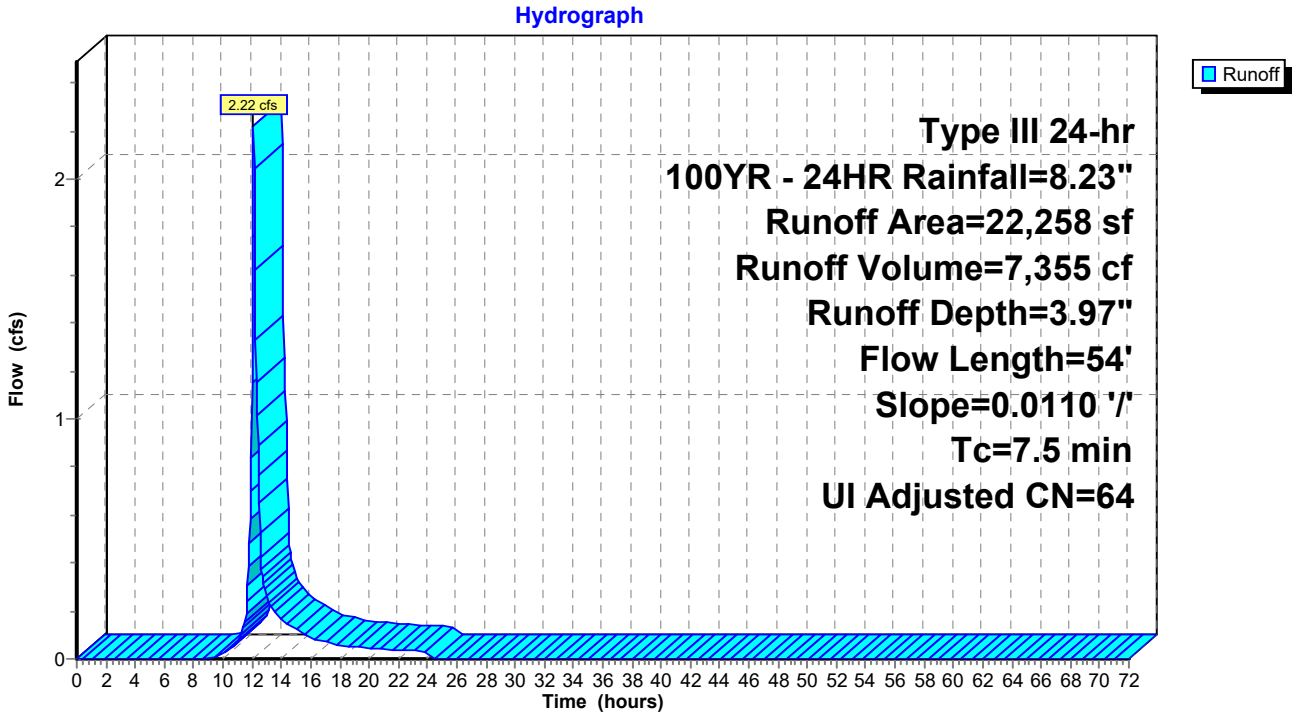
Runoff = 2.22 cfs @ 12.11 hrs, Volume= 7,355 cf, Depth= 3.97"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
18,224	61		>75% Grass cover, Good, HSG B
10	96		Gravel surface, HSG B
4,024	98		Unconnected pavement, HSG D
22,258	68	64	Weighted Average, UI Adjusted
18,234			81.92% Pervious Area
4,024			18.08% Impervious Area
4,024			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.5	54	0.0110	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"

Subcatchment 28S: SC 28



Summary for Subcatchment DS1: Ditch Segment 1

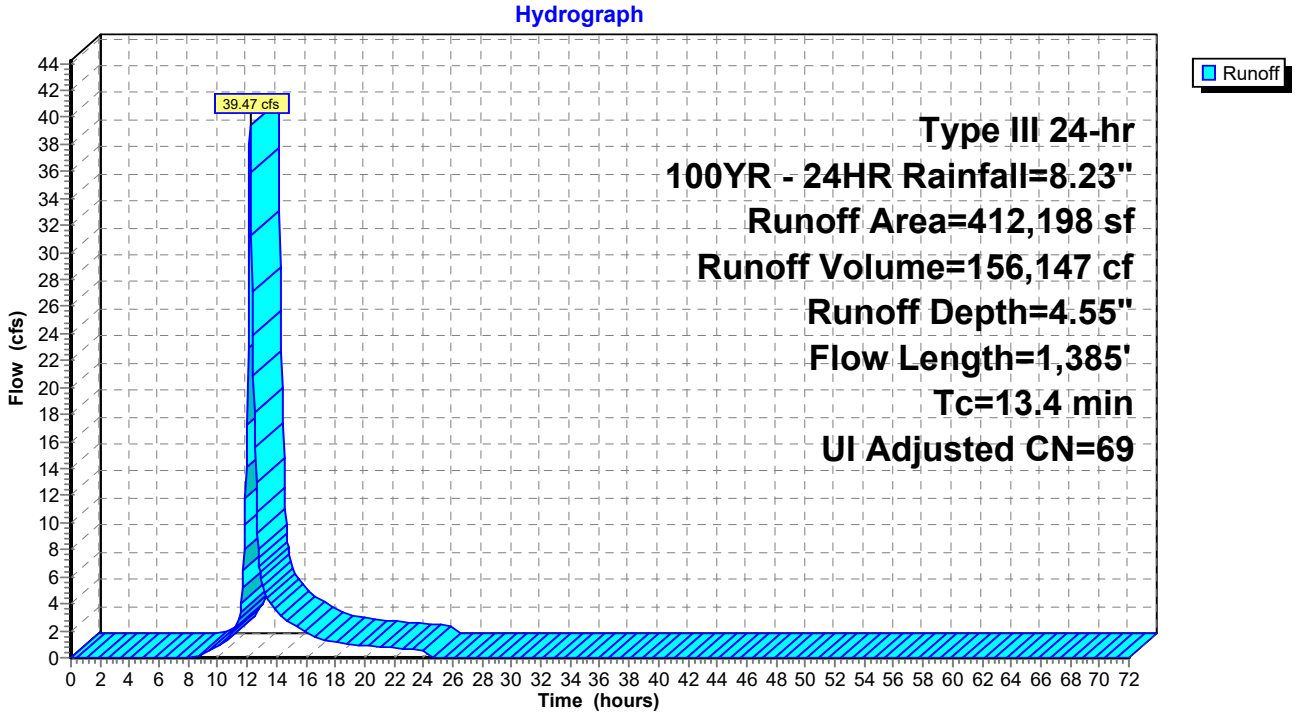
Runoff = 39.47 cfs @ 12.19 hrs, Volume= 156,147 cf, Depth= 4.55"
Routed to Reach 1R : WQS Segment 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	242,115	61		>75% Grass cover, Good, HSG B
	2,212	76		Gravel roads, HSG A
	0	98		Water Surface, 0% imp, HSG A
	0	98		Unconnected pavement, HSG A
	117,963	98		Unconnected pavement, HSG D
	20,768	55		Woods, Good, HSG B
*	29,140	98		Wetland/Water Surface, 0% imp, HSG A
	412,198	74	69	Weighted Average, UI Adjusted
	294,235			71.38% Pervious Area
	117,963			28.62% Impervious Area
	117,963			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	110	0.0200	1.42		**Sheet Flow, Pavement**
					Smooth surfaces n= 0.011 P2= 3.30"
0.8	65	0.0400	1.40		**Shallow Concentrated Flow, Grass**
					Short Grass Pasture Kv= 7.0 fps
11.3	1,210	0.0005	1.79	48.22	**Channel Flow, Ditch**
					Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
13.4	1,385	Total			

Subcatchment DS1: Ditch Segment 1



Summary for Subcatchment DS2: Ditch Segment 2

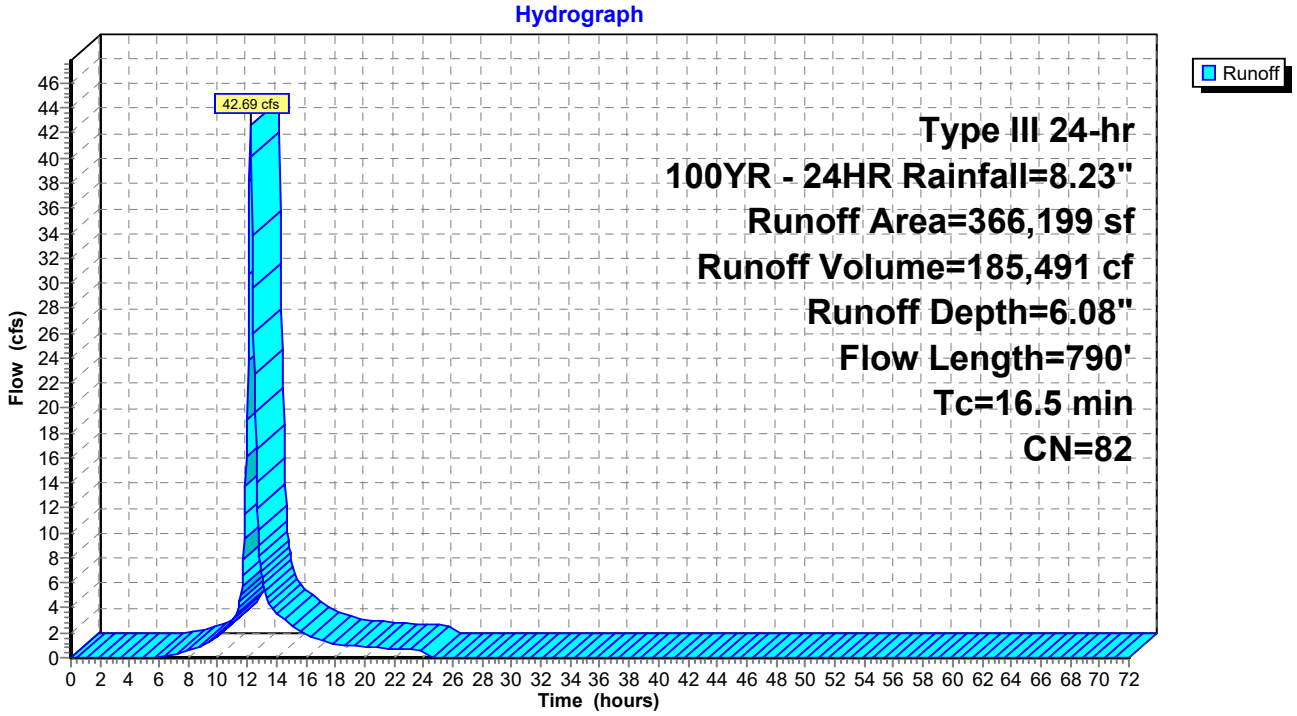
Runoff = 42.69 cfs @ 12.22 hrs, Volume= 185,491 cf, Depth= 6.08"
Routed to Reach 2R : WQS Segment 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
158,039	61	>75% Grass cover, Good, HSG B
9,172	98	Water Surface, 0% imp, HSG A
198,988	98	Unconnected pavement, HSG D
366,199	82	Weighted Average
167,211		45.66% Pervious Area
198,988		54.34% Impervious Area
198,988		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	140	0.0050	0.86		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
10.3	280	0.0005	0.45		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	370	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
16.5	790	Total			

Subcatchment DS2: Ditch Segment 2



Summary for Subcatchment DS3: Ditch Segment 3

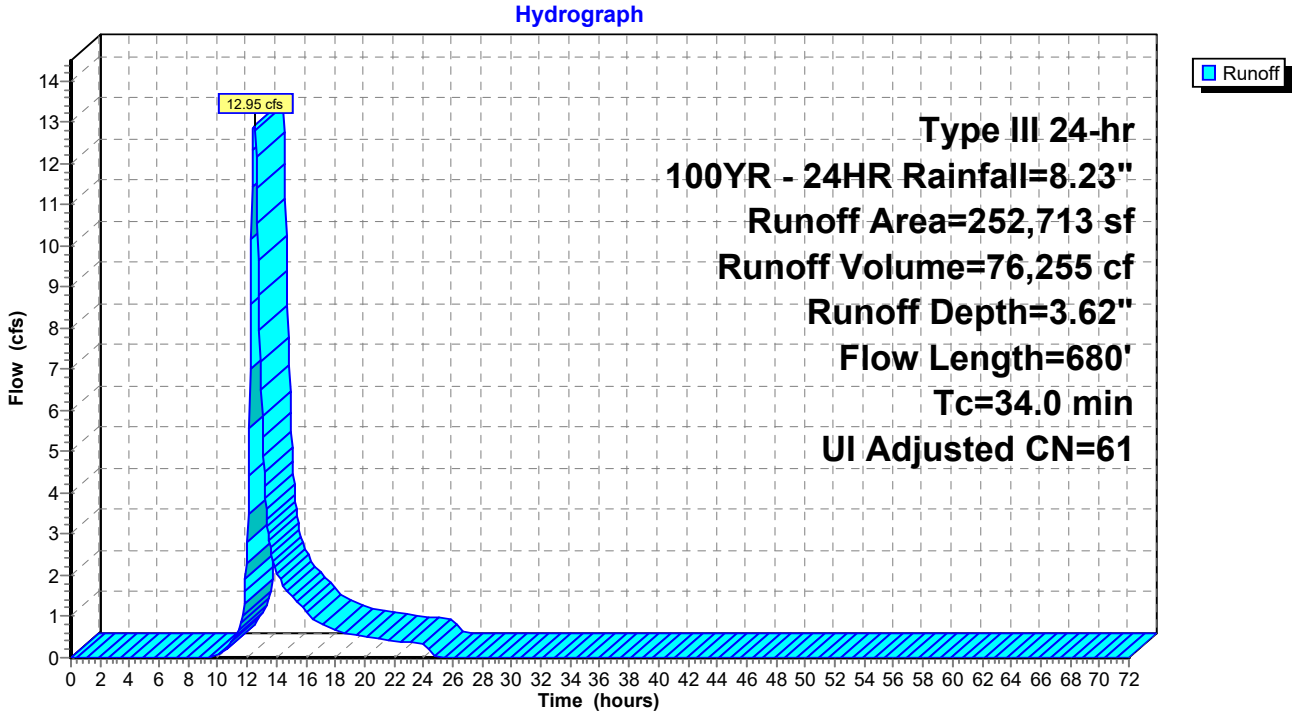
Runoff = 12.95 cfs @ 12.49 hrs, Volume= 76,255 cf, Depth= 3.62"
Routed to Reach 3R : WQS Segment 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	83,059	61		>75% Grass cover, Good, HSG B
	11,554	76		Gravel roads, HSG A
	544	98		Water Surface, 0% imp, HSG A
	39,077	98		Unconnected pavement, HSG D
	77,113	30		Woods, Good, HSG A
*	41,366	98		Wetland/Water Surface, 0% imp, HSG B
	252,713	64	61	Weighted Average, UI Adjusted
	213,636			84.54% Pervious Area
	39,077			15.46% Impervious Area
	39,077			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	90	0.0050	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
16.3	345	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.3	245	0.0005	1.79	48.22	**Channel Flow,** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
34.0	680	Total			

Subcatchment DS3: Ditch Segment 3



Summary for Subcatchment N10: DA-N10

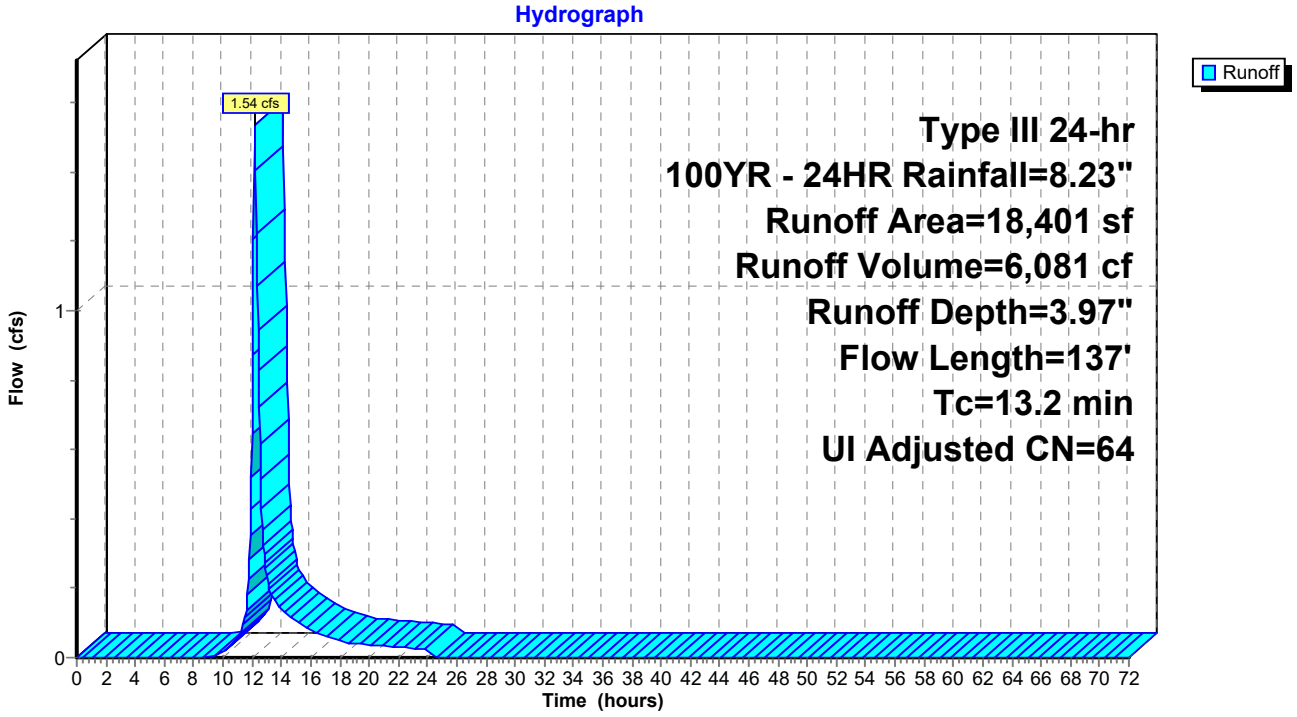
Runoff = 1.54 cfs @ 12.19 hrs, Volume= 6,081 cf, Depth= 3.97"
Routed to Pond P9 : Pond 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
13,244	58		Meadow, non-grazed, HSG B
0	98		Unconnected pavement, HSG A
5,157	98		Unconnected pavement, HSG D
18,401	69	64	Weighted Average, UI Adjusted
13,244			71.97% Pervious Area
5,157			28.03% Impervious Area
5,157			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	79	0.0709	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
8.4	58	0.0095	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
13.2	137	Total			

Subcatchment N10: DA-N10



Summary for Subcatchment N12: DA-N12

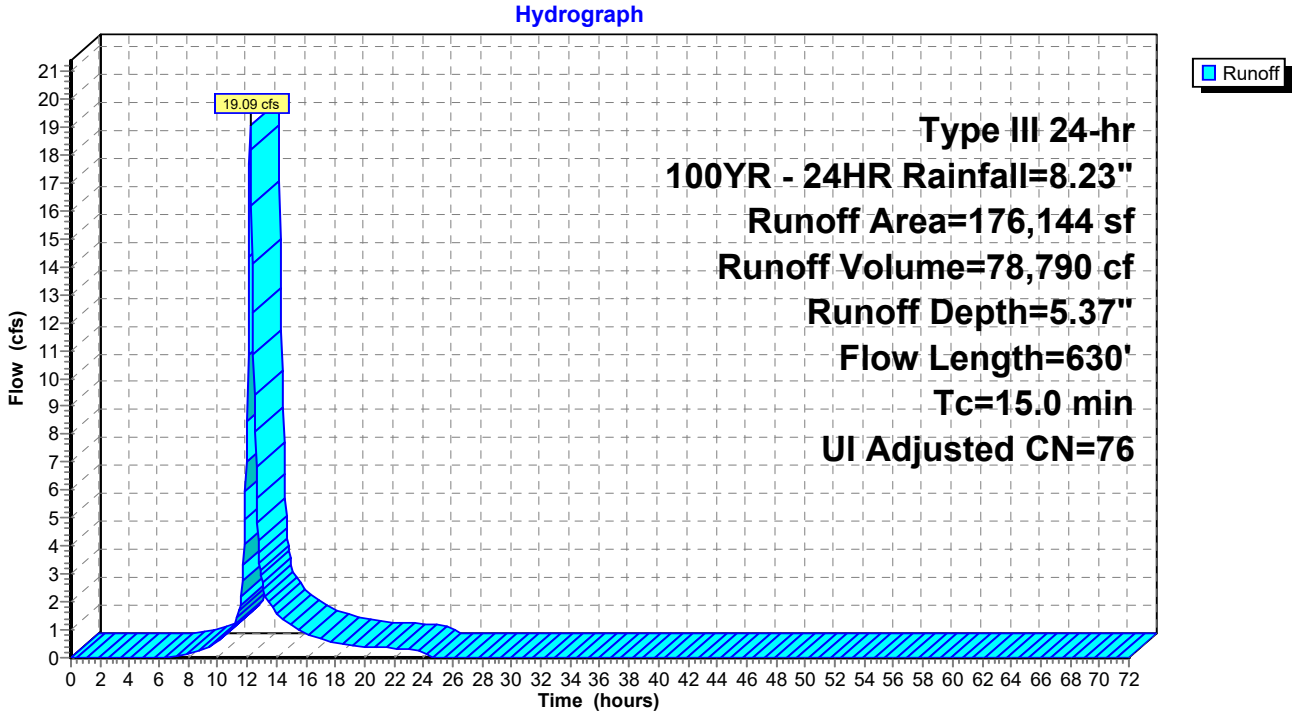
Runoff = 19.09 cfs @ 12.21 hrs, Volume= 78,790 cf, Depth= 5.37"
Routed to Pond P10 : Wetland Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	31,174	61		>75% Grass cover, Good, HSG B
	22,034	98		Unconnected pavement, HSG A
	4,614	98		Unconnected pavement, HSG D
	54,750	55		Woods, Good, HSG B
*	63,572	98		Wetland/Water Surface, 0% imp, HSG D
	176,144	78	76	Weighted Average, UI Adjusted
	149,496			84.87% Pervious Area
	26,648			15.13% Impervious Area
	26,648			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	152	0.0105	1.17		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
8.1	251	0.0054	0.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	227	0.0029	0.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	630	Total			

Subcatchment N12: DA-N12



Summary for Subcatchment N13: DA-N13

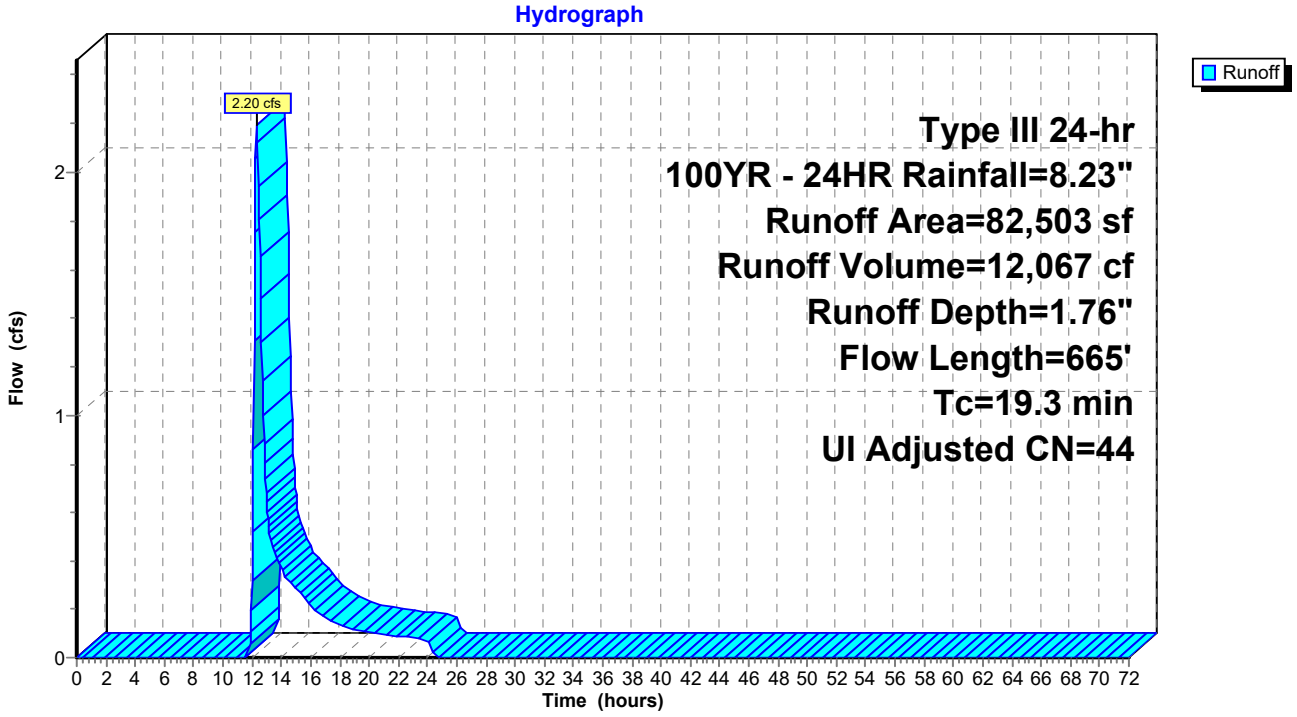
Runoff = 2.20 cfs @ 12.32 hrs, Volume= 12,067 cf, Depth= 1.76"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
183	98		Unconnected pavement, HSG A
14,377	98		Unconnected pavement, HSG D
67,943	39		>75% Grass cover, Good, HSG A
82,503	49	44	Weighted Average, UI Adjusted
67,943			82.35% Pervious Area
14,560			17.65% Impervious Area
14,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	115	0.0391	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
11.0	550	0.0141	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	665	Total			

Subcatchment N13: DA-N13



Summary for Subcatchment N14: DA-N14

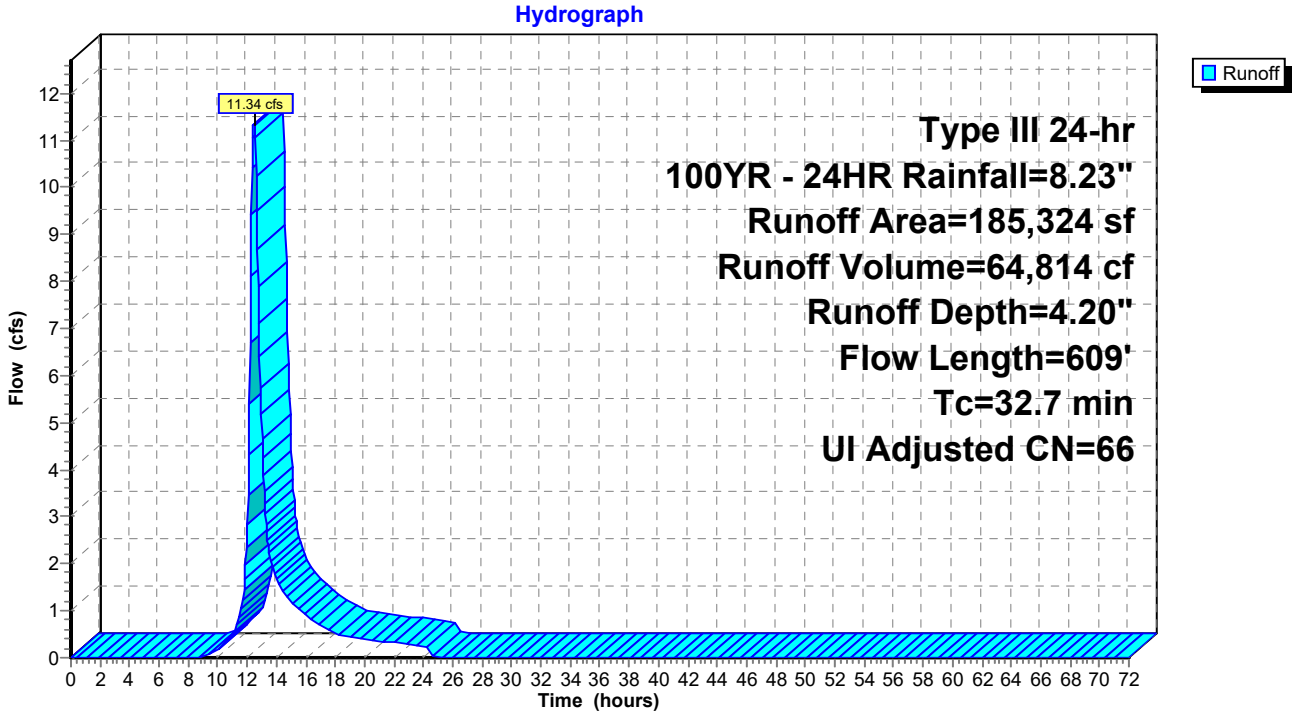
Runoff = 11.34 cfs @ 12.46 hrs, Volume= 64,814 cf, Depth= 4.20"
Routed to Pond P6 : Pond 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
139,813	61		>75% Grass cover, Good, HSG B
45,511	98		Unconnected pavement, HSG A
185,324	70	66	Weighted Average, UI Adjusted
139,813			75.44% Pervious Area
45,511			24.56% Impervious Area
45,511			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0122	1.08		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
13.2	122	0.0135	0.15		**Sheet Flow, Grasss** Grass: Short n= 0.150 P2= 3.30"
18.4	413	0.0036	0.37	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
32.7	609	Total			

Subcatchment N14: DA-N14



Summary for Subcatchment N15: DA-N15

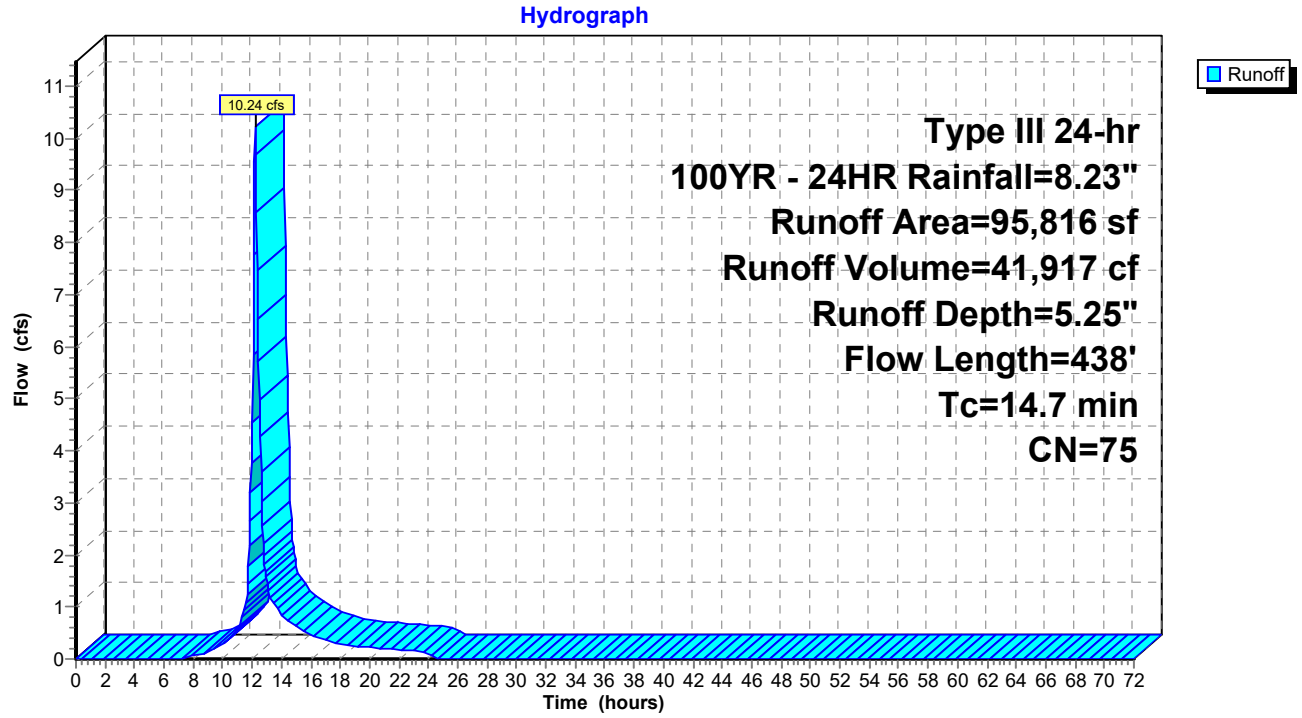
Runoff = 10.24 cfs @ 12.20 hrs, Volume= 41,917 cf, Depth= 5.25"
Routed to Pond P8 : Pond 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
59,706	61	>75% Grass cover, Good, HSG B
36,110	98	Unconnected pavement, HSG D
95,816	75	Weighted Average
59,706		62.31% Pervious Area
36,110		37.69% Impervious Area
36,110		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0783	0.27		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
6.9	60	0.0166	0.14		**Sheet Flow, grass** Grass: Short n= 0.150 P2= 3.30"
4.1	318	0.0075	1.30		**Shallow Concentrated Flow, Grass** Grassed Waterway Kv= 15.0 fps
14.7	438	Total			

Subcatchment N15: DA-N15



Summary for Subcatchment N2: DA-N2

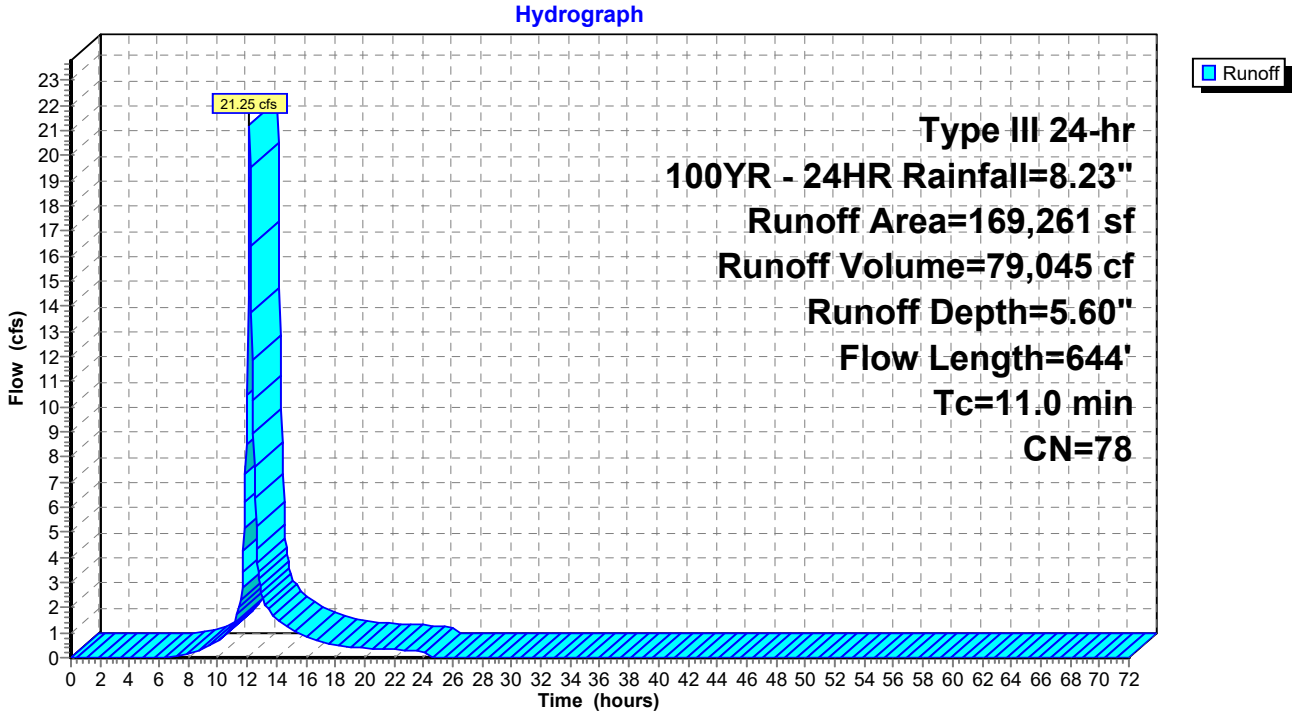
Runoff = 21.25 cfs @ 12.15 hrs, Volume= 79,045 cf, Depth= 5.60"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
84,479	98	Paved parking, HSG B
84,782	58	Meadow, non-grazed, HSG B
169,261	78	Weighted Average
84,782		50.09% Pervious Area
84,479		49.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	146	0.0137	1.30		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
9.1	498	0.0169	0.91		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.0	644	Total			

Subcatchment N2: DA-N2



Summary for Subcatchment N3: DA-N3

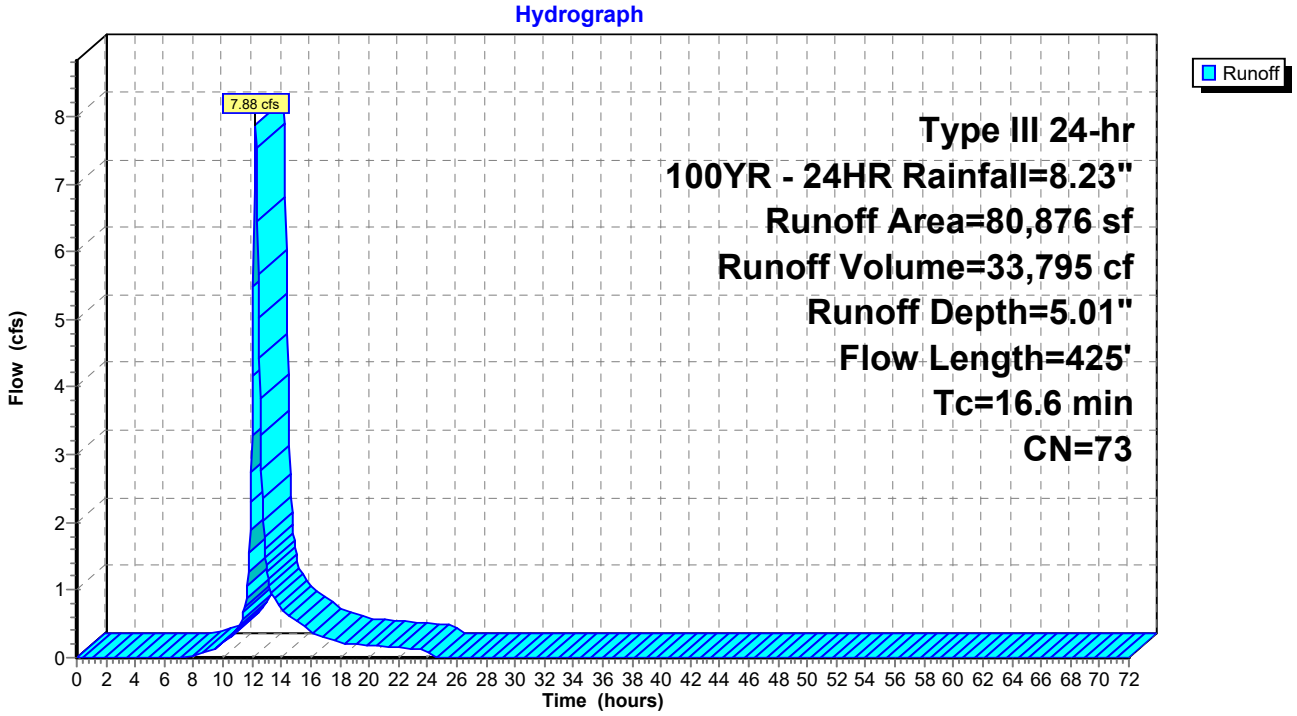
Runoff = 7.88 cfs @ 12.23 hrs, Volume= 33,795 cf, Depth= 5.01"
Routed to Pond P2 : Pond 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
50,316	58	Meadow, non-grazed, HSG B
29,045	98	Unconnected pavement, HSG A
1,515	98	Unconnected pavement, HSG D
80,876	73	Weighted Average
50,316		62.21% Pervious Area
30,560		37.79% Impervious Area
30,560		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	118	0.0127	1.20		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
6.7	69	0.0239	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
8.3	238	0.0059	0.48	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
16.6	425	Total			

Subcatchment N3: DA-N3



Summary for Subcatchment N4: DA-N4

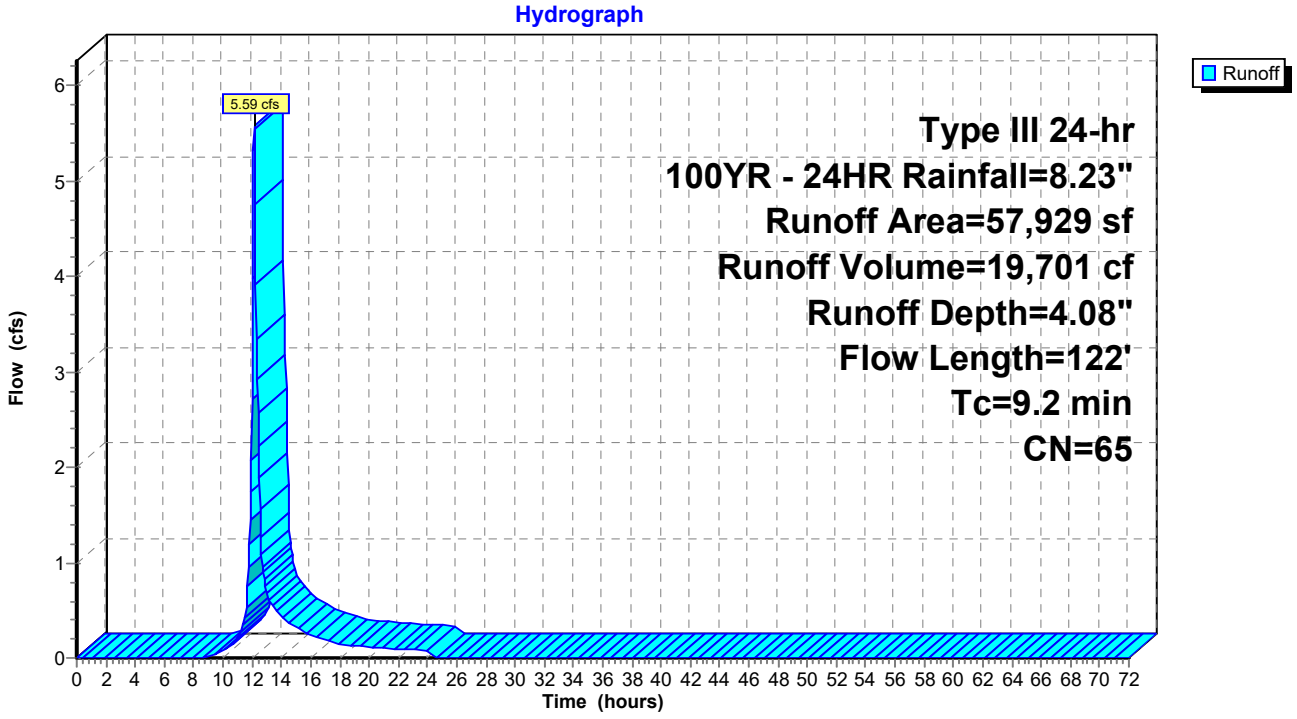
Runoff = 5.59 cfs @ 12.14 hrs, Volume= 19,701 cf, Depth= 4.08"
Routed to Pond P4 : Pond 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
47,807	58	Meadow, non-grazed, HSG B
10,122	98	Paved parking, HSG B
57,929	65	Weighted Average
47,807		82.53% Pervious Area
10,122		17.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.2	79	0.0190	0.16		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
1.0	43	0.0128	0.71	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
9.2	122	Total			

Subcatchment N4: DA-N4



Summary for Subcatchment N5: DA-N5

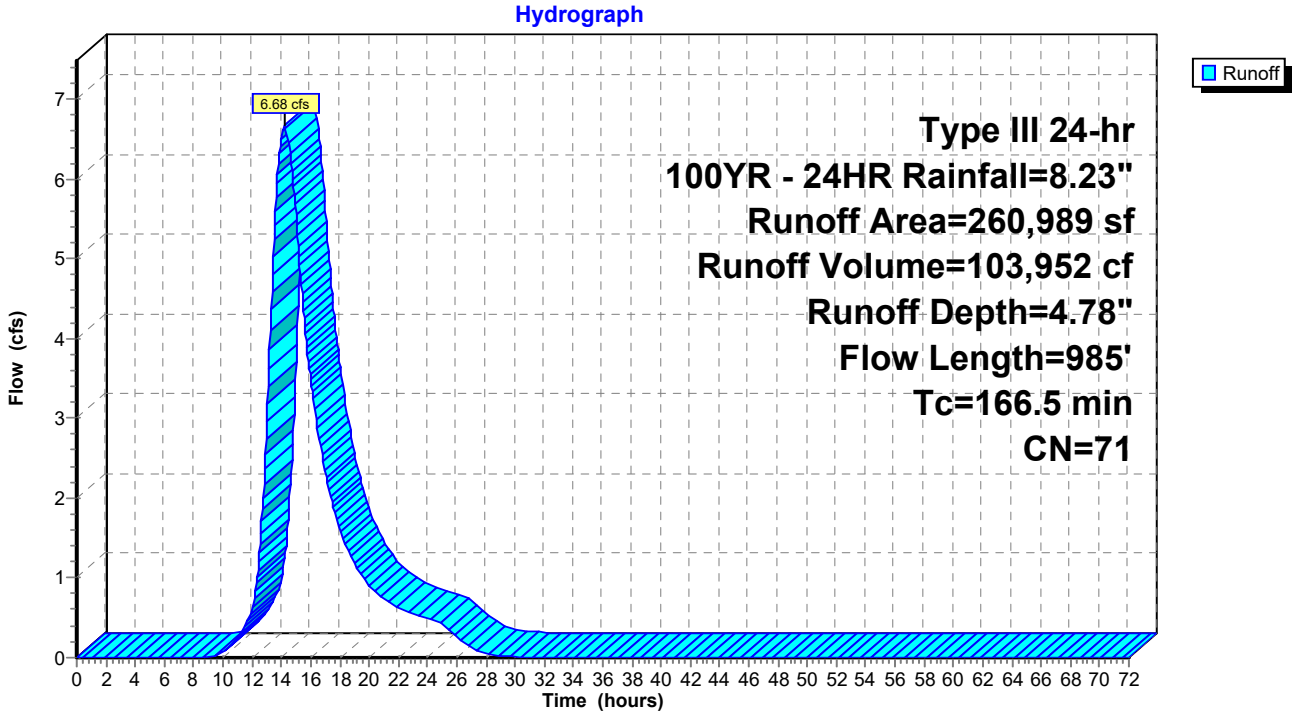
Runoff = 6.68 cfs @ 14.24 hrs, Volume= 103,952 cf, Depth= 4.78"
Routed to Pond CB5 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
86,498	98	Paved parking, HSG B
174,491	58	Meadow, non-grazed, HSG B
260,989	71	Weighted Average
174,491		66.86% Pervious Area
86,498		33.14% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.0	115	0.0043	0.10		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
146.5	870	0.0002	0.10		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
166.5	985	Total			

Subcatchment N5: DA-N5



Summary for Subcatchment N6: DA-N6

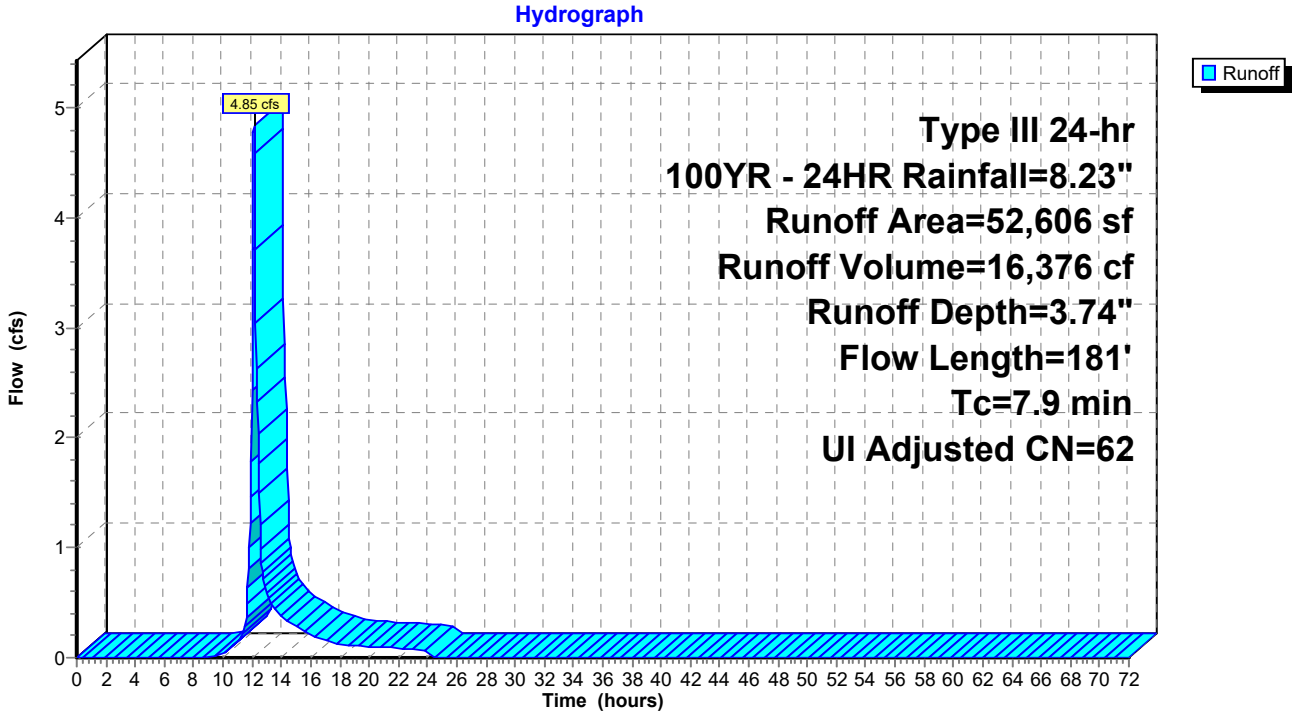
Runoff = 4.85 cfs @ 12.12 hrs, Volume= 16,376 cf, Depth= 3.74"
Routed to Pond P5 : Pond 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
41,980	58		Meadow, non-grazed, HSG B
9,109	98		Unconnected pavement, HSG A
1,517	98		Unconnected pavement, HSG D
52,606	66	62	Weighted Average, UI Adjusted
41,980			79.80% Pervious Area
10,626			20.20% Impervious Area
10,626			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.2	63	0.0238	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
0.4	59	0.0153	2.51		**Shallow Concentrated Flow, PCC Channel** Paved Kv= 20.3 fps
1.3	59	0.0153	0.77	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
7.9	181	Total			

Subcatchment N6: DA-N6



Summary for Subcatchment N7: DA-N7

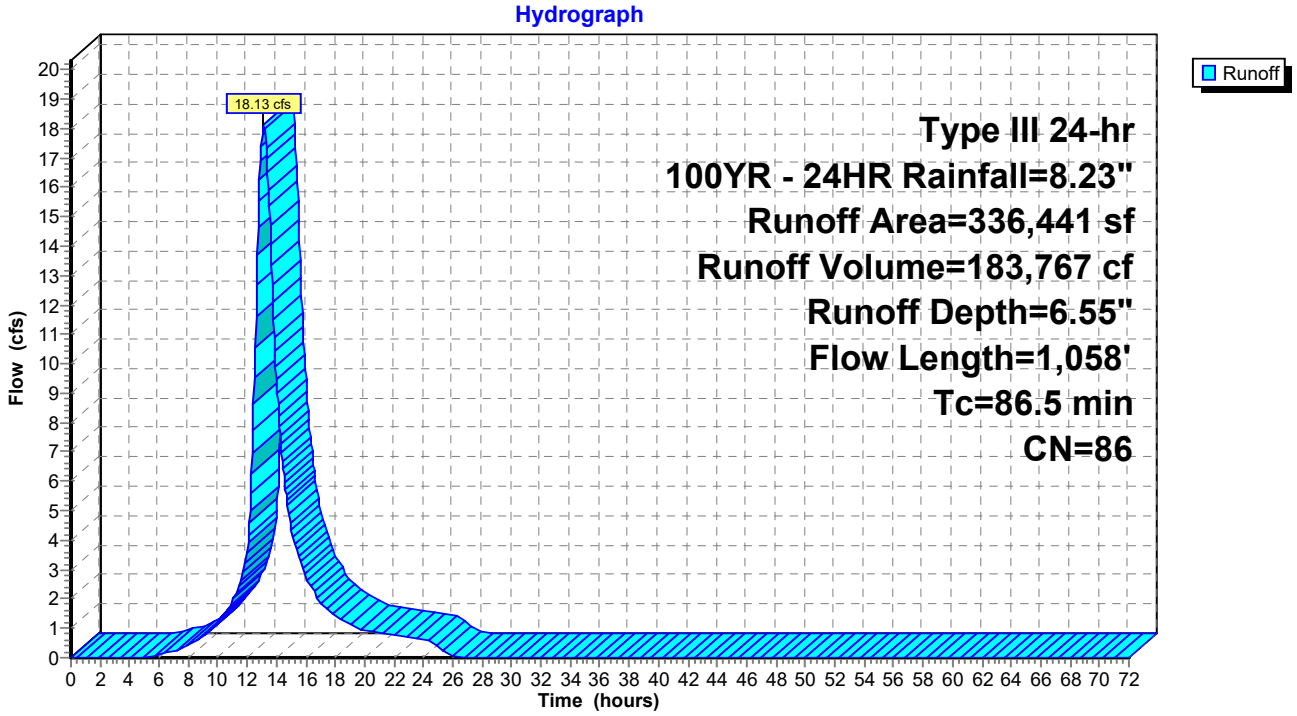
Runoff = 18.13 cfs @ 13.13 hrs, Volume= 183,767 cf, Depth= 6.55"
Routed to Pond P3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
104,683	58	Meadow, non-grazed, HSG B
231,758	98	Paved parking, HSG B
336,441	86	Weighted Average
104,683		31.11% Pervious Area
231,758		68.89% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	300	0.0043	0.94		**Sheet Flow, Apron** Smooth surfaces n= 0.011 P2= 3.30"
4.0	318	0.0043	1.33		**Shallow Concentrated Flow, Apron** Paved Kv= 20.3 fps
0.4	33	0.0424	1.44		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
76.8	407	0.0002	0.09	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
86.5	1,058	Total			

Subcatchment N7: DA-N7



Summary for Subcatchment N8: DA-N8

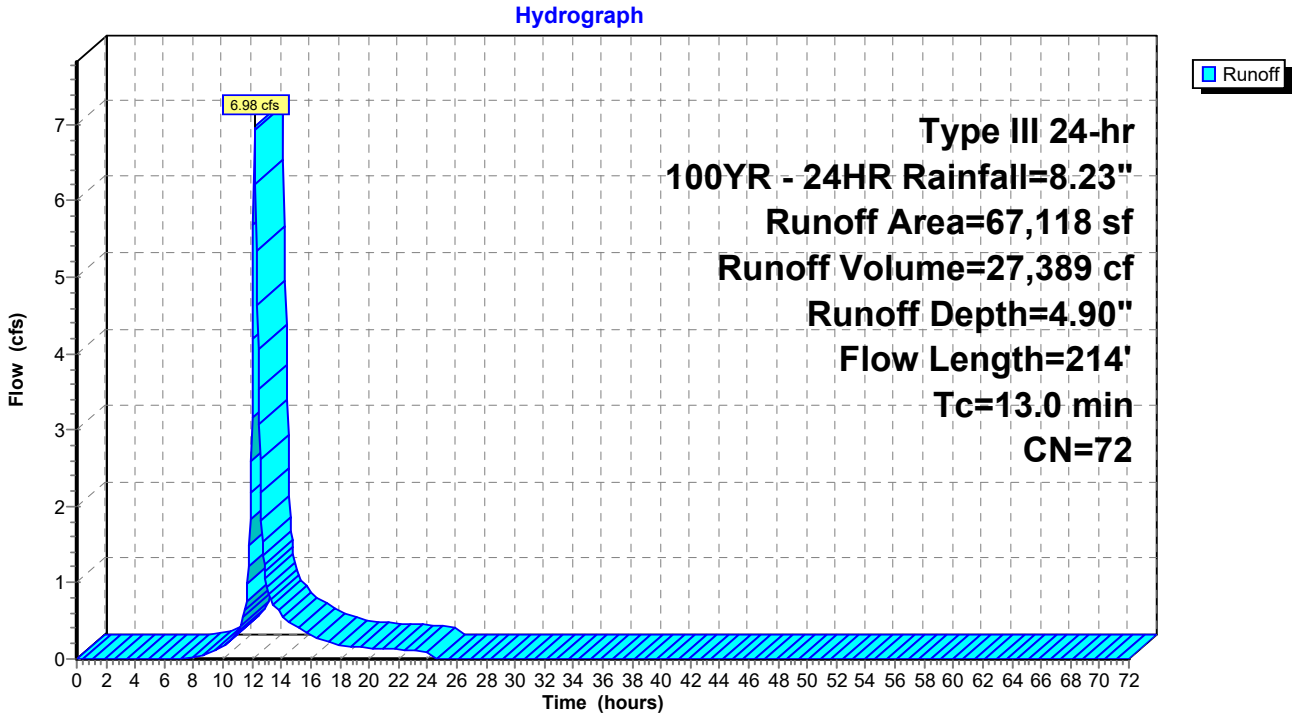
Runoff = 6.98 cfs @ 12.18 hrs, Volume= 27,389 cf, Depth= 4.90"
Routed to Pond P7 : Pond 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
43,882	58	Meadow, non-grazed, HSG B
23,236	98	Paved parking, HSG B
67,118	72	Weighted Average
43,882		65.38% Pervious Area
23,236		34.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.5	30	0.0133	0.93		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
11.0	112	0.0179	0.17		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
1.5	72	0.0174	0.82	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
13.0	214	Total			

Subcatchment N8: DA-N8



Summary for Subcatchment N9: DA-N9

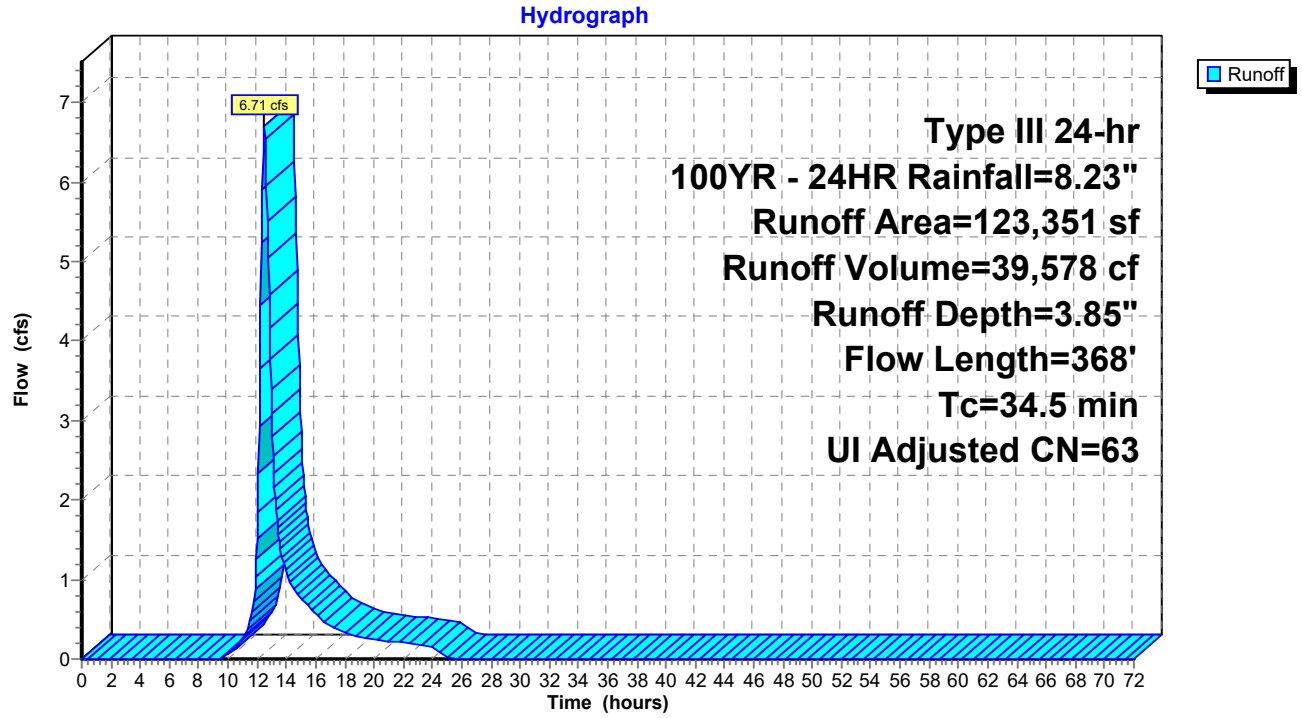
Runoff = 6.71 cfs @ 12.49 hrs, Volume= 39,578 cf, Depth= 3.85"
Routed to Pond P1 : Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
94,039	58		Meadow, non-grazed, HSG B
26,441	98		Unconnected pavement, HSG A
2,871	98		Unconnected pavement, HSG D
123,351	68	63	Weighted Average, UI Adjusted
94,039			76.24% Pervious Area
29,312			23.76% Impervious Area
29,312			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	214	0.0201	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
16.8	154	0.0006	0.15	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
34.5	368	Total			

Subcatchment N9: DA-N9



Summary for Reach 1R: WQS Segment 1

Inflow Area = 1,239,545 sf, 36.87% Impervious, Inflow Depth = 4.60" for 100YR - 24HR event
Inflow = 62.19 cfs @ 12.21 hrs, Volume= 474,799 cf
Outflow = 51.52 cfs @ 12.36 hrs, Volume= 474,799 cf, Atten= 17%, Lag= 9.1 min
Routed to Pond Cr-B : Robinson Driveway

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 11.3 min
Avg. Velocity = 0.47 fps, Avg. Travel Time= 44.7 min

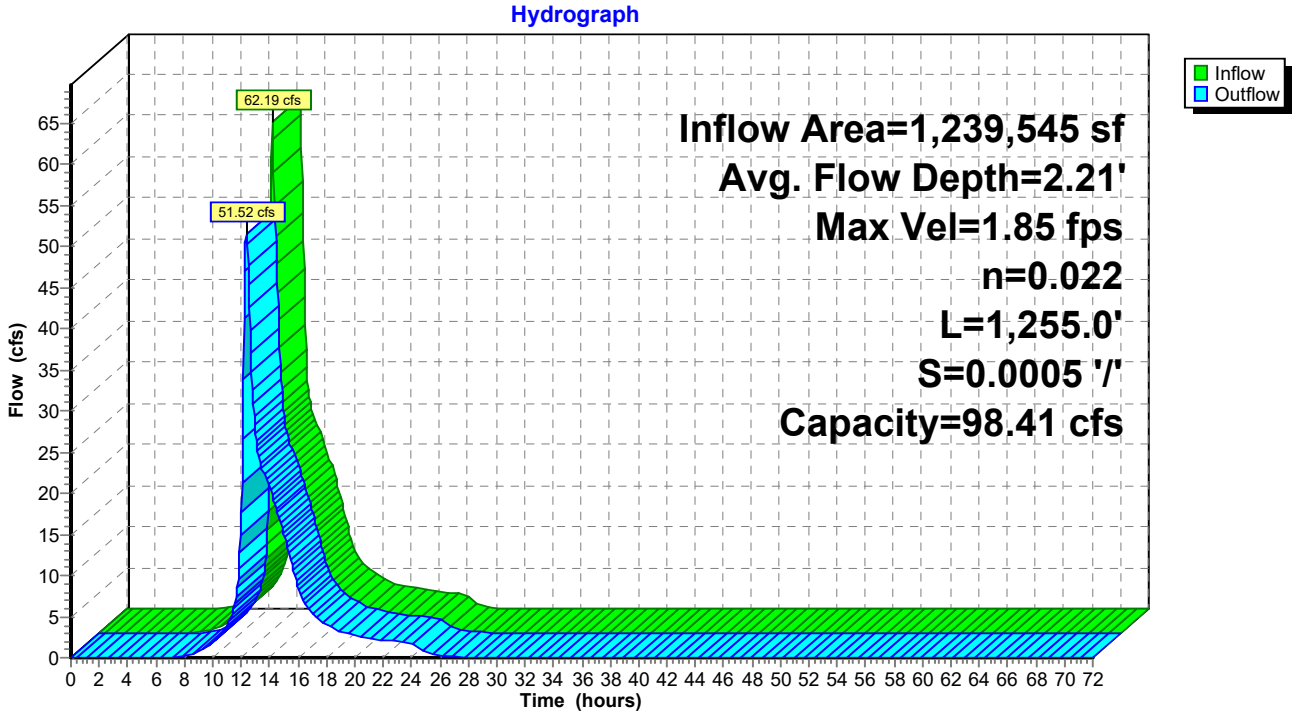
Peak Storage= 35,031 cf @ 12.36 hrs
Average Depth at Peak Storage= 2.21' , Surface Width= 19.26'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 239.23 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.41 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 1,255.0' Slope= 0.0005 '/'
Inlet Invert= 2.32', Outlet Invert= 1.72'



‡

Reach 1R: WQS Segment 1



Summary for Reach 2R: WQS Segment 2

Inflow Area = 1,605,744 sf, 40.85% Impervious, Inflow Depth = 4.93" for 100YR - 24HR event
Inflow = 89.65 cfs @ 12.27 hrs, Volume= 660,290 cf
Outflow = 84.60 cfs @ 12.36 hrs, Volume= 660,290 cf, Atten= 6%, Lag= 5.5 min
Routed to Pond Cr-CD : Utility Crossing

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.12 fps, Min. Travel Time= 6.0 min
Avg. Velocity = 0.51 fps, Avg. Travel Time= 25.0 min

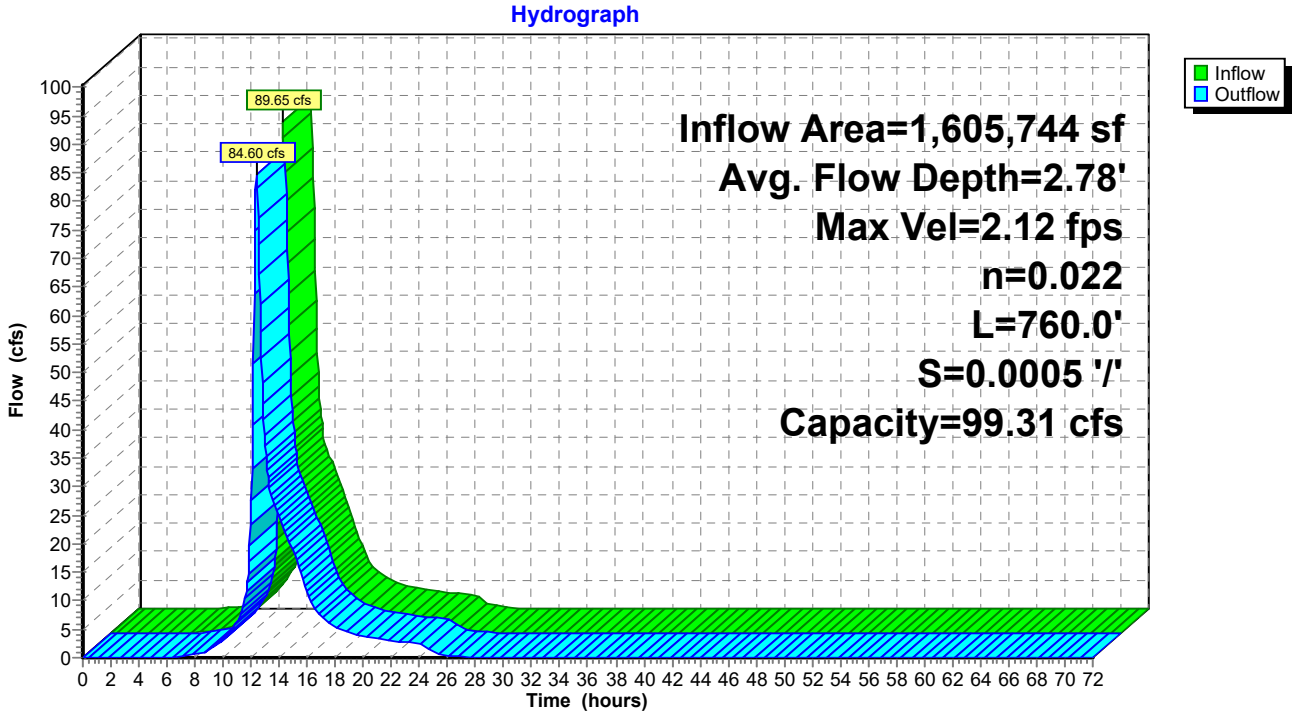
Peak Storage= 30,374 cf @ 12.36 hrs
Average Depth at Peak Storage= 2.78' , Surface Width= 22.71'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 241.41 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 99.31 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 760.0' Slope= 0.0005 '/'
Inlet Invert= 1.70', Outlet Invert= 1.33'



‡

Reach 2R: WQS Segment 2



Summary for Reach 3R: WQS Segment 3

Inflow Area = 2,225,116 sf, 36.18% Impervious, Inflow Depth = 4.69" for 100YR - 24HR event
Inflow = 116.20 cfs @ 12.35 hrs, Volume= 870,470 cf
Outflow = 108.28 cfs @ 12.43 hrs, Volume= 870,470 cf, Atten= 7%, Lag= 4.8 min
Routed to Link 3L : EAST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.23 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.44 fps, Avg. Travel Time= 23.2 min

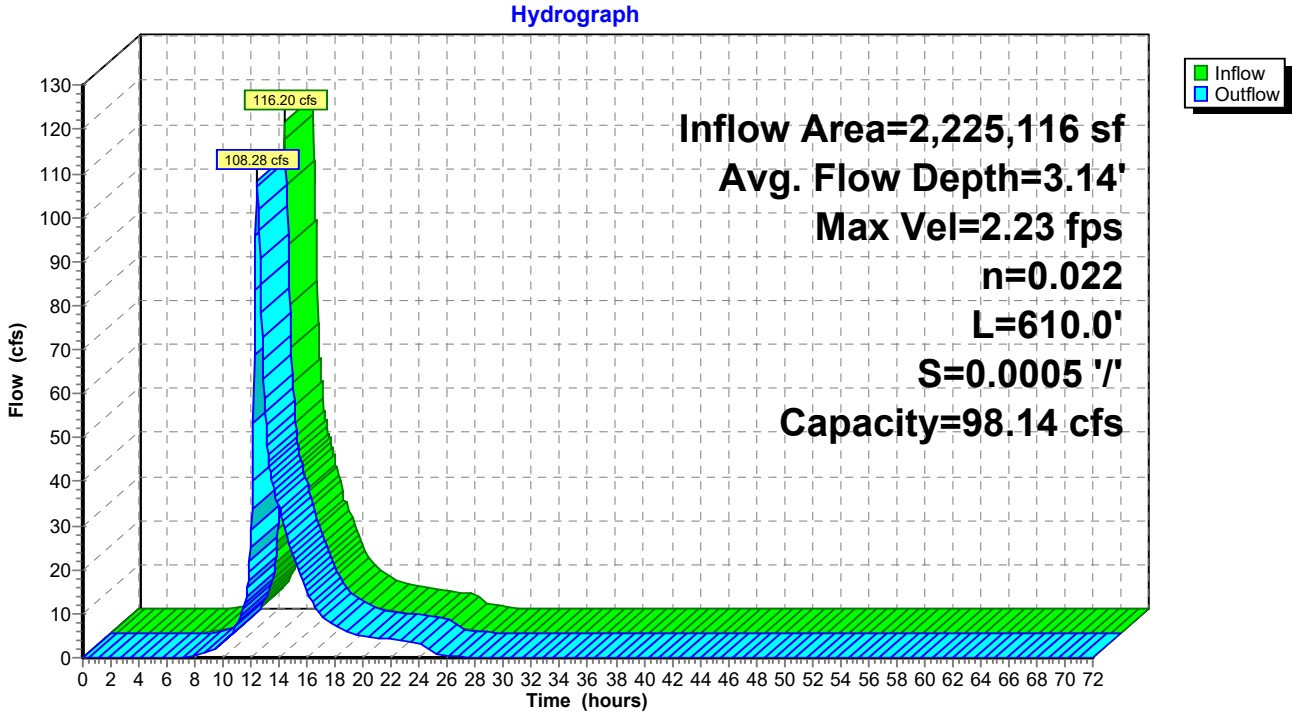
Peak Storage= 29,557 cf @ 12.43 hrs
Average Depth at Peak Storage= 3.14' , Surface Width= 24.87'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 238.55 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.14 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 610.0' Slope= 0.0005 '/'
Inlet Invert= 1.28', Outlet Invert= 0.99'



‡

Reach 3R: WQS Segment 3



Summary for Pond CB1: Exist CB

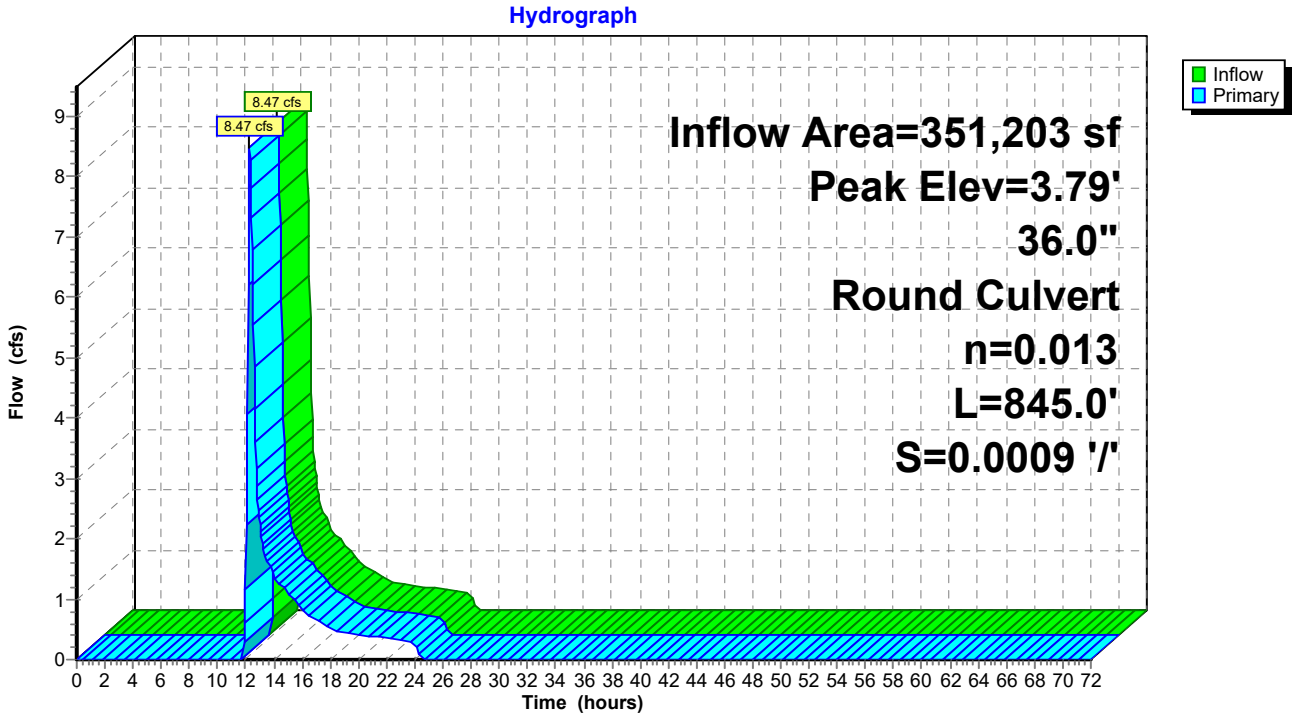
Inflow Area = 351,203 sf, 11.14% Impervious, Inflow Depth = 1.55" for 100YR - 24HR event
Inflow = 8.47 cfs @ 12.26 hrs, Volume= 45,394 cf
Outflow = 8.47 cfs @ 12.26 hrs, Volume= 45,394 cf, Atten= 0%, Lag= 0.0 min
Primary = 8.47 cfs @ 12.26 hrs, Volume= 45,394 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.79' @ 12.26 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.10'	**36.0" Round Culvert** L= 845.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 2.10' / 1.32' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf

Primary OutFlow Max=8.40 cfs @ 12.26 hrs HW=3.78' (Free Discharge)
1=Culvert (Barrel Controls 8.40 cfs @ 2.98 fps)

Pond CB1: Exist CB



Summary for Pond CB10: Exist CB

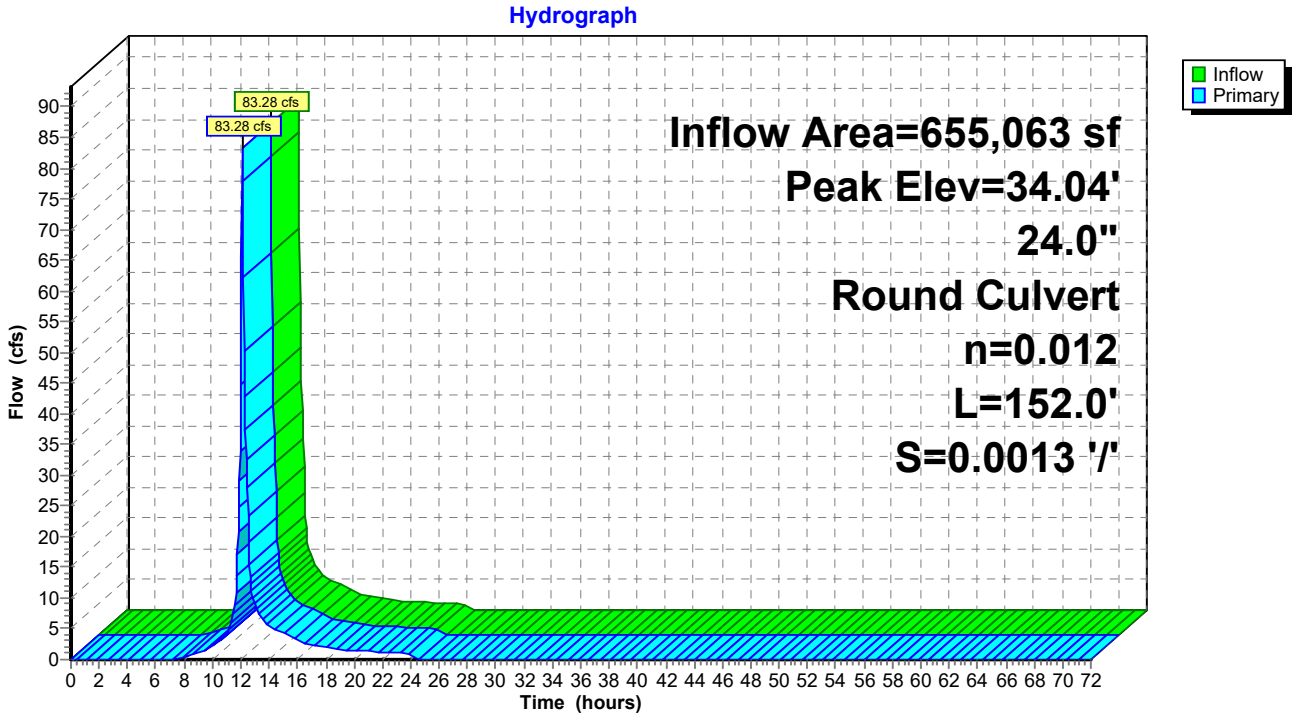
Inflow Area = 655,063 sf, 35.70% Impervious, Inflow Depth = 5.16" for 100YR - 24HR event
Inflow = 83.28 cfs @ 12.11 hrs, Volume= 281,662 cf
Outflow = 83.28 cfs @ 12.11 hrs, Volume= 281,662 cf, Atten= 0%, Lag= 0.0 min
Primary = 83.28 cfs @ 12.11 hrs, Volume= 281,662 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 34.04' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.62'	**24.0" Round Culvert** L= 152.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -1.62' / -1.82' S= 0.0013 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=81.14 cfs @ 12.11 hrs HW=32.44' (Free Discharge)
1=Culvert (Barrel Controls 81.14 cfs @ 25.83 fps)

Pond CB10: Exist CB



Summary for Pond CB11: Exist CB

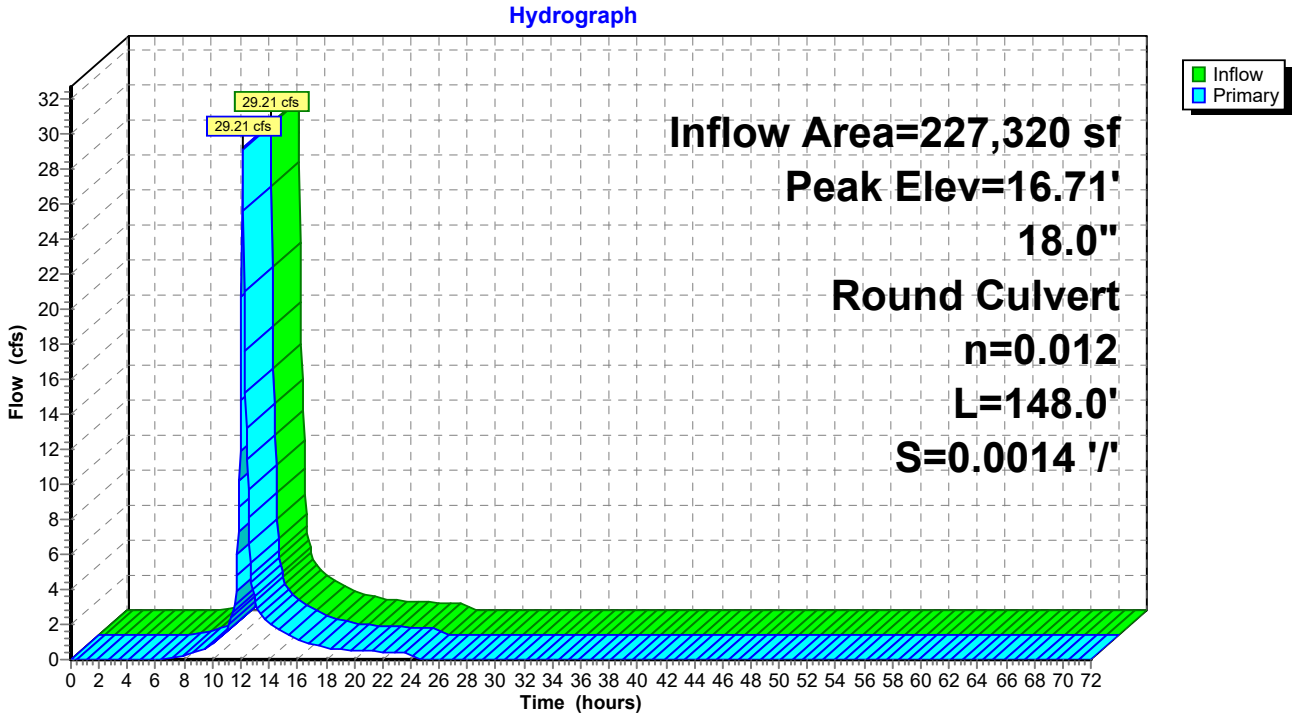
Inflow Area = 227,320 sf, 45.94% Impervious, Inflow Depth = 5.60" for 100YR - 24HR event
Inflow = 29.21 cfs @ 12.14 hrs, Volume= 106,159 cf
Outflow = 29.21 cfs @ 12.14 hrs, Volume= 106,159 cf, Atten= 0%, Lag= 0.0 min
Primary = 29.21 cfs @ 12.14 hrs, Volume= 106,159 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 16.71' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.73'	**18.0" Round RCP_Round 18"** L= 148.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.73' / -0.93' S= 0.0014 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=28.87 cfs @ 12.14 hrs HW=16.34' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 28.87 cfs @ 16.34 fps)

Pond CB11: Exist CB



Summary for Pond CB2: Exist CB

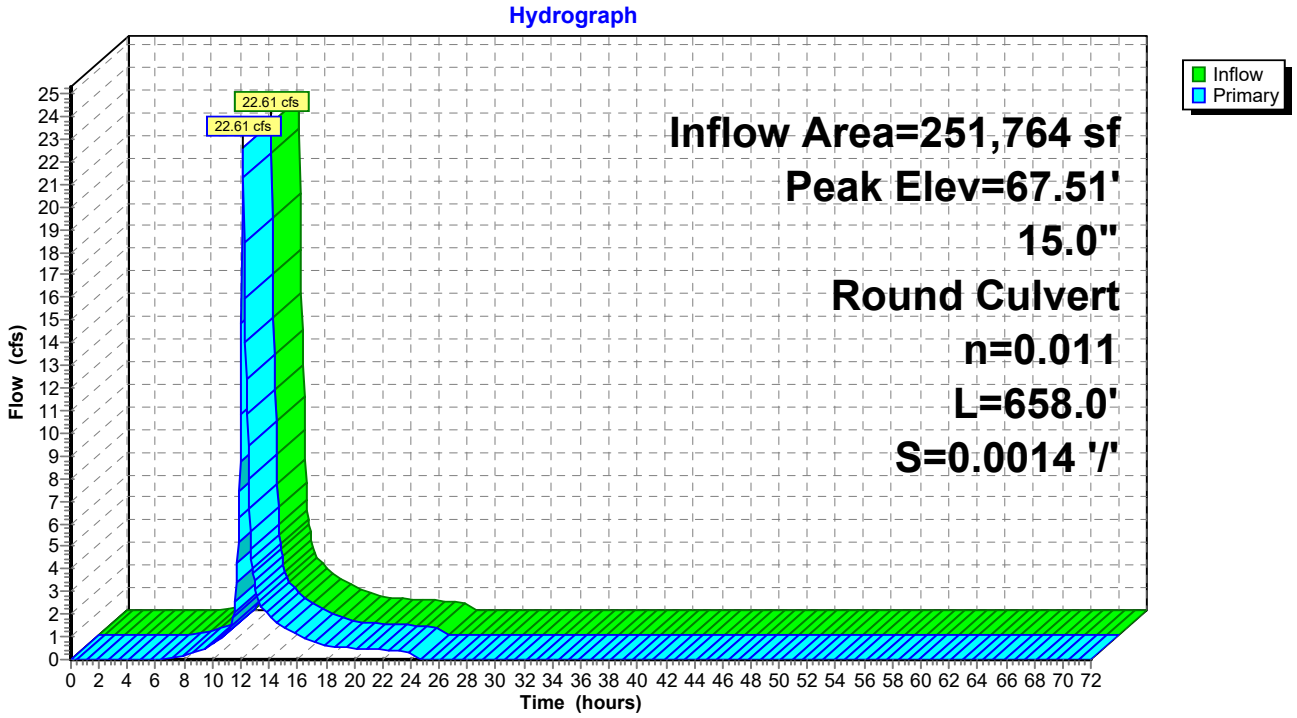
Inflow Area = 251,764 sf, 39.34% Impervious, Inflow Depth = 4.34" for 100YR - 24HR event
Inflow = 22.61 cfs @ 12.16 hrs, Volume= 91,112 cf
Outflow = 22.61 cfs @ 12.16 hrs, Volume= 91,112 cf, Atten= 0%, Lag= 0.0 min
Primary = 22.61 cfs @ 12.16 hrs, Volume= 91,112 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 67.51' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.40'	**15.0" Round Culvert** L= 658.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.40' / 0.50' S= 0.0014 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=22.33 cfs @ 12.16 hrs HW=65.96' (Free Discharge)
1=Culvert (Barrel Controls 22.33 cfs @ 18.20 fps)

Pond CB2: Exist CB



Summary for Pond CB3: Exist CB

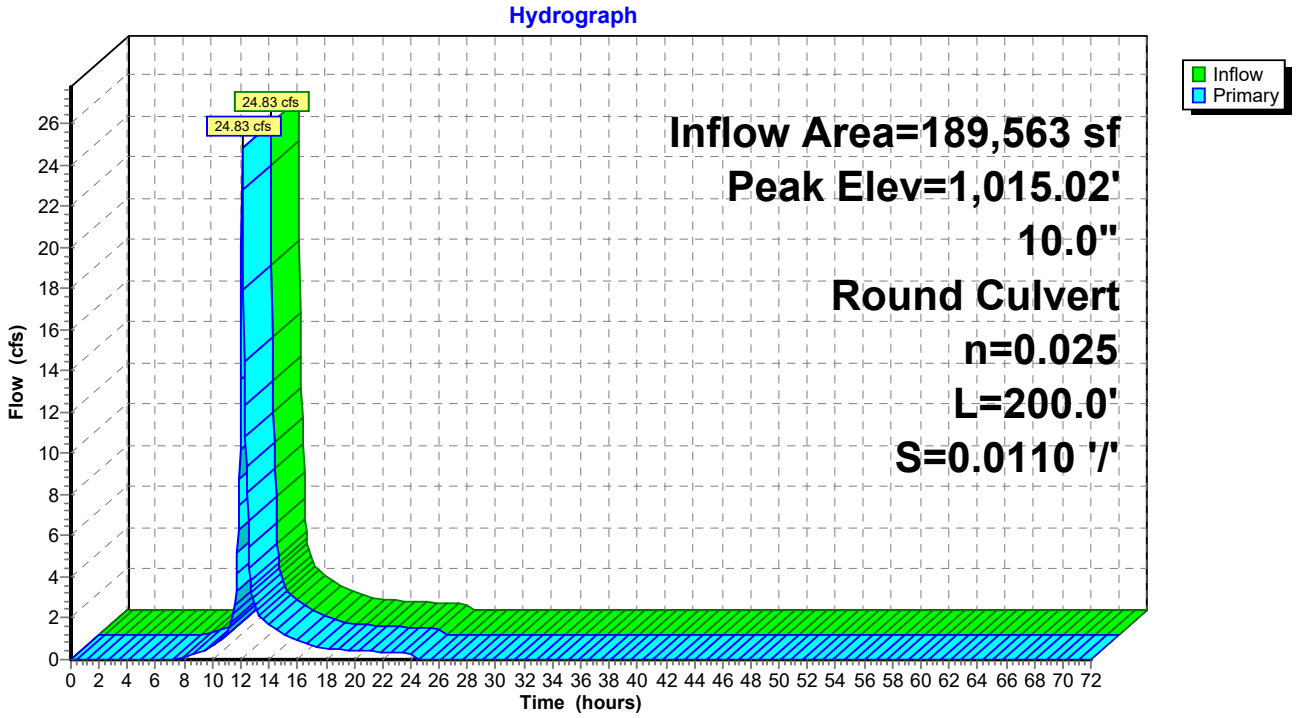
Inflow Area = 189,563 sf, 36.68% Impervious, Inflow Depth = 5.25" for 100YR - 24HR event
Inflow = 24.83 cfs @ 12.11 hrs, Volume= 82,929 cf
Outflow = 24.83 cfs @ 12.11 hrs, Volume= 82,929 cf, Atten= 0%, Lag= 0.0 min
Primary = 24.83 cfs @ 12.11 hrs, Volume= 82,929 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1,015.02' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.14'	**10.0" Round CMP_Round 10"** L= 200.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 4.14' / 1.94' S= 0.0110 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.55 sf

Primary OutFlow Max=24.30 cfs @ 12.11 hrs HW=974.40' (Free Discharge)
1=CMP_Round 10" (Barrel Controls 24.30 cfs @ 44.56 fps)

Pond CB3: Exist CB



Summary for Pond CB4: Exist CB

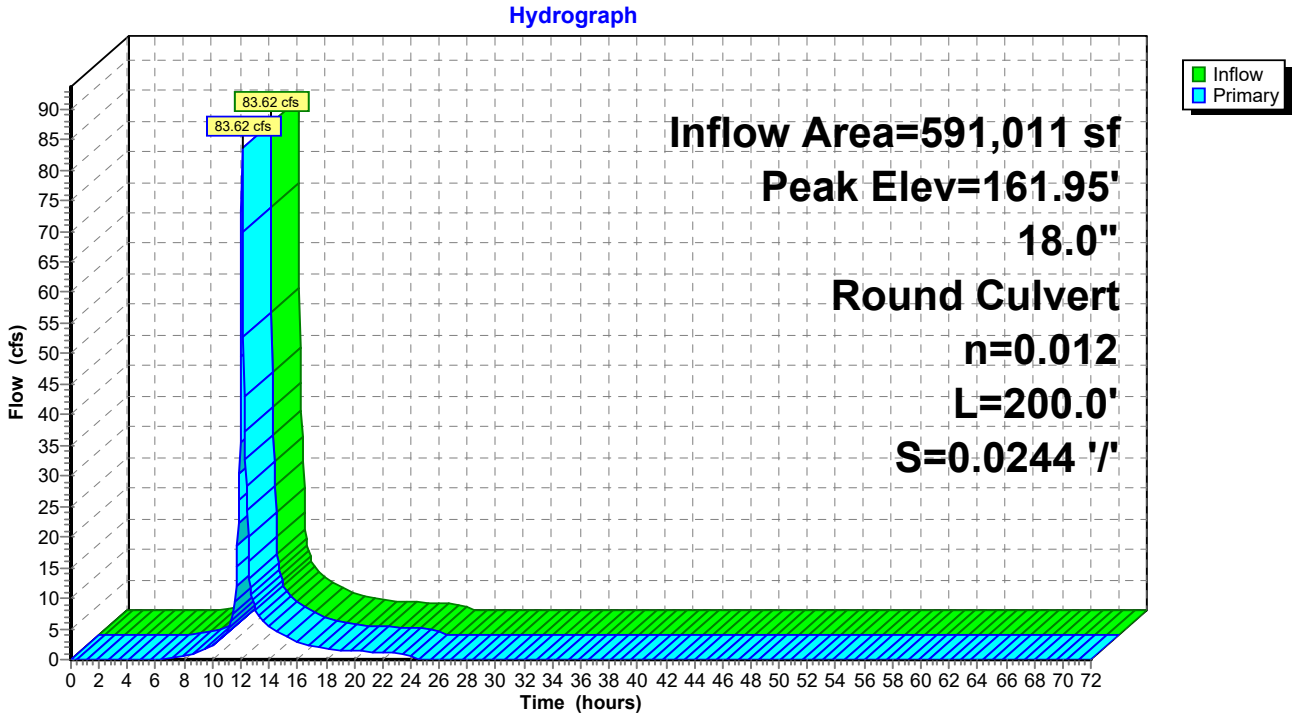
Inflow Area = 591,011 sf, 44.08% Impervious, Inflow Depth = 5.49" for 100YR - 24HR event
Inflow = 83.62 cfs @ 12.10 hrs, Volume= 270,178 cf
Outflow = 83.62 cfs @ 12.10 hrs, Volume= 270,178 cf, Atten= 0%, Lag= 0.0 min
Primary = 83.62 cfs @ 12.10 hrs, Volume= 270,178 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 161.95' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.89'	**18.0" Round RCP_Round 18"** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.89' / 0.00' S= 0.0244 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=82.87 cfs @ 12.10 hrs HW=159.14' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 82.87 cfs @ 46.89 fps)

Pond CB4: Exist CB



Summary for Pond CB5: Exist CB

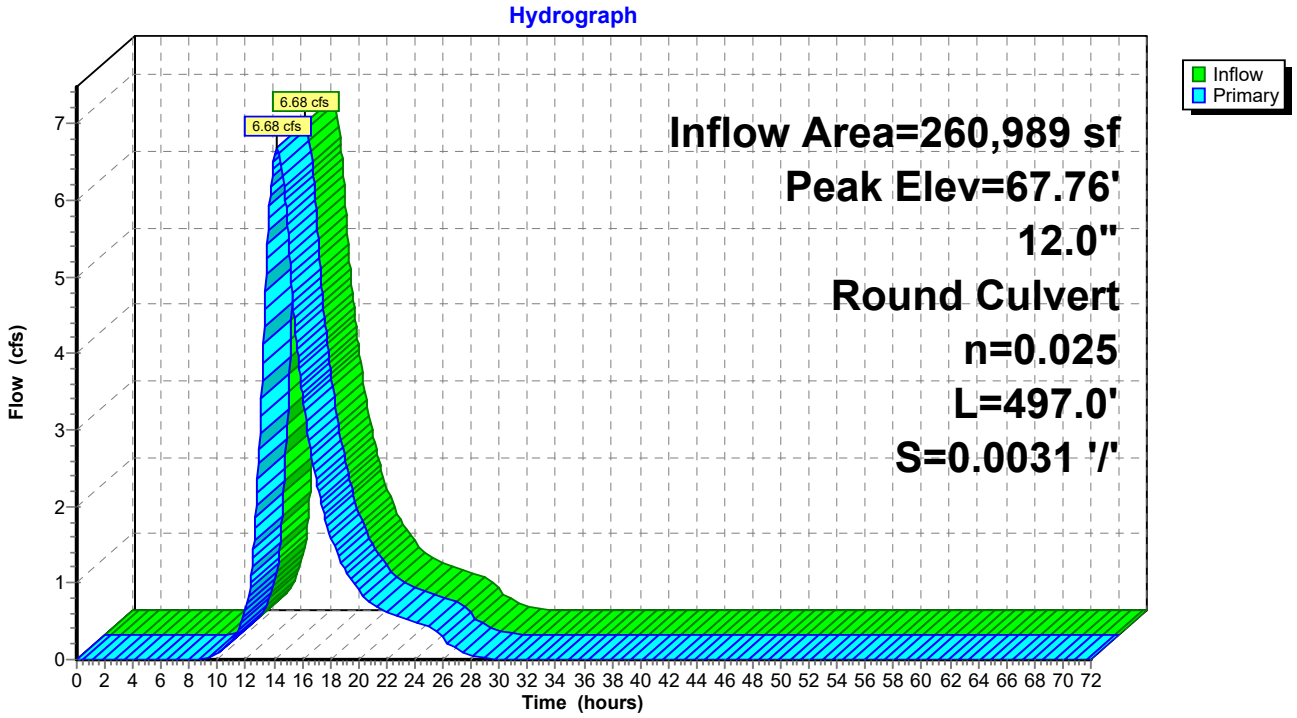
Inflow Area = 260,989 sf, 33.14% Impervious, Inflow Depth = 4.78" for 100YR - 24HR event
Inflow = 6.68 cfs @ 14.24 hrs, Volume= 103,952 cf
Outflow = 6.68 cfs @ 14.24 hrs, Volume= 103,952 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.68 cfs @ 14.24 hrs, Volume= 103,952 cf
Routed to Pond MH1 : Exist MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 67.76' @ 14.24 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.30'	**12.0" Round CMP_Round 12"** L= 497.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1.30' / -0.25' S= 0.0031 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=6.68 cfs @ 14.24 hrs HW=67.69' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 6.68 cfs @ 8.50 fps)

Pond CB5: Exist CB



Summary for Pond CB6: Exist CB

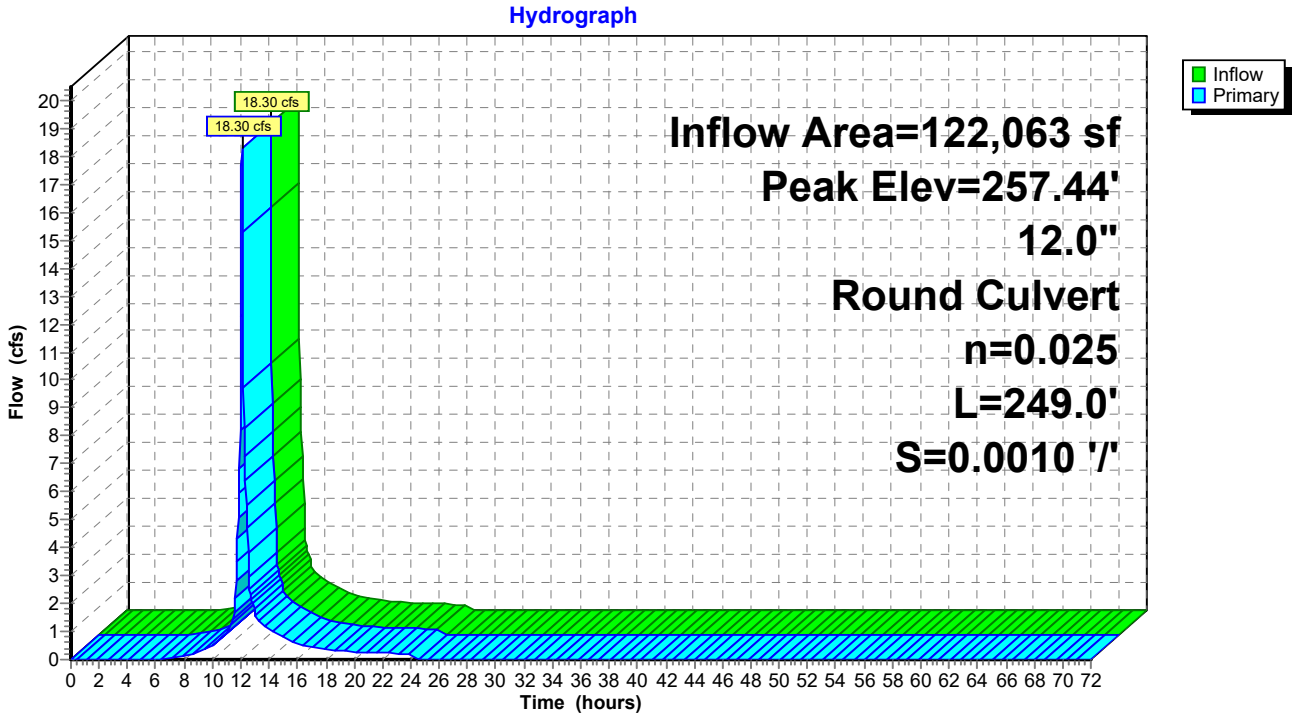
Inflow Area = 122,063 sf, 47.26% Impervious, Inflow Depth = 5.60" for 100YR - 24HR event
Inflow = 18.30 cfs @ 12.07 hrs, Volume= 57,004 cf
Outflow = 18.30 cfs @ 12.07 hrs, Volume= 57,004 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.30 cfs @ 12.07 hrs, Volume= 57,004 cf
Routed to Pond MH1 : Exist MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 257.44' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.01'	**12.0" Round CMP_Round 12"** L= 249.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.01' / -0.25' S= 0.0010 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.79 sf

Primary OutFlow Max=17.62 cfs @ 12.07 hrs HW=241.58' (Free Discharge)
1=CMP_Round 12" (Barrel Controls 17.62 cfs @ 22.44 fps)

Pond CB6: Exist CB



Summary for Pond CB7: Exist CB

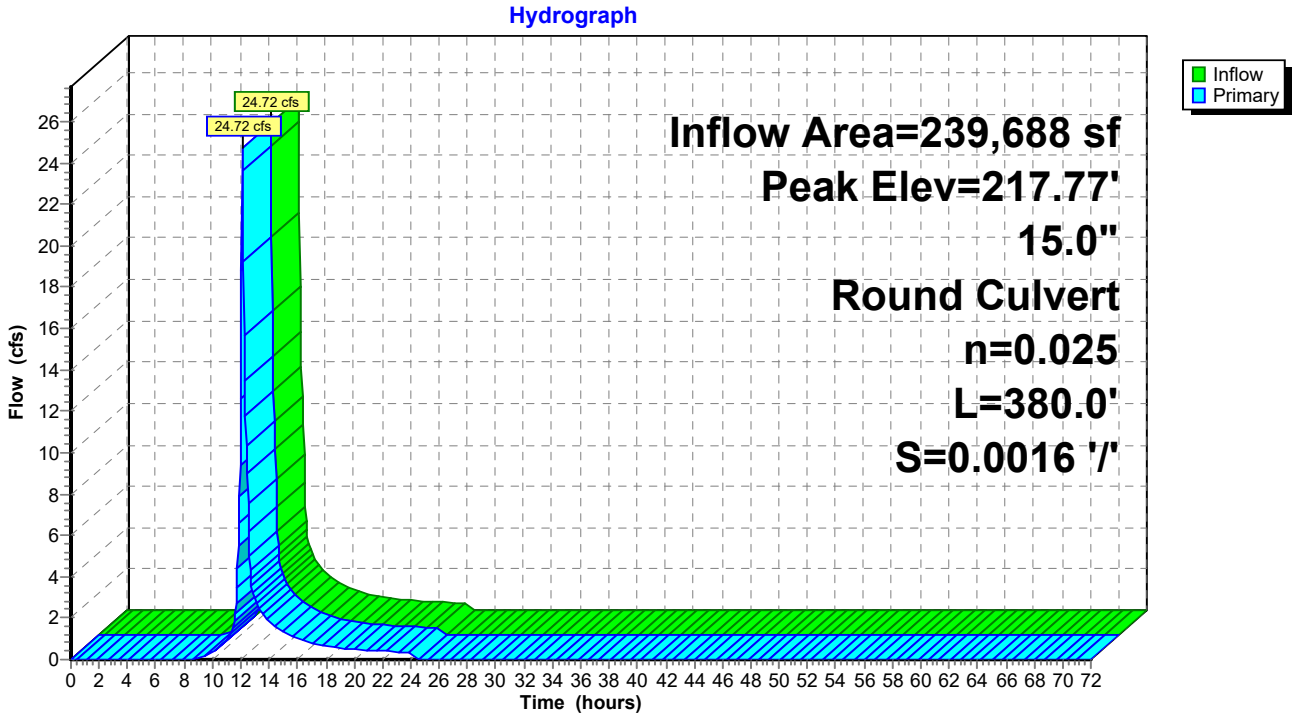
Inflow Area = 239,688 sf, 24.36% Impervious, Inflow Depth = 4.20" for 100YR - 24HR event
Inflow = 24.72 cfs @ 12.12 hrs, Volume= 83,827 cf
Outflow = 24.72 cfs @ 12.12 hrs, Volume= 83,827 cf, Atten= 0%, Lag= 0.0 min
Primary = 24.72 cfs @ 12.12 hrs, Volume= 83,827 cf
Routed to Pond CB8 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 217.77' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**15.0" Round CMP_Round 15"** L= 380.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -0.62' S= 0.0016 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=24.00 cfs @ 12.12 hrs HW=206.47' (Free Discharge)
1=CMP_Round 15" (Barrel Controls 24.00 cfs @ 19.55 fps)

Pond CB7: Exist CB



Summary for Pond CB8: Exist CB

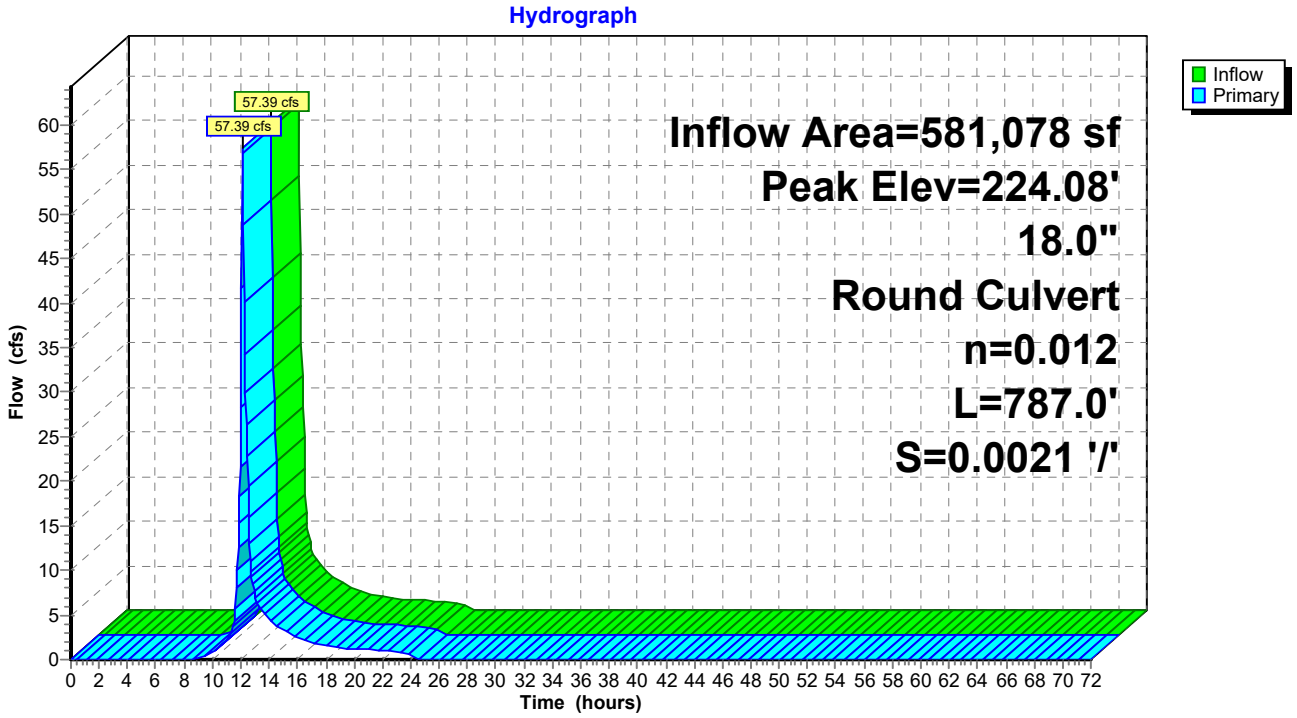
Inflow Area = 581,078 sf, 26.18% Impervious, Inflow Depth = 4.20" for 100YR - 24HR event
Inflow = 57.39 cfs @ 12.13 hrs, Volume= 203,223 cf
Outflow = 57.39 cfs @ 12.13 hrs, Volume= 203,223 cf, Atten= 0%, Lag= 0.0 min
Primary = 57.39 cfs @ 12.13 hrs, Volume= 203,223 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 224.08' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.72'	**18.0" Round RCP_Round 18"** L= 787.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.72' / -2.37' S= 0.0021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=56.31 cfs @ 12.13 hrs HW=216.15' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 56.31 cfs @ 31.87 fps)

Pond CB8: Exist CB



Summary for Pond CB9: Exist CB

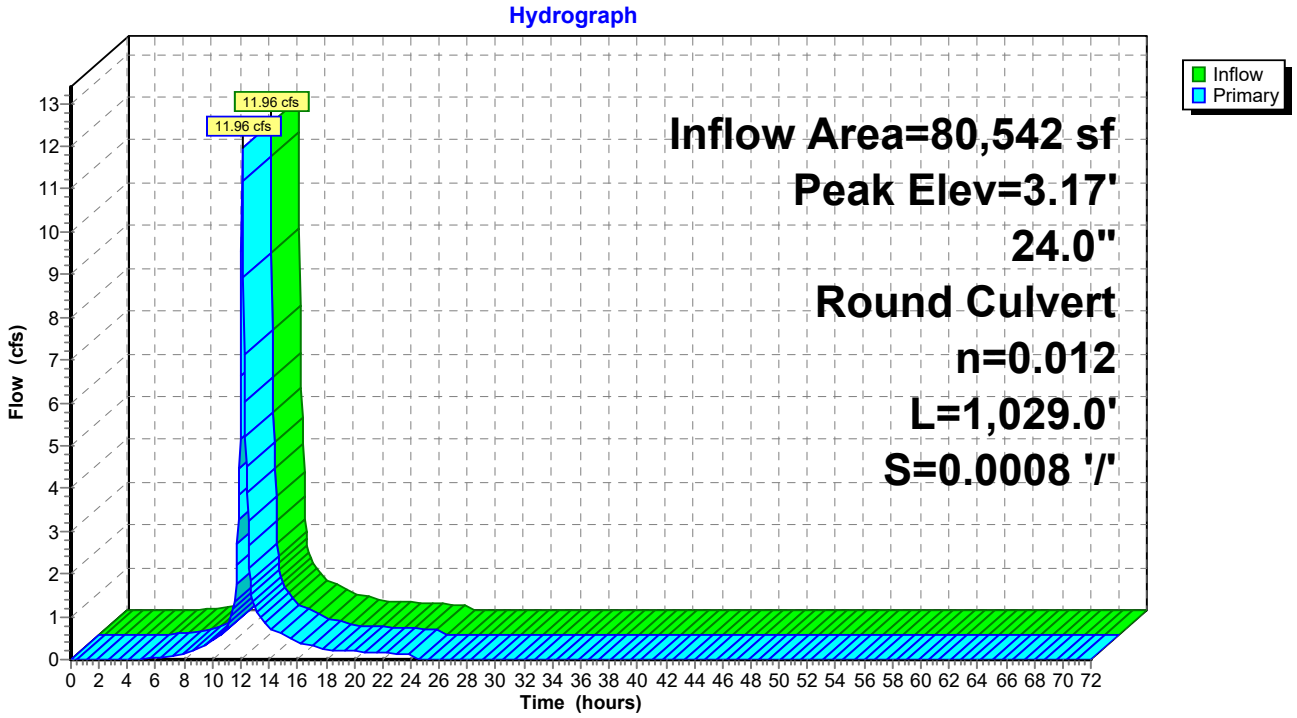
Inflow Area = 80,542 sf, 58.79% Impervious, Inflow Depth = 6.20" for 100YR - 24HR event
Inflow = 11.96 cfs @ 12.11 hrs, Volume= 41,595 cf
Outflow = 11.96 cfs @ 12.11 hrs, Volume= 41,595 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.96 cfs @ 12.11 hrs, Volume= 41,595 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.17' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.77'	**24.0" Round Culvert** L= 1,029.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.77' / -1.62' S= 0.0008 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=11.67 cfs @ 12.11 hrs HW=3.04' (Free Discharge)
1=Culvert (Barrel Controls 11.67 cfs @ 3.71 fps)

Pond CB9: Exist CB



Summary for Pond Cr-B: Robinson Driveway

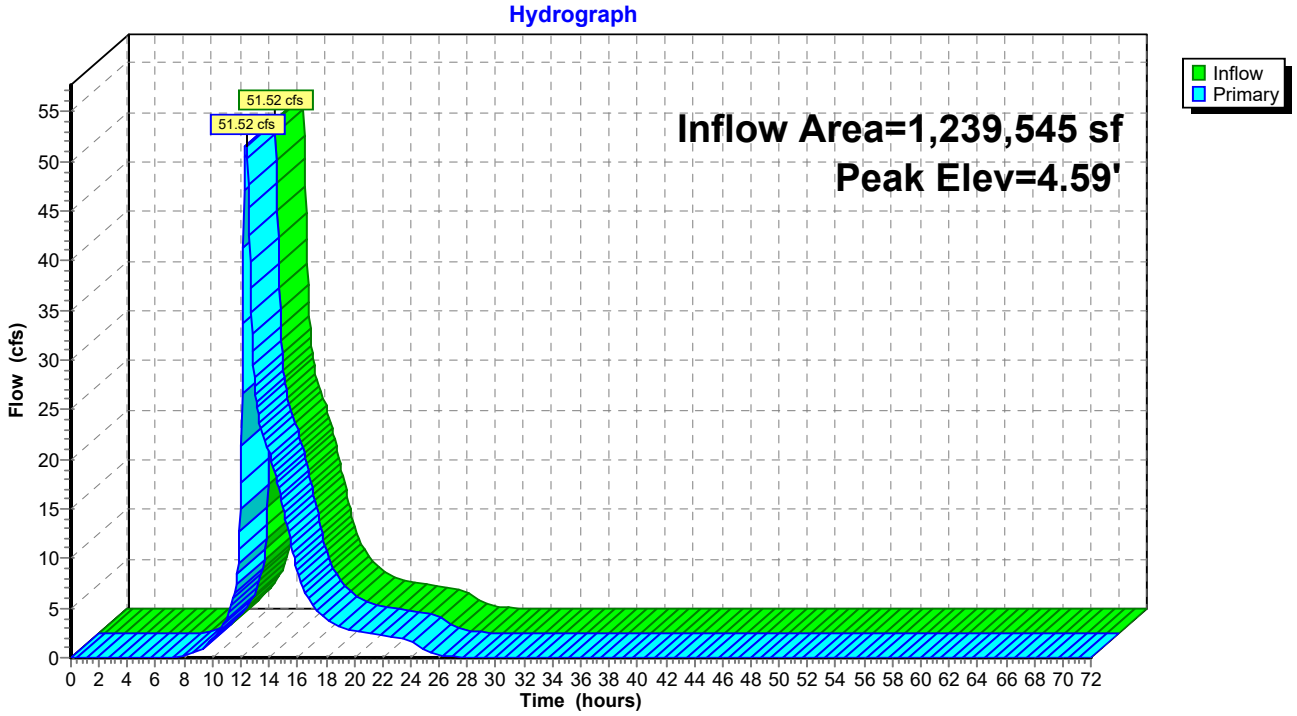
Inflow Area = 1,239,545 sf, 36.87% Impervious, Inflow Depth = 4.60" for 100YR - 24HR event
Inflow = 51.52 cfs @ 12.36 hrs, Volume= 474,799 cf
Outflow = 51.52 cfs @ 12.36 hrs, Volume= 474,799 cf, Atten= 0%, Lag= 0.0 min
Primary = 51.52 cfs @ 12.36 hrs, Volume= 474,799 cf
Routed to Reach 2R : WQS Segment 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.59' @ 12.36 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=51.40 cfs @ 12.36 hrs HW=4.59' (Free Discharge)
- **1=RCP_Round 24"** (Barrel Controls 17.13 cfs @ 5.45 fps)
- **2=RCP_Round 24"** (Barrel Controls 17.13 cfs @ 5.45 fps)
- **3=RCP_Round 24"** (Barrel Controls 17.13 cfs @ 5.45 fps)

Pond Cr-B: Robinson Driveway



Summary for Pond Cr-CD: Utility Crossing

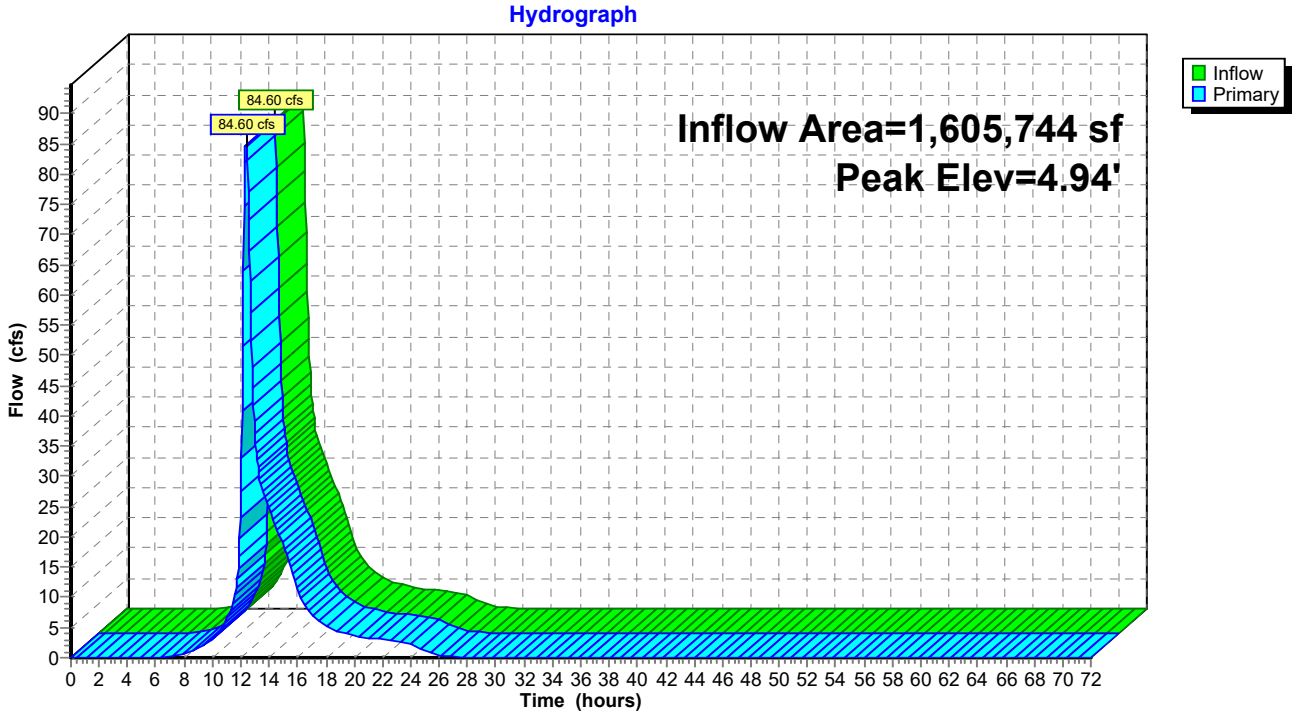
Inflow Area = 1,605,744 sf, 40.85% Impervious, Inflow Depth = 4.93" for 100YR - 24HR event
Inflow = 84.60 cfs @ 12.36 hrs, Volume= 660,290 cf
Outflow = 84.60 cfs @ 12.36 hrs, Volume= 660,290 cf, Atten= 0%, Lag= 0.0 min
Primary = 84.60 cfs @ 12.36 hrs, Volume= 660,290 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.94' @ 12.36 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#3	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=84.27 cfs @ 12.36 hrs HW=4.93' (Free Discharge)
- **1=RCP_Round 30"** (Barrel Controls 28.09 cfs @ 5.72 fps)
- **2=RCP_Round 30"** (Barrel Controls 28.09 cfs @ 5.72 fps)
- **3=RCP_Round 30"** (Barrel Controls 28.09 cfs @ 5.72 fps)

Pond Cr-CD: Utility Crossing



Summary for Pond MH1: Exist MH

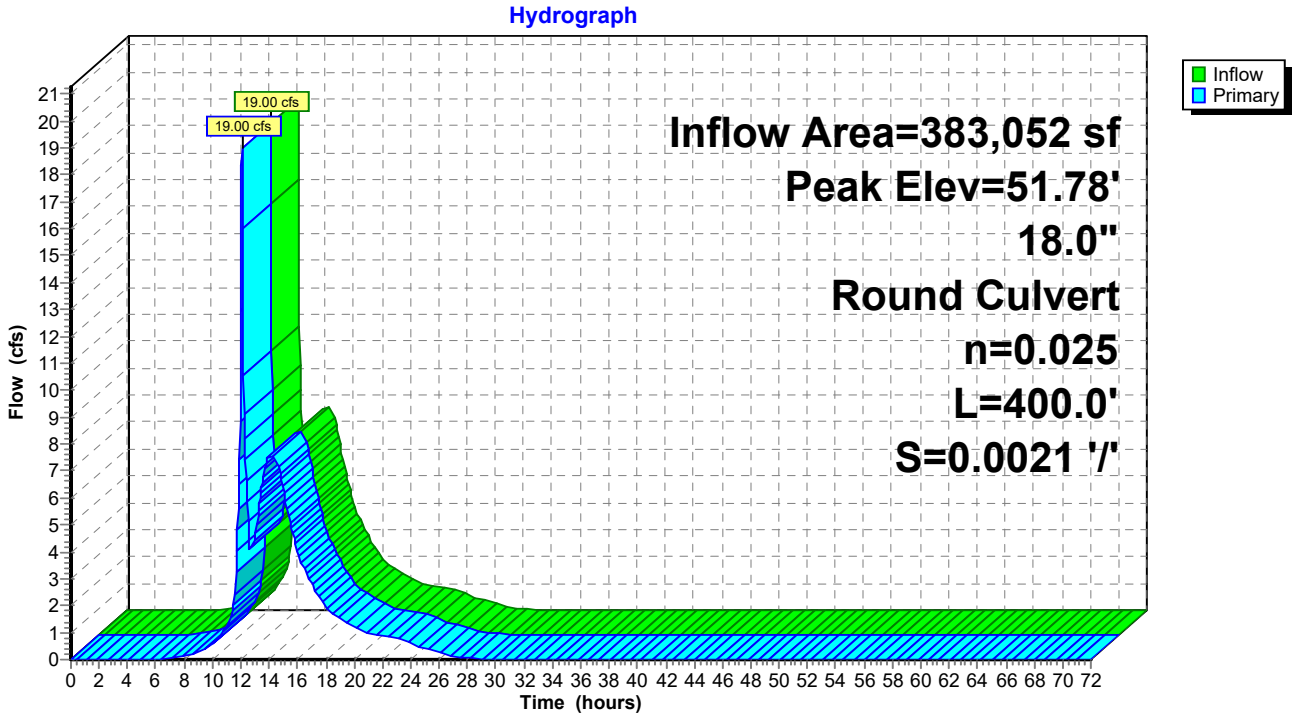
Inflow Area = 383,052 sf, 37.64% Impervious, Inflow Depth = 5.04" for 100YR - 24HR event
Inflow = 19.00 cfs @ 12.07 hrs, Volume= 160,956 cf
Outflow = 19.00 cfs @ 12.07 hrs, Volume= 160,956 cf, Atten= 0%, Lag= 0.0 min
Primary = 19.00 cfs @ 12.07 hrs, Volume= 160,956 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 51.78' @ 12.07 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.25'	**18.0" Round CMP_Round 18"** L= 400.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= -0.25' / -1.09' S= 0.0021 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.77 sf

Primary OutFlow Max=18.32 cfs @ 12.07 hrs HW=48.71' (Free Discharge)
1=CMP_Round 18" (Barrel Controls 18.32 cfs @ 10.37 fps)

Pond MH1: Exist MH



Summary for Pond P1: Pond 1

Inflow Area = 651,203 sf, 47.97% Impervious, Inflow Depth = 4.94" for 100YR - 24HR event
Inflow = 19.00 cfs @ 12.64 hrs, Volume= 268,336 cf
Outflow = 17.61 cfs @ 13.28 hrs, Volume= 268,336 cf, Atten= 7%, Lag= 38.7 min
Discarded = 1.52 cfs @ 13.28 hrs, Volume= 28,474 cf
Primary = 16.09 cfs @ 13.28 hrs, Volume= 239,862 cf
Routed to Pond P10 : Wetland Ditch

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.78' @ 13.28 hrs Surf.Area= 27,933 sf Storage= 18,039 cf

Plug-Flow detention time= 14.4 min calculated for 268,336 cf (100% of inflow)
Center-of-Mass det. time= 14.4 min (884.5 - 870.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2.40'	69,114 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

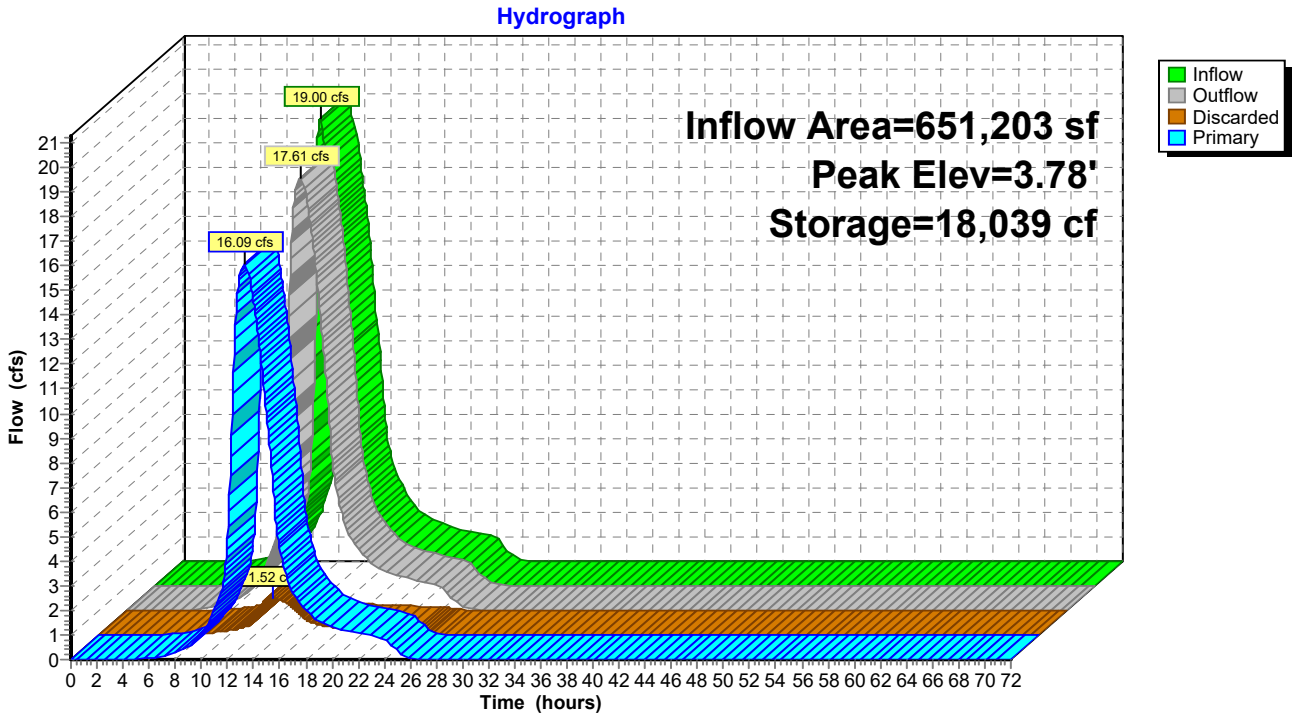
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.40	0	0.0	0	0	0
2.50	1,116	311.0	37	37	7,697
3.00	11,546	598.0	2,709	2,746	28,458
3.50	22,069	715.0	8,263	11,009	40,688
4.00	32,945	769.0	13,663	24,672	47,075
4.50	44,009	867.0	19,172	43,844	59,841
5.00	57,369	999.0	25,271	69,114	79,447

Device	Routing	Invert	Outlet Devices
#1	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#4	Discarded	2.40'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.30'

Discarded OutFlow Max=1.52 cfs @ 13.28 hrs HW=3.78' (Free Discharge)
└**4=Exfiltration** (Controls 1.52 cfs)

Primary OutFlow Max=16.09 cfs @ 13.28 hrs HW=3.78' (Free Discharge)
├**1=Culvert** (Barrel Controls 5.36 cfs @ 3.61 fps)
├**2=Culvert** (Barrel Controls 5.36 cfs @ 3.61 fps)
└**3=Culvert** (Barrel Controls 5.36 cfs @ 3.61 fps)

Pond P1: Pond 1



Summary for Pond P10: Wetland Ditch

Inflow Area = 827,347 sf, 40.98% Impervious, Inflow Depth = 4.62" for 100YR - 24HR event
Inflow = 26.77 cfs @ 12.22 hrs, Volume= 318,652 cf
Outflow = 24.82 cfs @ 12.32 hrs, Volume= 318,652 cf, Atten= 7%, Lag= 6.0 min
Primary = 24.82 cfs @ 12.32 hrs, Volume= 318,652 cf
Routed to Reach 1R : WQS Segment 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.15' @ 12.32 hrs Surf.Area= 9,837 sf Storage= 6,289 cf

Plug-Flow detention time= 4.9 min calculated for 318,652 cf (100% of inflow)
Center-of-Mass det. time= 4.9 min (871.5 - 866.6)

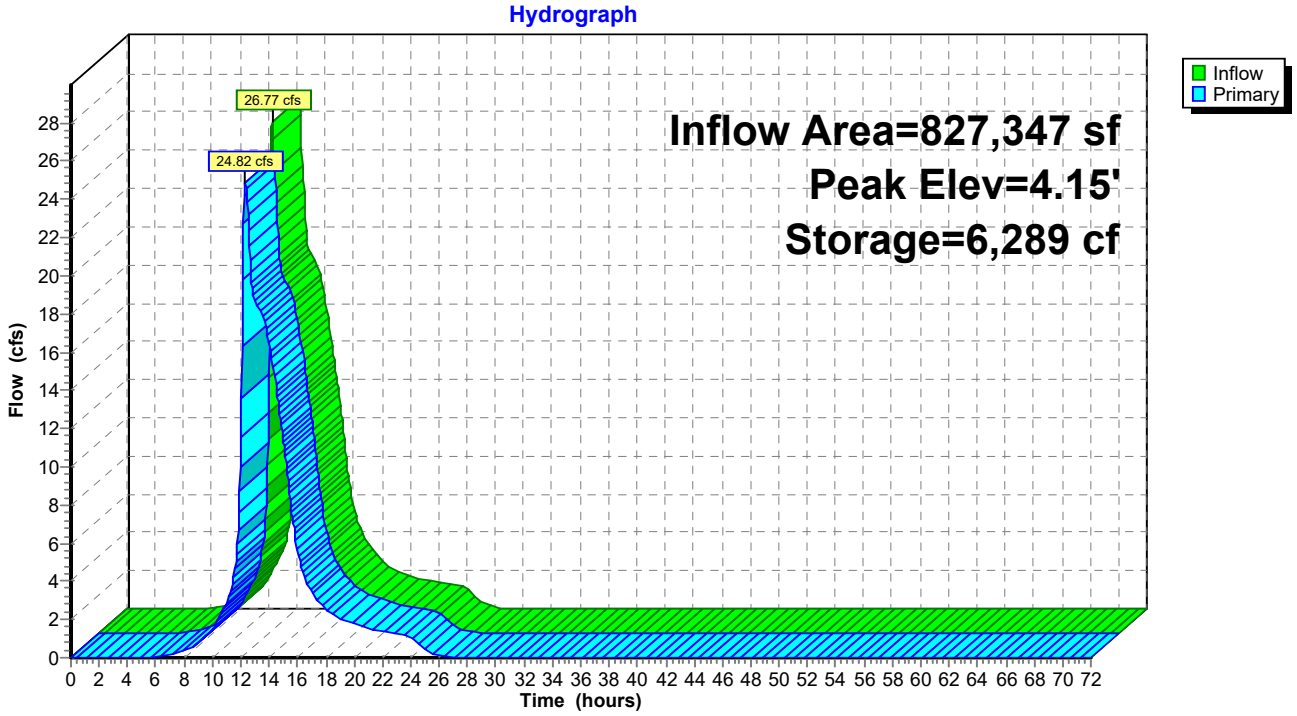
Volume	Invert	Avail.Storage	Storage Description
#1	2.33'	34,944 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.33	0	0.0	0	0	0
2.50	2,079	556.0	118	118	24,600
3.00	2,792	564.0	1,213	1,331	25,366
3.50	3,765	606.0	1,633	2,964	29,288
4.00	5,218	646.0	2,236	5,200	33,285
4.50	26,868	1,785.0	7,321	12,521	253,629
5.00	65,665	1,908.0	22,423	34,944	289,788

Device	Routing	Invert	Outlet Devices
#1	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf

Primary OutFlow Max=24.75 cfs @ 12.32 hrs HW=4.14' (Free Discharge)
- **1=RCP_Round 21"** (Barrel Controls 8.25 cfs @ 4.11 fps)
- **2=RCP_Round 21"** (Barrel Controls 8.25 cfs @ 4.11 fps)
- **3=RCP_Round 21"** (Barrel Controls 8.25 cfs @ 4.11 fps)

Pond P10: Wetland Ditch



Summary for Pond P2: Pond 2

Inflow Area = 80,876 sf, 37.79% Impervious, Inflow Depth = 5.01" for 100YR - 24HR event
Inflow = 7.88 cfs @ 12.23 hrs, Volume= 33,795 cf
Outflow = 3.75 cfs @ 12.56 hrs, Volume= 33,795 cf, Atten= 52%, Lag= 19.8 min
Discarded = 0.55 cfs @ 12.56 hrs, Volume= 2,769 cf
Primary = 3.19 cfs @ 12.56 hrs, Volume= 31,025 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.71' @ 12.56 hrs Surf.Area= 17,911 sf Storage= 6,306 cf

Plug-Flow detention time= 12.1 min calculated for 33,771 cf (100% of inflow)
Center-of-Mass det. time= 12.1 min (839.2 - 827.1)

Volume	Invert	Avail.Storage	Storage Description
#1	3.35'	13,689 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

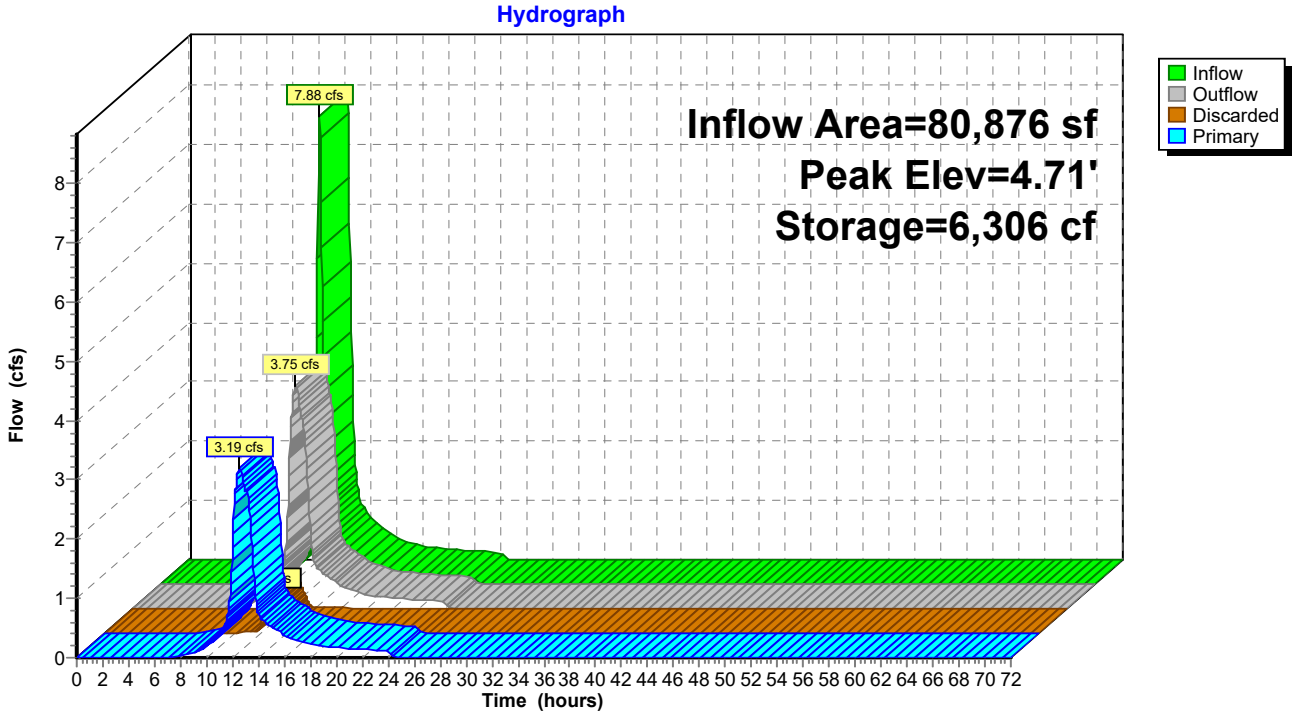
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.35	0	0.0	0	0	0
3.50	170	63.0	8	8	316
4.00	2,037	330.0	466	474	8,667
4.50	10,588	652.0	2,878	3,353	33,831
4.75	19,541	773.0	3,709	7,062	47,553
5.00	34,152	971.0	6,627	13,689	75,033

Device	Routing	Invert	Outlet Devices
#1	Primary	3.35'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 133.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.35' / 3.25' S= 0.0008 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.35'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.55 cfs @ 12.56 hrs HW=4.71' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.55 cfs)

Primary OutFlow Max=3.19 cfs @ 12.56 hrs HW=4.71' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.19 cfs @ 2.93 fps)

Pond P2: Pond 2



Summary for Pond P3: Pond 3

Inflow Area = 446,976 sf, 56.49% Impervious, Inflow Depth = 5.87" for 100YR - 24HR event
Inflow = 19.30 cfs @ 13.08 hrs, Volume= 218,805 cf
Outflow = 15.35 cfs @ 13.57 hrs, Volume= 218,805 cf, Atten= 20%, Lag= 29.8 min
Discarded = 1.81 cfs @ 13.57 hrs, Volume= 21,072 cf
Primary = 13.53 cfs @ 13.57 hrs, Volume= 197,733 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.57' @ 13.57 hrs Surf.Area= 35,970 sf Storage= 26,654 cf

Plug-Flow detention time= 16.3 min calculated for 218,653 cf (100% of inflow)
Center-of-Mass det. time= 16.3 min (875.2 - 858.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2.65'	46,661 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

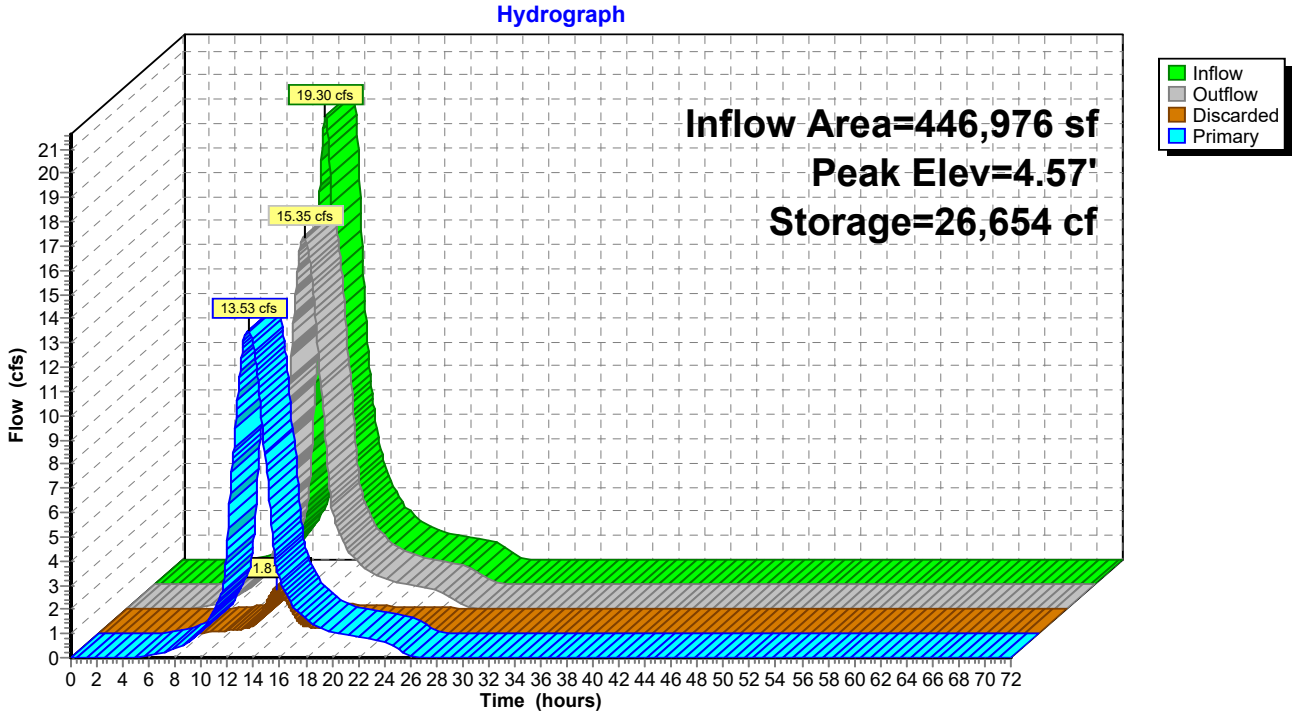
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.65	0	0.0	0	0	0
3.00	4,059	888.0	474	474	62,751
3.50	10,848	1,191.0	3,590	4,064	112,882
4.00	19,089	1,350.0	7,388	11,452	145,039
4.50	33,127	1,447.0	12,894	24,346	166,641
5.00	57,227	1,543.0	22,316	46,661	189,495

Device	Routing	Invert	Outlet Devices
#1	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#3	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#4	Discarded	2.65'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.55'

Discarded OutFlow Max=1.81 cfs @ 13.57 hrs HW=4.57' (Free Discharge)
└**4=Exfiltration** (Controls 1.81 cfs)

Primary OutFlow Max=13.53 cfs @ 13.57 hrs HW=4.57' (Free Discharge)
├**1=Culvert** (Barrel Controls 4.51 cfs @ 4.14 fps)
├**2=Culvert** (Barrel Controls 4.51 cfs @ 4.14 fps)
└**3=Culvert** (Barrel Controls 4.51 cfs @ 4.14 fps)

Pond P3: Pond 3



Summary for Pond P4: Pond 4

Inflow Area = 57,929 sf, 17.47% Impervious, Inflow Depth = 4.08" for 100YR - 24HR event
Inflow = 5.59 cfs @ 12.14 hrs, Volume= 19,701 cf
Outflow = 3.07 cfs @ 12.33 hrs, Volume= 19,701 cf, Atten= 45%, Lag= 11.8 min
Discarded = 0.24 cfs @ 12.33 hrs, Volume= 732 cf
Primary = 2.83 cfs @ 12.33 hrs, Volume= 18,969 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.38' @ 12.33 hrs Surf.Area= 7,606 sf Storage= 2,366 cf

Plug-Flow detention time= 4.7 min calculated for 19,687 cf (100% of inflow)
Center-of-Mass det. time= 4.6 min (841.6 - 836.9)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	12,438 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

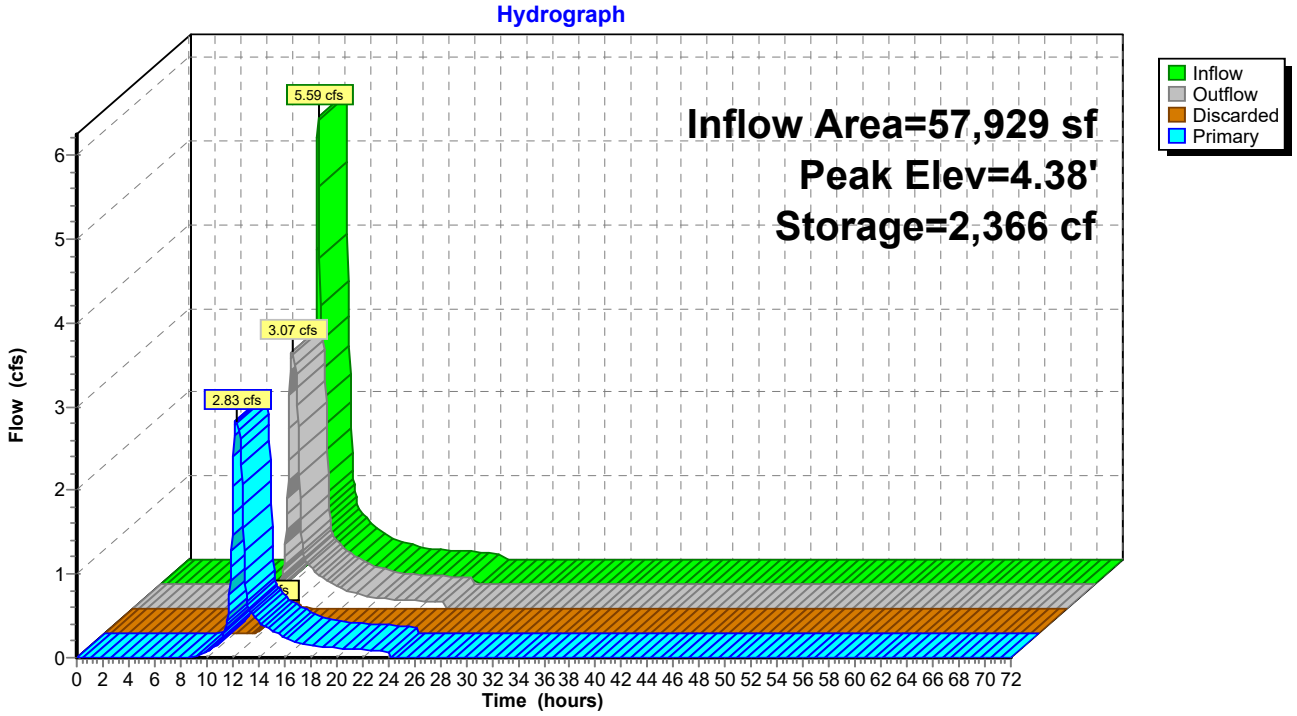
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.20	0	0.0	0	0	0
3.50	149	61.0	15	15	296
4.00	2,440	293.0	532	547	6,832
4.50	9,823	539.0	2,860	3,407	23,121
4.75	16,825	666.0	3,292	6,699	35,300
5.00	29,698	866.0	5,740	12,438	59,683

Device	Routing	Invert	Outlet Devices
#1	Primary	3.20'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 134.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.20' / 3.10' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.20'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.24 cfs @ 12.33 hrs HW=4.38' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.24 cfs)

Primary OutFlow Max=2.83 cfs @ 12.33 hrs HW=4.38' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.83 cfs @ 2.62 fps)

Pond P4: Pond 4



Summary for Pond P5: Pond 5

Inflow Area = 52,606 sf, 20.20% Impervious, Inflow Depth = 3.74" for 100YR - 24HR event
Inflow = 4.85 cfs @ 12.12 hrs, Volume= 16,376 cf
Outflow = 3.03 cfs @ 12.26 hrs, Volume= 16,376 cf, Atten= 37%, Lag= 8.5 min
Discarded = 0.14 cfs @ 12.26 hrs, Volume= 307 cf
Primary = 2.89 cfs @ 12.26 hrs, Volume= 16,068 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.13' @ 12.26 hrs Surf.Area= 4,242 sf Storage= 1,296 cf

Plug-Flow detention time= 2.3 min calculated for 16,364 cf (100% of inflow)
Center-of-Mass det. time= 2.3 min (844.3 - 842.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2.85'	12,246 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

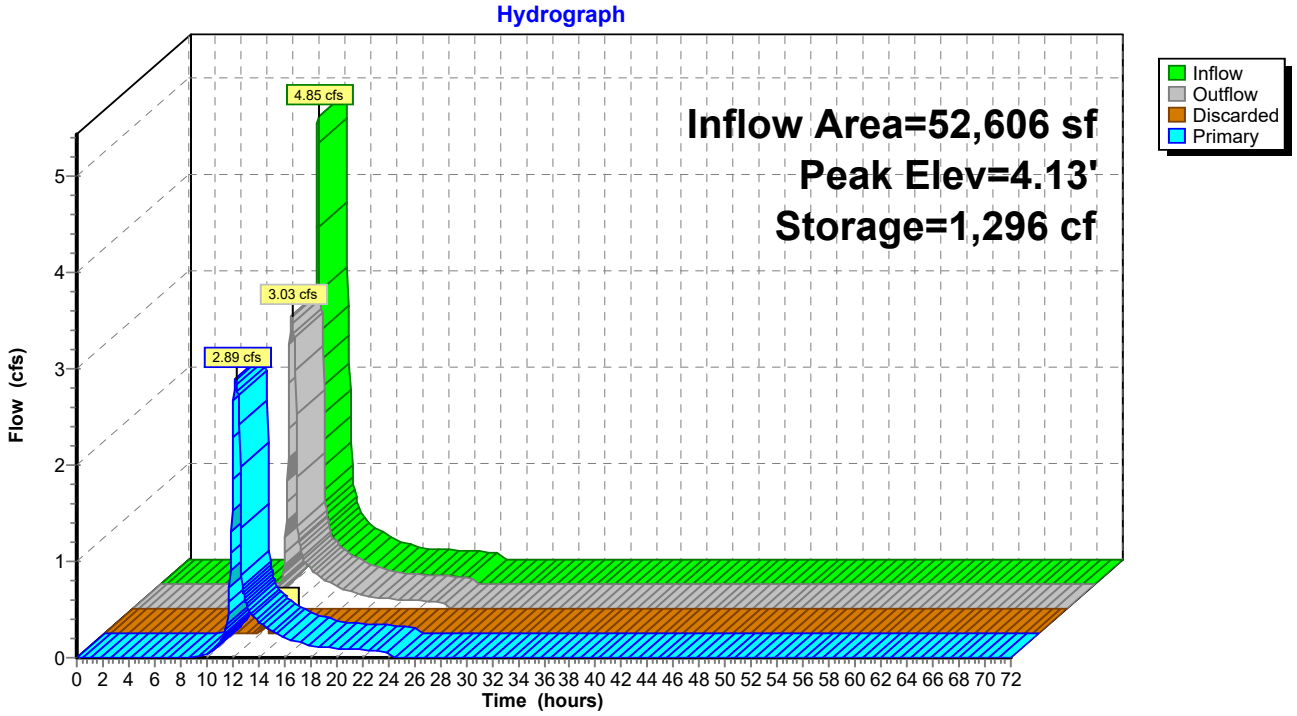
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.85	0	0.0	0	0	0
3.00	22	19.0	1	1	29
3.50	418	102.0	89	90	829
4.00	2,904	284.0	737	828	6,420
4.50	9,309	476.0	2,902	3,730	18,033
4.90	21,881	695.0	6,062	9,791	38,442
5.00	27,310	796.0	2,455	12,246	50,426

Device	Routing	Invert	Outlet Devices
#1	Primary	2.85'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 142.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.85' / 2.75' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.85'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.75'

Discarded OutFlow Max=0.14 cfs @ 12.26 hrs HW=4.13' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.14 cfs)

Primary OutFlow Max=2.89 cfs @ 12.26 hrs HW=4.13' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.89 cfs @ 2.65 fps)

Pond P5: Pond 5



Summary for Pond P6: Pond 6

Inflow Area = 252,442 sf, 27.23% Impervious, Inflow Depth = 4.33" for 100YR - 24HR event
Inflow = 14.74 cfs @ 12.46 hrs, Volume= 91,165 cf
Outflow = 7.95 cfs @ 12.93 hrs, Volume= 91,283 cf, Atten= 46%, Lag= 28.3 min
Discarded = 1.14 cfs @ 12.93 hrs, Volume= 4,977 cf
Primary = 6.81 cfs @ 12.93 hrs, Volume= 86,306 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.08' @ 12.93 hrs Surf.Area= 28,773 sf Storage= 14,024 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.6 min (860.9 - 850.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	48,739 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

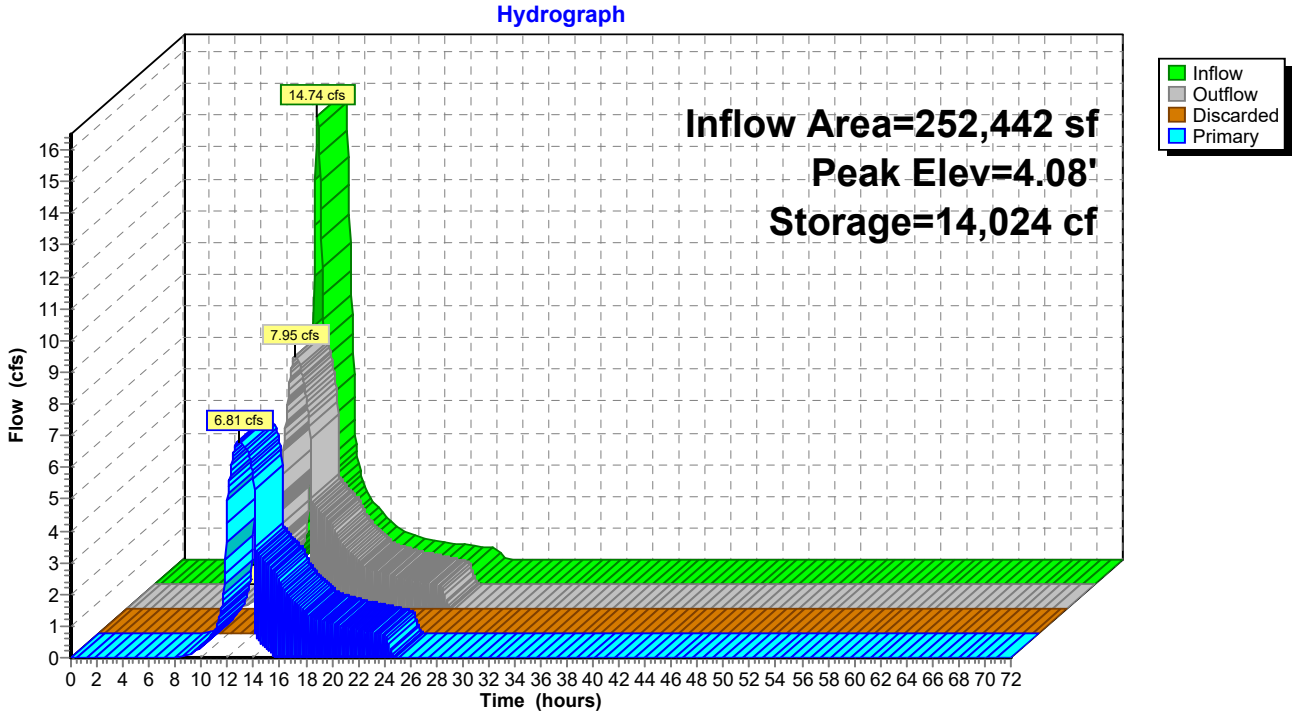
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
3.00	3,571	520.0	595	595	21,518
3.50	9,437	727.0	3,136	3,731	42,062
4.00	24,344	1,116.0	8,156	11,887	99,115
4.50	57,812	1,402.0	19,945	31,832	156,426
4.75	77,941	1,580.0	16,907	48,739	198,667

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**15.0" Round CMP_Round 15"** L= 265.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 0.50' / -0.40' S= 0.0034 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	2.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.40'

Discarded OutFlow Max=1.14 cfs @ 12.93 hrs HW=4.08' (Free Discharge)
↑—**2=Exfiltration** (Controls 1.14 cfs)

Primary OutFlow Max=6.80 cfs @ 12.93 hrs HW=4.08' (Free Discharge)
↑—**1=CMP_Round 15"** (Barrel Controls 6.80 cfs @ 5.55 fps)

Pond P6: Pond 6



Summary for Pond P7: Pond 7

Inflow Area = 67,118 sf, 34.62% Impervious, Inflow Depth = 4.90" for 100YR - 24HR event
Inflow = 6.98 cfs @ 12.18 hrs, Volume= 27,389 cf
Outflow = 3.72 cfs @ 12.43 hrs, Volume= 27,389 cf, Atten= 47%, Lag= 15.1 min
Discarded = 0.32 cfs @ 12.43 hrs, Volume= 1,038 cf
Primary = 3.40 cfs @ 12.43 hrs, Volume= 26,351 cf
Routed to Pond P6 : Pond 6

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.32' @ 12.43 hrs Surf.Area= 9,785 sf Storage= 3,841 cf

Plug-Flow detention time= 6.1 min calculated for 27,370 cf (100% of inflow)
Center-of-Mass det. time= 6.1 min (832.0 - 825.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2.75'	16,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

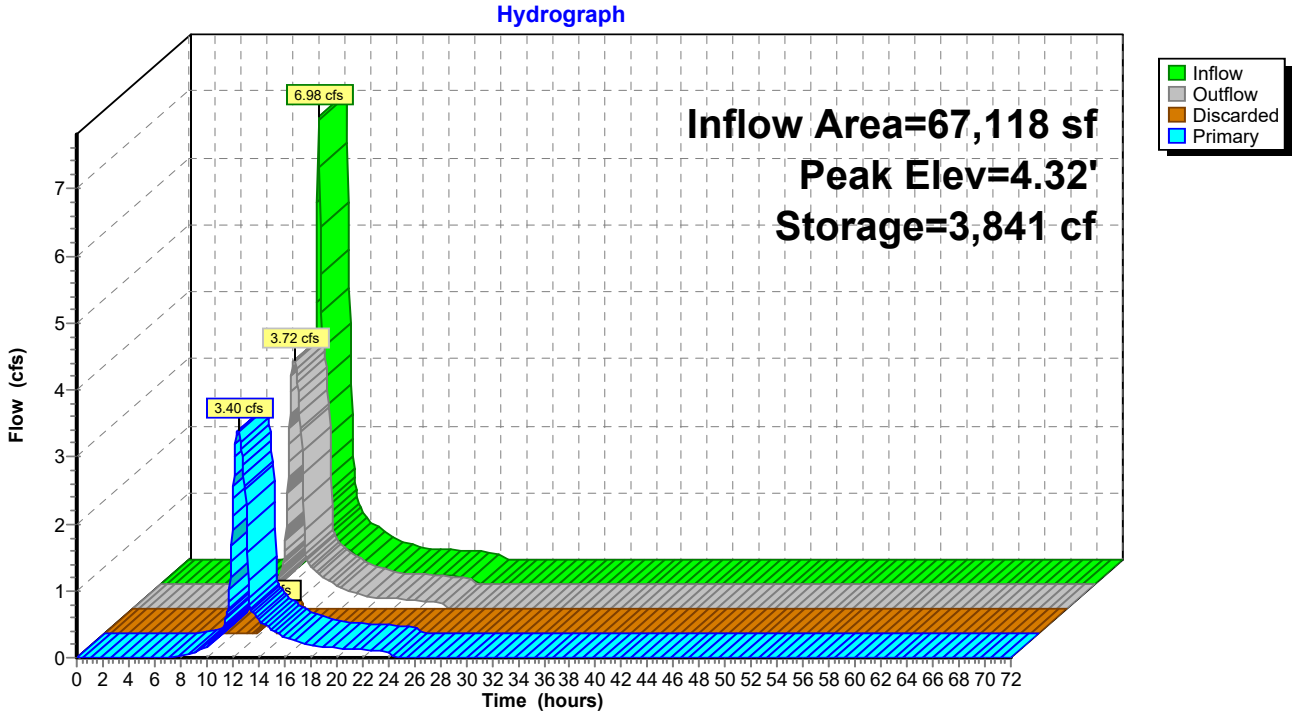
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.75	0	0.0	0	0	0
3.00	47	29.0	4	4	67
3.50	992	154.0	209	213	1,888
4.00	4,809	305.0	1,331	1,544	7,405
4.50	13,313	480.0	4,354	5,898	18,338
4.90	25,536	679.0	7,638	13,536	36,694
5.00	29,518	743.0	2,750	16,286	43,936

Device	Routing	Invert	Outlet Devices
#1	Primary	2.75'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 180.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.75' / 2.65' S= 0.0006 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.75'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.65'

Discarded OutFlow Max=0.32 cfs @ 12.43 hrs HW=4.32' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.32 cfs)

Primary OutFlow Max=3.40 cfs @ 12.43 hrs HW=4.32' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.40 cfs @ 3.12 fps)

Pond P7: Pond 7



Summary for Pond P8: Pond 8

Inflow Area = 366,659 sf, 30.00% Impervious, Inflow Depth = 4.38" for 100YR - 24HR event
Inflow = 17.82 cfs @ 12.20 hrs, Volume= 133,895 cf
Outflow = 22.53 cfs @ 12.25 hrs, Volume= 133,924 cf, Atten= 0%, Lag= 2.7 min
Primary = 22.53 cfs @ 12.25 hrs, Volume= 133,924 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 38.47' @ 12.25 hrs Surf.Area= 21,292 sf Storage= 4,397 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.7 min (856.7 - 852.0)

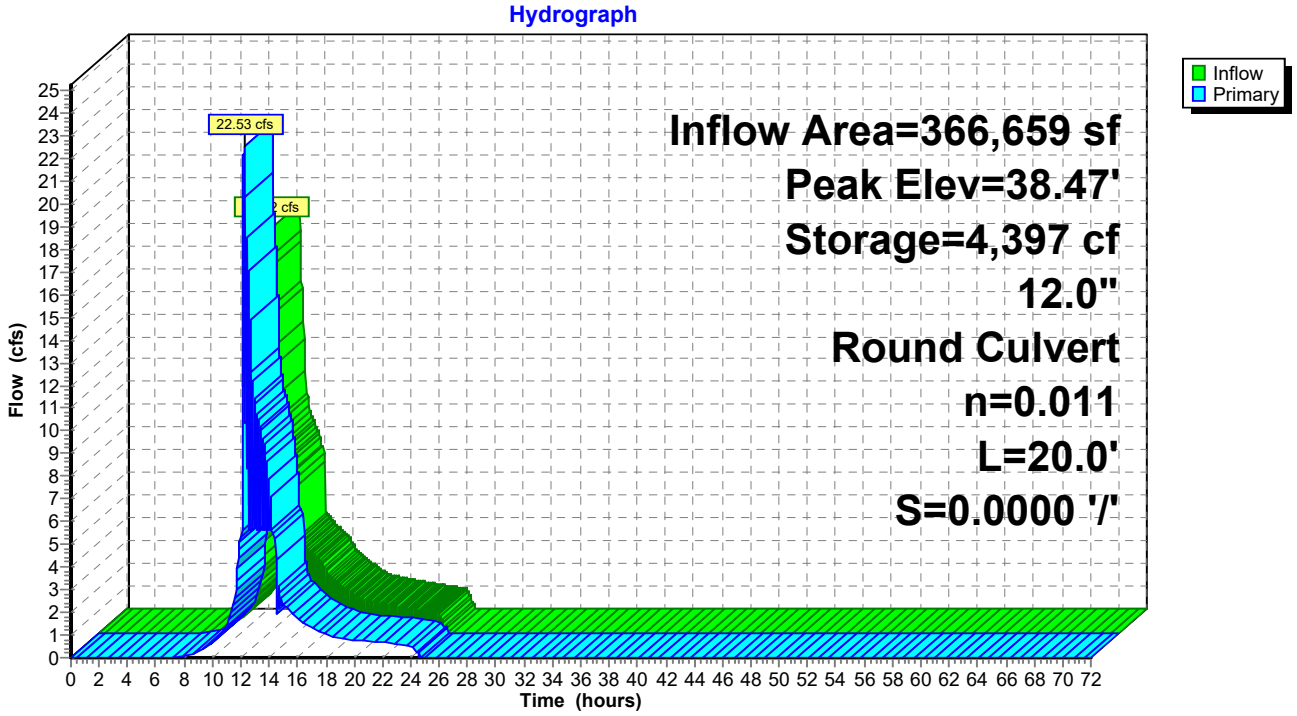
Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	4,397 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
4.00	44	40.0	22	22	131
4.50	348	192.0	86	108	2,938
5.00	5,358	771.0	1,179	1,287	47,309
5.25	21,292	781.0	3,111	4,397	48,559

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 2.50' / 2.50' S= 0.0000 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=22.22 cfs @ 12.25 hrs HW=37.53' (Free Discharge)
1=Culvert (Inlet Controls 22.22 cfs @ 28.30 fps)

Pond P8: Pond 8



Summary for Pond P9: Pond 9

Inflow Area = 18,401 sf, 28.03% Impervious, Inflow Depth = 3.97" for 100YR - 24HR event
Inflow = 1.54 cfs @ 12.19 hrs, Volume= 6,081 cf
Outflow = 1.85 cfs @ 12.20 hrs, Volume= 5,672 cf, Atten= 0%, Lag= 0.6 min
Primary = 1.85 cfs @ 12.20 hrs, Volume= 5,672 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.26' @ 12.20 hrs Surf.Area= 2,618 sf Storage= 532 cf

Plug-Flow detention time= 68.8 min calculated for 5,668 cf (93% of inflow)
Center-of-Mass det. time= 34.9 min (877.7 - 842.8)

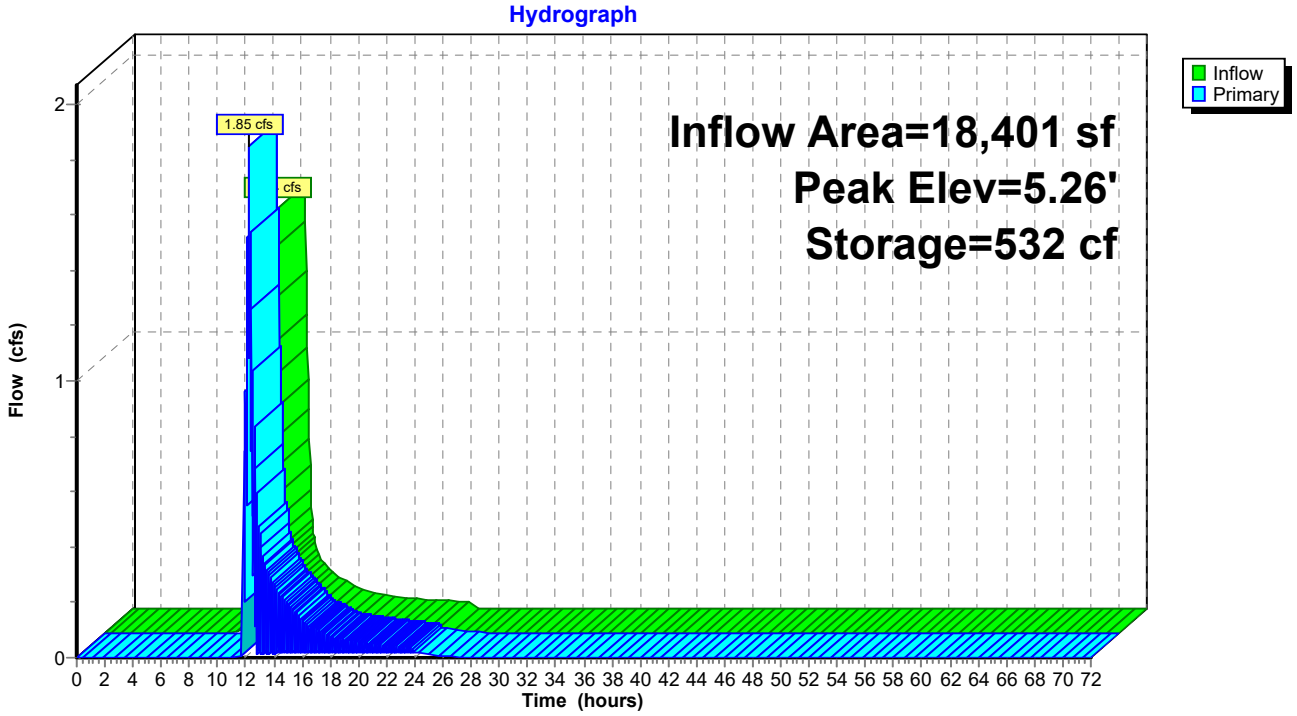
Volume	Invert	Avail.Storage	Storage Description
#1	1.60'	532 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1.60	12	12.0	0	0	12
4.45	12	12.0	34	34	46
4.50	1,258	168.0	23	57	2,281
4.75	2,618	234.0	474	532	4,393

Device	Routing	Invert	Outlet Devices
#1	Primary	4.70'	**12.0" Round Culvert** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	4.70'	**12.0" Round RCP_Round 12"** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.83 cfs @ 12.20 hrs HW=5.25' (Free Discharge)
1=Culvert (Barrel Controls 0.91 cfs @ 2.96 fps)
2=RCP_Round 12" (Barrel Controls 0.91 cfs @ 2.96 fps)

Pond P9: Pond 9

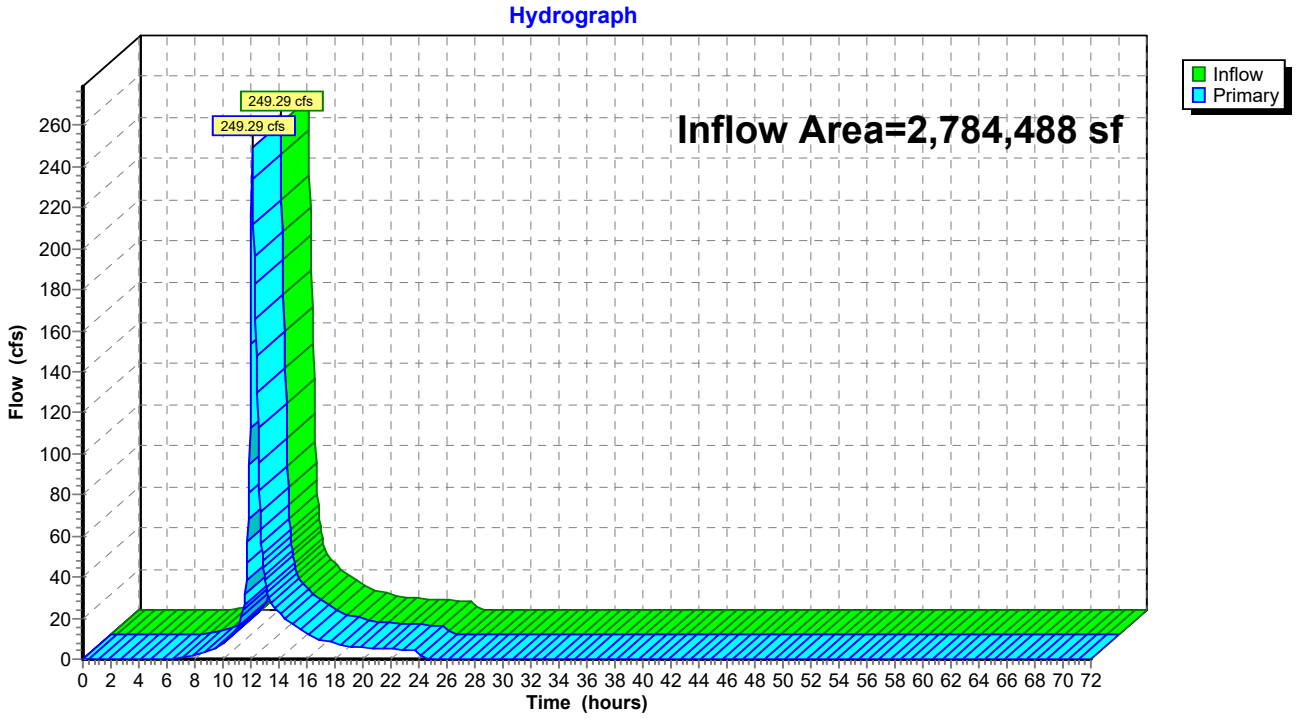


Summary for Link 1L: WEST WETL

Inflow Area = 2,784,488 sf, 39.12% Impervious, Inflow Depth = 4.69" for 100YR - 24HR event
Inflow = 249.29 cfs @ 12.11 hrs, Volume= 1,088,786 cf
Primary = 249.29 cfs @ 12.11 hrs, Volume= 1,088,786 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : TUTTLE BROOK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 1L: WEST WETL

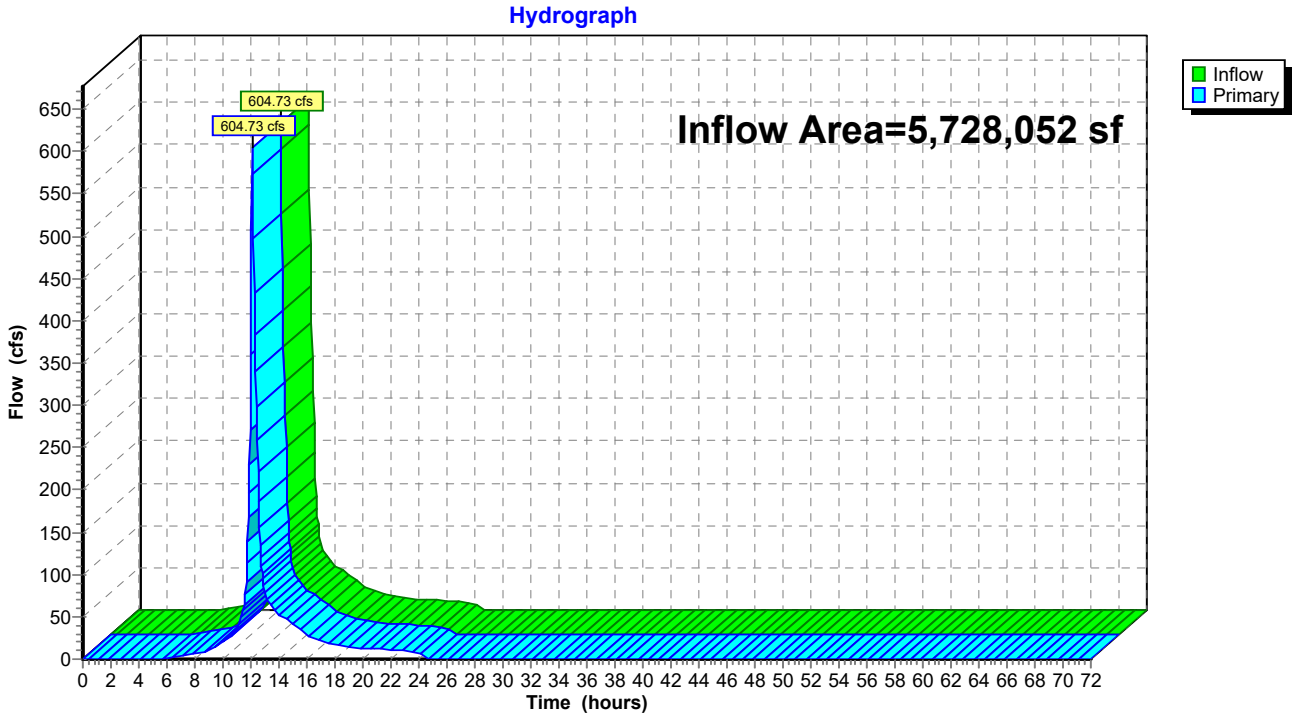


Summary for Link 2L: TUTTLE BROOK

Inflow Area = 5,728,052 sf, 28.97% Impervious, Inflow Depth = 5.24" for 100YR - 24HR event
Inflow = 604.73 cfs @ 12.11 hrs, Volume= 2,501,791 cf
Primary = 604.73 cfs @ 12.11 hrs, Volume= 2,501,791 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 2L: TUTTLE BROOK

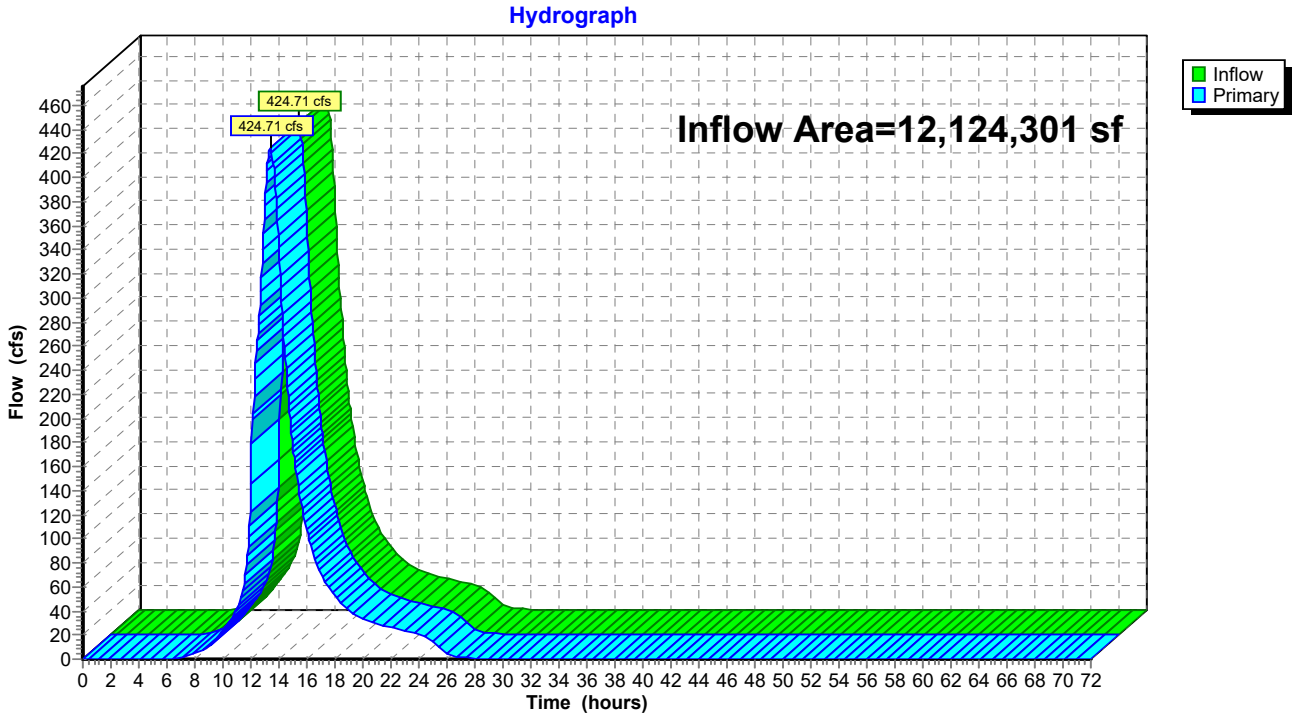


Summary for Link 3L: EAST WETL

Inflow Area = 12,124,301 sf, 40.20% Impervious, Inflow Depth = 5.53" for 100YR - 24HR event
Inflow = 424.71 cfs @ 13.40 hrs, Volume= 5,584,938 cf
Primary = 424.71 cfs @ 13.40 hrs, Volume= 5,584,938 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: EAST WETL

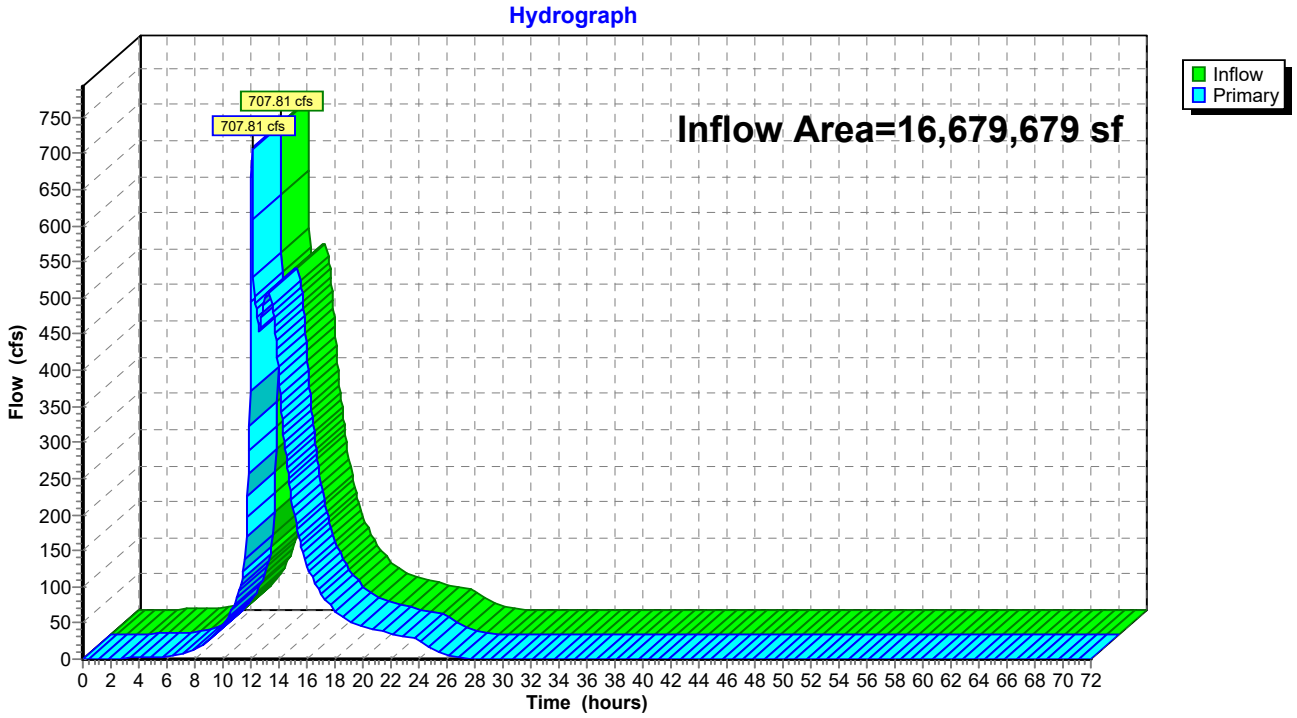


Summary for Link 4L: MORRIS CREEK

Inflow Area = 16,679,679 sf, 36.47% Impervious, Inflow Depth = 5.76" for 100YR - 24HR event
Inflow = 707.81 cfs @ 12.09 hrs, Volume= 8,003,477 cf
Primary = 707.81 cfs @ 12.09 hrs, Volume= 8,003,477 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: MORRIS CREEK



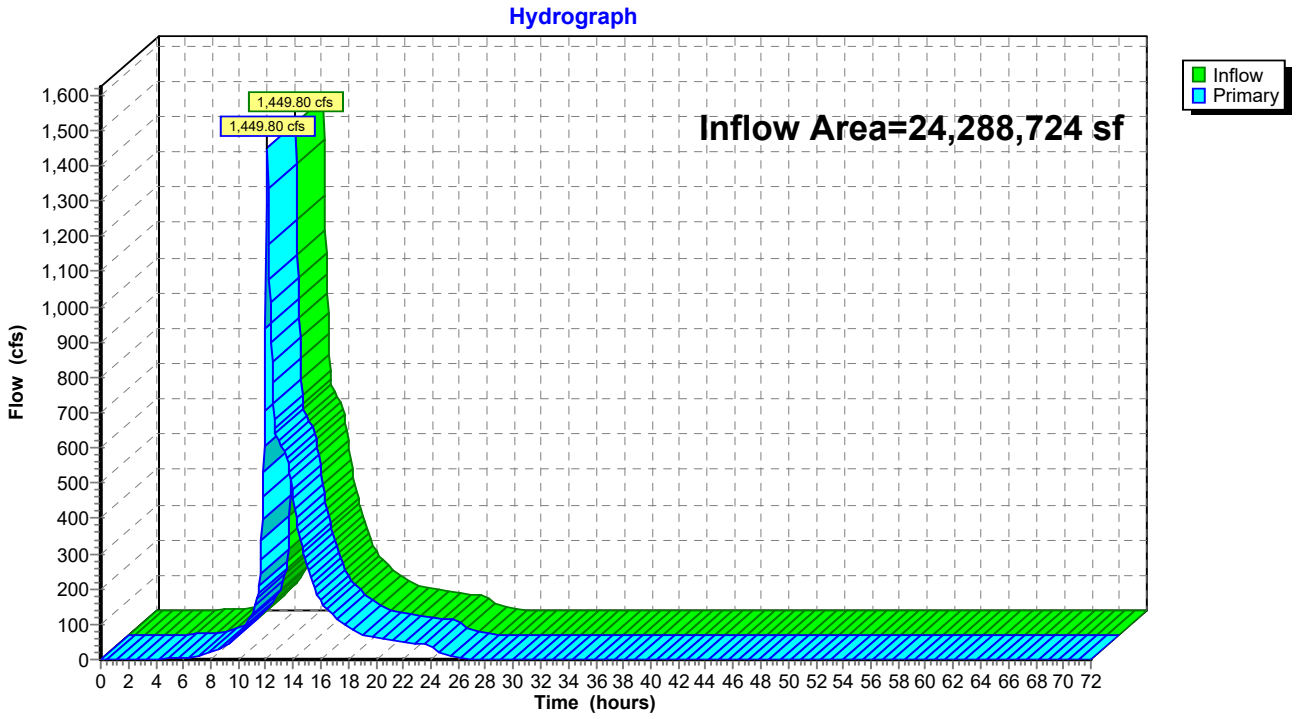
Summary for Link AP1: TIDE GATE

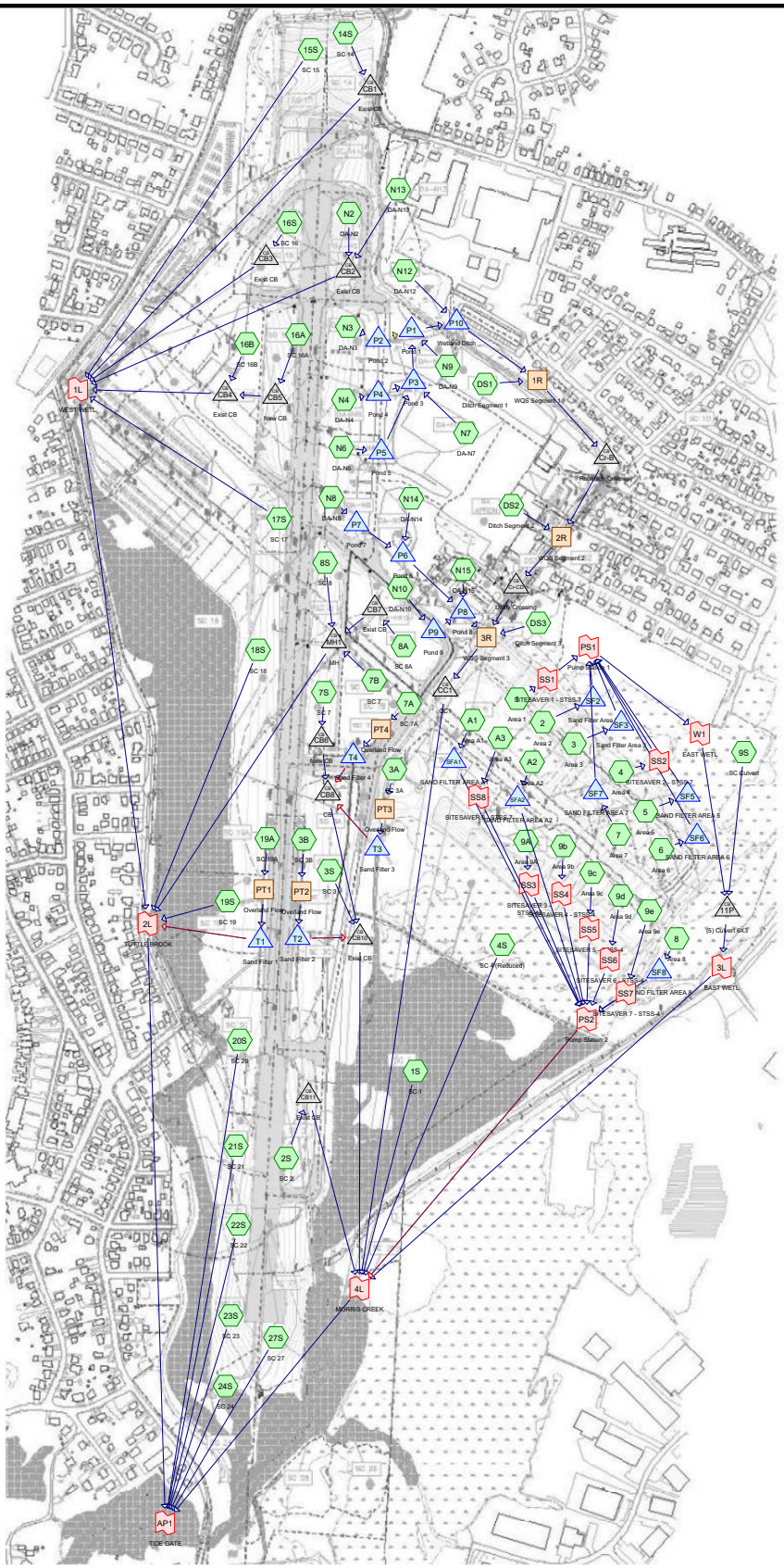
Inflow Area = 24,288,724 sf, 32.39% Impervious, Inflow Depth = 5.57" for 100YR - 24HR event
Inflow = 1,449.80 cfs @ 12.10 hrs, Volume= 11,272,850 cf
Primary = 1,449.80 cfs @ 12.10 hrs, Volume= 11,272,850 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 2.50'

Link AP1: TIDE GATE





Routing Diagram for post

Prepared by Hoyle, Tanner & Associates, Printed 4/16/2025

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2YR - 24HR	Type III 24-hr		Default	24.00	1	3.35	2
2	10YR - 24HR	Type III 24-hr		Default	24.00	1	5.23	2
3	100YR - 24HR	Type III 24-hr		Default	24.00	1	8.23	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
374,616	54	1/2 acre lots, 25% imp, HSG A (9S)
101,930	85	1/2 acre lots, 25% imp, HSG D (9S)
535,352	61	1/4 acre lots, 38% imp, HSG A (9S)
15,682	75	1/4 acre lots, 38% imp, HSG B (9S)
436	87	1/4 acre lots, 38% imp, HSG D (9S)
2,403,205	77	1/8 acre lots, 65% imp, HSG A (9S)
21,344	85	1/8 acre lots, 65% imp, HSG B (9S)
436	92	1/8 acre lots, 65% imp, HSG D (9S)
128,502	68	<50% Grass cover, Poor, HSG A (1, 2, 3, 4, 5, 6, 7, 8, 9A, 9b, 9c, 9d, 9e, A1, A3)
1,038,884	39	>75% Grass cover, Good, HSG A (9S, 14S, 15S, DS2, N13)
4,450,696	61	>75% Grass cover, Good, HSG B (2S, 3A, 3B, 3S, 4S, 7A, 7B, 7S, 8A, 8S, 9S, 16A, 16B, 16S, 17S, 18S, 19A, 19S, 20S, 21S, 22S, 23S, 24S, 27S, DS1, DS3, N12, N14, N15)
264,523	80	>75% Grass cover, Good, HSG D (1S, 9S)
96,268	67	Brush, Poor, HSG B (9S)
32,234	83	Brush, Poor, HSG D (9S)
11,597	76	Gravel roads, HSG A (15S, DS1, DS3, N6)
716	85	Gravel roads, HSG B (N3)
170	96	Gravel surface, HSG A (14S)
41,689	96	Gravel surface, HSG B (20S, 22S, 23S, 24S, 27S)
40,323	96	Gravel surface, HSG D (1S)
652,963	58	Meadow, non-grazed, HSG B (N10, N2, N3, N4, N6, N7, N8, N9)
1,393,920	98	Paved parking, HSG A (1, 2, 3, 4, 5, 6, 7, 8, 9A, 9b, 9c, 9d, 9e, A1, A2, A3)
76,508	98	Paved parking, HSG B (N2)
446,926	98	Paved roads w/curbs & sewers, HSG A (9S)
125,888	98	Paved roads w/curbs & sewers, HSG B (9S)
61,420	98	Paved roads w/curbs & sewers, HSG D (9S)
1,431,644	98	Unconnected pavement, HSG A (1S, 2S, 3A, 3B, 3S, 7A, 7S, 8A, 8S, 14S, 15S, 16A, 16B, 16S, 17S, 18S, 19A, 20S, 22S, 23S, 24S, 27S, N10, N12, N13, N14, N15, N3, N4, N6, N7, N8, N9)
18,295	98	Unconnected pavement, HSG B (4S)
1,438,875	98	Unconnected pavement, HSG D (1S, 2S, 3S, 7B, 15S, 16A, 16B, 16S, 17S, 18S, 20S, 21S, DS1, DS2, DS3, N10, N12, N13, N15, N3, N4, N6, N7, N8, N9)
125,453	89	Urban commercial, 85% imp, HSG A (9S)
490,486	92	Urban commercial, 85% imp, HSG B (9S)
914,760	95	Urban commercial, 85% imp, HSG D (9S)
7,841	81	Urban industrial, 72% imp, HSG A (9S)
22,651	93	Urban industrial, 72% imp, HSG D (9S)
41,942	98	Water Surface, 0% imp, HSG A (15S, DS2, DS3)

Area Listing (all nodes) (continued)

Area (sq-ft)	CN	Description (subcatchment-numbers)
516,717	98	Water Surface, 0% imp, HSG D (1S, 18S, 19S, 20S, 21S, 22S, 23S, 24S)
30,448	98	Wetland/Water Surface, 0% imp, HSG A (9S, 27S, DS1)
475,211	98	Wetland/Water Surface, 0% imp, HSG B (9S, DS3)
2,582,792	98	Wetland/Water Surface, 0% imp, HSG D (1S, 9S, N12)
273,992	98	Wetland/Water Surface, HSG B (4S)
480,136	98	Wetland/Water Surface. HSG D (4S)
107,642	98	Wetland/water Surface, 0% imp, HSG A (15S)
1,135,305	98	Wetland/water Surface, 0% imp, HSG D (18S, 19S, 20S, 21S, 22S, 23S, 24S)
311,507	30	Woods, Good, HSG A (9S, 15S, 20S, DS3)
1,004,051	55	Woods, Good, HSG B (9S, 23S, 24S, DS1, N12)
92,068	70	Woods, Good, HSG C (18S)
470,681	77	Woods, Good, HSG D (1S, 9S)
24,288,724	**80**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
8,389,648	HSG A	1, 1S, 2, 2S, 3, 3A, 3B, 3S, 4, 5, 6, 7, 7A, 7S, 8, 8A, 8S, 9A, 9b, 9c, 9d, 9e, 9S, 14S, 15S, 16A, 16B, 16S, 17S, 18S, 19A, 20S, 22S, 23S, 24S, 27S, A1, A2, A3, DS1, DS2, DS3, N10, N12, N13, N14, N15, N3, N4, N6, N7, N8, N9
7,743,789	HSG B	2S, 3A, 3B, 3S, 4S, 7A, 7B, 7S, 8A, 8S, 9S, 16A, 16B, 16S, 17S, 18S, 19A, 19S, 20S, 21S, 22S, 23S, 24S, 27S, DS1, DS3, N10, N12, N14, N15, N2, N3, N4, N6, N7, N8, N9
92,068	HSG C	18S
8,063,219	HSG D	1S, 2S, 3S, 4S, 7B, 9S, 15S, 16A, 16B, 16S, 17S, 18S, 19S, 20S, 21S, 22S, 23S, 24S, DS1, DS2, DS3, N10, N12, N13, N15, N3, N4, N6, N7, N8, N9
0	Other	
24,288,724		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
374,616	0	0	101,930	0	476,546	1/2 acre lots, 25% imp
535,352	15,682	0	436	0	551,470	1/4 acre lots, 38% imp
2,403,205	21,344	0	436	0	2,424,985	1/8 acre lots, 65% imp
128,502	0	0	0	0	128,502	<50% Grass cover, Poor
1,038,884	4,450,696	0	264,523	0	5,754,103	>75% Grass cover, Good
0	96,268	0	32,234	0	128,502	Brush, Poor
11,597	716	0	0	0	12,313	Gravel roads
170	41,689	0	40,323	0	82,182	Gravel surface
0	652,963	0	0	0	652,963	Meadow, non-grazed
1,393,920	76,508	0	0	0	1,470,428	Paved parking
446,926	125,888	0	61,420	0	634,234	Paved roads w/curbs & sewers
1,431,644	18,295	0	1,438,875	0	2,888,814	Unconnected pavement
125,453	490,486	0	914,760	0	1,530,698	Urban commercial, 85% imp
7,841	0	0	22,651	0	30,492	Urban industrial, 72% imp
41,942	0	0	516,717	0	558,659	Water Surface, 0% imp
0	273,992	0	0	0	273,992	Wetland/Water Surface
30,448	475,211	0	2,582,792	0	3,088,451	Wetland/Water Surface, 0% imp
0	0	0	480,136	0	480,136	Wetland/Water Surface.
107,642	0	0	1,135,305	0	1,242,947	Wetland/water Surface, 0% imp
311,507	1,004,051	92,068	470,681	0	1,878,307	Woods, Good
8,389,648	**7,743,789**	**92,068**	**8,063,219**	**0**	**24,288,724**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	11P	3.00	2.80	60.0	0.0033	0.012	72.0	36.0	0.0	
2	CB1	2.10	1.32	845.0	0.0009	0.013	0.0	36.0	0.0	
3	CB10	-1.62	-1.82	152.0	0.0013	0.012	0.0	24.0	0.0	
4	CB11	-0.73	-0.93	148.0	0.0014	0.012	0.0	18.0	0.0	
5	CB2	1.40	0.50	658.0	0.0014	0.011	0.0	15.0	0.0	
6	CB3	4.14	1.94	200.0	0.0110	0.025	0.0	10.0	0.0	
7	CB4	4.89	0.00	200.0	0.0244	0.012	0.0	18.0	0.0	
8	CB5	1.55	0.50	360.0	0.0029	0.011	17.0	13.0	0.0	
9	CB6	-0.30	-0.85	291.0	0.0019	0.013	0.0	18.0	0.0	
10	CB7	0.00	-0.62	380.0	0.0016	0.025	0.0	15.0	0.0	
11	CB8	-0.95	-1.52	813.0	0.0007	0.013	0.0	24.0	0.0	
12	CC1	1.20	-0.40	1,272.0	0.0013	0.011	35.0	24.0	0.0	
13	Cr-B	1.72	1.70	48.0	0.0004	0.011	0.0	24.0	0.0	
14	Cr-B	1.72	1.70	48.0	0.0004	0.011	0.0	24.0	0.0	
15	Cr-B	1.72	1.70	48.0	0.0004	0.011	0.0	24.0	0.0	
16	Cr-CD	1.33	1.28	114.0	0.0004	0.011	0.0	30.0	0.0	
17	Cr-CD	1.33	1.28	114.0	0.0004	0.011	0.0	30.0	0.0	
18	Cr-CD	1.33	1.28	114.0	0.0004	0.011	0.0	30.0	0.0	
19	MH1	-0.72	-2.37	787.0	0.0021	0.012	0.0	18.0	0.0	
20	P1	2.40	2.35	48.0	0.0010	0.011	0.0	21.0	0.0	
21	P1	2.40	2.35	48.0	0.0010	0.011	0.0	21.0	0.0	
22	P1	2.40	2.35	48.0	0.0010	0.011	0.0	21.0	0.0	
23	P10	2.33	2.32	32.0	0.0003	0.011	0.0	21.0	0.0	
24	P10	2.33	2.32	32.0	0.0003	0.011	0.0	21.0	0.0	
25	P10	2.33	2.32	32.0	0.0003	0.011	0.0	21.0	0.0	
26	P2	3.35	3.25	133.0	0.0008	0.011	18.0	11.0	0.0	
27	P3	2.65	2.55	136.0	0.0007	0.011	18.0	11.0	0.0	
28	P3	2.65	2.55	136.0	0.0007	0.011	18.0	11.0	0.0	
29	P3	2.65	2.55	136.0	0.0007	0.011	18.0	11.0	0.0	
30	P4	3.20	3.10	134.0	0.0007	0.011	18.0	11.0	0.0	
31	P5	2.85	2.75	142.0	0.0007	0.011	18.0	11.0	0.0	
32	P6	0.50	-0.40	265.0	0.0034	0.012	0.0	15.0	0.0	
33	P7	2.75	2.65	180.0	0.0006	0.011	18.0	11.0	0.0	
34	P8	2.50	2.50	20.0	0.0000	0.011	0.0	12.0	0.0	
35	P9	4.70	4.50	37.0	0.0054	0.011	0.0	12.0	0.0	
36	P9	4.70	4.50	37.0	0.0054	0.011	0.0	12.0	0.0	
37	T1	0.21	0.11	202.0	0.0005	0.020	0.0	18.0	0.0	
38	T2	-1.20	-1.59	177.0	0.0022	0.020	0.0	18.0	0.0	
39	T3	-0.95	-1.01	38.0	0.0016	0.012	0.0	24.0	0.0	
40	T4	-0.65	-0.85	131.0	0.0015	0.013	0.0	24.0	0.0	

Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1: Area 1 Runoff Area=1.080 ac 87.04% Impervious Runoff Depth=2.69"
Tc=5.0 min CN=94 Runoff=3.27 cfs 10,544 cf

Subcatchment1S: SC 1 Runoff Area=1,993,439 sf 2.18% Impervious Runoff Depth=2.59"
Flow Length=161' Tc=6.9 min CN=93 Runoff=128.25 cfs 430,271 cf

Subcatchment2: Area 2 Runoff Area=3.870 ac 97.16% Impervious Runoff Depth=3.01"
Tc=5.0 min CN=97 Runoff=12.50 cfs 42,221 cf

Subcatchment2S: SC 2 Runoff Area=218,401 sf 45.10% Impervious Runoff Depth=1.38"
Flow Length=568' Tc=16.0 min CN=78 Runoff=5.84 cfs 25,195 cf

Subcatchment3: Area 3 Runoff Area=4.180 ac 91.63% Impervious Runoff Depth=2.79"
Tc=5.0 min CN=95 Runoff=12.98 cfs 42,362 cf

Subcatchment3A: SC 3A Runoff Area=34,322 sf 59.30% Impervious Runoff Depth=1.73"
Flow Length=143' Tc=5.0 min CN=83 Runoff=1.60 cfs 4,957 cf

Subcatchment3B: SC 3B Runoff Area=98,736 sf 72.12% Impervious Runoff Depth=2.13"
Flow Length=100' Tc=5.0 min CN=88 Runoff=5.64 cfs 17,545 cf

Subcatchment3S: SC 3 Runoff Area=447,354 sf 20.28% Impervious Runoff Depth=0.67"
Flow Length=413' Tc=11.6 min UI Adjusted CN=65 Runoff=5.35 cfs 25,154 cf

Subcatchment4: Area 4 Runoff Area=1.070 ac 91.59% Impervious Runoff Depth=2.79"
Tc=5.0 min CN=95 Runoff=3.32 cfs 10,844 cf

Subcatchment4S: SC 4 (Reduced) Runoff Area=871,304 sf 88.65% Impervious Runoff Depth=2.69"
Tc=36.8 min CN=94 Runoff=31.16 cfs 195,286 cf

Subcatchment5: Area 5 Runoff Area=2.510 ac 91.63% Impervious Runoff Depth=2.79"
Tc=5.0 min CN=95 Runoff=7.79 cfs 25,438 cf

Subcatchment6: Area 6 Runoff Area=3.930 ac 92.11% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=96 Runoff=12.47 cfs 41,330 cf

Subcatchment7: Area 7 Runoff Area=1.560 ac 92.31% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=96 Runoff=4.95 cfs 16,406 cf

Subcatchment7A: SC 7A Runoff Area=31,658 sf 56.17% Impervious Runoff Depth=1.66"
Flow Length=105' Tc=5.0 min CN=82 Runoff=1.41 cfs 4,378 cf

Subcatchment7B: SC 7 Runoff Area=171,281 sf 3.53% Impervious Runoff Depth=0.55"
Flow Length=162' Tc=10.5 min CN=62 Runoff=1.51 cfs 7,804 cf

Subcatchment7S: SC 7 Runoff Area=171,785 sf 31.18% Impervious Runoff Depth=1.08"
Flow Length=772' Tc=127.8 min CN=73 Runoff=1.11 cfs 15,460 cf

Subcatchment8: Area 8 Runoff Area=1.230 ac 90.24% Impervious Runoff Depth=2.79"
Tc=5.0 min CN=95 Runoff=3.82 cfs 12,465 cf

Subcatchment8A: SC 8A Runoff Area=233,085 sf 13.62% Impervious Runoff Depth=0.63"
Flow Length=304' Tc=7.1 min UI Adjusted CN=64 Runoff=2.88 cfs 12,250 cf

Subcatchment8S: SC 8 Runoff Area=162,499 sf 33.95% Impervious Runoff Depth=1.14"
Flow Length=721' Tc=43.3 min CN=74 Runoff=2.24 cfs 15,404 cf

Subcatchment9A: Area 9A Runoff Area=1.670 ac 95.21% Impervious Runoff Depth=3.01"
Tc=5.0 min CN=97 Runoff=5.39 cfs 18,219 cf

Subcatchment9b: Area 9b Runoff Area=0.360 ac 91.67% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=96 Runoff=1.14 cfs 3,786 cf

Subcatchment9c: Area 9c Runoff Area=0.540 ac 94.44% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=96 Runoff=1.71 cfs 5,679 cf

Subcatchment9d: Area 9d Runoff Area=0.540 ac 94.44% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=96 Runoff=1.71 cfs 5,679 cf

Subcatchment9e: Area 9e Runoff Area=0.640 ac 93.75% Impervious Runoff Depth=2.90"
Tc=5.0 min CN=96 Runoff=2.03 cfs 6,731 cf

Subcatchment9S: SC Culvert Runoff Area=212.450 ac 41.73% Impervious Runoff Depth=1.45"
Tc=110.6 min CN=79 Runoff=92.81 cfs 1,118,523 cf

Subcatchment14S: SC 14 Runoff Area=364,481 sf 23.60% Impervious Runoff Depth=0.08"
Flow Length=594' Tc=18.6 min UI Adjusted CN=46 Runoff=0.09 cfs 2,394 cf

Subcatchment15S: SC 15 Runoff Area=974,157 sf 40.31% Impervious Runoff Depth=0.97"
Flow Length=592' Tc=15.7 min CN=71 Runoff=17.17 cfs 78,714 cf

Subcatchment16A: SC 16A Runoff Area=281,403 sf 34.62% Impervious Runoff Depth=1.14"
Flow Length=629' Tc=6.5 min CN=74 Runoff=7.99 cfs 26,676 cf

Subcatchment16B: SC 16B Runoff Area=304,059 sf 44.14% Impervious Runoff Depth=1.32"
Flow Length=370' Tc=5.5 min CN=77 Runoff=10.51 cfs 33,449 cf

Subcatchment16S: SC 16 Runoff Area=189,563 sf 41.96% Impervious Runoff Depth=1.32"
Flow Length=466' Tc=9.1 min CN=77 Runoff=5.81 cfs 20,853 cf

Subcatchment17S: SC 17 Runoff Area=411,986 sf 54.00% Impervious Runoff Depth=1.59"
Flow Length=444' Tc=22.6 min CN=81 Runoff=11.18 cfs 54,517 cf

Subcatchment18S: SC 18 Runoff Area=1,697,838 sf 11.60% Impervious Runoff Depth=1.81"
Flow Length=519' Tc=14.3 min UI Adjusted CN=84 Runoff=63.32 cfs 255,906 cf

Subcatchment19A: SC 19A Runoff Area=98,736 sf 72.12% Impervious Runoff Depth=2.13"
Flow Length=98' Tc=5.0 min CN=88 Runoff=5.64 cfs 17,545 cf

Subcatchment19S: SC 19 Runoff Area=227,314 sf 0.00% Impervious Runoff Depth=1.66"
Flow Length=165' Tc=5.0 min CN=82 Runoff=10.15 cfs 31,436 cf

Subcatchment20S: SC 20 Runoff Area=404,240 sf 16.91% Impervious Runoff Depth=1.08"
Flow Length=414' Tc=7.6 min UI Adjusted CN=73 Runoff=10.36 cfs 36,381 cf

Subcatchment21S: SC 21 Runoff Area=222,583 sf 10.63% Impervious Runoff Depth=1.14"
Flow Length=472' Tc=8.8 min UI Adjusted CN=74 Runoff=5.79 cfs 21,100 cf

Subcatchment22S: SC 22 Runoff Area=253,526 sf 11.67% Impervious Runoff Depth=1.08"
Flow Length=356' Tc=14.1 min UI Adjusted CN=73 Runoff=5.34 cfs 22,817 cf

Subcatchment23S: SC 23 Runoff Area=436,850 sf 7.67% Impervious Runoff Depth=1.32"
Flow Length=384' Tc=6.1 min UI Adjusted CN=77 Runoff=14.88 cfs 48,057 cf

Subcatchment24S: SC 24 Runoff Area=325,253 sf 1.55% Impervious Runoff Depth=1.08"
Flow Length=365' Tc=11.8 min CN=73 Runoff=7.24 cfs 29,272 cf

Subcatchment27S: SC 27 Runoff Area=260,949 sf 26.73% Impervious Runoff Depth=0.72"
Flow Length=266' Tc=26.7 min UI Adjusted CN=66 Runoff=2.52 cfs 15,662 cf

SubcatchmentA1: Area A1 Runoff Area=4.660 ac 83.69% Impervious Runoff Depth=2.59"
Tc=5.0 min CN=93 Runoff=13.74 cfs 43,814 cf

SubcatchmentA2: Area A2 Runoff Area=4.370 ac 100.00% Impervious Runoff Depth=3.12"
Tc=5.0 min CN=98 Runoff=14.32 cfs 49,445 cf

SubcatchmentA3: Area A3 Runoff Area=2.740 ac 80.66% Impervious Runoff Depth=2.49"
Tc=5.0 min CN=92 Runoff=7.85 cfs 24,800 cf

SubcatchmentDS1: Ditch Segment 1 Runoff Area=412,198 sf 28.62% Impervious Runoff Depth=0.87"
Flow Length=1,385' Tc=13.4 min UI Adjusted CN=69 Runoff=6.68 cfs 29,727 cf

SubcatchmentDS2: Ditch Segment 2 Runoff Area=366,199 sf 54.34% Impervious Runoff Depth=1.08"
Flow Length=790' Tc=16.5 min CN=73 Runoff=7.25 cfs 32,957 cf

SubcatchmentDS3: Ditch Segment 3 Runoff Area=148,377 sf 4.46% Impervious Runoff Depth=0.36"
Flow Length=632' Tc=19.6 min UI Adjusted CN=57 Runoff=0.54 cfs 4,466 cf

SubcatchmentN10: DA-N10 Runoff Area=18,400 sf 27.62% Impervious Runoff Depth=0.63"
Flow Length=137' Tc=13.2 min UI Adjusted CN=64 Runoff=0.19 cfs 967 cf

SubcatchmentN12: DA-N12 Runoff Area=176,145 sf 14.99% Impervious Runoff Depth=1.26"
Flow Length=630' Tc=15.0 min UI Adjusted CN=76 Runoff=4.34 cfs 18,459 cf

SubcatchmentN13: DA-N13 Runoff Area=80,589 sf 15.59% Impervious Runoff Depth=0.05"
Flow Length=665' Tc=19.3 min UI Adjusted CN=44 Runoff=0.01 cfs 321 cf

SubcatchmentN14: DA-N14 Runoff Area=183,876 sf 23.85% Impervious Runoff Depth=0.67"
Flow Length=609' Tc=32.7 min UI Adjusted CN=65 Runoff=1.49 cfs 10,339 cf

SubcatchmentN15: DA-N15 Runoff Area=95,454 sf 35.36% Impervious Runoff Depth=1.14"
Flow Length=438' Tc=14.7 min CN=74 Runoff=2.11 cfs 9,049 cf

SubcatchmentN2: DA-N2 Runoff Area=159,295 sf 48.03% Impervious Runoff Depth=1.32"
Flow Length=644' Tc=11.0 min CN=77 Runoff=4.64 cfs 17,524 cf

SubcatchmentN3: DA-N3 Runoff Area=145,656 sf 34.19% Impervious Runoff Depth=1.02"
Flow Length=440' Tc=20.1 min CN=72 Runoff=2.50 cfs 12,430 cf

SubcatchmentN4: DA-N4 Runoff Area=140,632 sf 26.62% Impervious Runoff Depth=0.59"
Flow Length=358' Tc=11.1 min UI Adjusted CN=63 Runoff=1.38 cfs 6,891 cf

SubcatchmentN6: DA-N6 Runoff Area=127,978 sf 26.51% Impervious Runoff Depth=0.59"
Flow Length=365' Tc=18.6 min UI Adjusted CN=63 Runoff=1.05 cfs 6,271 cf

SubcatchmentN7: DA-N7 Runoff Area=336,200 sf 68.86% Impervious Runoff Depth=1.97"
Flow Length=1,058' Tc=86.5 min CN=86 Runoff=5.58 cfs 55,085 cf

SubcatchmentN8: DA-N8 Runoff Area=110,829 sf 40.07% Impervious Runoff Depth=1.14"
Flow Length=241' Tc=11.9 min CN=74 Runoff=2.62 cfs 10,506 cf

SubcatchmentN9: DA-N9 Runoff Area=123,350 sf 23.73% Impervious Runoff Depth=0.59"
Flow Length=368' Tc=34.5 min UI Adjusted CN=63 Runoff=0.80 cfs 6,044 cf

Reach 1R: WQS Segment 1 Avg. Flow Depth=0.92' Max Vel=1.14 fps Inflow=11.81 cfs 117,742 cf
n=0.022 L=1,255.0' S=0.0005 '/' Capacity=98.41 cfs Outflow=9.24 cfs 117,742 cf

Reach 2R: WQS Segment 2 Avg. Flow Depth=1.11' Max Vel=1.28 fps Inflow=14.14 cfs 150,700 cf
n=0.022 L=760.0' S=0.0005 '/' Capacity=99.31 cfs Outflow=13.30 cfs 150,700 cf

Reach 3R: WQS Segment 3 Avg. Flow Depth=1.29' Max Vel=1.37 fps Inflow=18.29 cfs 185,457 cf
n=0.022 L=610.0' S=0.0005 '/' Capacity=98.14 cfs Outflow=17.50 cfs 185,457 cf

Reach PT1: Overland Flow Avg. Flow Depth=0.05' Max Vel=0.10 fps Inflow=5.34 cfs 8,326 cf
n=0.240 L=25.0' S=0.0160 '/' Capacity=18.78 cfs Outflow=4.86 cfs 8,326 cf

Reach PT2: Overland Flow Avg. Flow Depth=0.06' Max Vel=0.12 fps Inflow=5.34 cfs 8,326 cf
n=0.240 L=25.0' S=0.0164 '/' Capacity=14.55 cfs Outflow=4.95 cfs 8,326 cf

Reach PT3: Overland Flow Avg. Flow Depth=0.03' Max Vel=0.08 fps Inflow=1.30 cfs 1,296 cf
n=0.240 L=25.0' S=0.0224 '/' Capacity=10.81 cfs Outflow=1.08 cfs 1,296 cf

Reach PT4: Overland Flow Avg. Flow Depth=0.02' Max Vel=0.08 fps Inflow=1.11 cfs 1,044 cf
n=0.240 L=25.0' S=0.0244 '/' Capacity=11.40 cfs Outflow=0.90 cfs 1,044 cf

Pond 11P: (5) Culvert 6X3 Peak Elev=4.09' Inflow=97.06 cfs 1,307,668 cf
Outflow=97.06 cfs 1,307,668 cf

Pond CB1: Exist CB Peak Elev=2.29' Inflow=0.09 cfs 2,394 cf
36.0" Round Culvert n=0.013 L=845.0' S=0.0009 '/' Outflow=0.09 cfs 2,394 cf

Pond CB10: Exist CB Peak Elev=0.43' Inflow=10.61 cfs 50,869 cf
24.0" Round Culvert n=0.012 L=152.0' S=0.0013 '/' Outflow=10.61 cfs 50,869 cf

Pond CB11: Exist CB Peak Elev=1.03' Inflow=5.84 cfs 25,195 cf
18.0" Round Culvert n=0.012 L=148.0' S=0.0014 '/' Outflow=5.84 cfs 25,195 cf

Pond CB2: Exist CB Peak Elev=4.52' Inflow=4.64 cfs 17,845 cf
15.0" Round Culvert n=0.011 L=658.0' S=0.0014 '/' Outflow=4.64 cfs 17,845 cf

Pond CB3: Exist CB Peak Elev=58.30' Inflow=5.81 cfs 20,853 cf
10.0" Round Culvert n=0.025 L=200.0' S=0.0110 '/' Outflow=5.81 cfs 20,853 cf

Pond CB4: Exist CB Peak Elev=10.33' Inflow=18.44 cfs 60,124 cf
18.0" Round Culvert n=0.012 L=200.0' S=0.0244 '/' Outflow=18.44 cfs 60,124 cf

Pond CB5: New CB Peak Elev=6.58' Inflow=7.99 cfs 26,676 cf
17.0" x 13.0", R=9.0"/25.6" Pipe Arch Culvert n=0.011 L=360.0' S=0.0029 '/' Outflow=7.99 cfs 26,676 cf

Pond CB6: New CB Peak Elev=0.36' Inflow=1.11 cfs 15,460 cf
18.0" Round Culvert n=0.013 L=291.0' S=0.0019 '/' Outflow=1.11 cfs 15,460 cf

Pond CB7: Exist CB Peak Elev=3.58' Inflow=2.88 cfs 12,250 cf
15.0" Round Culvert n=0.025 L=380.0' S=0.0016 '/' Outflow=2.88 cfs 12,250 cf

Pond CB8: CB Peak Elev=-0.04' Inflow=1.71 cfs 17,616 cf
24.0" Round Culvert n=0.013 L=813.0' S=0.0007 '/' Outflow=1.71 cfs 17,616 cf

Pond CC1: CC1 Peak Elev=2.22' Inflow=17.50 cfs 185,457 cf
35.0" x 24.0", R=17.9"/55.1" Pipe Arch Culvert x 3.00 n=0.011 L=1,272.0' S=0.0013 '/' Outflow=17.50 cfs 185,457 cf

Pond Cr-B: Robinson Driveway Peak Elev=2.71' Inflow=9.24 cfs 117,742 cf
Outflow=9.24 cfs 117,742 cf

Pond Cr-CD: Utility Crossing Peak Elev=2.49' Inflow=13.30 cfs 150,700 cf
Outflow=13.30 cfs 150,700 cf

Pond MH1: MH Peak Elev=0.78' Inflow=4.90 cfs 35,457 cf
18.0" Round Culvert n=0.012 L=787.0' S=0.0021 '/' Outflow=4.90 cfs 35,457 cf

Pond P1: Pond 1 Peak Elev=3.18' Storage=5,064 cf Inflow=6.49 cfs 80,277 cf
Discarded=0.67 cfs 10,721 cf Primary=5.54 cfs 69,556 cf Outflow=6.21 cfs 80,277 cf

Pond P10: Wetland Ditch Peak Elev=3.16' Storage=1,806 cf Inflow=6.16 cfs 88,016 cf
Outflow=6.15 cfs 88,016 cf

Pond P2: Pond 2 Peak Elev=4.16' Storage=952 cf Inflow=2.50 cfs 12,430 cf
Discarded=0.12 cfs 629 cf Primary=1.89 cfs 11,801 cf Outflow=2.02 cfs 12,430 cf

Pond P3: Pond 3 Peak Elev=3.44' Storage=3,444 cf Inflow=6.14 cfs 68,061 cf
Discarded=0.44 cfs 5,629 cf Primary=5.44 cfs 62,432 cf Outflow=5.88 cfs 68,061 cf

Pond P4: Pond 4 Peak Elev=3.81' Storage=203 cf Inflow=1.38 cfs 6,891 cf
Discarded=0.04 cfs 125 cf Primary=1.19 cfs 6,765 cf Outflow=1.23 cfs 6,891 cf

Pond P5: Pond 5 Peak Elev=3.42' Storage=61 cf Inflow=1.05 cfs 6,271 cf
Discarded=0.01 cfs 59 cf Primary=1.03 cfs 6,211 cf Outflow=1.05 cfs 6,271 cf

Pond P6: Pond 6 Peak Elev=2.51' Storage=0 cf Inflow=3.23 cfs 20,684 cf
Discarded=0.00 cfs 1 cf Primary=3.23 cfs 20,683 cf Outflow=3.23 cfs 20,684 cf

Pond P7: Pond 7 Peak Elev=3.69' Storage=491 cf Inflow=2.62 cfs 10,506 cf
Discarded=0.07 cfs 161 cf Primary=2.11 cfs 10,345 cf Outflow=2.17 cfs 10,506 cf

Pond P8: Pond 8 Peak Elev=4.63' Storage=193 cf Inflow=4.91 cfs 30,290 cf
12.0" Round Culvert n=0.011 L=20.0' S=0.0000 '/' Outflow=4.79 cfs 30,290 cf

Pond P9: Pond 9 Peak Elev=4.77' Storage=532 cf Inflow=0.19 cfs 967 cf
Outflow=0.03 cfs 558 cf

Pond SF2: Sand Filter Area 2 Peak Elev=-3.76' Storage=0.107 af Inflow=12.50 cfs 42,221 cf
Outflow=9.99 cfs 42,221 cf

Pond SF3: Sand Filter Area 3 Peak Elev=-3.79' Storage=0.145 af Inflow=12.98 cfs 42,362 cf
Outflow=9.36 cfs 42,362 cf

Pond SF5: SAND FILTER AREA 5 Peak Elev=-3.96' Storage=0.073 af Inflow=7.79 cfs 25,438 cf
Outflow=5.94 cfs 25,438 cf

Pond SF6: SAND FILTER AREA 6 Peak Elev=-3.80' Storage=0.137 af Inflow=12.47 cfs 41,330 cf
Outflow=9.07 cfs 41,330 cf

Pond SF7: SAND FILTER AREA 7 Peak Elev=-4.08' Storage=0.037 af Inflow=4.95 cfs 16,406 cf
Outflow=4.02 cfs 16,406 cf

Pond SF8: SAND FILTER AREA 8 Peak Elev=-4.15' Storage=0.031 af Inflow=3.82 cfs 12,465 cf
Outflow=3.04 cfs 12,465 cf

Pond SFA1: SAND FILTER AREA A1 Peak Elev=-3.73' Storage=0.127 af Inflow=13.74 cfs 43,814 cf
Outflow=10.70 cfs 43,814 cf

Pond SFA2: SAND FILTER AREA A2 Peak Elev=-3.78' Storage=0.186 af Inflow=14.32 cfs 49,445 cf
Outflow=9.64 cfs 49,445 cf

Pond T1: Sand Filter 1 Peak Elev=1.82' Storage=2,918 cf Inflow=4.86 cfs 8,326 cf
Primary=3.02 cfs 8,073 cf Secondary=0.00 cfs 0 cf Outflow=3.02 cfs 8,073 cf

Pond T2: Sand Filter 2 Peak Elev=0.27' Storage=2,310 cf Inflow=4.95 cfs 8,326 cf
Primary=3.57 cfs 8,099 cf Secondary=0.00 cfs 0 cf Outflow=3.57 cfs 8,099 cf

Pond T3: Sand Filter 3 Peak Elev=-0.43' Storage=274 cf Inflow=1.08 cfs 1,296 cf
Primary=0.95 cfs 1,203 cf Secondary=0.00 cfs 0 cf Outflow=0.95 cfs 1,203 cf

Pond T4: Sand Filter 4 Peak Elev=-0.16' Storage=313 cf Inflow=0.90 cfs 1,044 cf
Primary=0.72 cfs 952 cf Secondary=0.00 cfs 0 cf Outflow=0.72 cfs 952 cf

Link 1L: WEST WETL Inflow=47.82 cfs 234,448 cf
Primary=47.82 cfs 234,448 cf

Link 2L: TUTTLE BROOK Inflow=124.12 cfs 565,321 cf
Primary=124.12 cfs 565,321 cf

Link 3L: EAST WETL Inflow=97.06 cfs 1,307,668 cf
Primary=97.06 cfs 1,307,668 cf

Link 4L: MORRIS CREEK Inflow=248.57 cfs 2,365,358 cf
Primary=248.57 cfs 2,365,358 cf

Link AP1: TIDE GATE Inflow=400.27 cfs 3,103,967 cf
Primary=400.27 cfs 3,103,967 cf

Link PS1: Pump Station 1 below 75.00 cfs Inflow=43.25 cfs 189,145 cf
Primary=43.25 cfs 189,145 cf Secondary=0.00 cfs 0 cf

Link PS2: Pump Station 2 below 120.00 cfs Inflow=40.61 cfs 170,611 cf
Primary=40.61 cfs 170,611 cf Secondary=0.00 cfs 0 cf

Link SS1: SITESAVER1 - STSS-7 below 7.56 cfs Inflow=3.27 cfs 10,544 cf
Primary=3.27 cfs 10,544 cf Secondary=0.00 cfs 0 cf

Link SS2: SITESAVER2 - STSS-7 below 7.56 cfs Inflow=3.32 cfs 10,844 cf
Primary=3.32 cfs 10,844 cf Secondary=0.00 cfs 0 cf

Link SS3: SITESAVER3 - STSS-12 below 12.96 cfs Inflow=5.39 cfs 18,219 cf
Primary=5.39 cfs 18,219 cf Secondary=0.00 cfs 0 cf

Link SS4: SITESAVER4 - STSS-4 below 4.32 cfs Inflow=1.14 cfs 3,786 cf
Primary=1.14 cfs 3,786 cf Secondary=0.00 cfs 0 cf

Link SS5: SITESAVER5 - STSS-4 below 4.32 cfs Inflow=1.71 cfs 5,679 cf
Primary=1.71 cfs 5,679 cf Secondary=0.00 cfs 0 cf

Link SS6: SITESAVER6 - STSS-4 below 4.32 cfs Inflow=1.71 cfs 5,679 cf
Primary=1.71 cfs 5,679 cf Secondary=0.00 cfs 0 cf

Link SS7: SITESAVER7 - STSS-4 below 4.32 cfs Inflow=2.03 cfs 6,731 cf
Primary=2.03 cfs 6,731 cf Secondary=0.00 cfs 0 cf

Link SS8: SITESAVER8 - STSS-7 below 7.56 cfs Inflow=7.85 cfs 24,800 cf
Primary=7.82 cfs 24,793 cf Secondary=0.04 cfs 7 cf

Link W1: EAST WETL Inflow=43.25 cfs 189,145 cf
Primary=43.25 cfs 189,145 cf

Total Runoff Area = 24,288,724 sf Runoff Volume = 3,147,806 cf Average Runoff Depth = 1.56"
63.05% Pervious = 15,313,137 sf 36.95% Impervious = 8,975,587 sf

Summary for Subcatchment 1: Area 1

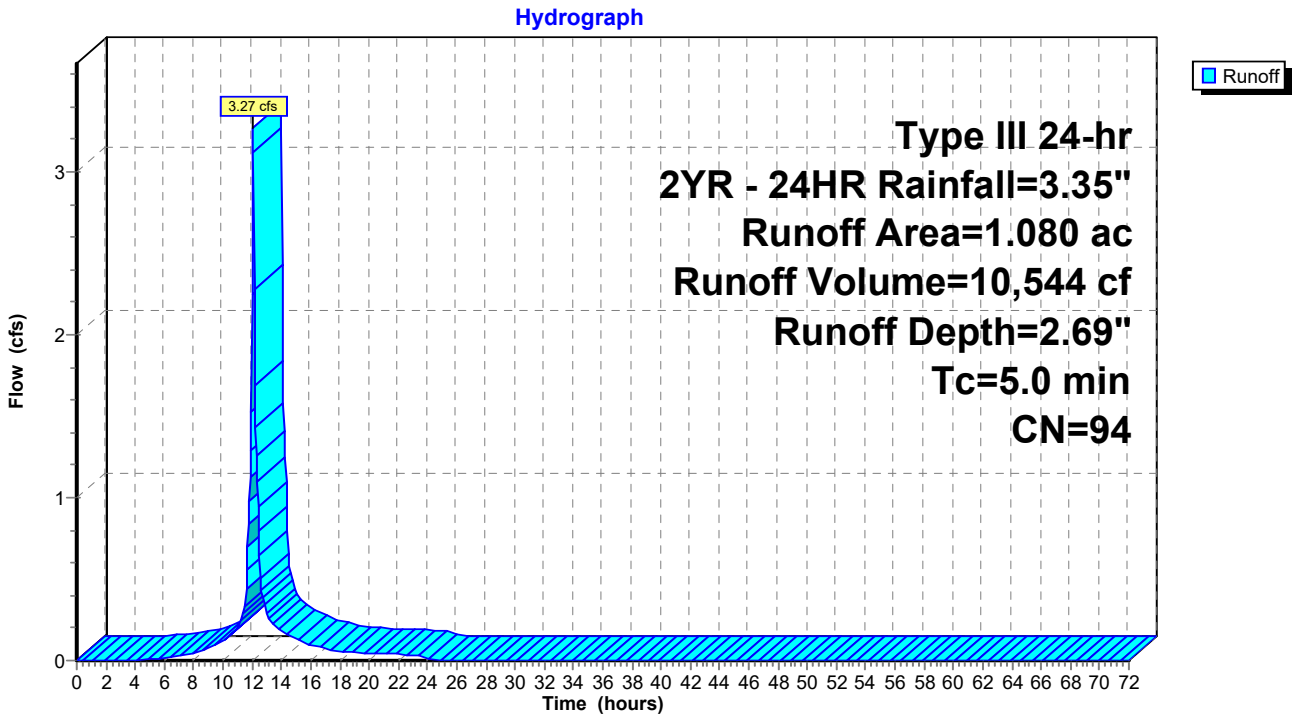
Runoff = 3.27 cfs @ 12.07 hrs, Volume= 10,544 cf, Depth= 2.69"
Routed to Link SS1 : SITESAVER 1 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
0.940	98	Paved parking, HSG A
0.140	68	<50% Grass cover, Poor, HSG A
1.080	94	Weighted Average
0.140		12.96% Pervious Area
0.940		87.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1: Area 1



Summary for Subcatchment 1S: SC 1

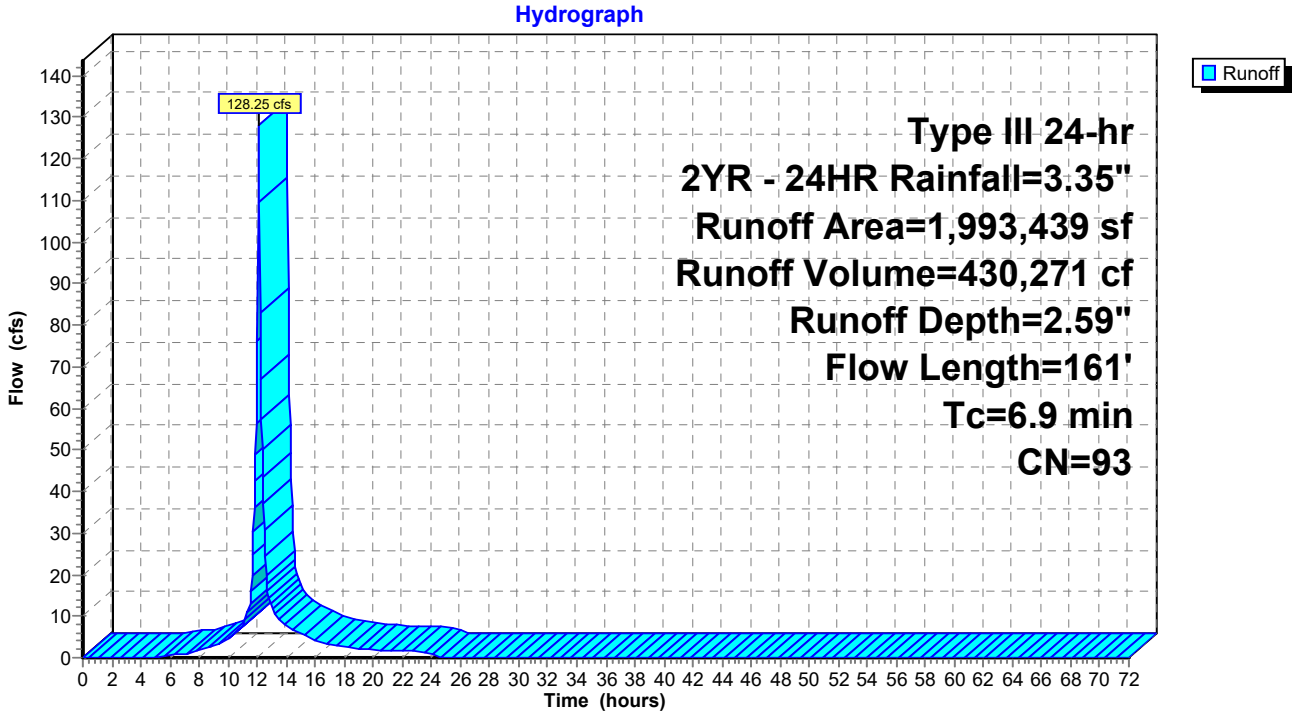
Runoff = 128.25 cfs @ 12.10 hrs, Volume= 430,271 cf, Depth= 2.59"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	210,509	80	>75% Grass cover, Good, HSG D
	40,323	96	Gravel surface, HSG D
	176,389	98	Water Surface, 0% imp, HSG D
	10,474	98	Unconnected pavement, HSG A
	32,944	98	Unconnected pavement, HSG D
	248,525	77	Woods, Good, HSG D
*	1,274,275	98	Wetland/Water Surface, 0% imp, HSG D
	1,993,439	93	Weighted Average
	1,950,021		97.82% Pervious Area
	43,418		2.18% Impervious Area
	43,418		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	23	0.1335	2.22		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
6.7	138	0.0024	0.34		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.9	161	Total			

Subcatchment 1S: SC 1



Summary for Subcatchment 2: Area 2

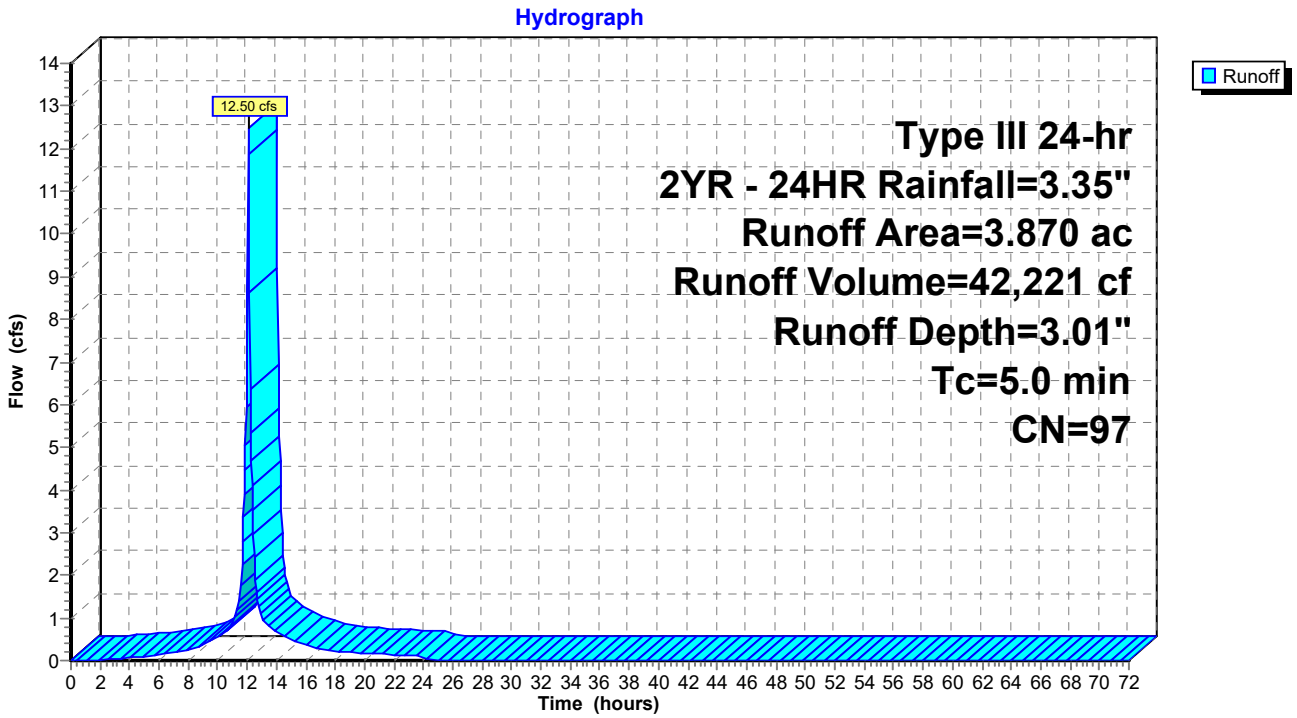
Runoff = 12.50 cfs @ 12.07 hrs, Volume= 42,221 cf, Depth= 3.01"
Routed to Pond SF2 : Sand Filter Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
3.760	98	Paved parking, HSG A
0.110	68	<50% Grass cover, Poor, HSG A
3.870	97	Weighted Average
0.110		2.84% Pervious Area
3.760		97.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Area 2



Summary for Subcatchment 2S: SC 2

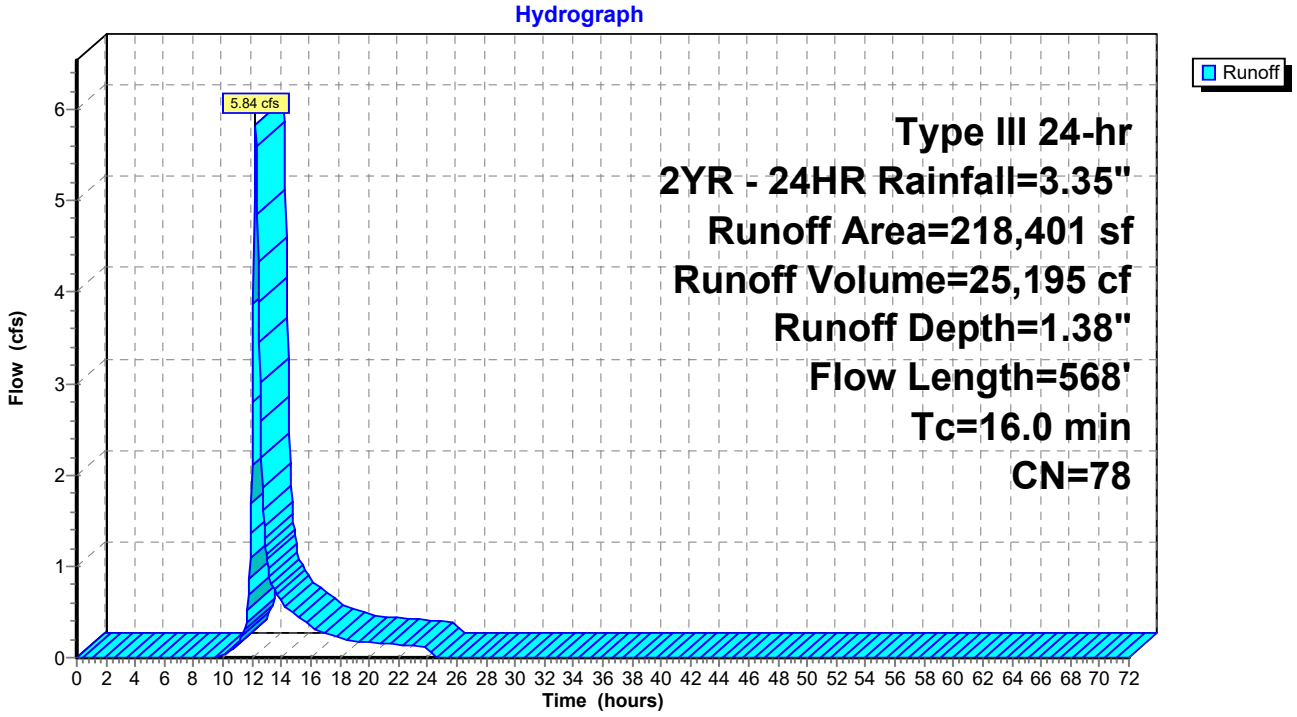
Runoff = 5.84 cfs @ 12.23 hrs, Volume= 25,195 cf, Depth= 1.38"
Routed to Pond CB11 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
119,910	61	>75% Grass cover, Good, HSG B
84,094	98	Unconnected pavement, HSG A
14,397	98	Unconnected pavement, HSG D
218,401	78	Weighted Average
119,910		54.90% Pervious Area
98,491		45.10% Impervious Area
98,491		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	81	0.0114	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
14.7	487	0.0062	0.55		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
16.0	568	Total			

Subcatchment 2S: SC 2



Summary for Subcatchment 3: Area 3

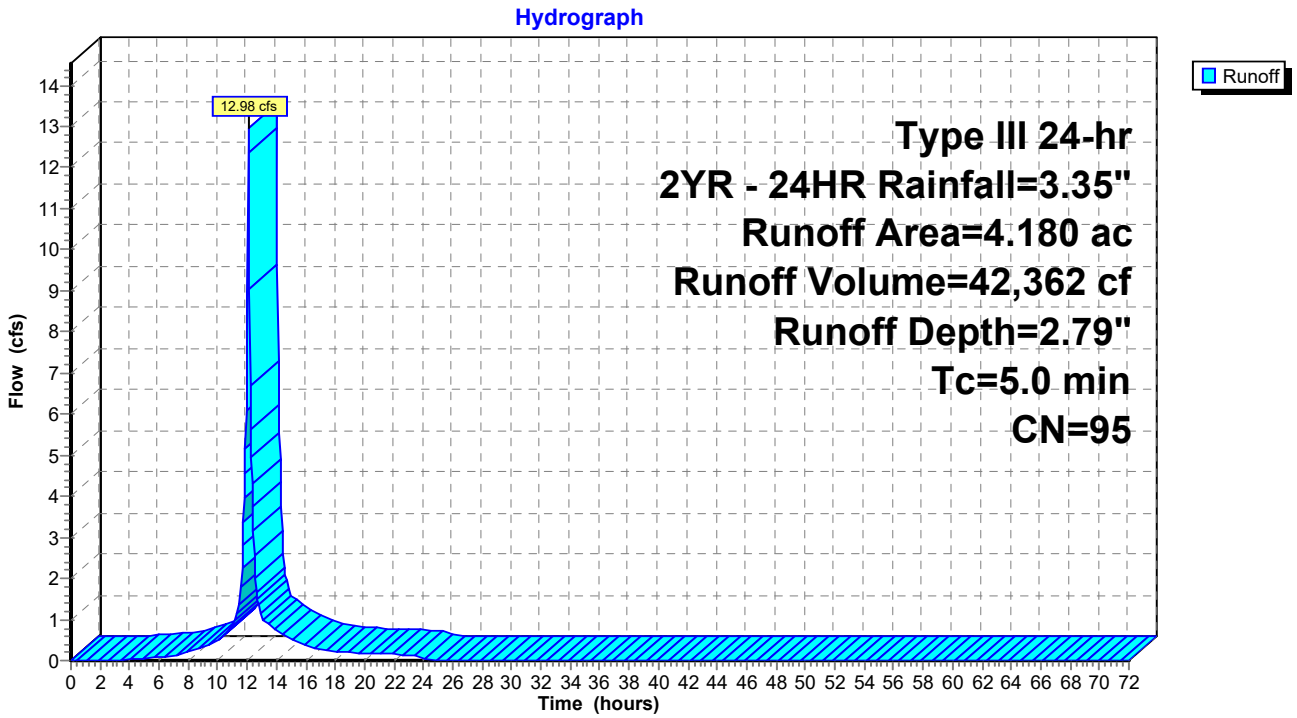
Runoff = 12.98 cfs @ 12.07 hrs, Volume= 42,362 cf, Depth= 2.79"
Routed to Pond SF3 : Sand Filter Area 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
3.830	98	Paved parking, HSG A
0.350	68	<50% Grass cover, Poor, HSG A
4.180	95	Weighted Average
0.350		8.37% Pervious Area
3.830		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Area 3



Summary for Subcatchment 3A: SC 3A

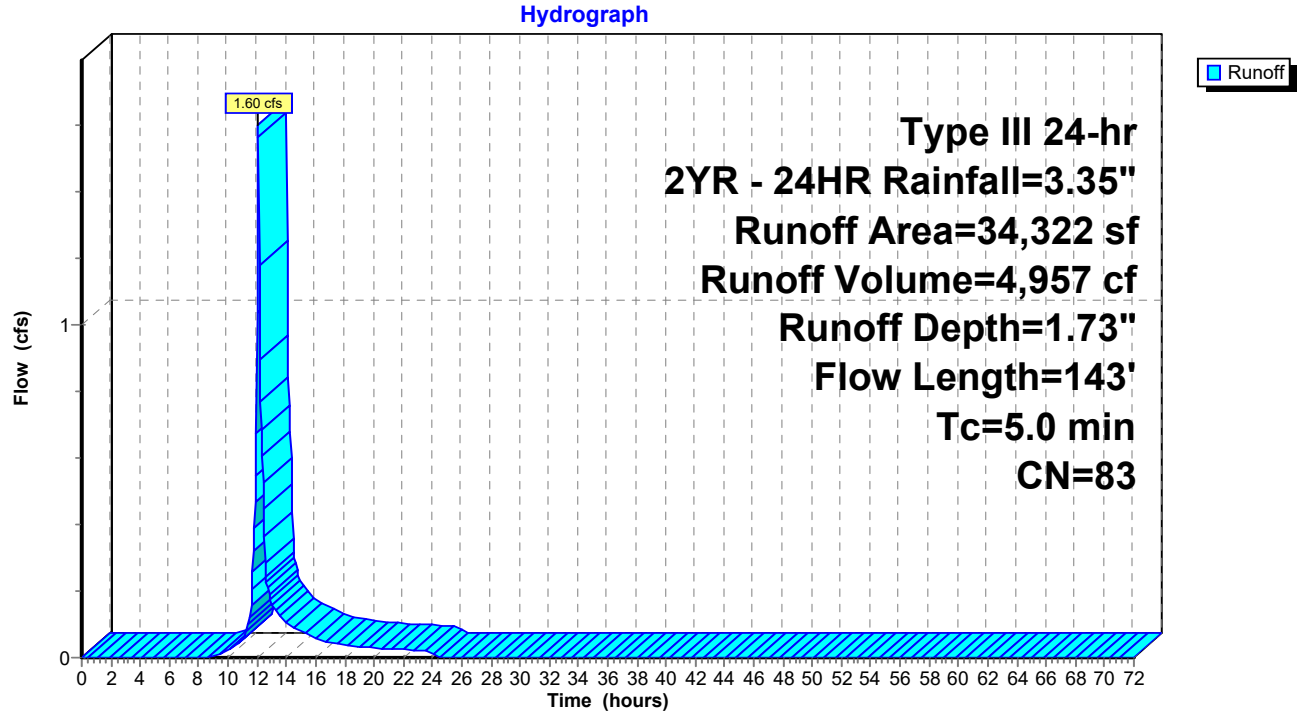
Runoff = 1.60 cfs @ 12.08 hrs, Volume= 4,957 cf, Depth= 1.73"
Routed to Reach PT3 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
13,969	61	>75% Grass cover, Good, HSG B
20,353	98	Unconnected pavement, HSG A
34,322	83	Weighted Average
13,969		40.70% Pervious Area
20,353		59.30% Impervious Area
20,353		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	84	0.0055	0.80		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.2	59	0.0145	0.84		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.1					**Direct Entry, minimum 5 min**
5.0	143	Total			

Subcatchment 3A: SC 3A



Summary for Subcatchment 3B: SC 3B

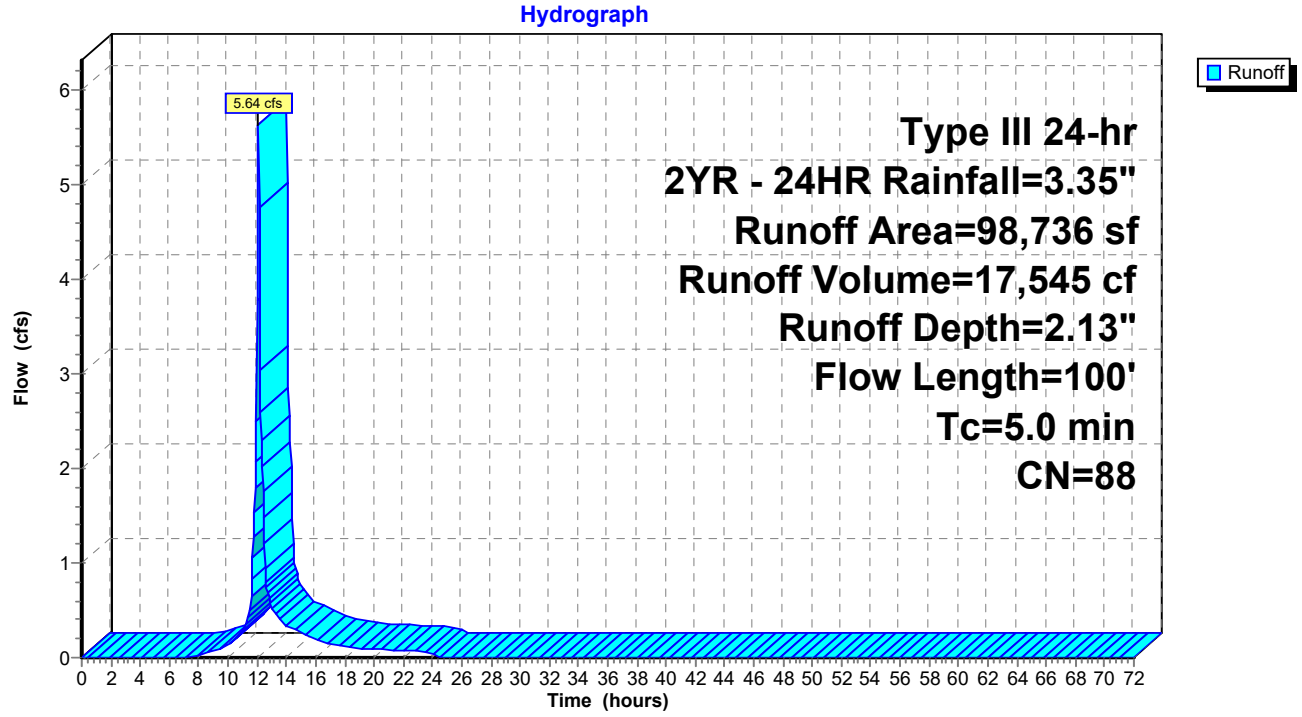
Runoff = 5.64 cfs @ 12.08 hrs, Volume= 17,545 cf, Depth= 2.13"
Routed to Reach PT2 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
27,532	61	>75% Grass cover, Good, HSG B
71,204	98	Unconnected pavement, HSG A
98,736	88	Weighted Average
27,532		27.88% Pervious Area
71,204		72.12% Impervious Area
71,204		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	71	0.0100	0.99		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	29	0.0169	0.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.3					**Direct Entry, minimum 5 min**
5.0	100	Total			

Subcatchment 3B: SC 3B



Summary for Subcatchment 3S: SC 3

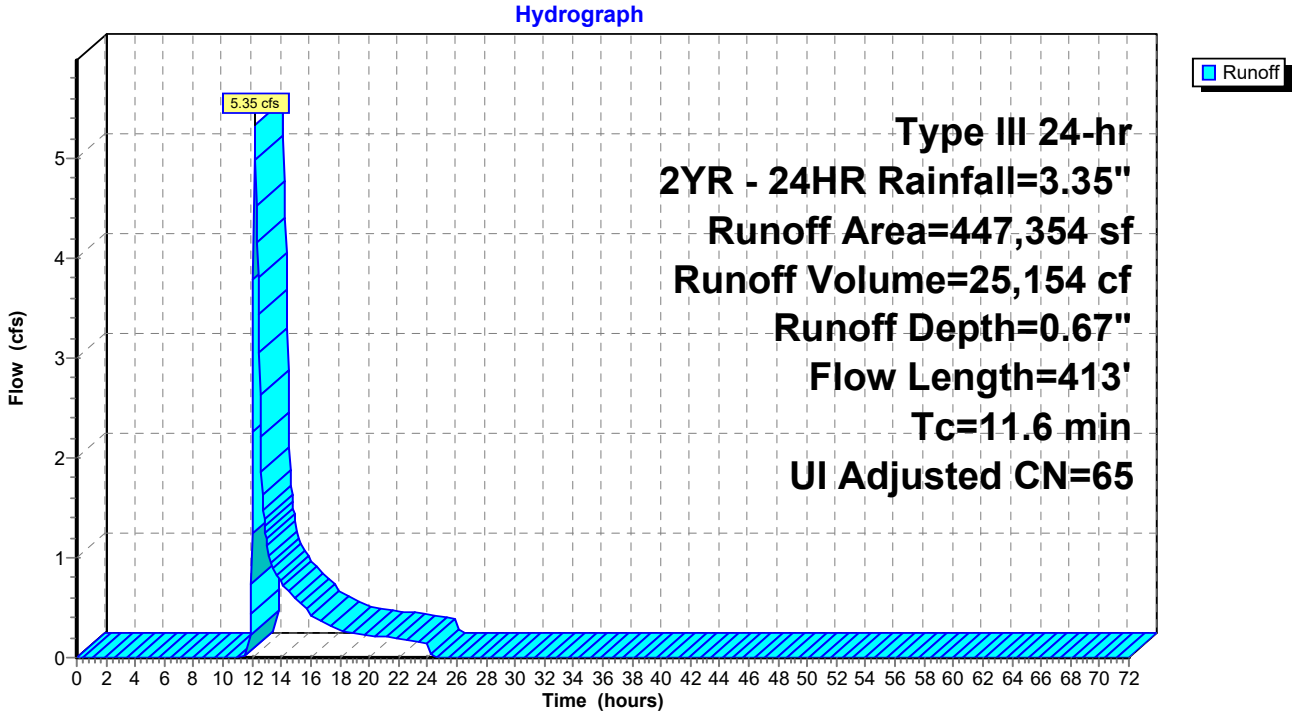
Runoff = 5.35 cfs @ 12.20 hrs, Volume= 25,154 cf, Depth= 0.67"
Routed to Pond CB10 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
356,645	61		>75% Grass cover, Good, HSG B
62,664	98		Unconnected pavement, HSG A
28,045	98		Unconnected pavement, HSG D
447,354	69	65	Weighted Average, UI Adjusted
356,645			79.72% Pervious Area
90,709			20.28% Impervious Area
90,709			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	88	0.0117	1.10		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
10.3	325	0.0056	0.52		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
11.6	413	Total			

Subcatchment 3S: SC 3



Summary for Subcatchment 4: Area 4

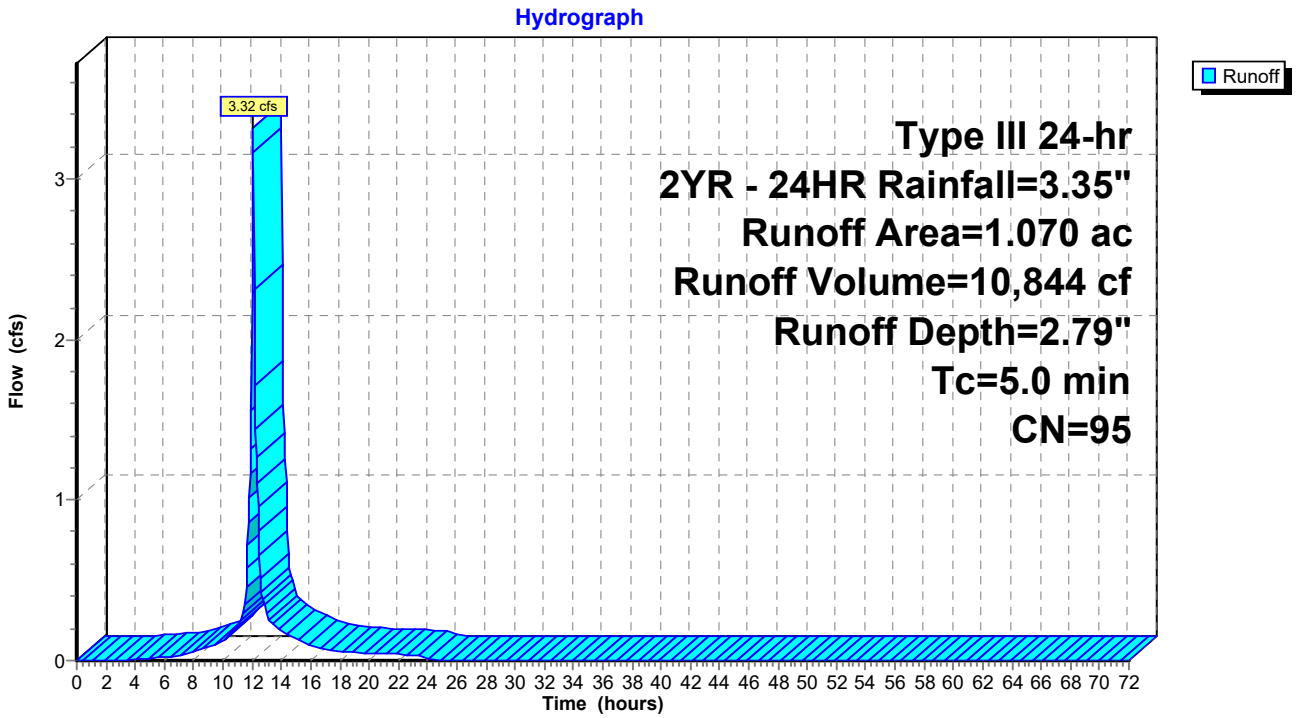
Runoff = 3.32 cfs @ 12.07 hrs, Volume= 10,844 cf, Depth= 2.79"
Routed to Link SS2 : SITESAVER 2 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
0.980	98	Paved parking, HSG A
0.090	68	<50% Grass cover, Poor, HSG A
1.070	95	Weighted Average
0.090		8.41% Pervious Area
0.980		91.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Area 4



Summary for Subcatchment 4S: SC 4 (Reduced)

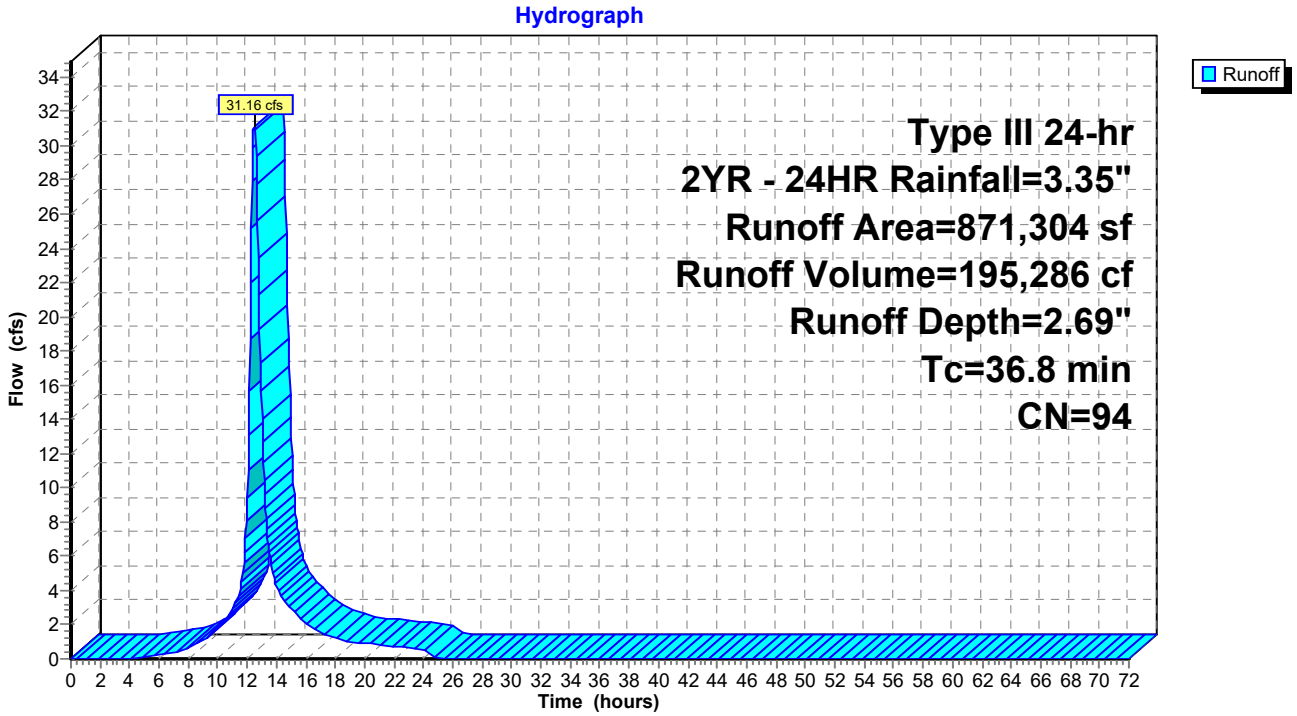
Runoff = 31.16 cfs @ 12.49 hrs, Volume= 195,286 cf, Depth= 2.69"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	98,881	61	>75% Grass cover, Good, HSG B
	18,295	98	Unconnected pavement, HSG B
*	273,992	98	Wetland/Water Surface, HSG B
*	480,136	98	Wetland/Water Surface. HSG D
	871,304	94	Weighted Average
	98,881		11.35% Pervious Area
	772,423		88.65% Impervious Area
	18,295		2.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8					**Direct Entry, See Calculation Sheet**

Subcatchment 4S: SC 4 (Reduced)



Summary for Subcatchment 5: Area 5

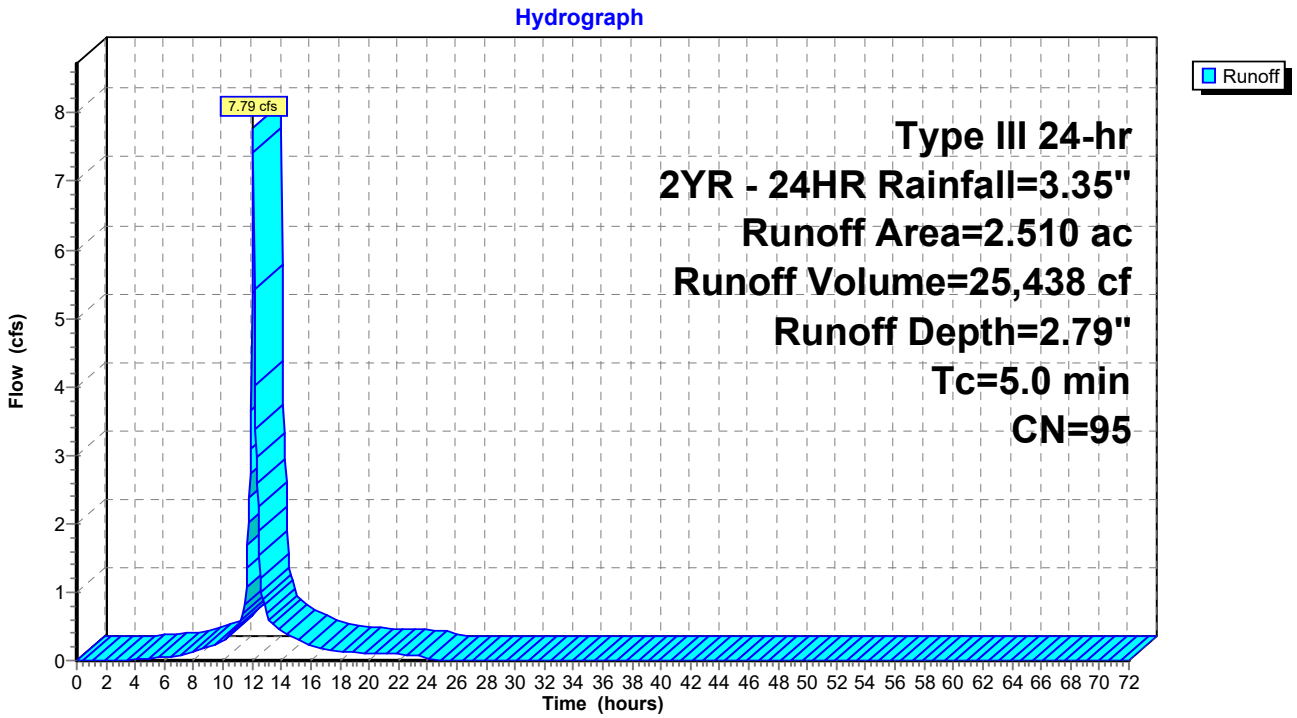
Runoff = 7.79 cfs @ 12.07 hrs, Volume= 25,438 cf, Depth= 2.79"
Routed to Pond SF5 : SAND FILTER AREA 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
2.300	98	Paved parking, HSG A
0.210	68	<50% Grass cover, Poor, HSG A
2.510	95	Weighted Average
0.210		8.37% Pervious Area
2.300		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Area 5



Summary for Subcatchment 6: Area 6

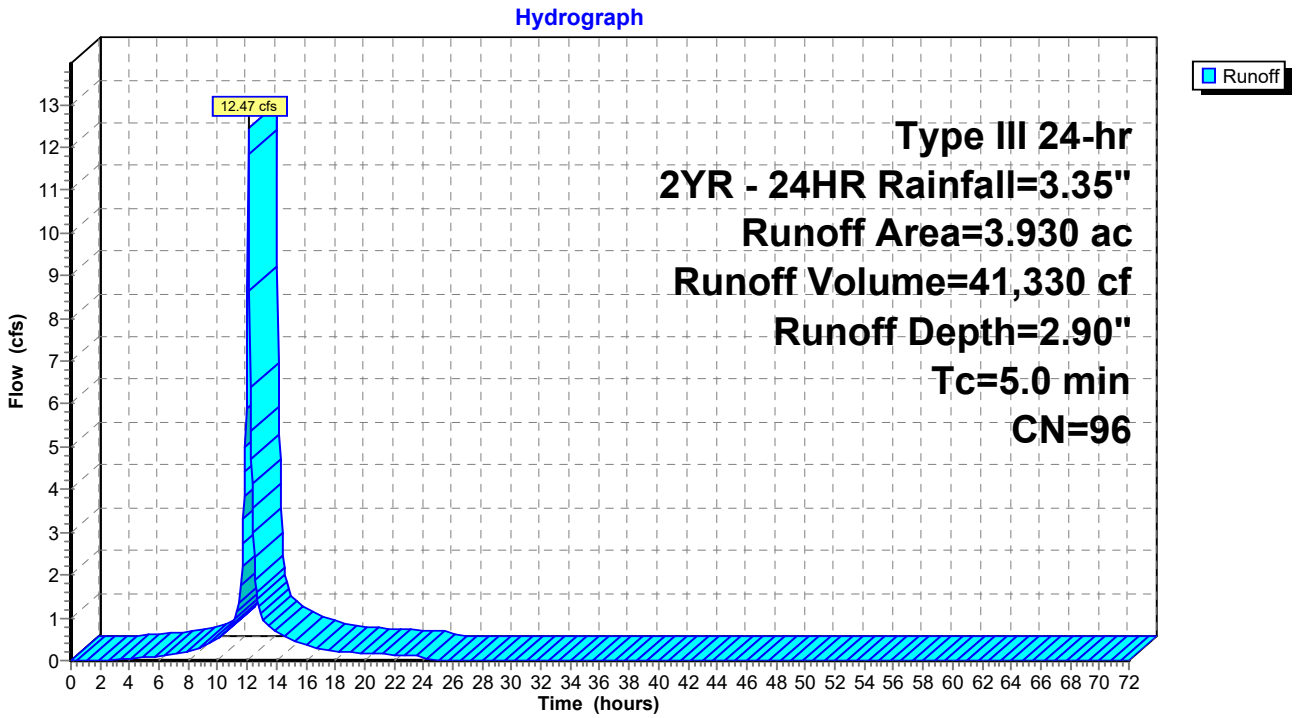
Runoff = 12.47 cfs @ 12.07 hrs, Volume= 41,330 cf, Depth= 2.90"
Routed to Pond SF6 : SAND FILTER AREA 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
3.620	98	Paved parking, HSG A
0.310	68	<50% Grass cover, Poor, HSG A
3.930	96	Weighted Average
0.310		7.89% Pervious Area
3.620		92.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Area 6



Summary for Subcatchment 7: Area 7

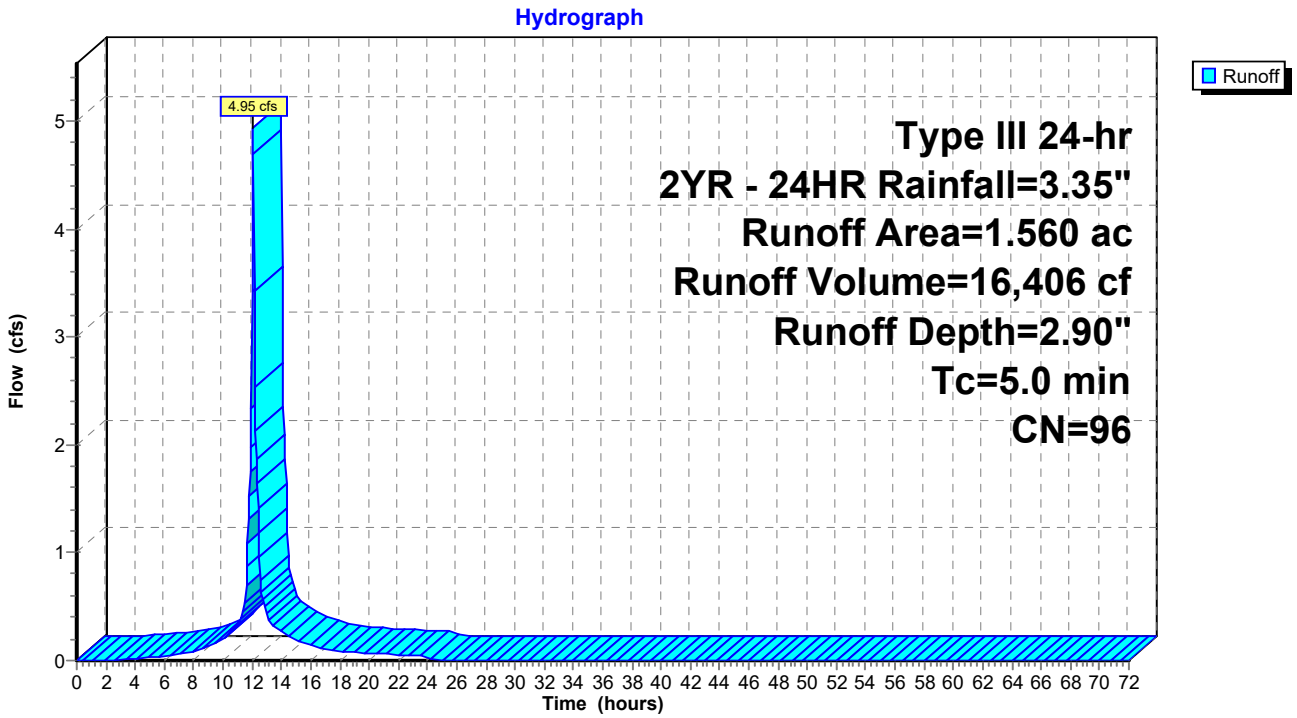
Runoff = 4.95 cfs @ 12.07 hrs, Volume= 16,406 cf, Depth= 2.90"
Routed to Pond SF7 : SAND FILTER AREA 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
1.440	98	Paved parking, HSG A
0.120	68	<50% Grass cover, Poor, HSG A
1.560	96	Weighted Average
0.120		7.69% Pervious Area
1.440		92.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Area 7



Summary for Subcatchment 7A: SC 7A

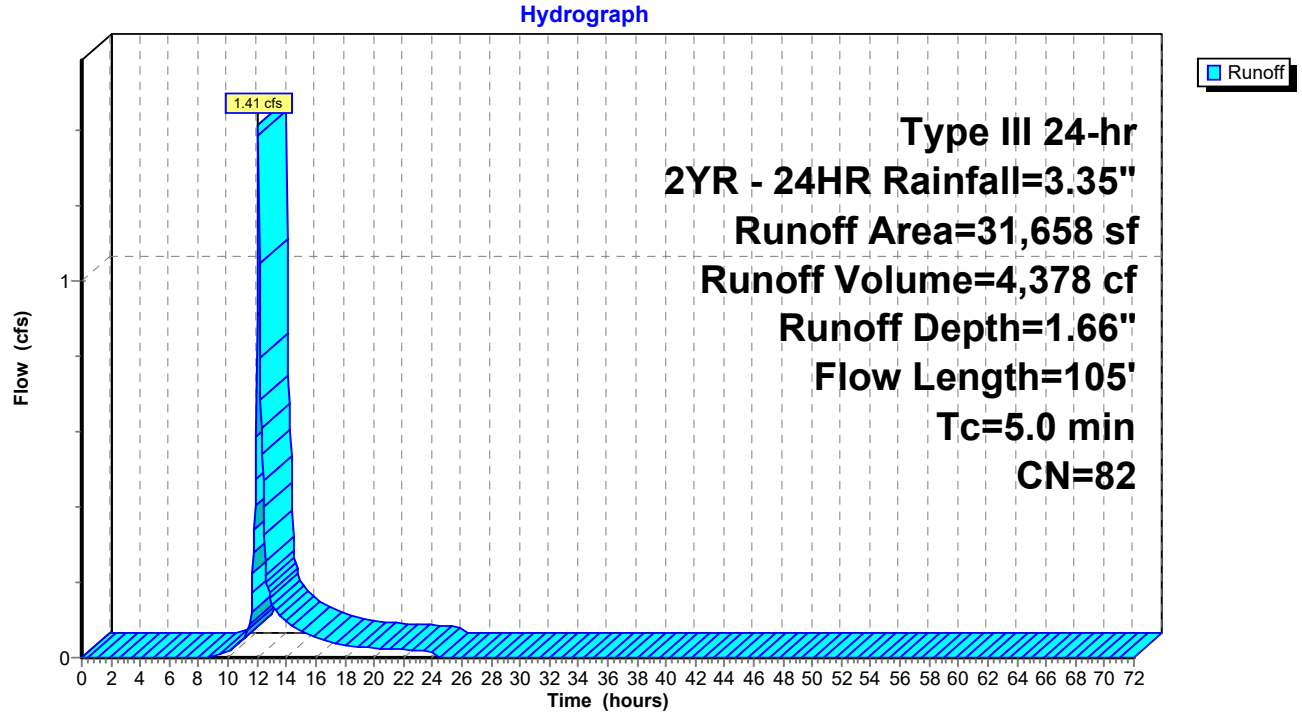
Runoff = 1.41 cfs @ 12.08 hrs, Volume= 4,378 cf, Depth= 1.66"
Routed to Reach PT4 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
13,875	61	>75% Grass cover, Good, HSG B
17,783	98	Unconnected pavement, HSG A
31,658	82	Weighted Average
13,875		43.83% Pervious Area
17,783		56.17% Impervious Area
17,783		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0123	1.08		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	33	0.0254	1.12		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.4					**Direct Entry, minimum 5 min**
5.0	105	Total			

Subcatchment 7A: SC 7A



Summary for Subcatchment 7B: SC 7

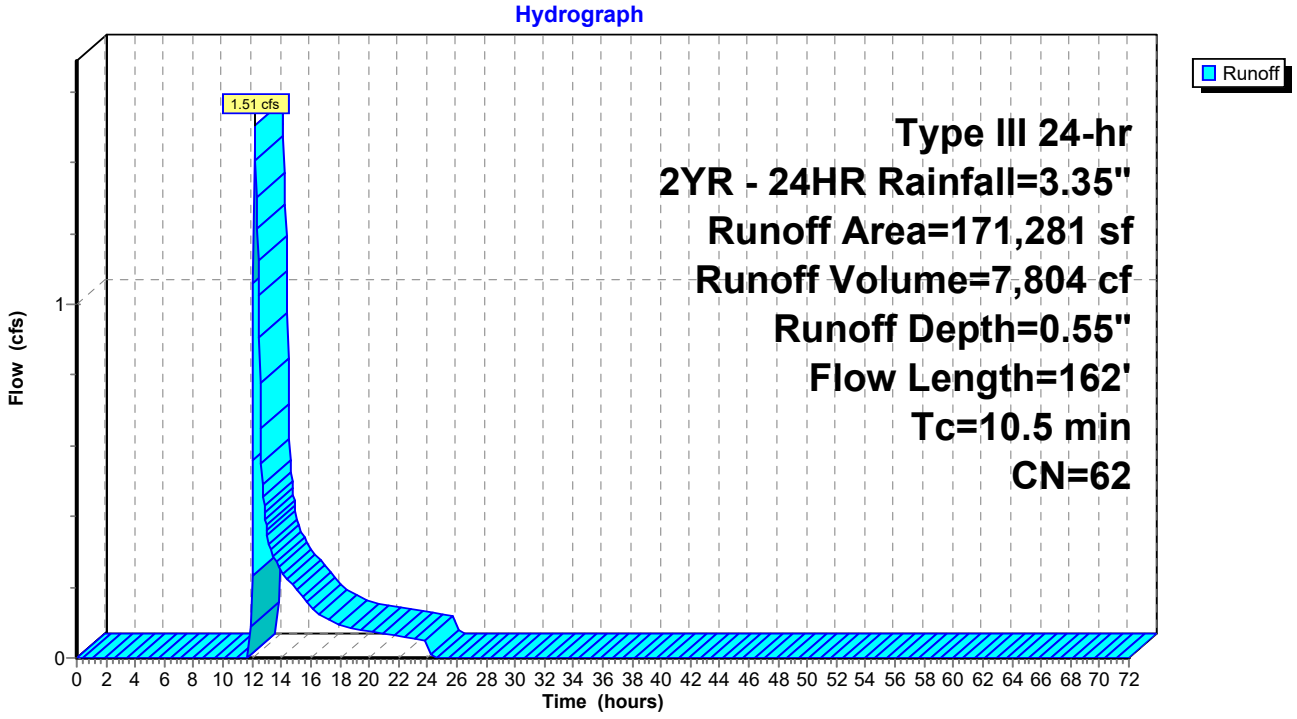
Runoff = 1.51 cfs @ 12.19 hrs, Volume= 7,804 cf, Depth= 0.55"
Routed to Pond MH1 : MH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
165,238	61	>75% Grass cover, Good, HSG B
6,043	98	Unconnected pavement, HSG D
171,281	62	Weighted Average
165,238		96.47% Pervious Area
6,043		3.53% Impervious Area
6,043		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0097	0.86		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.8	124	0.0009	0.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
10.5	162	Total			

Subcatchment 7B: SC 7



Summary for Subcatchment 7S: SC 7

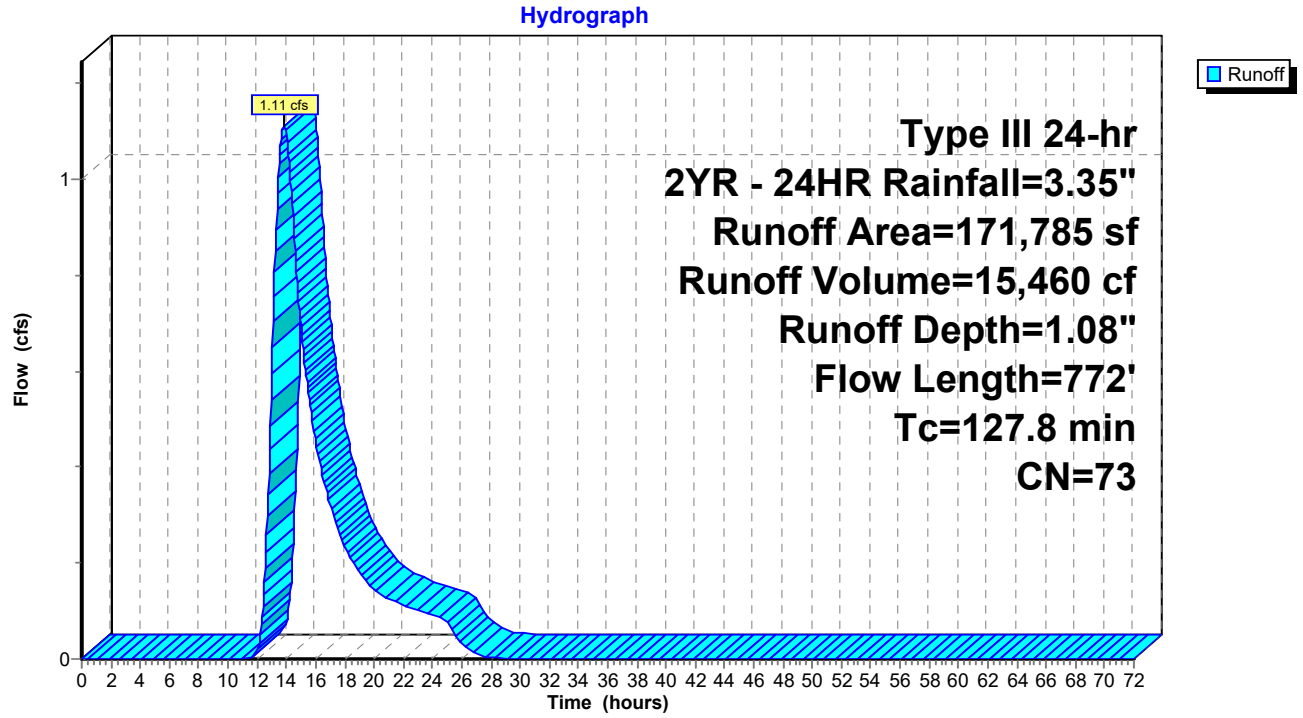
Runoff = 1.11 cfs @ 13.80 hrs, Volume= 15,460 cf, Depth= 1.08"
Routed to Pond CB6 : New CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
118,215	61	>75% Grass cover, Good, HSG B
53,570	98	Unconnected pavement, HSG A
171,785	73	Weighted Average
118,215		68.82% Pervious Area
53,570		31.18% Impervious Area
53,570		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	76	0.0118	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.5	179	0.0152	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
123.1	517	0.0001	0.07		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
127.8	772	Total			

Subcatchment 7S: SC 7



Summary for Subcatchment 8: Area 8

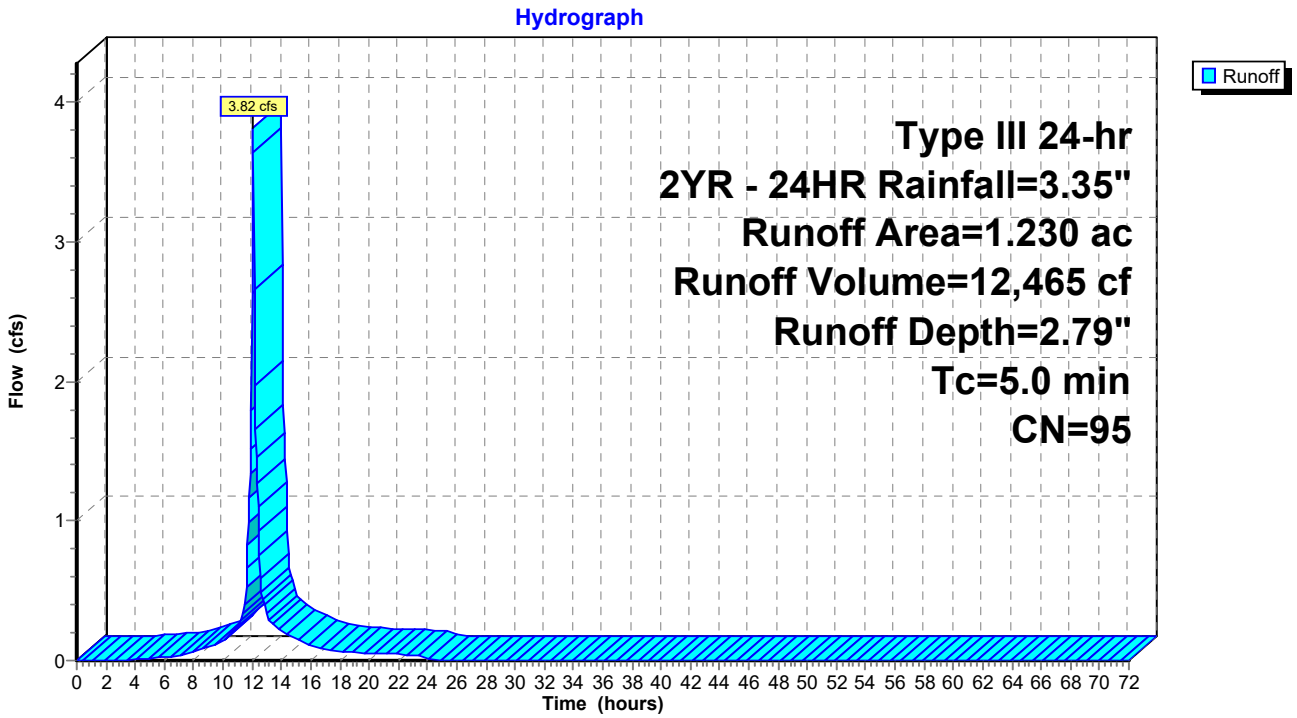
Runoff = 3.82 cfs @ 12.07 hrs, Volume= 12,465 cf, Depth= 2.79"
Routed to Pond SF8 : SAND FILTER AREA 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG A
0.120	68	<50% Grass cover, Poor, HSG A
1.230	95	Weighted Average
0.120		9.76% Pervious Area
1.110		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8: Area 8



Summary for Subcatchment 8A: SC 8A

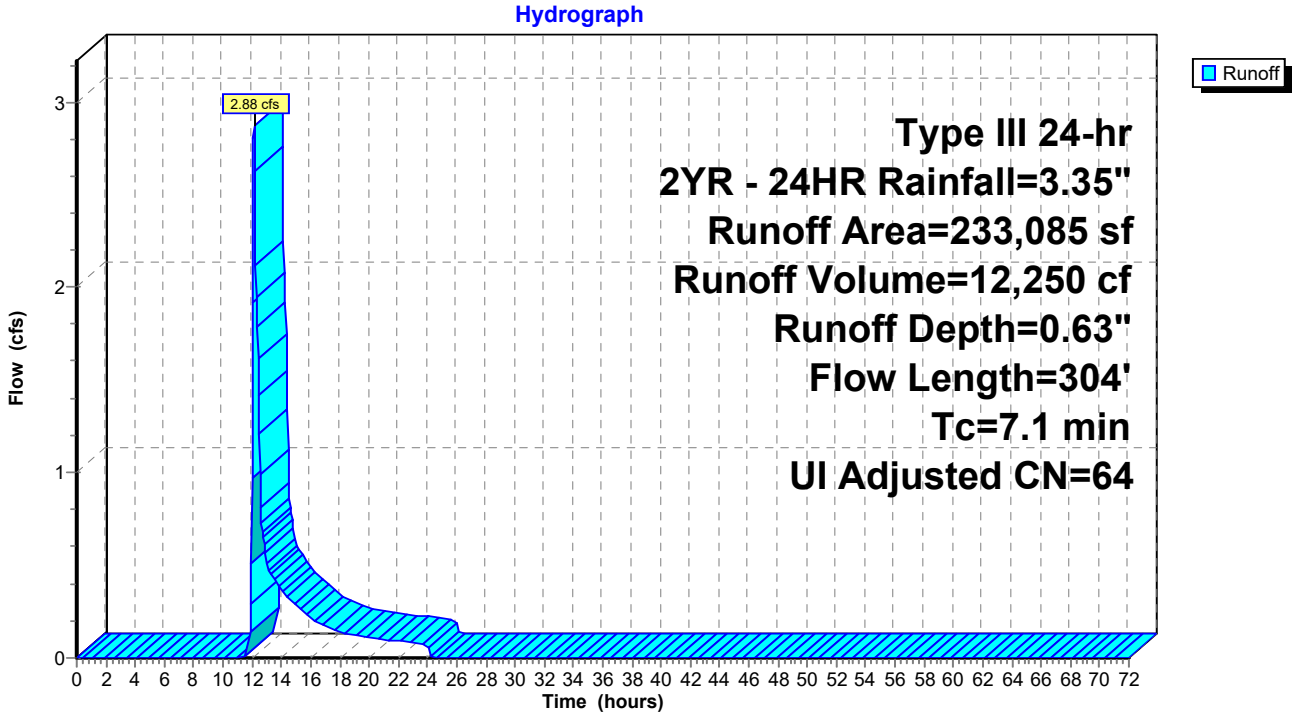
Runoff = 2.88 cfs @ 12.13 hrs, Volume= 12,250 cf, Depth= 0.63"
Routed to Pond CB7 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
201,343	61		>75% Grass cover, Good, HSG B
31,742	98		Unconnected pavement, HSG A
233,085	66	64	Weighted Average, UI Adjusted
201,343			86.38% Pervious Area
31,742			13.62% Impervious Area
31,742			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	115	0.0010	0.43		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
2.7	189	0.0274	1.16		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.1	304	Total			

Subcatchment 8A: SC 8A



Summary for Subcatchment 8S: SC 8

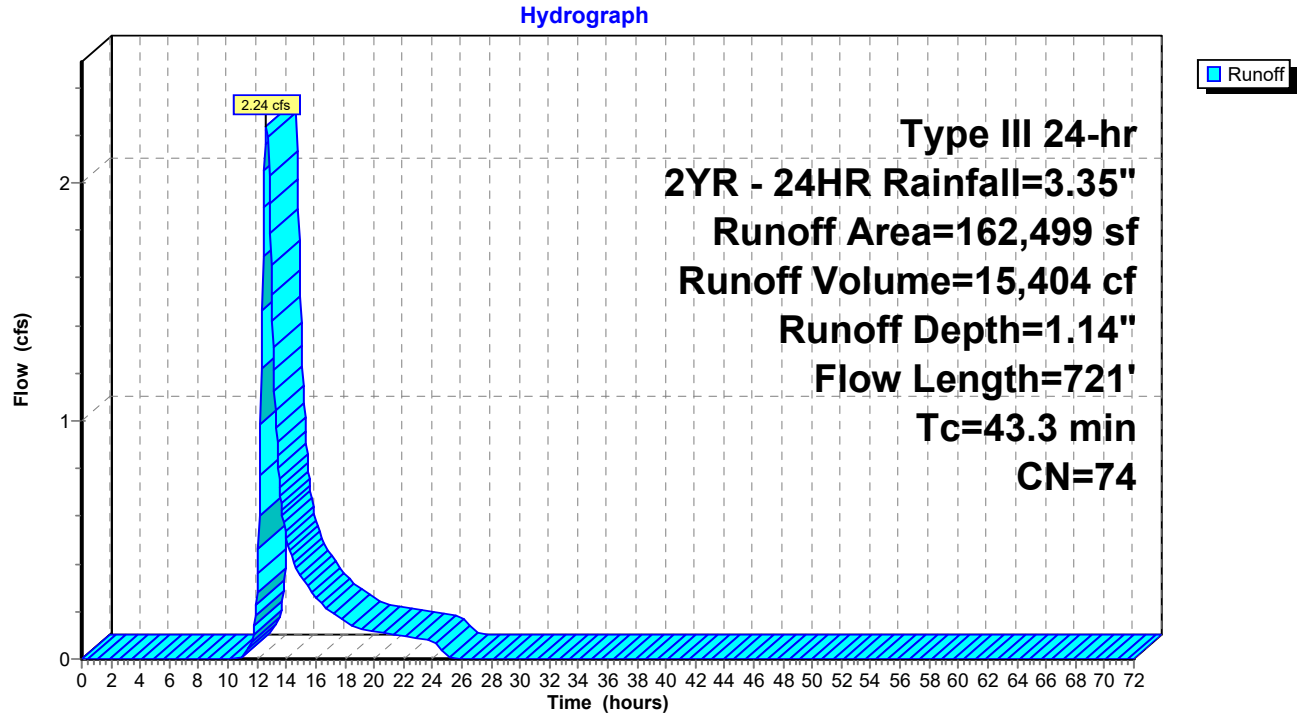
Runoff = 2.24 cfs @ 12.64 hrs, Volume= 15,404 cf, Depth= 1.14"
Routed to Pond MH1 : MH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
107,335	61	>75% Grass cover, Good, HSG B
55,164	98	Unconnected pavement, HSG A
162,499	74	Weighted Average
107,335		66.05% Pervious Area
55,164		33.95% Impervious Area
55,164		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	106	0.0093	1.04		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
5.7	246	0.0106	0.72		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
35.9	369	0.0006	0.17		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
43.3	721	Total			

Subcatchment 8S: SC 8



Summary for Subcatchment 9A: Area 9A

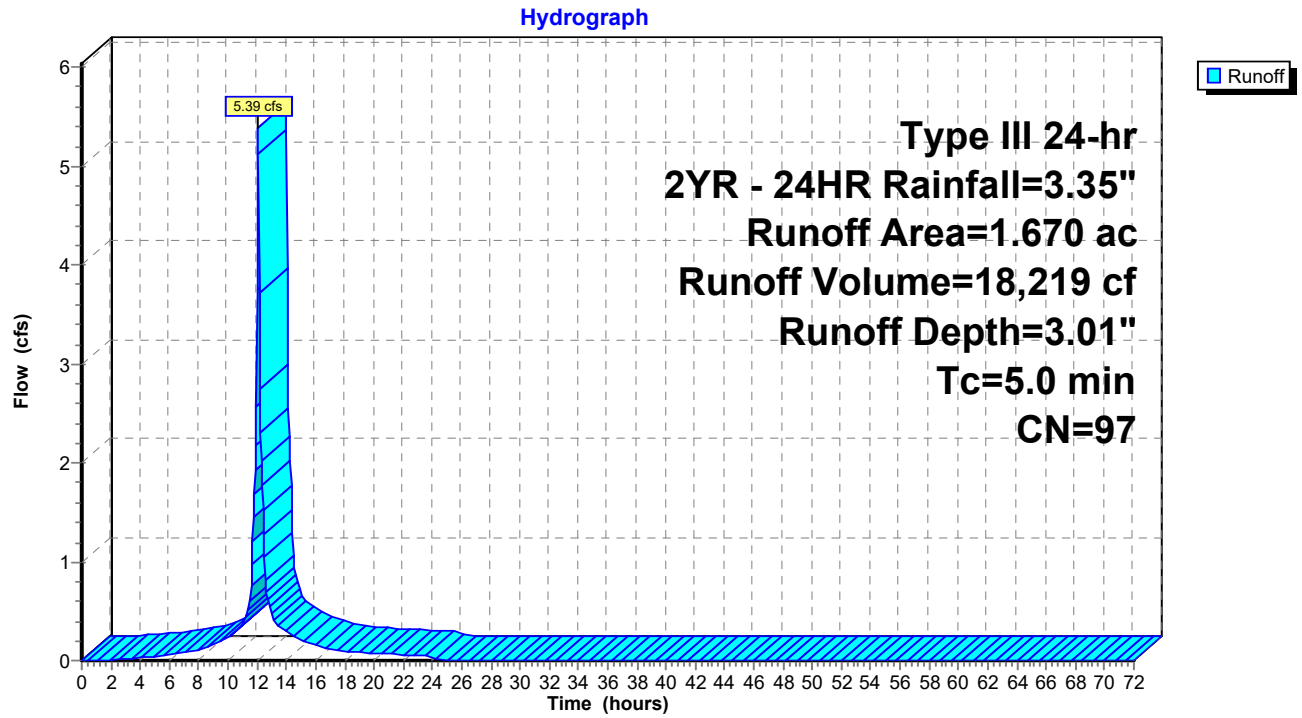
Runoff = 5.39 cfs @ 12.07 hrs, Volume= 18,219 cf, Depth= 3.01"
Routed to Link SS3 : SITESAVER 3 - STSS-12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
1.590	98	Paved parking, HSG A
0.080	68	<50% Grass cover, Poor, HSG A
1.670	97	Weighted Average
0.080		4.79% Pervious Area
1.590		95.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9A: Area 9A



Summary for Subcatchment 9b: Area 9b

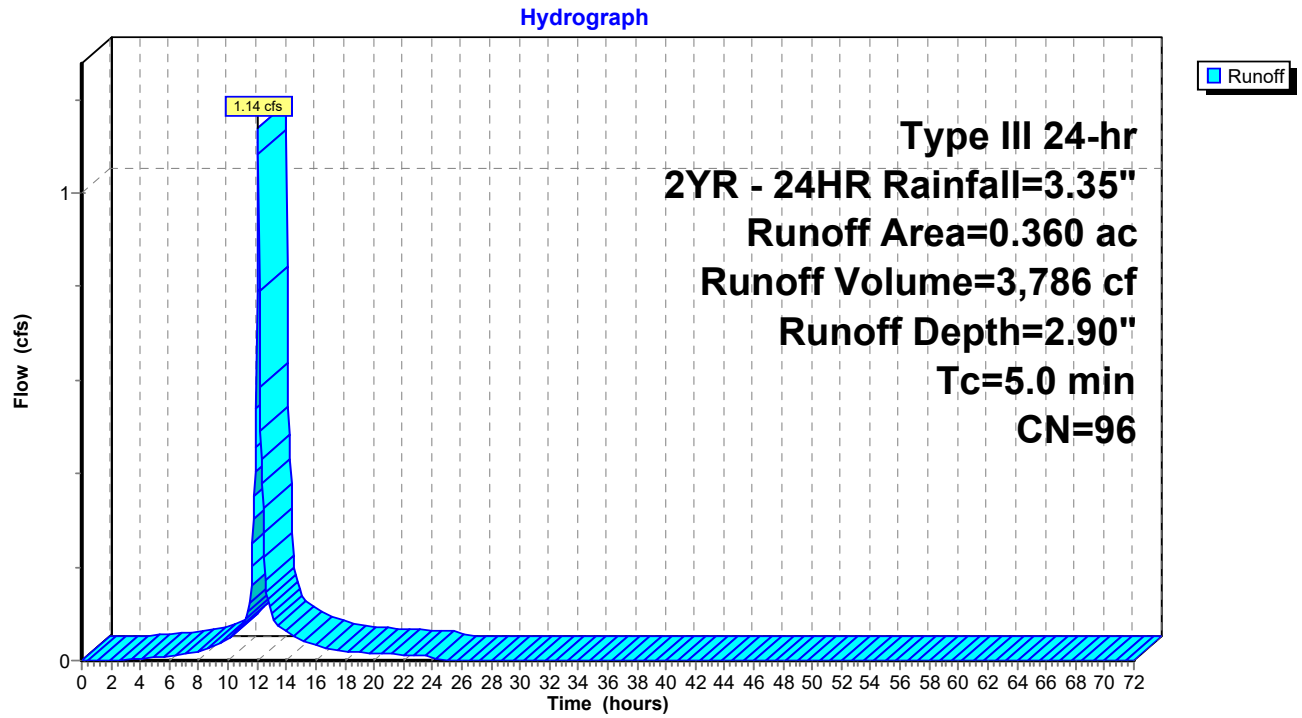
Runoff = 1.14 cfs @ 12.07 hrs, Volume= 3,786 cf, Depth= 2.90"
Routed to Link SS4 : SITESAVER 4 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
0.330	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.360	96	Weighted Average
0.030		8.33% Pervious Area
0.330		91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9b: Area 9b



Summary for Subcatchment 9c: Area 9c

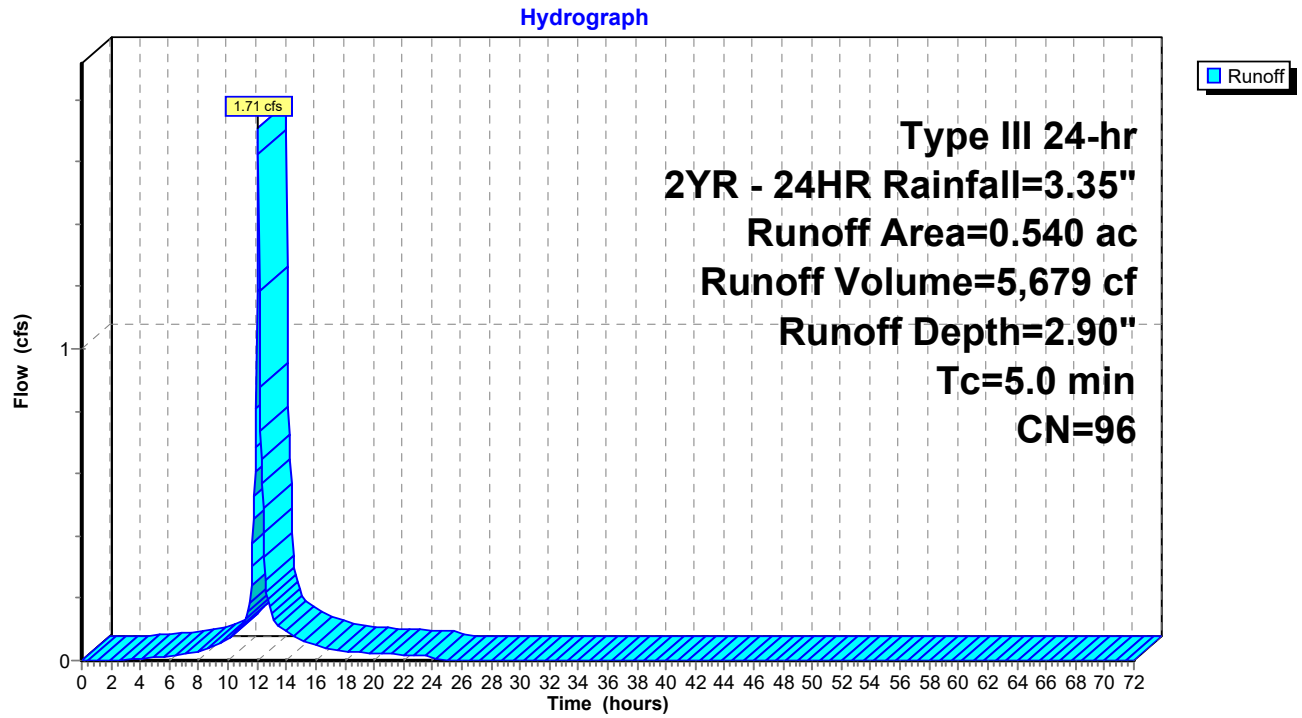
Runoff = 1.71 cfs @ 12.07 hrs, Volume= 5,679 cf, Depth= 2.90"
Routed to Link SS5 : SITESAVER 5 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.540	96	Weighted Average
0.030		5.56% Pervious Area
0.510		94.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9c: Area 9c



Summary for Subcatchment 9d: Area 9d

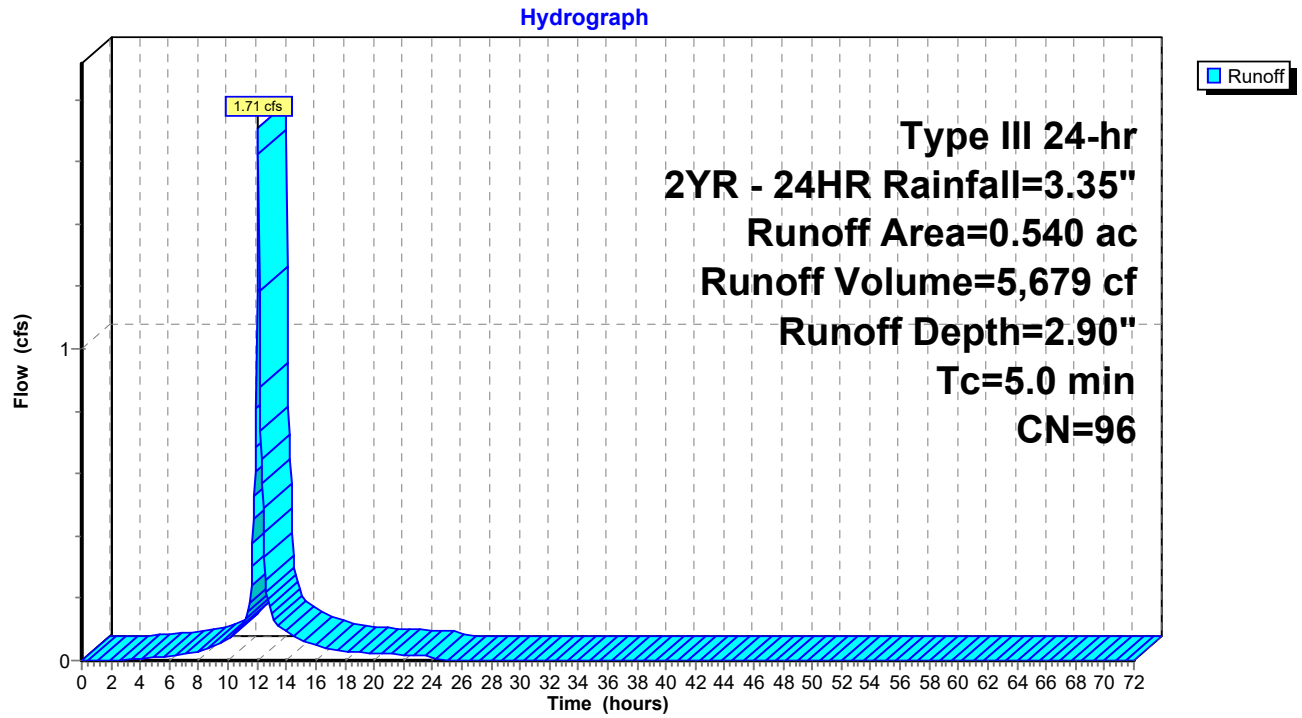
Runoff = 1.71 cfs @ 12.07 hrs, Volume= 5,679 cf, Depth= 2.90"
Routed to Link SS6 : SITESAVER 6 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.540	96	Weighted Average
0.030		5.56% Pervious Area
0.510		94.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9d: Area 9d



Summary for Subcatchment 9e: Area 9e

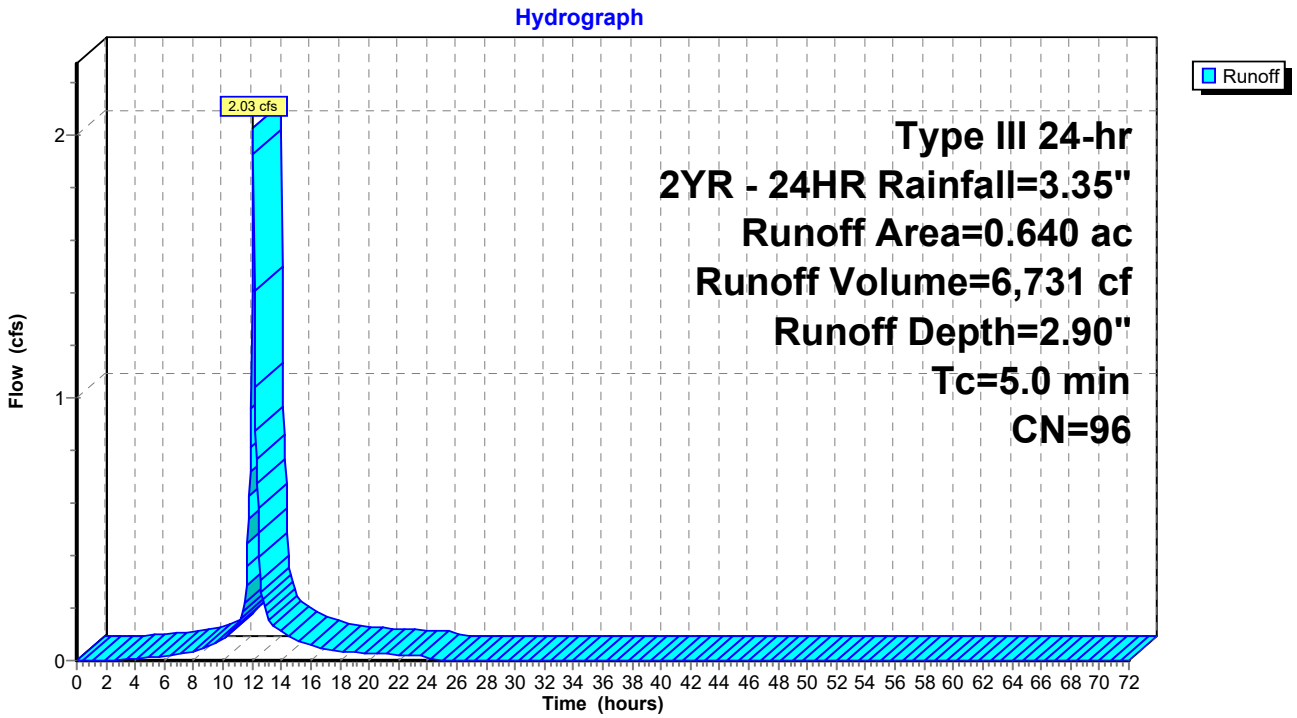
Runoff = 2.03 cfs @ 12.07 hrs, Volume= 6,731 cf, Depth= 2.90"
Routed to Link SS7 : SITESAVER 7 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
0.600	98	Paved parking, HSG A
0.040	68	<50% Grass cover, Poor, HSG A
0.640	96	Weighted Average
0.040		6.25% Pervious Area
0.600		93.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9e: Area 9e



Summary for Subcatchment 9S: SC Culvert

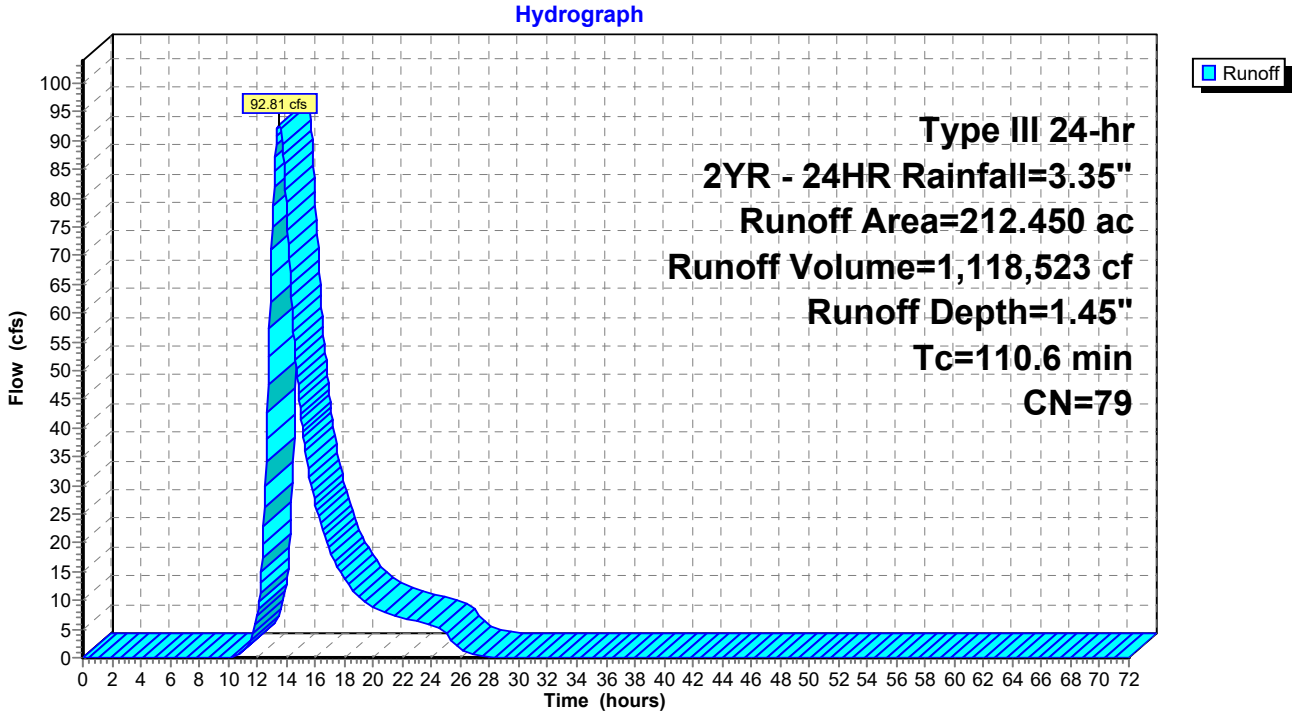
Runoff = 92.81 cfs @ 13.51 hrs, Volume= 1,118,523 cf, Depth= 1.45"
Routed to Pond 11P : (5) Culvert 6X3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (ac)	CN	Description
	8.600	54	1/2 acre lots, 25% imp, HSG A
	2.340	85	1/2 acre lots, 25% imp, HSG D
	12.290	61	1/4 acre lots, 38% imp, HSG A
	0.360	75	1/4 acre lots, 38% imp, HSG B
	0.010	87	1/4 acre lots, 38% imp, HSG D
	55.170	77	1/8 acre lots, 65% imp, HSG A
	0.490	85	1/8 acre lots, 65% imp, HSG B
	0.010	92	1/8 acre lots, 65% imp, HSG D
	2.210	67	Brush, Poor, HSG B
	0.740	83	Brush, Poor, HSG D
	2.880	89	Urban commercial, 85% imp, HSG A
	11.260	92	Urban commercial, 85% imp, HSG B
	21.000	95	Urban commercial, 85% imp, HSG D
	2.430	39	>75% Grass cover, Good, HSG A
	10.380	61	>75% Grass cover, Good, HSG B
	1.240	80	>75% Grass cover, Good, HSG D
	0.180	81	Urban industrial, 72% imp, HSG A
	0.520	93	Urban industrial, 72% imp, HSG D
	10.260	98	Paved roads w/curbs & sewers, HSG A
	2.890	98	Paved roads w/curbs & sewers, HSG B
	1.410	98	Paved roads w/curbs & sewers, HSG D
*	0.010	98	Wetland/Water Surface, 0% imp, HSG A
*	9.990	98	Wetland/Water Surface, 0% imp, HSG B
*	28.580	98	Wetland/Water Surface, 0% imp, HSG D
	5.120	30	Woods, Good, HSG A
	16.980	55	Woods, Good, HSG B
	5.100	77	Woods, Good, HSG D
	212.450	79	Weighted Average
	123.786		58.27% Pervious Area
	88.664		41.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.6					**Direct Entry, See Calculation Sheet**

Subcatchment 9S: SC Culvert



Summary for Subcatchment 14S: SC 14

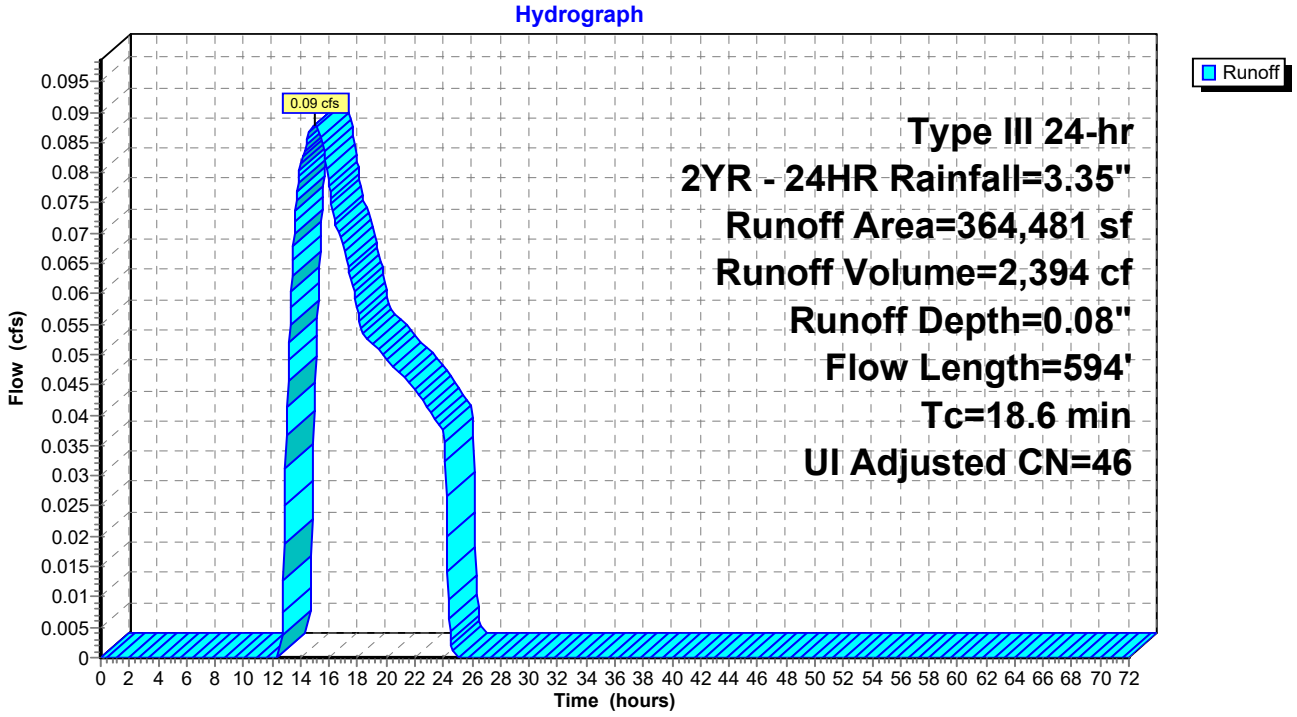
Runoff = 0.09 cfs @ 14.96 hrs, Volume= 2,394 cf, Depth= 0.08"
Routed to Pond CB1 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
278,288	39		>75% Grass cover, Good, HSG A
170	96		Gravel surface, HSG A
86,023	98		Unconnected pavement, HSG A
364,481	53	46	Weighted Average, UI Adjusted
278,458			76.40% Pervious Area
86,023			23.60% Impervious Area
86,023			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0425	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
8.2	494	0.0204	1.00		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
18.6	594	Total			

Subcatchment 14S: SC 14



Summary for Subcatchment 15S: SC 15

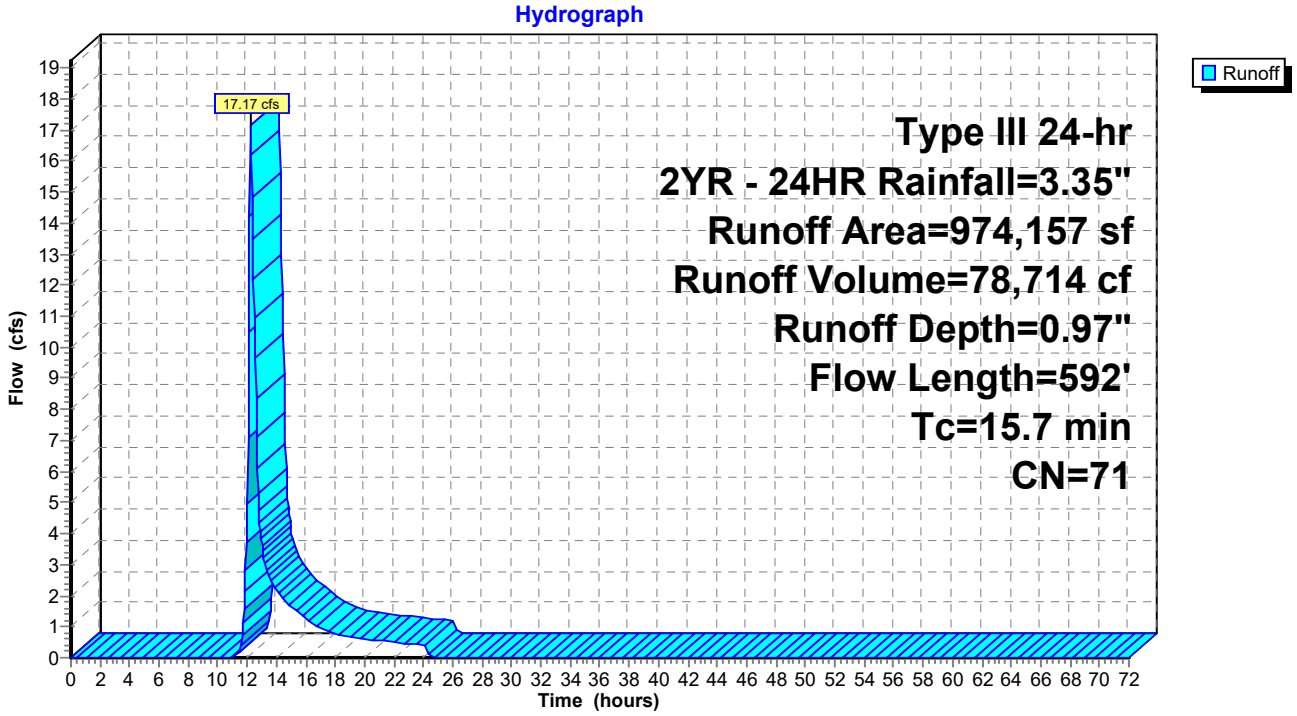
Runoff = 17.17 cfs @ 12.24 hrs, Volume= 78,714 cf, Depth= 0.97"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	428,677	39	>75% Grass cover, Good, HSG A
	1,164	76	Gravel roads, HSG A
	32,761	98	Water Surface, 0% imp, HSG A
	83,054	98	Unconnected pavement, HSG A
	309,611	98	Unconnected pavement, HSG D
	11,248	30	Woods, Good, HSG A
*	107,642	98	Wetland/water Surface, 0% imp, HSG A
	974,157	71	Weighted Average
	581,492		59.69% Pervious Area
	392,665		40.31% Impervious Area
	392,665		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0630	0.19		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
6.1	423	0.0276	1.16		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	19	0.0175	2.69		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.6	50	0.0394	1.39		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
15.7	592	Total			

Subcatchment 15S: SC 15



Summary for Subcatchment 16A: SC 16A

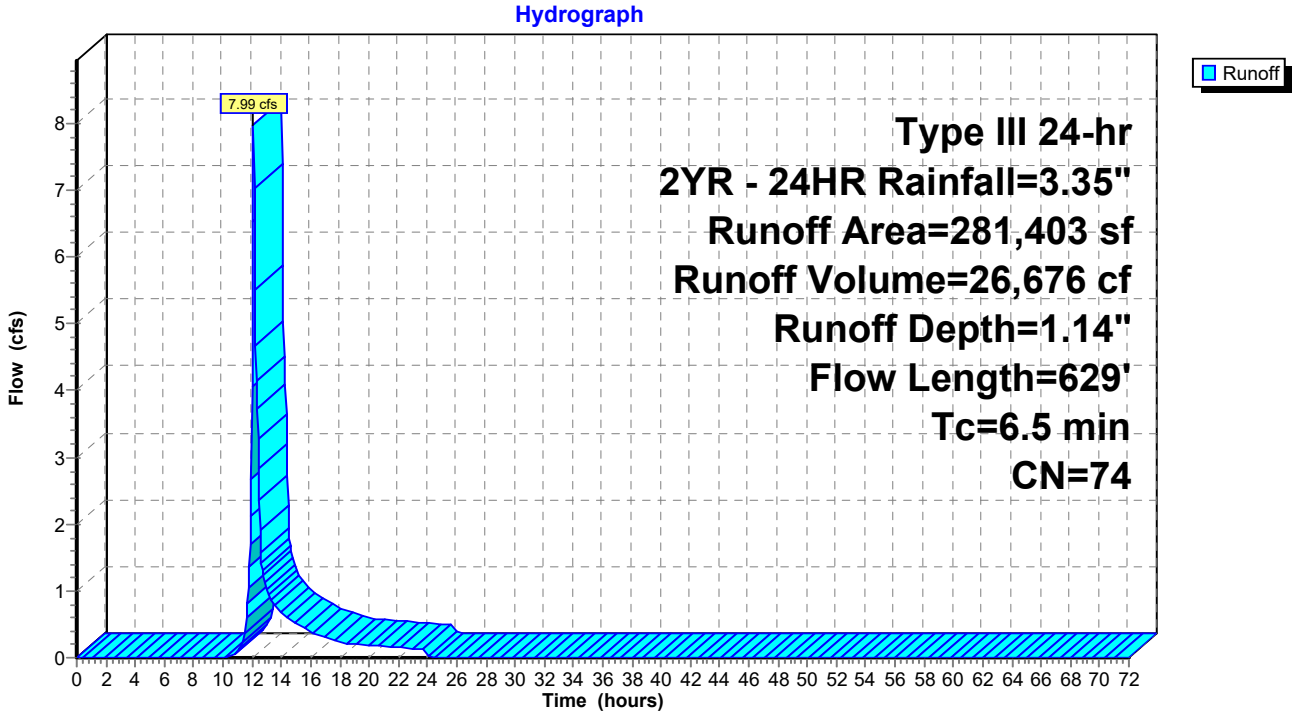
Runoff = 7.99 cfs @ 12.11 hrs, Volume= 26,676 cf, Depth= 1.14"
Routed to Pond CB5 : New CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
183,990	61	>75% Grass cover, Good, HSG B
97,294	98	Unconnected pavement, HSG A
119	98	Unconnected pavement, HSG D
281,403	74	Weighted Average
183,990		65.38% Pervious Area
97,413		34.62% Impervious Area
97,413		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0107	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.0	157	0.0160	0.89		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	372	0.0030	3.09	110.88	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
6.5	629	Total			

Subcatchment 16A: SC 16A



Summary for Subcatchment 16B: SC 16B

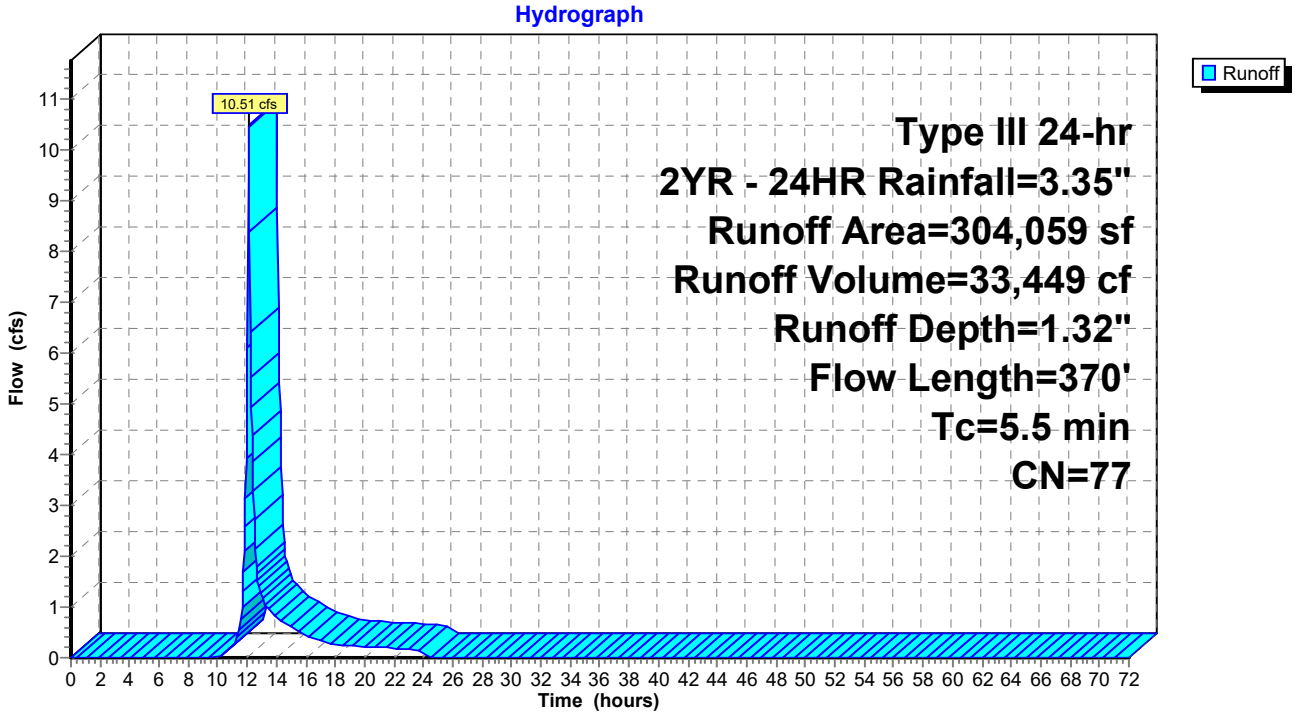
Runoff = 10.51 cfs @ 12.09 hrs, Volume= 33,449 cf, Depth= 1.32"
Routed to Pond CB4 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
169,834	61	>75% Grass cover, Good, HSG B
5	98	Unconnected pavement, HSG A
134,220	98	Unconnected pavement, HSG D
304,059	77	Weighted Average
169,834		55.86% Pervious Area
134,225		44.14% Impervious Area
134,225		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	101	0.0094	1.03		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.5	184	0.0159	0.88		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.4	85	0.0034	3.28	118.04	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
5.5	370	Total			

Subcatchment 16B: SC 16B



Summary for Subcatchment 16S: SC 16

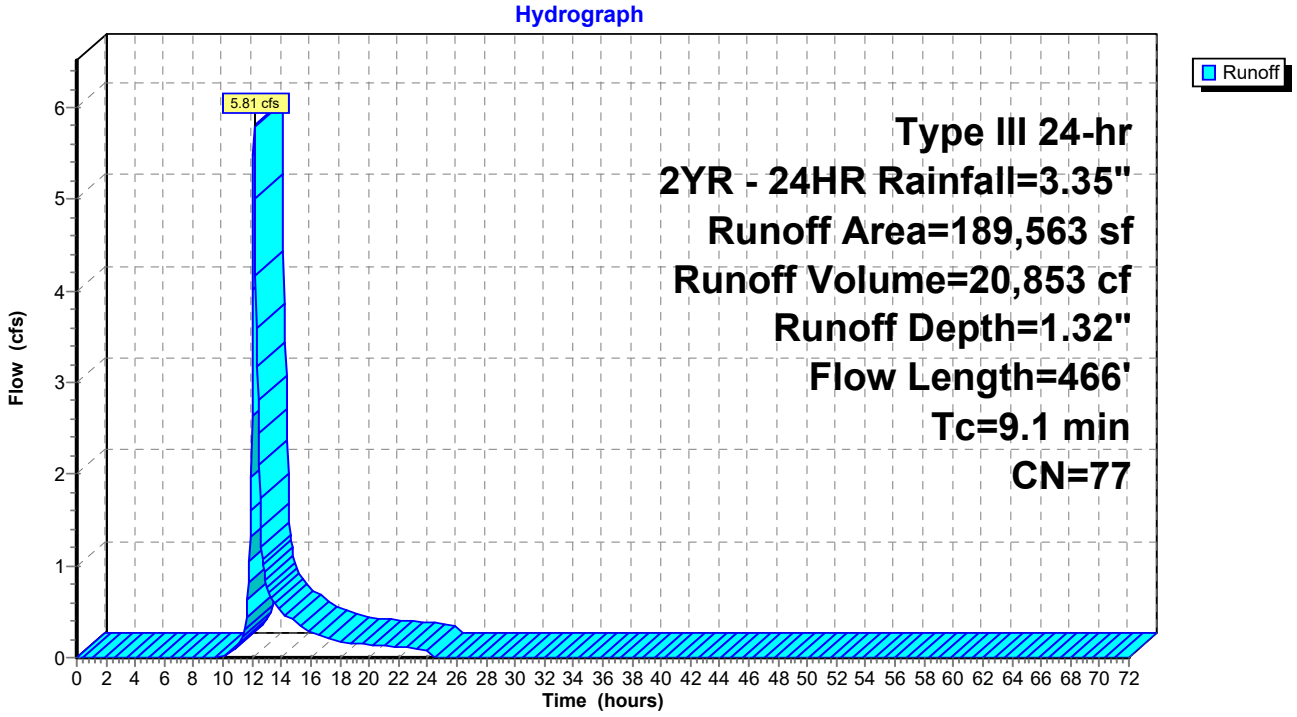
Runoff = 5.81 cfs @ 12.14 hrs, Volume= 20,853 cf, Depth= 1.32"
Routed to Pond CB3 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
110,029	61	>75% Grass cover, Good, HSG B
67,280	98	Unconnected pavement, HSG A
12,254	98	Unconnected pavement, HSG D
189,563	77	Weighted Average
110,029		58.04% Pervious Area
79,534		41.96% Impervious Area
79,534		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	117	0.0103	1.11		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	349	0.0129	0.80		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.1	466	Total			

Subcatchment 16S: SC 16



Summary for Subcatchment 17S: SC 17

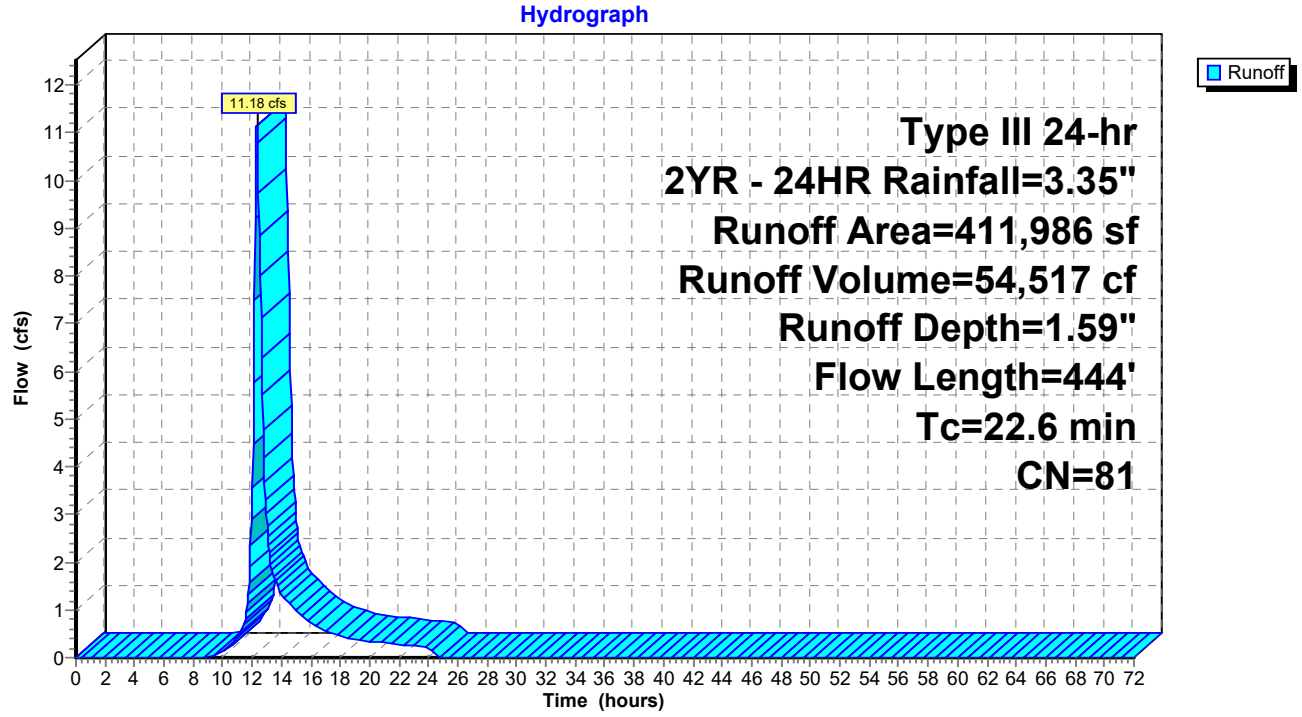
Runoff = 11.18 cfs @ 12.32 hrs, Volume= 54,517 cf, Depth= 1.59"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
189,518	61	>75% Grass cover, Good, HSG B
89,409	98	Unconnected pavement, HSG A
133,059	98	Unconnected pavement, HSG D
411,986	81	Weighted Average
189,518		46.00% Pervious Area
222,468		54.00% Impervious Area
222,468		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	115	0.0107	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
20.9	329	0.0014	0.26		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
22.6	444	Total			

Subcatchment 17S: SC 17



Summary for Subcatchment 18S: SC 18

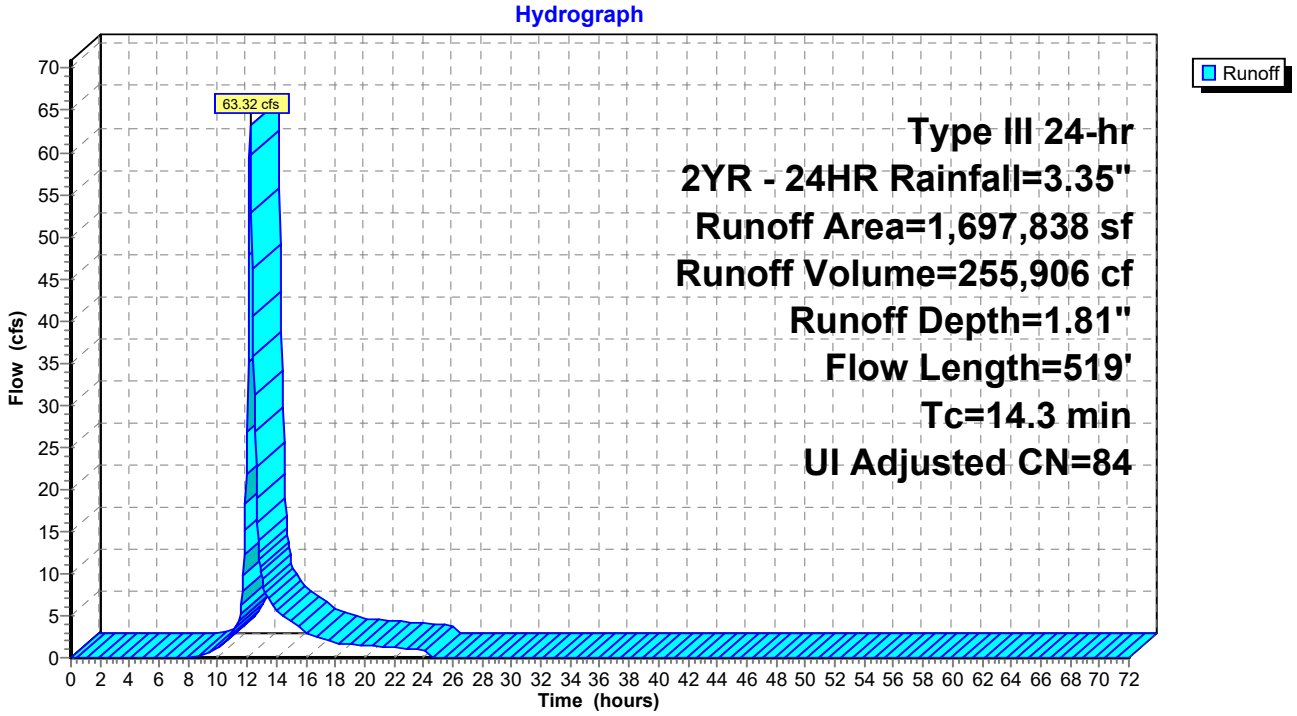
Runoff = 63.32 cfs @ 12.20 hrs, Volume= 255,906 cf, Depth= 1.81"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	528,385	61		>75% Grass cover, Good, HSG B
	145,596	98		Water Surface, 0% imp, HSG D
	108,069	98		Unconnected pavement, HSG A
	88,963	98		Unconnected pavement, HSG D
	92,068	70		Woods, Good, HSG C
*	734,757	98		Wetland/water Surface, 0% imp, HSG D
	1,697,838	85	84	Weighted Average, UI Adjusted
	1,500,806			88.40% Pervious Area
	197,032			11.60% Impervious Area
	197,032			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	69	0.0099	0.98		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
13.1	450	0.0067	0.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.3	519	Total			

Subcatchment 18S: SC 18



Summary for Subcatchment 19A: SC 19A

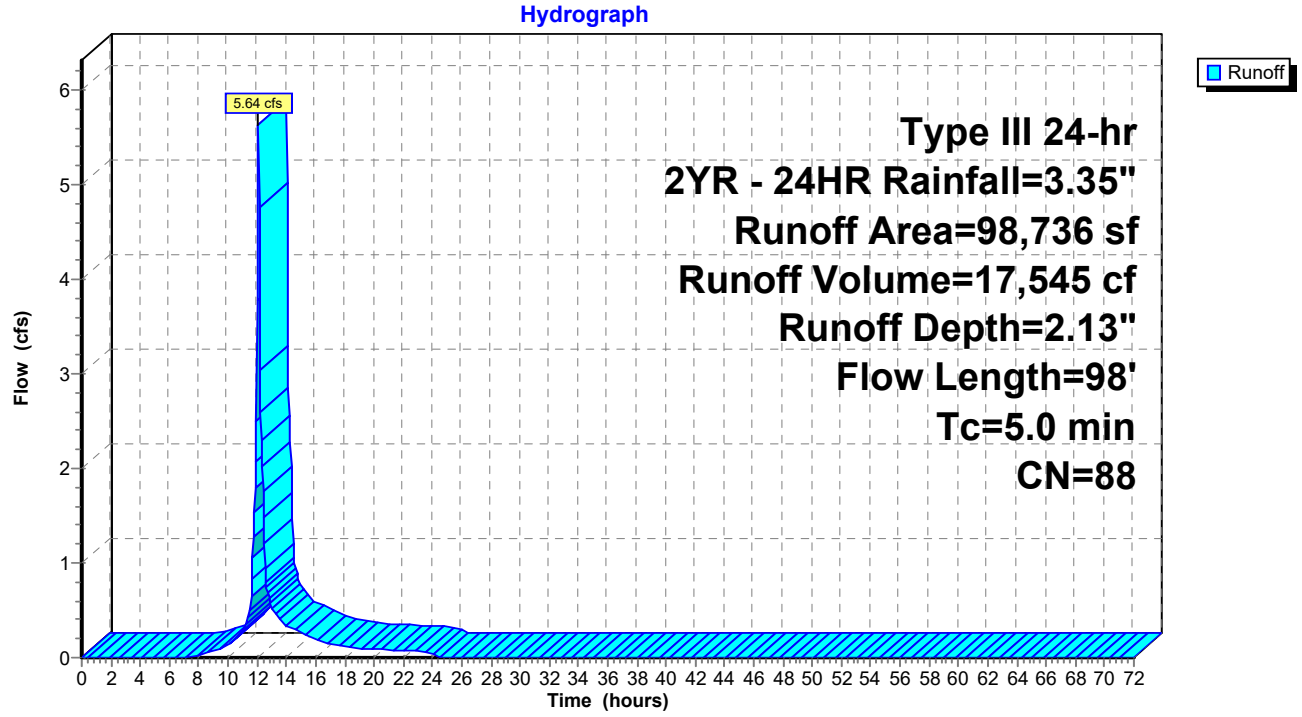
Runoff = 5.64 cfs @ 12.08 hrs, Volume= 17,545 cf, Depth= 2.13"
Routed to Reach PT1 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
27,532	61	>75% Grass cover, Good, HSG B
71,204	98	Unconnected pavement, HSG A
98,736	88	Weighted Average
27,532		27.88% Pervious Area
71,204		72.12% Impervious Area
71,204		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	69	0.0125	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	29	0.0197	0.98		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.4					**Direct Entry, minimum 5 min**
5.0	98	Total			

Subcatchment 19A: SC 19A



Summary for Subcatchment 19S: SC 19

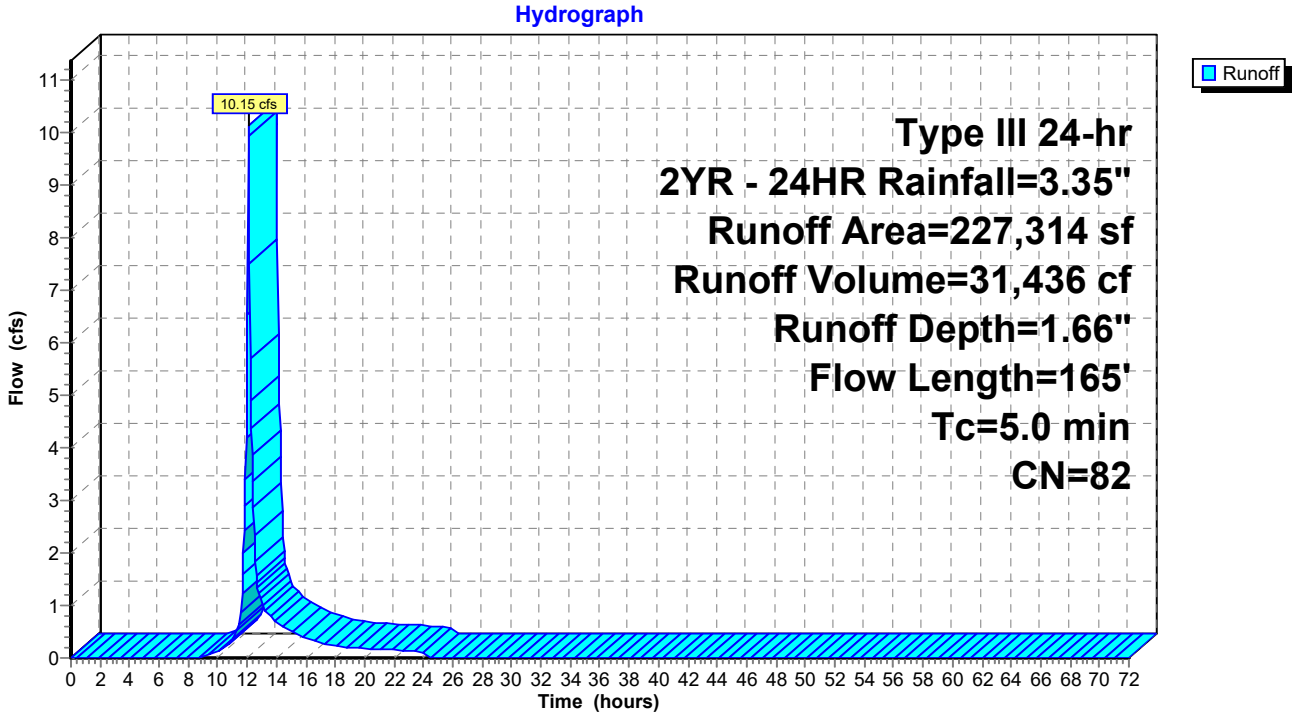
Runoff = 10.15 cfs @ 12.08 hrs, Volume= 31,436 cf, Depth= 1.66"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	98,182	61	>75% Grass cover, Good, HSG B
	15,781	98	Water Surface, 0% imp, HSG D
*	113,351	98	Wetland/water Surface, 0% imp, HSG D
	227,314	82	Weighted Average
	227,314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0075	0.94		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
2.5	65	0.0039	0.44		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7					**Direct Entry, minimum 5 min**
5.0	165	Total			

Subcatchment 19S: SC 19



Summary for Subcatchment 20S: SC 20

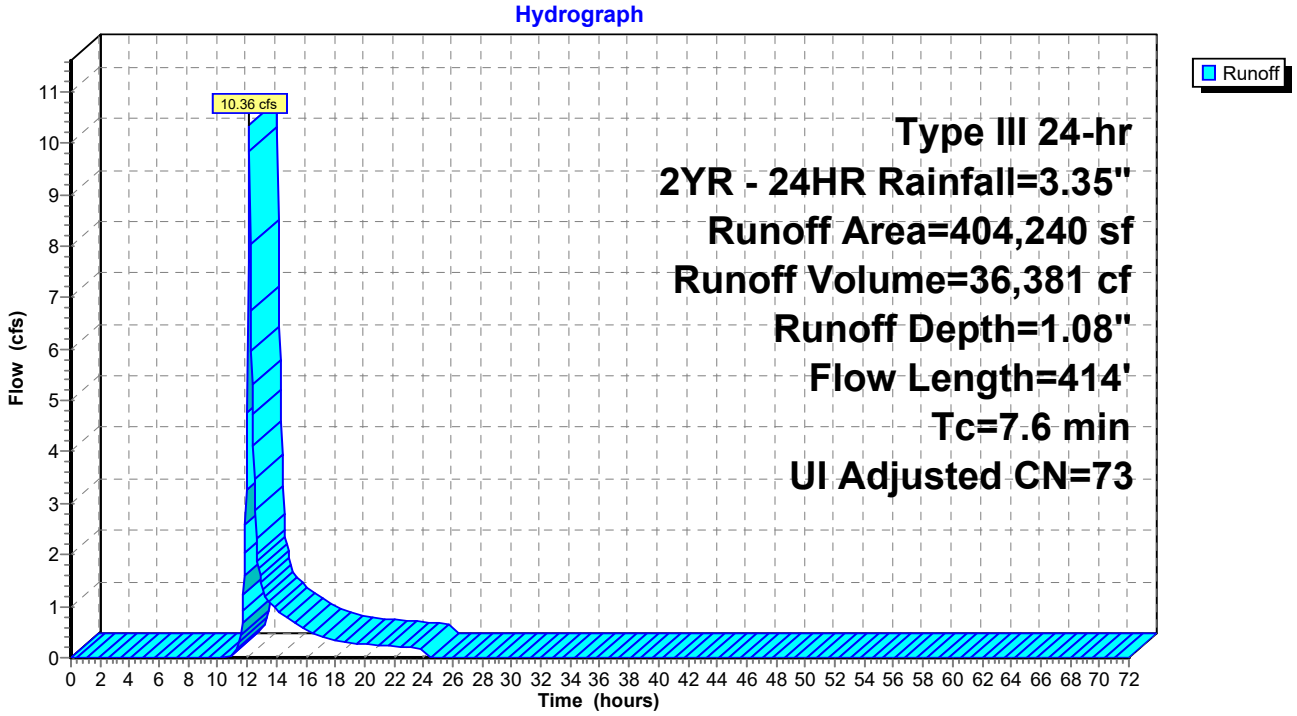
Runoff = 10.36 cfs @ 12.12 hrs, Volume= 36,381 cf, Depth= 1.08"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	246,051	61		>75% Grass cover, Good, HSG B
	2,273	96		Gravel surface, HSG B
	23,627	98		Water Surface, 0% imp, HSG D
	66,507	98		Unconnected pavement, HSG A
	1,831	98		Unconnected pavement, HSG D
	1,971	30		Woods, Good, HSG A
*	61,980	98		Wetland/water Surface, 0% imp, HSG D
	404,240	75	73	Weighted Average, UI Adjusted
	335,902			83.09% Pervious Area
	68,338			16.91% Impervious Area
	68,338			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0128	1.13		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.30"
6.4	331	0.0153	0.87		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
7.6	414	Total			

Subcatchment 20S: SC 20



Summary for Subcatchment 21S: SC 21

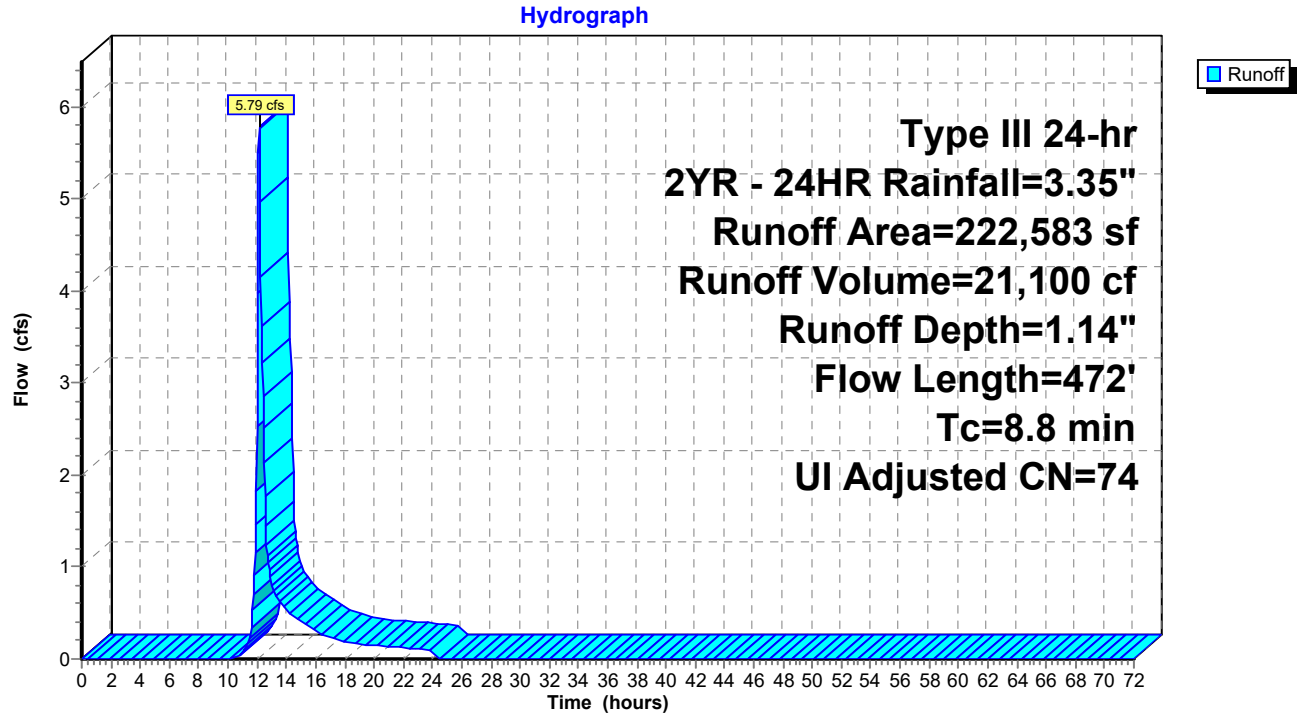
Runoff = 5.79 cfs @ 12.14 hrs, Volume= 21,100 cf, Depth= 1.14"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	138,267	61		>75% Grass cover, Good, HSG B
	16,801	98		Water Surface, 0% imp, HSG D
	23,650	98		Unconnected pavement, HSG D
*	43,865	98		Wetland/water Surface, 0% imp, HSG D
	222,583	75	74	Weighted Average, UI Adjusted
	198,933			89.37% Pervious Area
	23,650			10.63% Impervious Area
	23,650			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	73	0.0119	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.7	399	0.0152	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.8	472	Total			

Subcatchment 21S: SC 21



Summary for Subcatchment 22S: SC 22

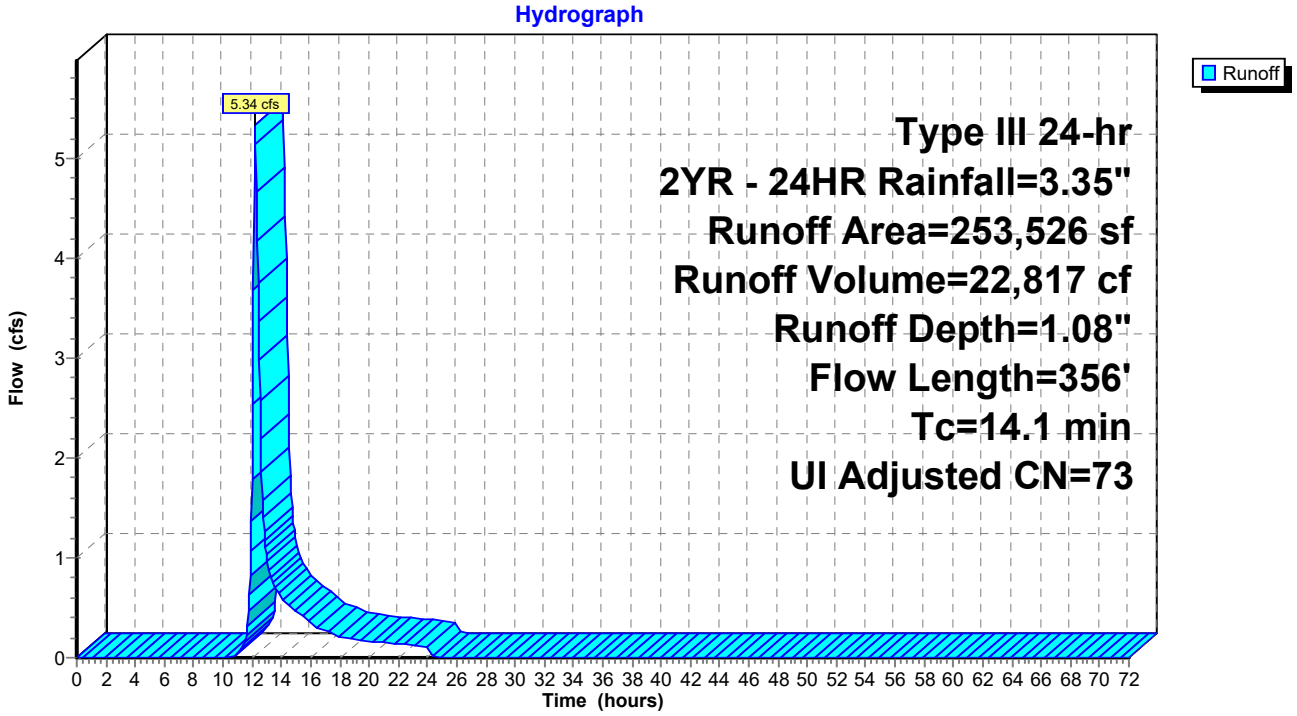
Runoff = 5.34 cfs @ 12.21 hrs, Volume= 22,817 cf, Depth= 1.08"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	162,251	61		>75% Grass cover, Good, HSG B
	9,076	96		Gravel surface, HSG B
	29,012	98		Water Surface, 0% imp, HSG D
	29,583	98		Unconnected pavement, HSG A
*	23,604	98		Wetland/water Surface, 0% imp, HSG D
	253,526	74	73	Weighted Average, UI Adjusted
	223,943			88.33% Pervious Area
	29,583			11.67% Impervious Area
	29,583			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	72	0.0102	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.4	284	0.0241	1.09		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.1	356	Total			

Subcatchment 22S: SC 22



Summary for Subcatchment 23S: SC 23

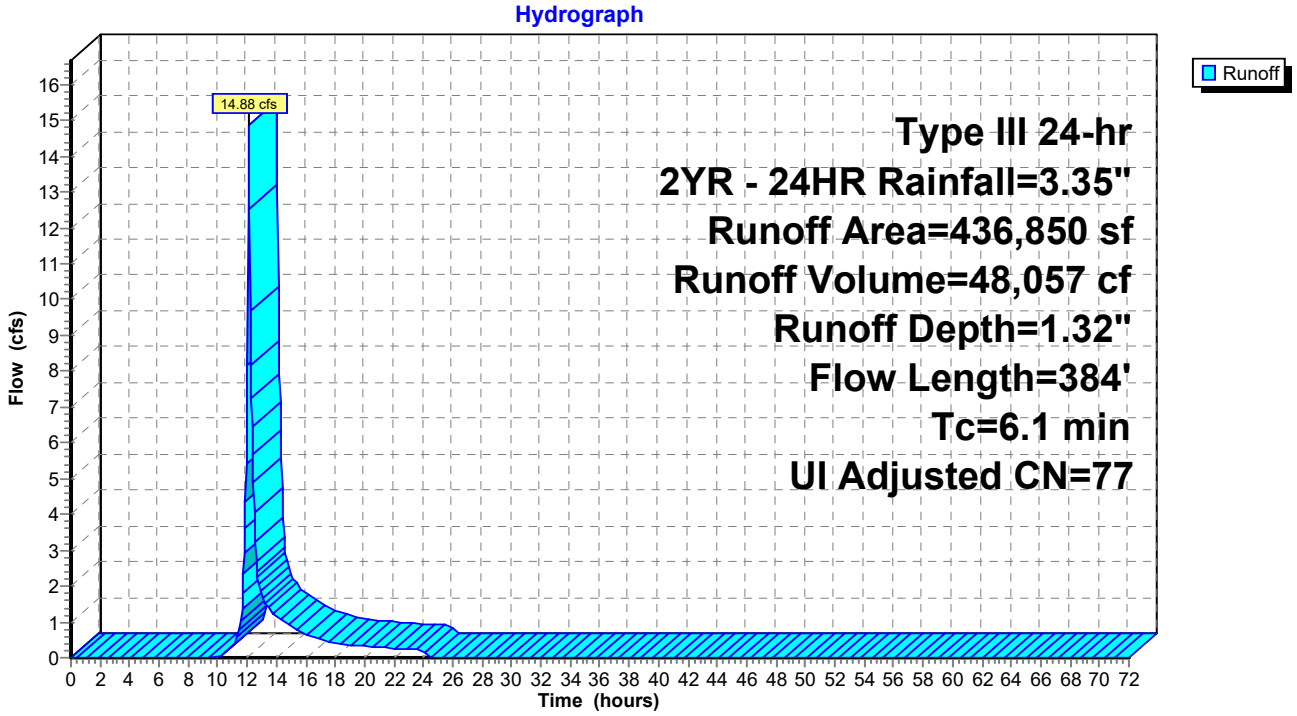
Runoff = 14.88 cfs @ 12.10 hrs, Volume= 48,057 cf, Depth= 1.32"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	172,047	61		>75% Grass cover, Good, HSG B
	16,592	96		Gravel surface, HSG B
	53,251	98		Water Surface, 0% imp, HSG D
	33,520	98		Unconnected pavement, HSG A
	59,182	55		Woods, Good, HSG B
*	102,258	98		Wetland/water Surface, 0% imp, HSG D
	436,850	78	77	Weighted Average, UI Adjusted
	403,330			92.33% Pervious Area
	33,520			7.67% Impervious Area
	33,520			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	88	0.0090	0.99		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.6	296	0.0234	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.1	384	Total			

Subcatchment 23S: SC 23



Summary for Subcatchment 24S: SC 24

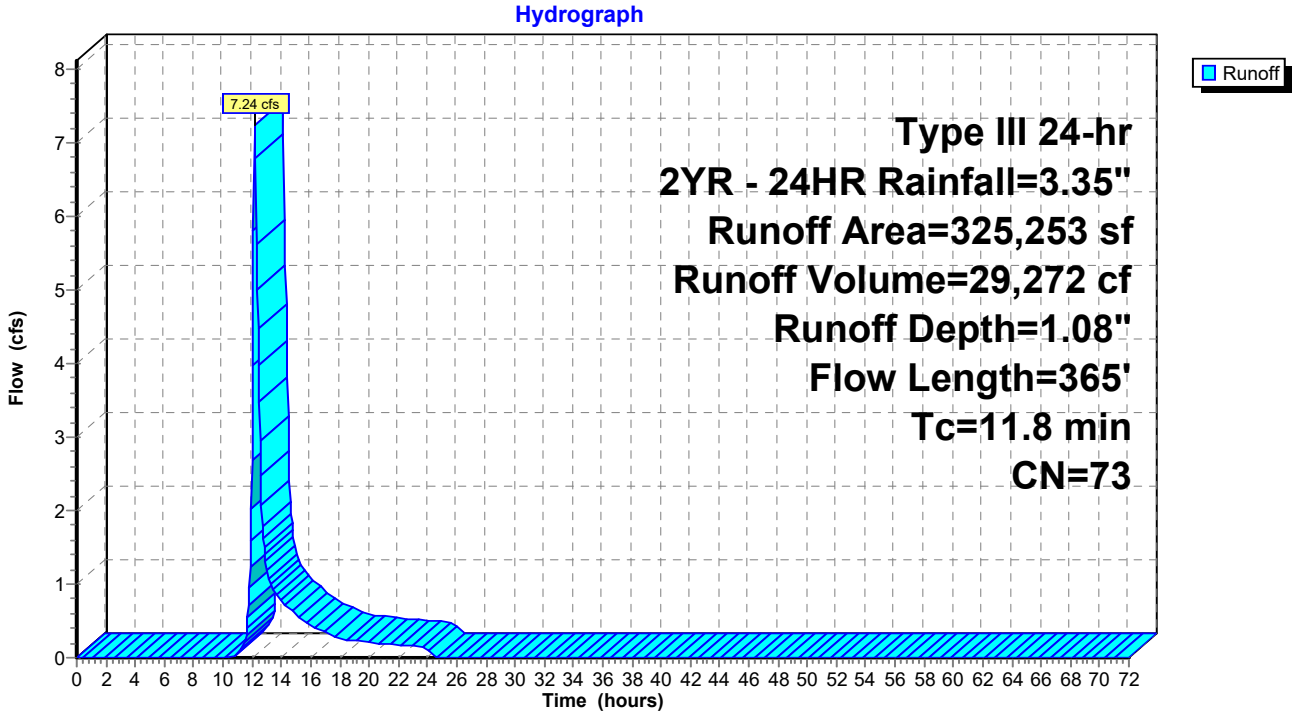
Runoff = 7.24 cfs @ 12.18 hrs, Volume= 29,272 cf, Depth= 1.08"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Description
	65,366	61	>75% Grass cover, Good, HSG B
	13,384	96	Gravel surface, HSG B
	56,260	98	Water Surface, 0% imp, HSG D
	5,050	98	Unconnected pavement, HSG A
	129,703	55	Woods, Good, HSG B
*	55,490	98	Wetland/water Surface, 0% imp, HSG D
	325,253	73	Weighted Average
	320,203		98.45% Pervious Area
	5,050		1.55% Impervious Area
	5,050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0171	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
0.1	21	0.0152	2.50		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.0	89	0.0115	0.75		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0120	2.22		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
4.7	215	0.0120	0.77		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
11.8	365	Total			

Subcatchment 24S: SC 24



Summary for Subcatchment 27S: SC 27

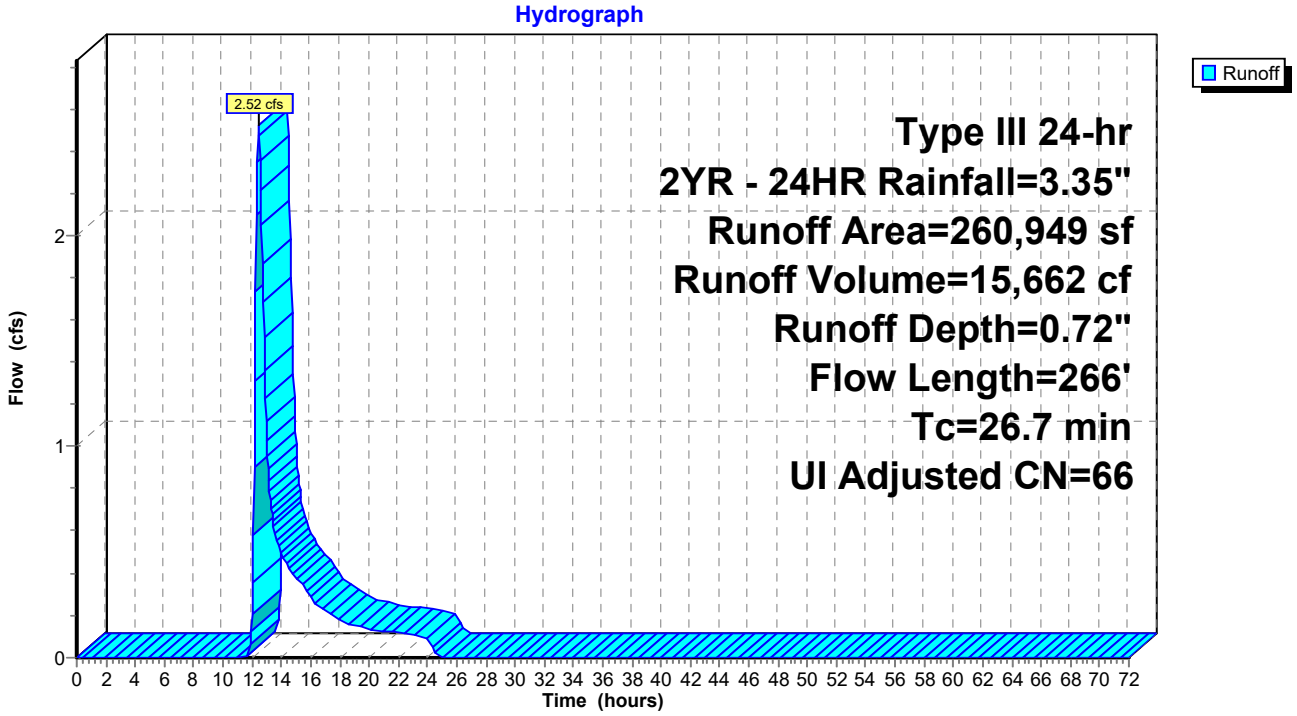
Runoff = 2.52 cfs @ 12.45 hrs, Volume= 15,662 cf, Depth= 0.72"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	189,955	61		>75% Grass cover, Good, HSG B
	364	96		Gravel surface, HSG B
	69,758	98		Unconnected pavement, HSG A
	0	98		Unconnected pavement, HSG D
*	872	98		Wetland/Water Surface, 0% imp, HSG A
	260,949	71	66	Weighted Average, UI Adjusted
	191,191			73.27% Pervious Area
	69,758			26.73% Impervious Area
	69,758			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	100	0.0052	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
2.6	166	0.0233	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
26.7	266	Total			

Subcatchment 27S: SC 27



Summary for Subcatchment A1: Area A1

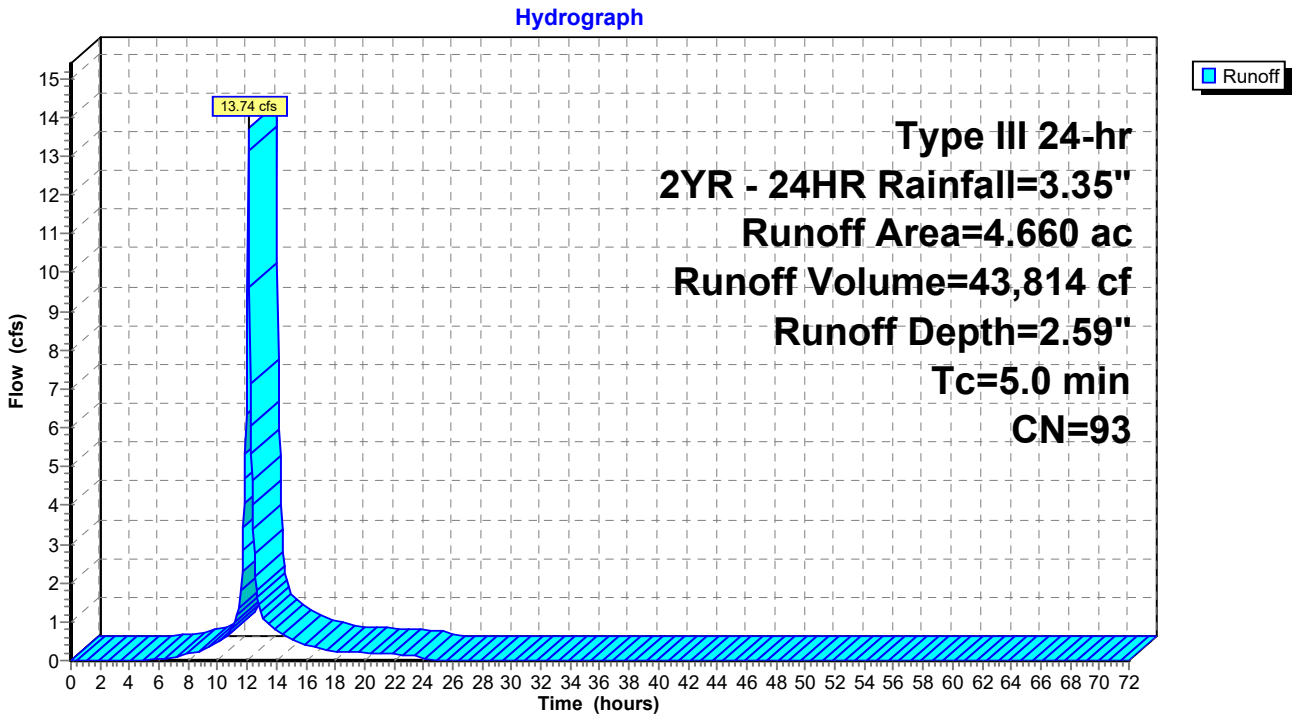
Runoff = 13.74 cfs @ 12.07 hrs, Volume= 43,814 cf, Depth= 2.59"
Routed to Pond SFA1 : SAND FILTER AREA A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
3.900	98	Paved parking, HSG A
0.760	68	<50% Grass cover, Poor, HSG A
4.660	93	Weighted Average
0.760		16.31% Pervious Area
3.900		83.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A1: Area A1



Summary for Subcatchment A2: Area A2

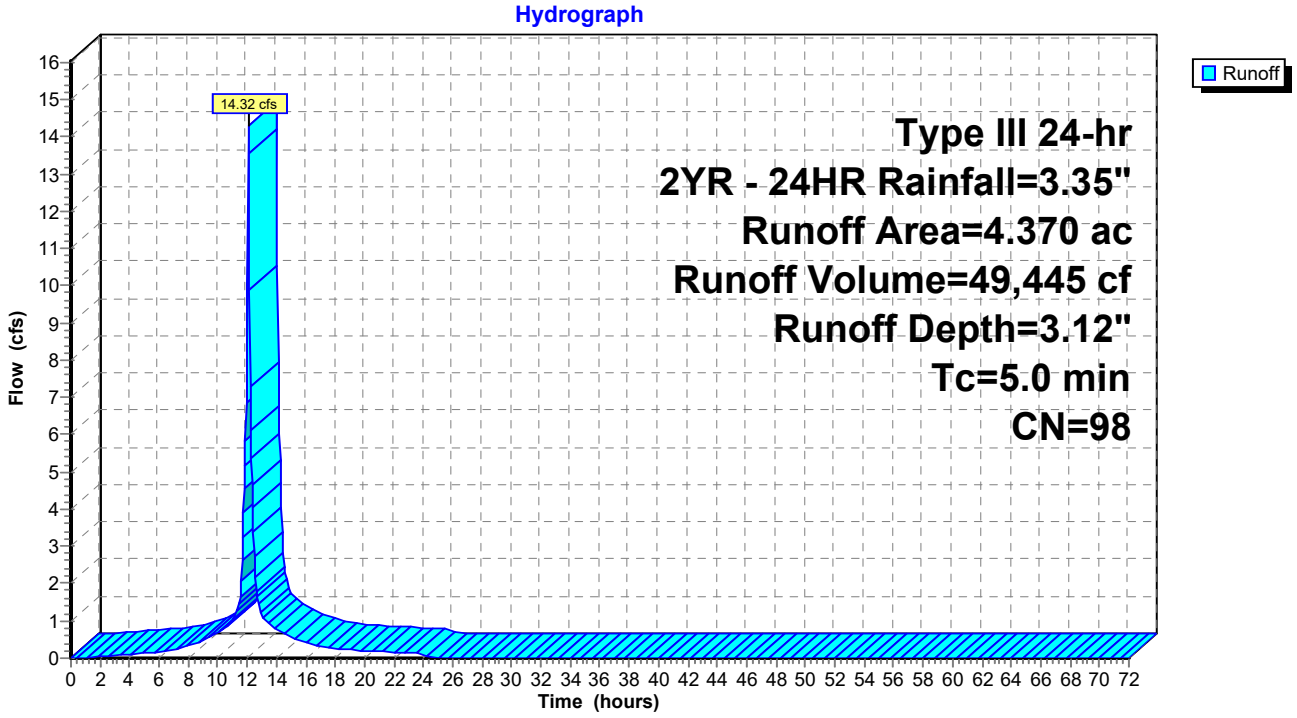
Runoff = 14.32 cfs @ 12.07 hrs, Volume= 49,445 cf, Depth= 3.12"
Routed to Pond SFA2 : SAND FILTER AREA A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
4.370	98	Paved parking, HSG A
0.000	68	<50% Grass cover, Poor, HSG A
4.370	98	Weighted Average
4.370		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A2: Area A2



Summary for Subcatchment A3: Area A3

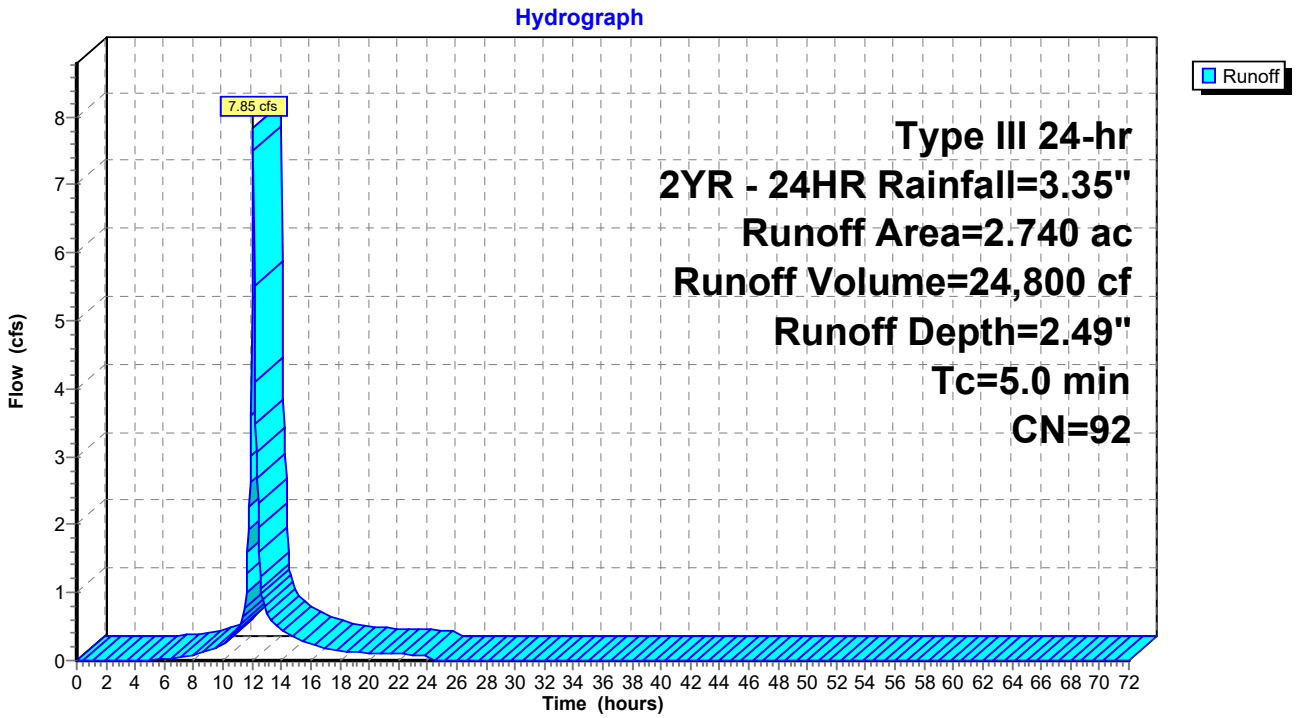
Runoff = 7.85 cfs @ 12.07 hrs, Volume= 24,800 cf, Depth= 2.49"
Routed to Link SS8 : SITESAVER 8 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (ac)	CN	Description
2.210	98	Paved parking, HSG A
0.530	68	<50% Grass cover, Poor, HSG A
2.740	92	Weighted Average
0.530		19.34% Pervious Area
2.210		80.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A3: Area A3



Summary for Subcatchment DS1: Ditch Segment 1

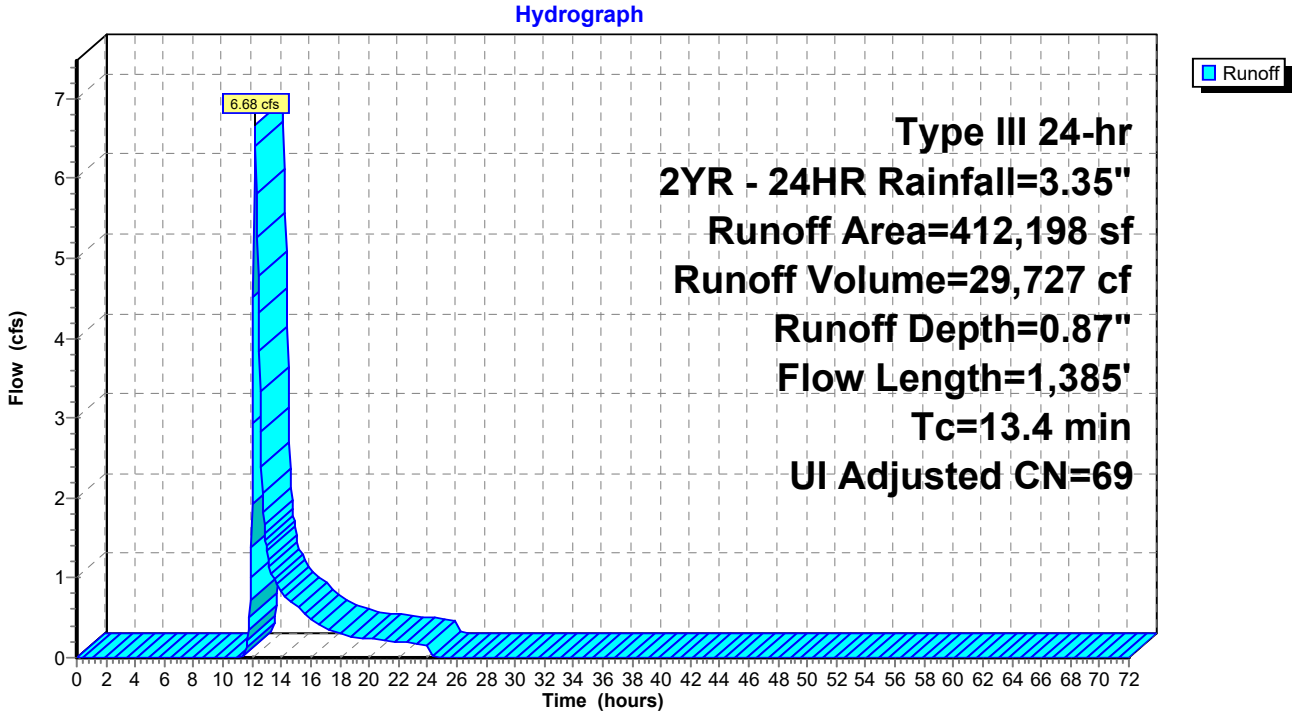
Runoff = 6.68 cfs @ 12.21 hrs, Volume= 29,727 cf, Depth= 0.87"
Routed to Reach 1R : WQS Segment 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	242,115	61		>75% Grass cover, Good, HSG B
	2,212	76		Gravel roads, HSG A
	0	98		Water Surface, 0% imp, HSG A
	0	98		Unconnected pavement, HSG A
	117,963	98		Unconnected pavement, HSG D
	20,768	55		Woods, Good, HSG B
*	29,140	98		Wetland/Water Surface, 0% imp, HSG A
	412,198	74	69	Weighted Average, UI Adjusted
	294,235			71.38% Pervious Area
	117,963			28.62% Impervious Area
	117,963			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	110	0.0200	1.42		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
0.8	65	0.0400	1.40		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.3	1,210	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
13.4	1,385	Total			

Subcatchment DS1: Ditch Segment 1



Summary for Subcatchment DS2: Ditch Segment 2

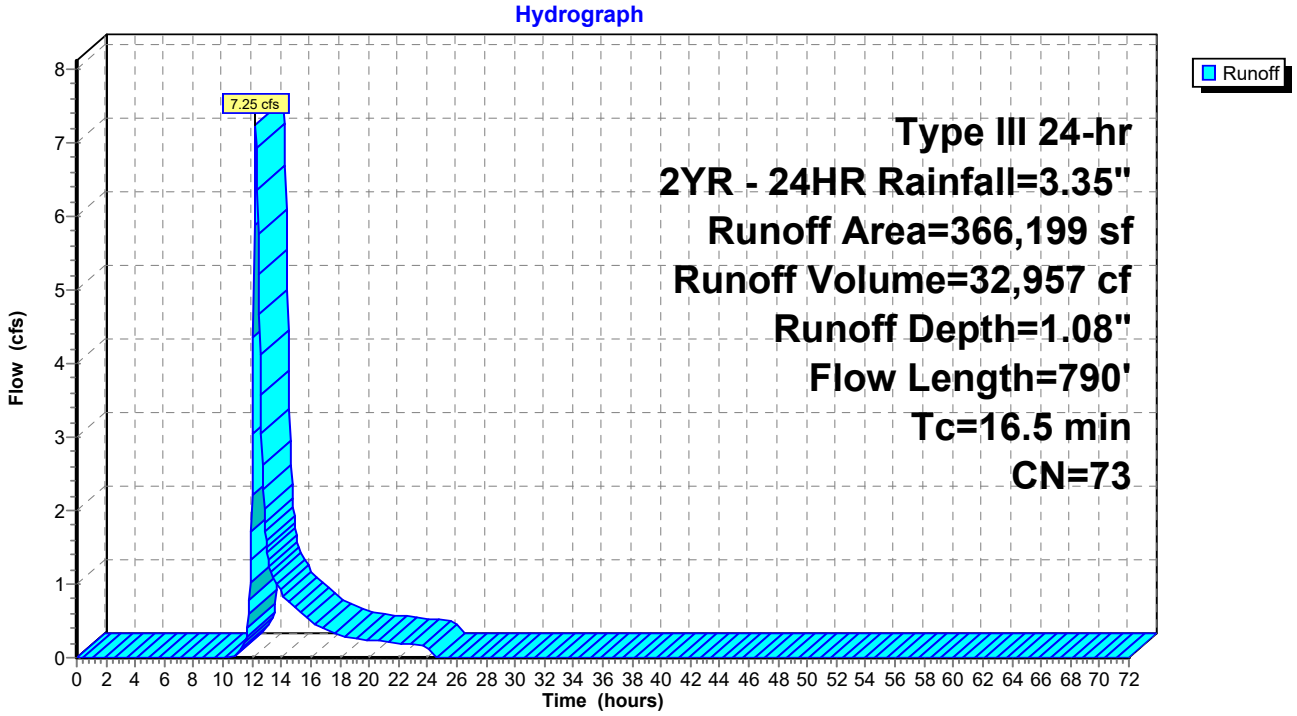
Runoff = 7.25 cfs @ 12.25 hrs, Volume= 32,957 cf, Depth= 1.08"
Routed to Reach 2R : WQS Segment 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
158,039	39	>75% Grass cover, Good, HSG A
9,172	98	Water Surface, 0% imp, HSG A
198,988	98	Unconnected pavement, HSG D
366,199	73	Weighted Average
167,211		45.66% Pervious Area
198,988		54.34% Impervious Area
198,988		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	140	0.0050	0.86		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
10.3	280	0.0005	0.45		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	370	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
16.5	790	Total			

Subcatchment DS2: Ditch Segment 2



Summary for Subcatchment DS3: Ditch Segment 3

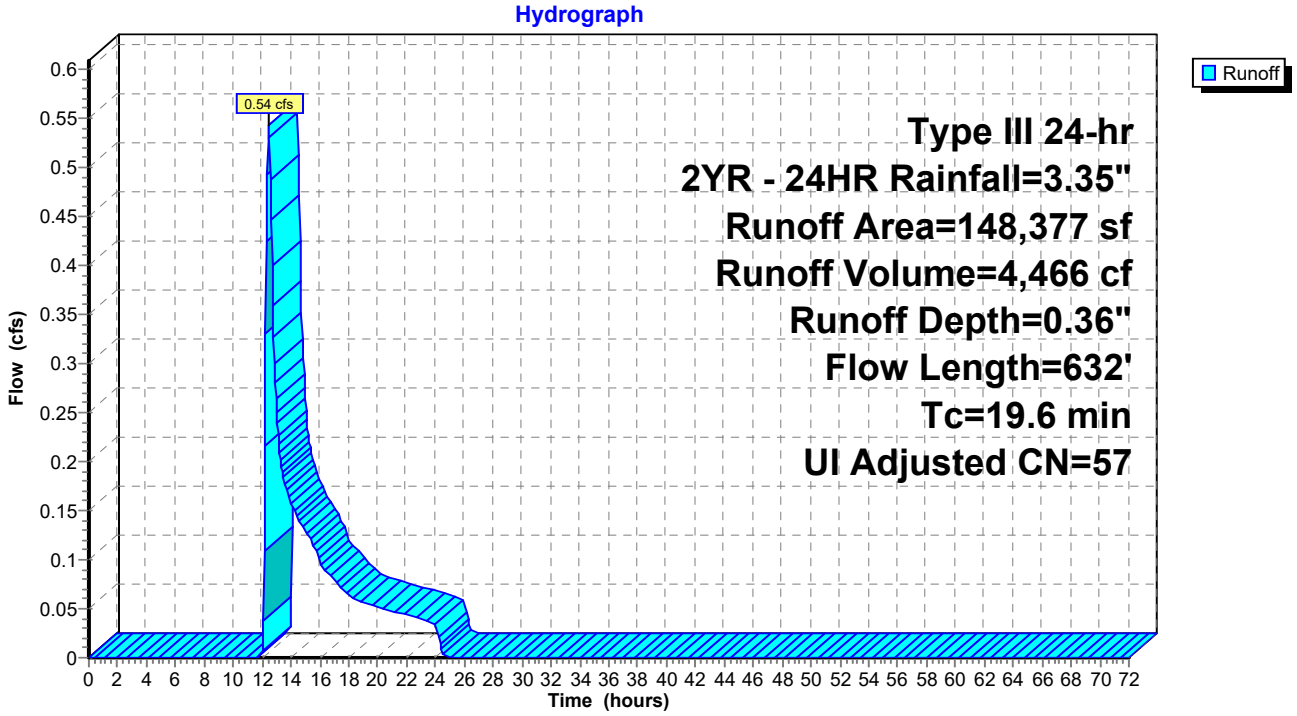
Runoff = 0.54 cfs @ 12.47 hrs, Volume= 4,466 cf, Depth= 0.36"
Routed to Reach 3R : WQS Segment 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	18,935	61		>75% Grass cover, Good, HSG B
	7,512	76		Gravel roads, HSG A
	9	98		Water Surface, 0% imp, HSG A
	6,613	98		Unconnected pavement, HSG D
	75,261	30		Woods, Good, HSG A
*	40,047	98		Wetland/Water Surface, 0% imp, HSG B
	148,377	58	57	Weighted Average, UI Adjusted
	141,764			95.54% Pervious Area
	6,613			4.46% Impervious Area
	6,613			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	42	0.0050	0.67		**Sheet Flow, Pavement A-B** Smooth surfaces n= 0.011 P2= 3.30"
16.3	345	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.3	245	0.0005	1.79	48.22	**Channel Flow,** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
19.6	632	Total			

Subcatchment DS3: Ditch Segment 3



Summary for Subcatchment N10: DA-N10

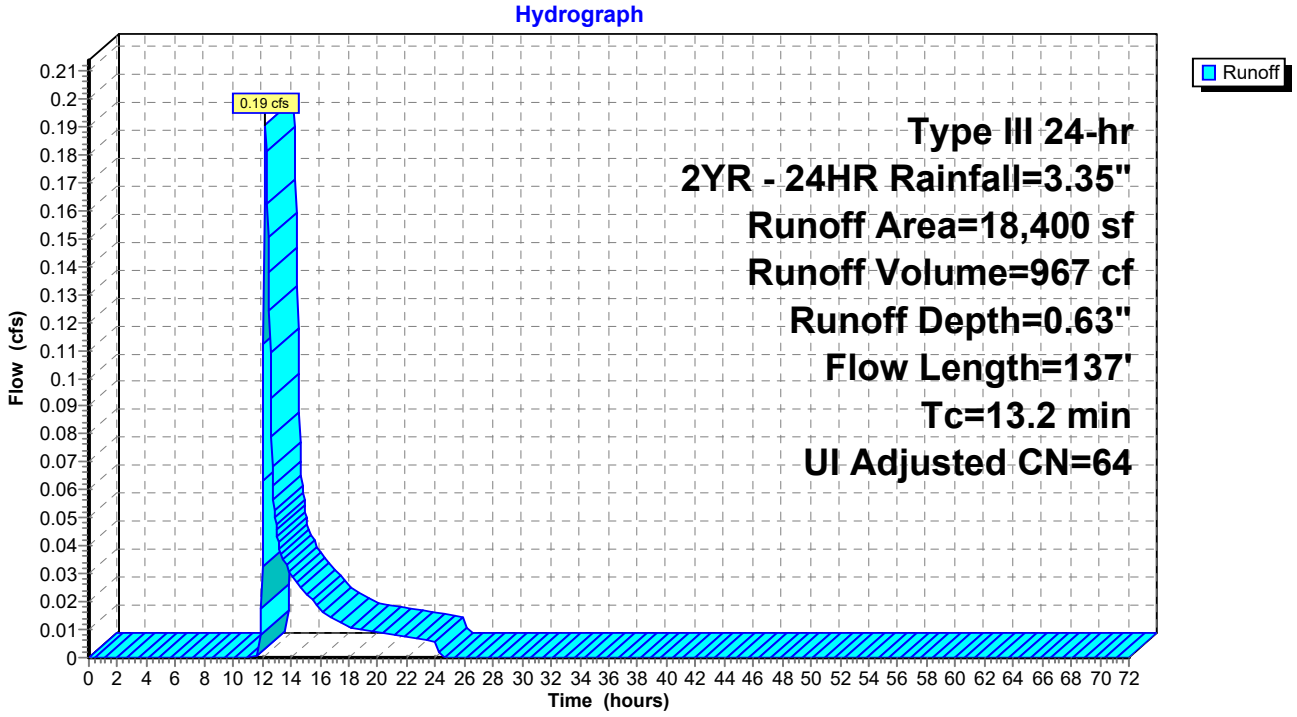
Runoff = 0.19 cfs @ 12.22 hrs, Volume= 967 cf, Depth= 0.63"
Routed to Pond P9 : Pond 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
13,317	58		Meadow, non-grazed, HSG B
3,878	98		Unconnected pavement, HSG A
1,205	98		Unconnected pavement, HSG D
18,400	69	64	Weighted Average, UI Adjusted
13,317			72.38% Pervious Area
5,083			27.62% Impervious Area
5,083			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	79	0.0709	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
8.4	58	0.0095	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
13.2	137	Total			

Subcatchment N10: DA-N10



Summary for Subcatchment N12: DA-N12

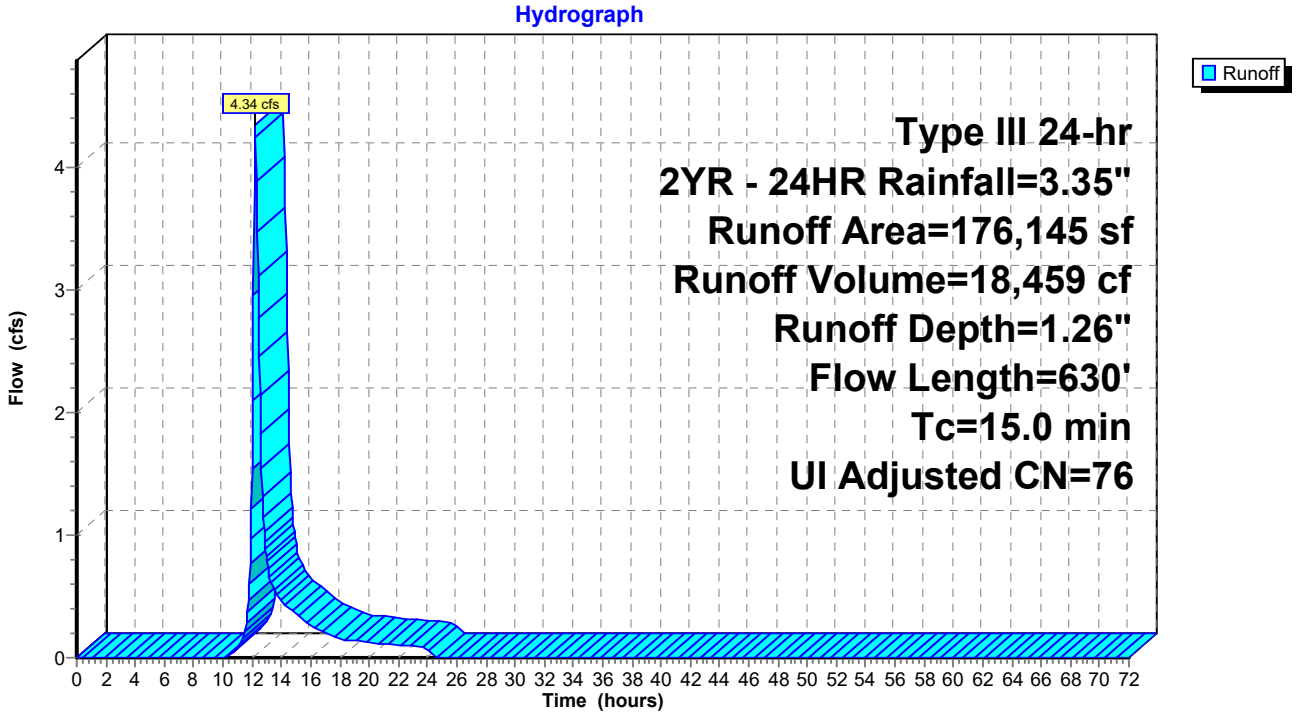
Runoff = 4.34 cfs @ 12.22 hrs, Volume= 18,459 cf, Depth= 1.26"
Routed to Pond P10 : Wetland Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

	Area (sf)	CN	Adj	Description
	31,420	61		>75% Grass cover, Good, HSG B
	13,488	98		Unconnected pavement, HSG A
	12,916	98		Unconnected pavement, HSG D
	54,749	55		Woods, Good, HSG B
*	63,572	98		Wetland/Water Surface, 0% imp, HSG D
	176,145	78	76	Weighted Average, UI Adjusted
	149,741			85.01% Pervious Area
	26,404			14.99% Impervious Area
	26,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	152	0.0105	1.17		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
8.1	251	0.0054	0.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	227	0.0029	0.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	630	Total			

Subcatchment N12: DA-N12



Summary for Subcatchment N13: DA-N13

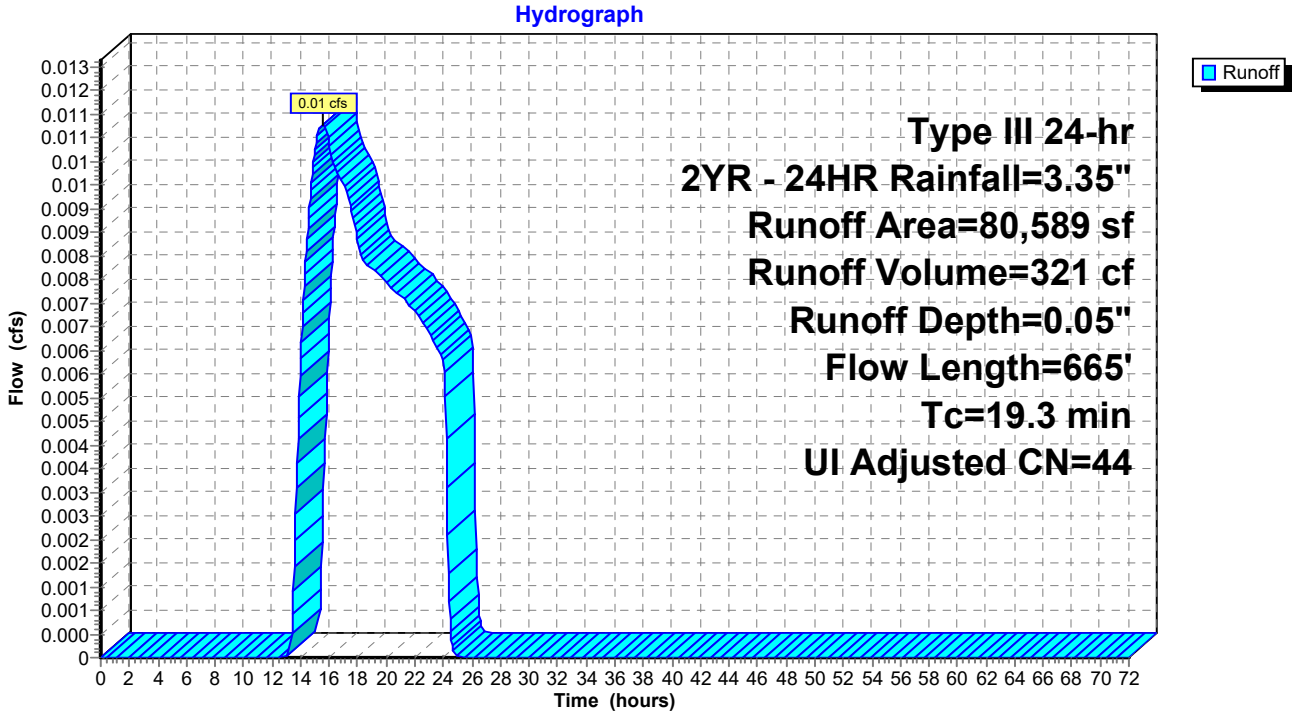
Runoff = 0.01 cfs @ 15.52 hrs, Volume= 321 cf, Depth= 0.05"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
12,512	98		Unconnected pavement, HSG A
48	98		Unconnected pavement, HSG D
68,029	39		>75% Grass cover, Good, HSG A
80,589	48	44	Weighted Average, UI Adjusted
68,029			84.41% Pervious Area
12,560			15.59% Impervious Area
12,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	115	0.0391	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
11.0	550	0.0141	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	665	Total			

Subcatchment N13: DA-N13



Summary for Subcatchment N14: DA-N14

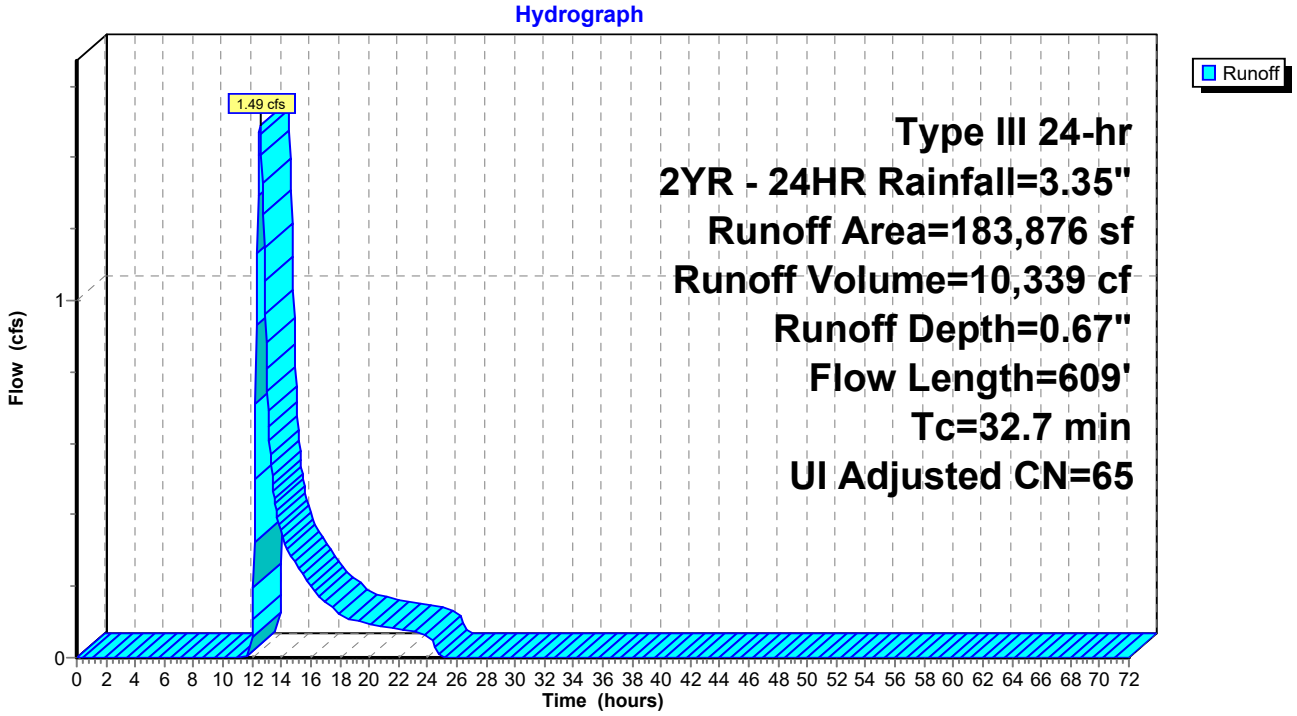
Runoff = 1.49 cfs @ 12.55 hrs, Volume= 10,339 cf, Depth= 0.67"
Routed to Pond P6 : Pond 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
140,023	61		>75% Grass cover, Good, HSG B
20,811	98		Unconnected pavement, HSG A
23,042	98		Unconnected pavement, HSG A
183,876	70	65	Weighted Average, UI Adjusted
140,023			76.15% Pervious Area
43,853			23.85% Impervious Area
43,853			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0122	1.08		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
13.2	122	0.0135	0.15		**Sheet Flow, Grasss** Grass: Short n= 0.150 P2= 3.30"
18.4	413	0.0036	0.37	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
32.7	609	Total			

Subcatchment N14: DA-N14



Summary for Subcatchment N15: DA-N15

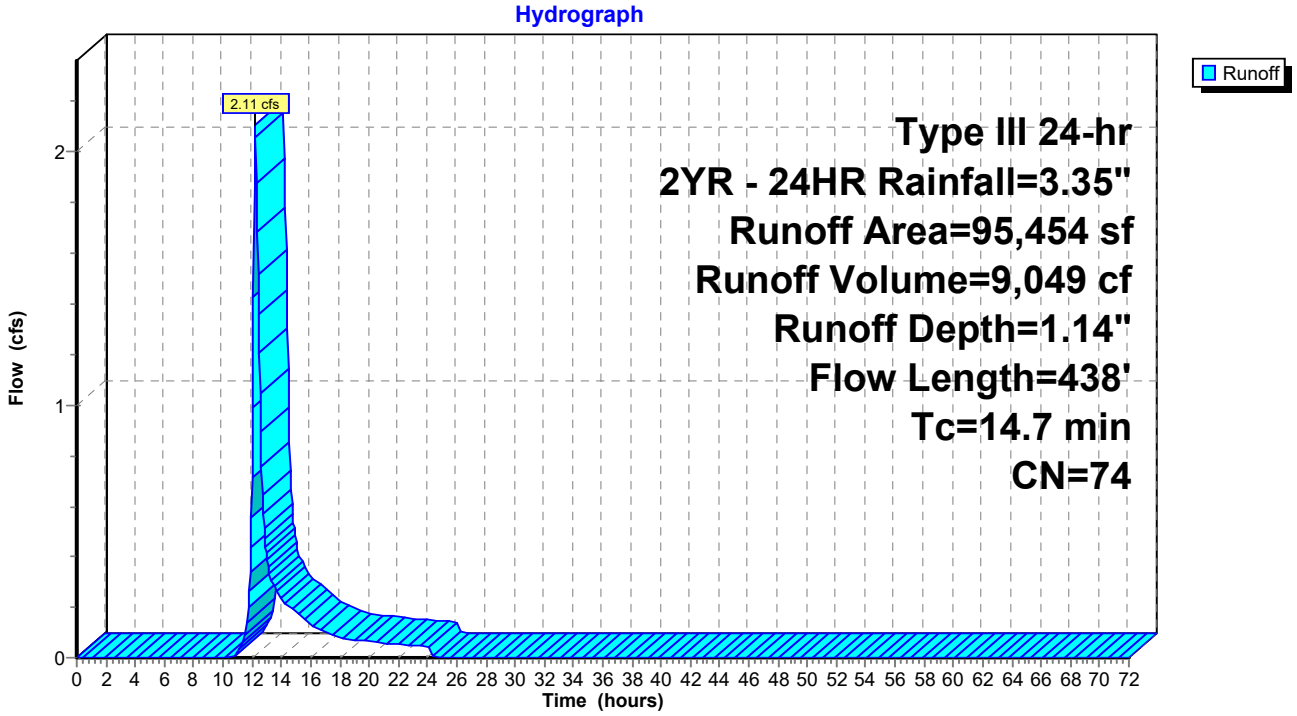
Runoff = 2.11 cfs @ 12.22 hrs, Volume= 9,049 cf, Depth= 1.14"
Routed to Pond P8 : Pond 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
61,700	61	>75% Grass cover, Good, HSG B
8,846	98	Unconnected pavement, HSG A
24,908	98	Unconnected pavement, HSG D
95,454	74	Weighted Average
61,700		64.64% Pervious Area
33,754		35.36% Impervious Area
33,754		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0783	0.27		**Sheet Flow, Grass**
					Grass: Short n= 0.150 P2= 3.30"
6.9	60	0.0166	0.14		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.30"
4.1	318	0.0075	1.30		**Shallow Concentrated Flow, Grass**
					Grassed Waterway Kv= 15.0 fps
14.7	438	Total			

Subcatchment N15: DA-N15



Summary for Subcatchment N2: DA-N2

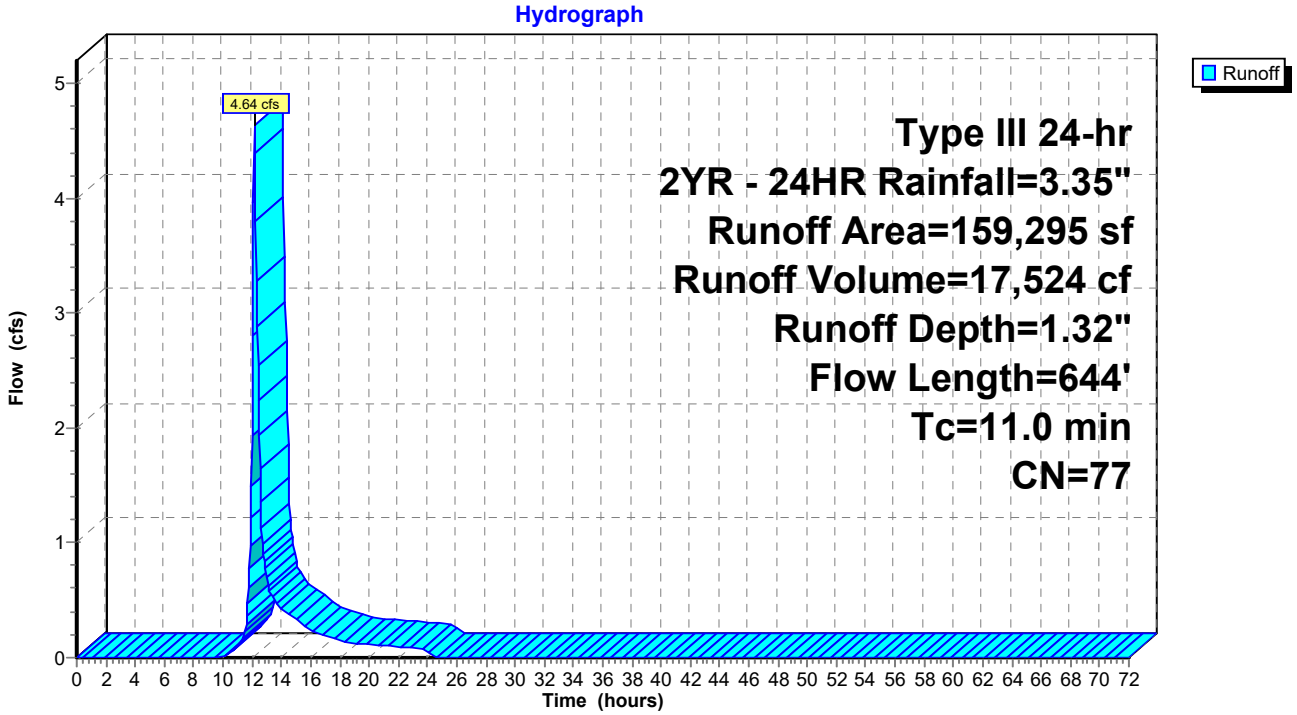
Runoff = 4.64 cfs @ 12.16 hrs, Volume= 17,524 cf, Depth= 1.32"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
76,508	98	Paved parking, HSG B
82,787	58	Meadow, non-grazed, HSG B
159,295	77	Weighted Average
82,787		51.97% Pervious Area
76,508		48.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	146	0.0137	1.30		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
9.1	498	0.0169	0.91		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.0	644	Total			

Subcatchment N2: DA-N2



Summary for Subcatchment N3: DA-N3

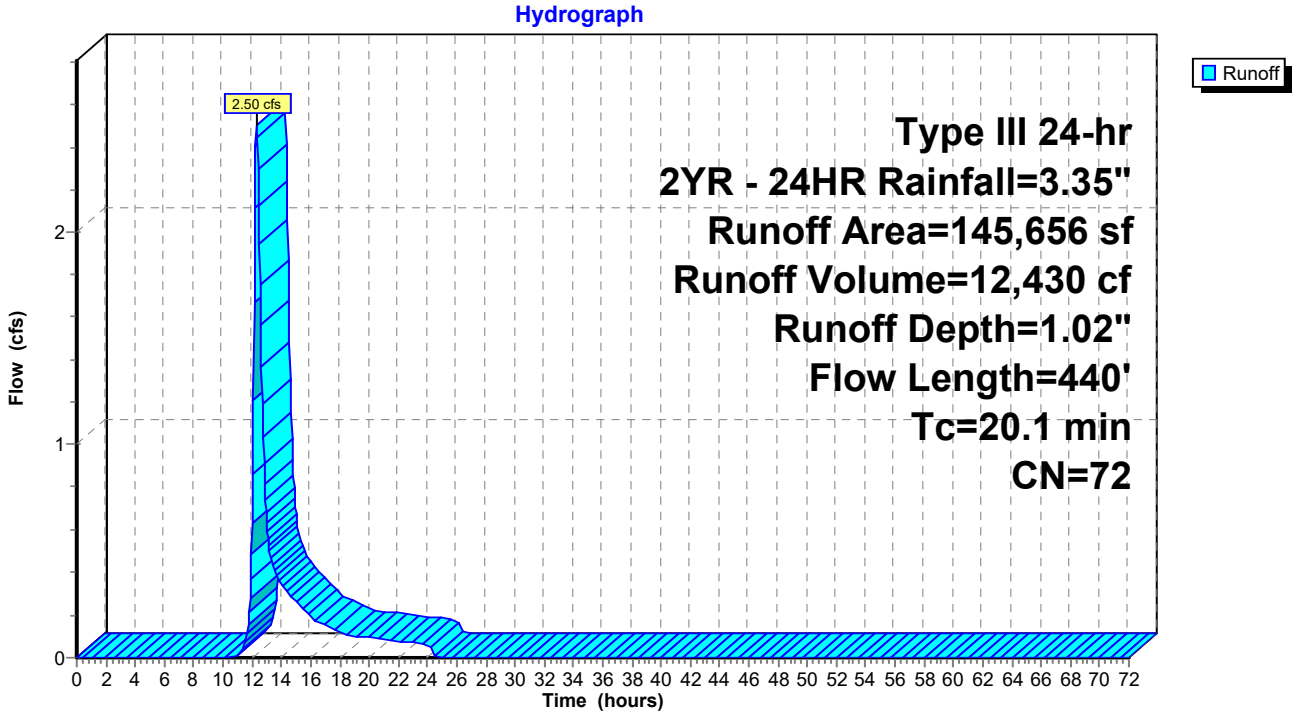
Runoff = 2.50 cfs @ 12.31 hrs, Volume= 12,430 cf, Depth= 1.02"
Routed to Pond P2 : Pond 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
95,136	58	Meadow, non-grazed, HSG B
716	85	Gravel roads, HSG B
39,197	98	Unconnected pavement, HSG A
10,607	98	Unconnected pavement, HSG D
145,656	72	Weighted Average
95,852		65.81% Pervious Area
49,804		34.19% Impervious Area
49,804		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	124	0.0127	1.22		**Sheet Flow, Taxiway A-B** Smooth surfaces n= 0.011 P2= 3.30"
12.3	140	0.0214	0.19		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
6.1	176	0.0059	0.48	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel C-D** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
20.1	440	Total			

Subcatchment N3: DA-N3



Summary for Subcatchment N4: DA-N4

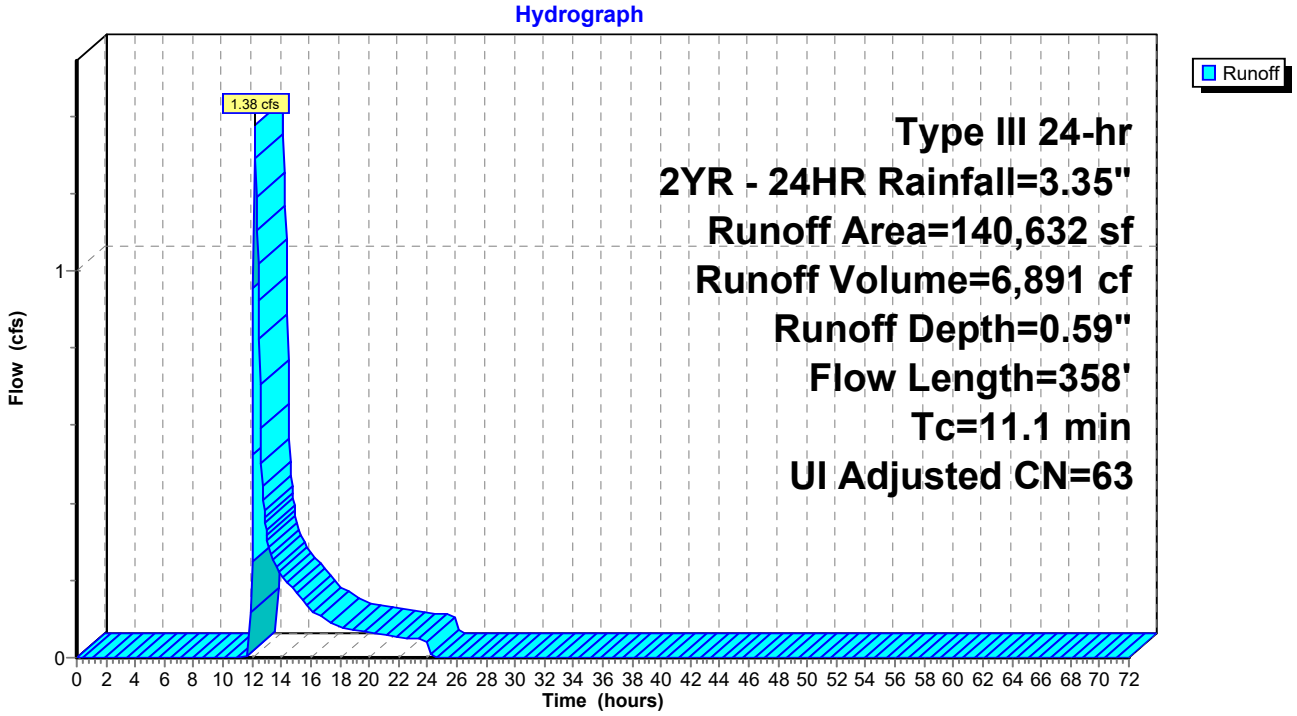
Runoff = 1.38 cfs @ 12.20 hrs, Volume= 6,891 cf, Depth= 0.59"
Routed to Pond P4 : Pond 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
103,196	58		Meadow, non-grazed, HSG B
28,491	98		Unconnected pavement, HSG A
8,945	98		Unconnected pavement, HSG D
140,632	69	63	Weighted Average, UI Adjusted
103,196			73.38% Pervious Area
37,436			26.62% Impervious Area
37,436			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	75	0.0100	1.00		**Sheet Flow, Runway A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.2	25	0.0100	0.10		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
4.1	200	0.0135	0.81		**Shallow Concentrated Flow, Grass C-D** Short Grass Pasture Kv= 7.0 fps
1.5	58	0.0103	0.63	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
11.1	358	Total			

Subcatchment N4: DA-N4



Summary for Subcatchment N6: DA-N6

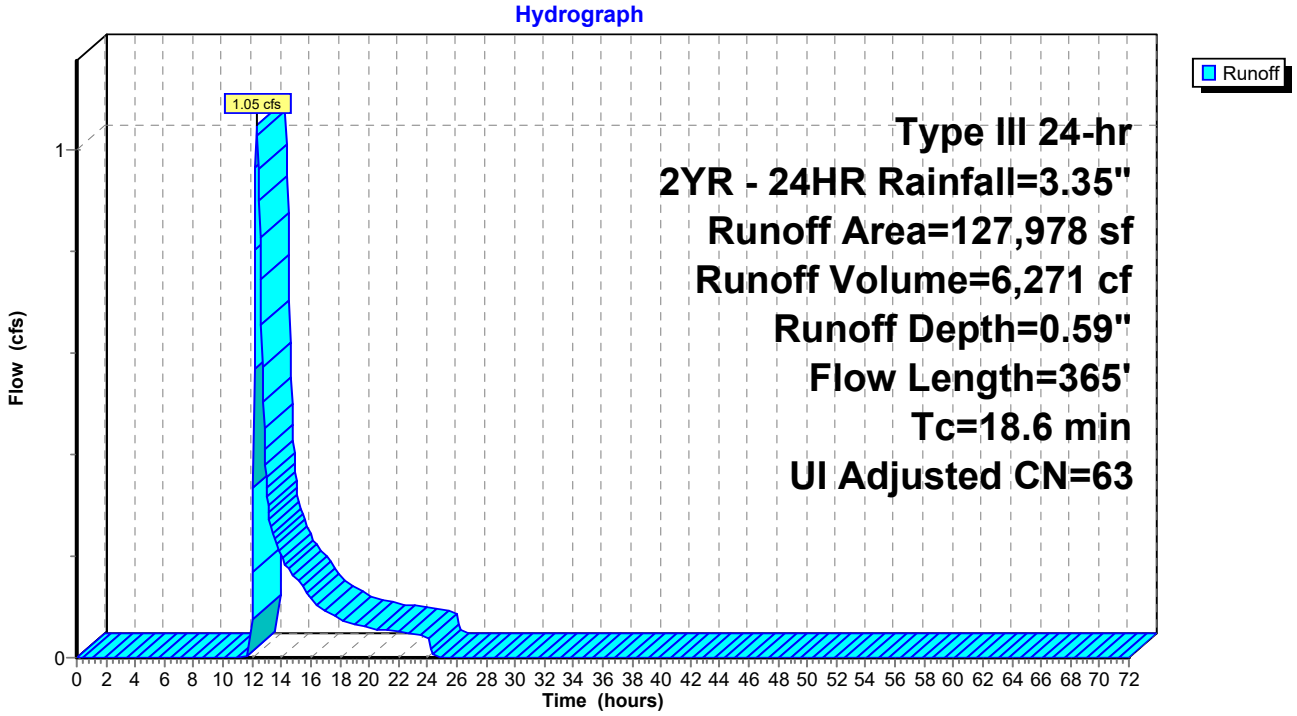
Runoff = 1.05 cfs @ 12.33 hrs, Volume= 6,271 cf, Depth= 0.59"
Routed to Pond P5 : Pond 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
93,344	58		Meadow, non-grazed, HSG B
709	76		Gravel roads, HSG A
25,067	98		Unconnected pavement, HSG A
8,858	98		Unconnected pavement, HSG D
127,978	69	63	Weighted Average, UI Adjusted
94,053			73.49% Pervious Area
33,925			26.51% Impervious Area
33,925			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	78	0.0102	0.13		**Sheet Flow, Runway A-B** Grass: Short n= 0.150 P2= 3.30"
2.7	22	0.0242	0.14		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
3.6	143	0.0088	0.66		**Shallow Concentrated Flow, Grass C-D** Short Grass Pasture Kv= 7.0 fps
0.4	55	0.0120	2.22		**Shallow Concentrated Flow, PCC Channel D-E** Paved Kv= 20.3 fps
1.5	67	0.0149	0.76	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
18.6	365	Total			

Subcatchment N6: DA-N6



Summary for Subcatchment N7: DA-N7

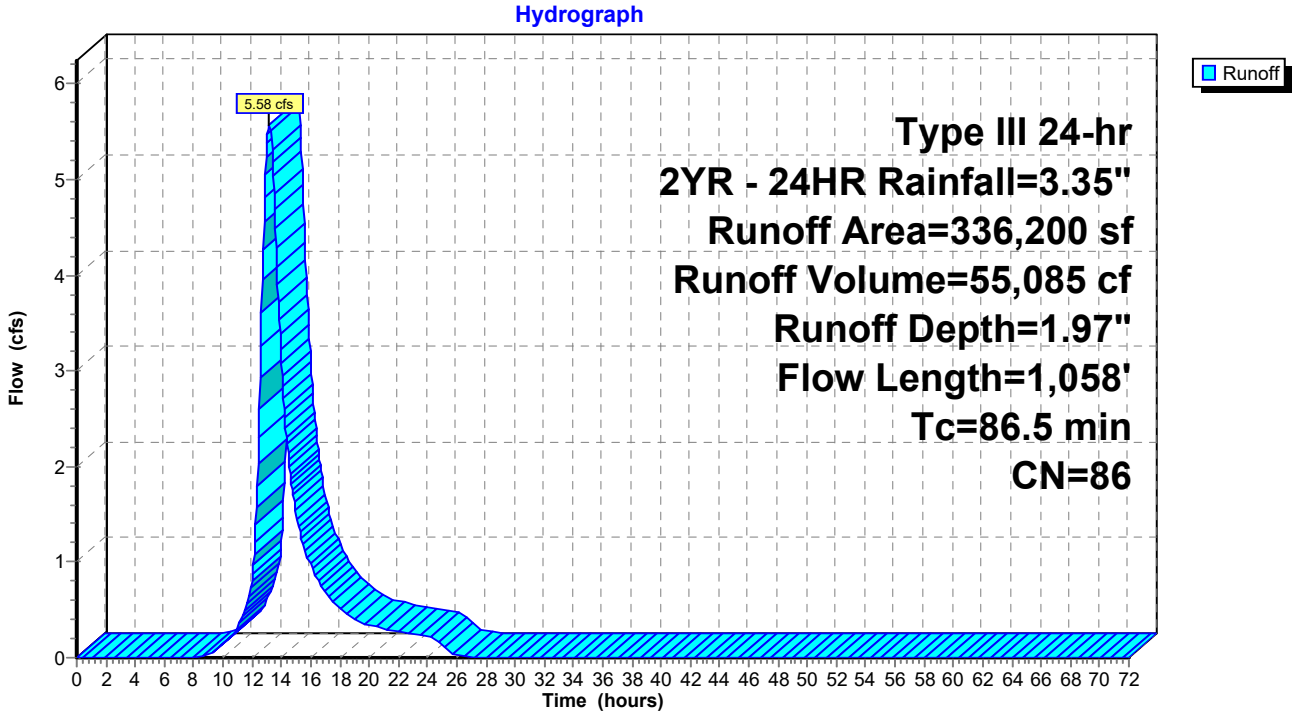
Runoff = 5.58 cfs @ 13.16 hrs, Volume= 55,085 cf, Depth= 1.97"
Routed to Pond P3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
104,683	58	Meadow, non-grazed, HSG B
2,298	98	Unconnected pavement, HSG A
229,219	98	Unconnected pavement, HSG D
336,200	86	Weighted Average
104,683		31.14% Pervious Area
231,517		68.86% Impervious Area
231,517		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	300	0.0043	0.94		**Sheet Flow, Apron** Smooth surfaces n= 0.011 P2= 3.30"
4.0	318	0.0043	1.33		**Shallow Concentrated Flow, Apron** Paved Kv= 20.3 fps
0.4	33	0.0424	1.44		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
76.8	407	0.0002	0.09	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
86.5	1,058	Total			

Subcatchment N7: DA-N7



Summary for Subcatchment N8: DA-N8

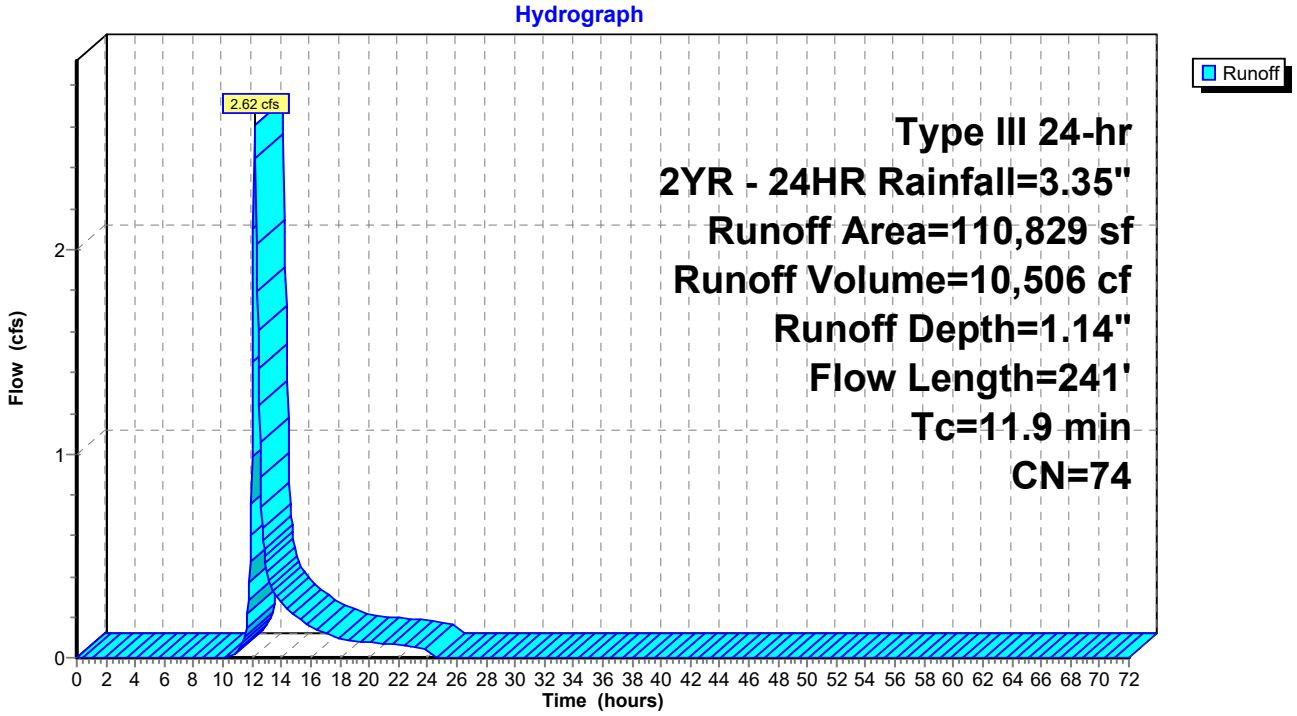
Runoff = 2.62 cfs @ 12.18 hrs, Volume= 10,506 cf, Depth= 1.14"
Routed to Pond P7 : Pond 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Description
66,418	58	Meadow, non-grazed, HSG B
36,227	98	Unconnected pavement, HSG A
8,184	98	Unconnected pavement, HSG D
110,829	74	Weighted Average
66,418		59.93% Pervious Area
44,411		40.07% Impervious Area
44,411		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	102	0.0107	1.09		**Sheet Flow, Pavement A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.6	105	0.0221	0.18		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
0.7	34	0.0174	0.82	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
11.9	241	Total			

Subcatchment N8: DA-N8



Summary for Subcatchment N9: DA-N9

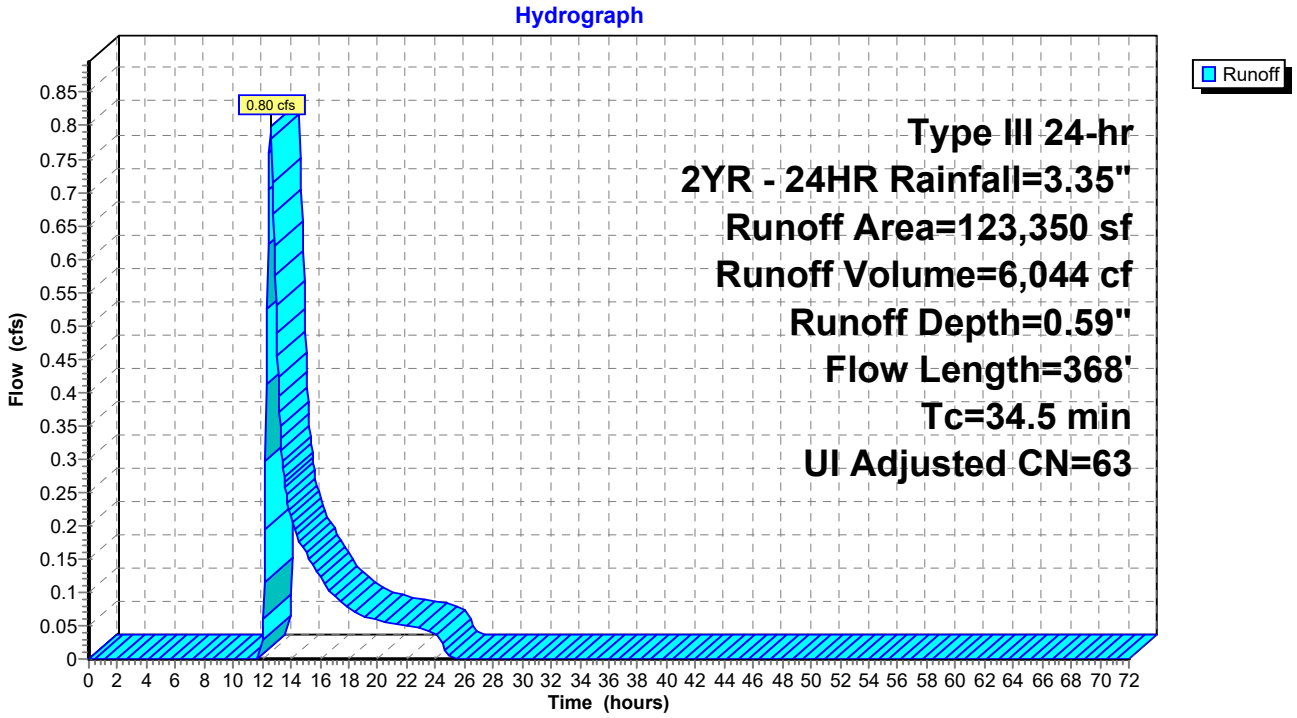
Runoff = 0.80 cfs @ 12.59 hrs, Volume= 6,044 cf, Depth= 0.59"
Routed to Pond P1 : Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 2YR - 24HR Rainfall=3.35"

Area (sf)	CN	Adj	Description
94,082	58		Meadow, non-grazed, HSG B
3,983	98		Unconnected pavement, HSG A
25,285	98		Unconnected pavement, HSG D
123,350	67	63	Weighted Average, UI Adjusted
94,082			76.27% Pervious Area
29,268			23.73% Impervious Area
29,268			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	214	0.0201	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
16.8	154	0.0006	0.15	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
34.5	368	Total			

Subcatchment N9: DA-N9



Summary for Reach 1R: WQS Segment 1

Inflow Area = 1,462,159 sf, 36.00% Impervious, Inflow Depth = 0.97" for 2YR - 24HR event
Inflow = 11.81 cfs @ 12.26 hrs, Volume= 117,742 cf
Outflow = 9.24 cfs @ 12.57 hrs, Volume= 117,742 cf, Atten= 22%, Lag= 18.7 min
Routed to Pond Cr-B : Robinson Driveway

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.14 fps, Min. Travel Time= 18.3 min
Avg. Velocity = 0.34 fps, Avg. Travel Time= 62.2 min

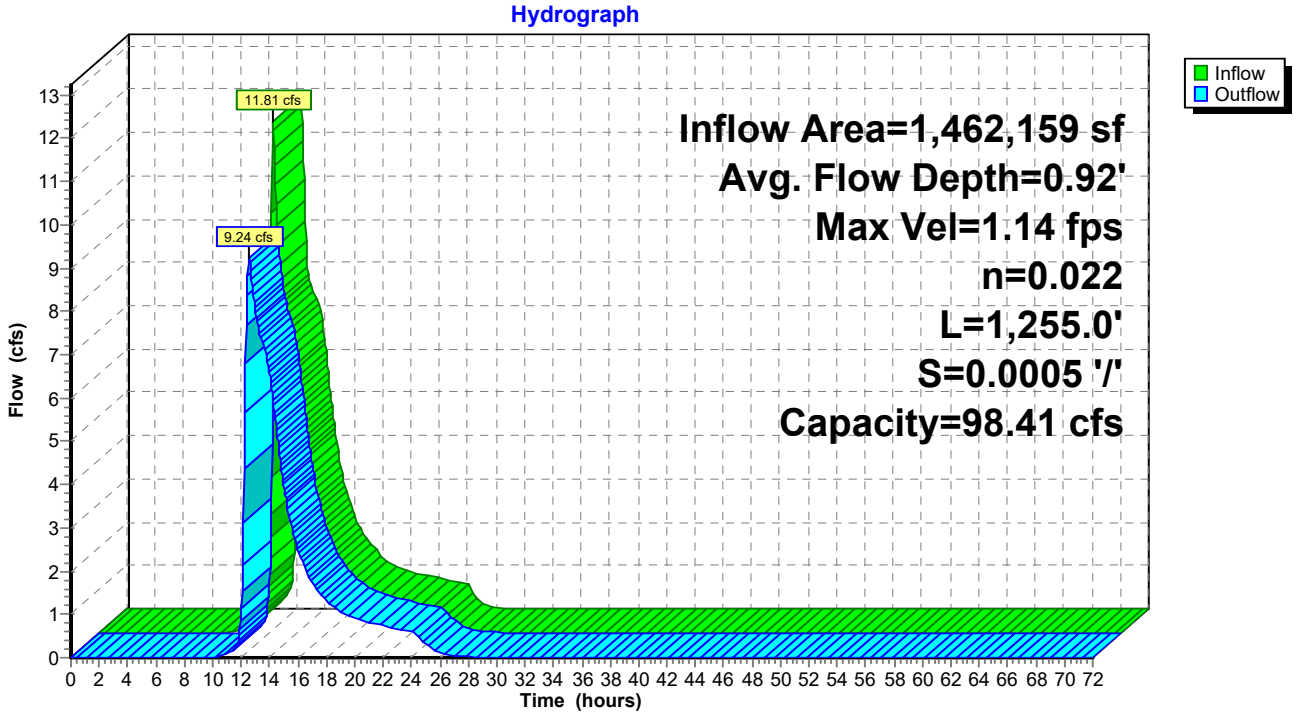
Peak Storage= 10,125 cf @ 12.57 hrs
Average Depth at Peak Storage= 0.92' , Surface Width= 11.52'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 239.23 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.41 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 1,255.0' Slope= 0.0005 '/'
Inlet Invert= 2.32', Outlet Invert= 1.72'



‡

Reach 1R: WQS Segment 1



Summary for Reach 2R: WQS Segment 2

Inflow Area = 1,828,358 sf, 39.67% Impervious, Inflow Depth = 0.99" for 2YR - 24HR event
Inflow = 14.14 cfs @ 12.40 hrs, Volume= 150,700 cf
Outflow = 13.30 cfs @ 12.56 hrs, Volume= 150,700 cf, Atten= 6%, Lag= 9.6 min
Routed to Pond Cr-CD : Utility Crossing

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.28 fps, Min. Travel Time= 9.9 min
Avg. Velocity = 0.35 fps, Avg. Travel Time= 36.1 min

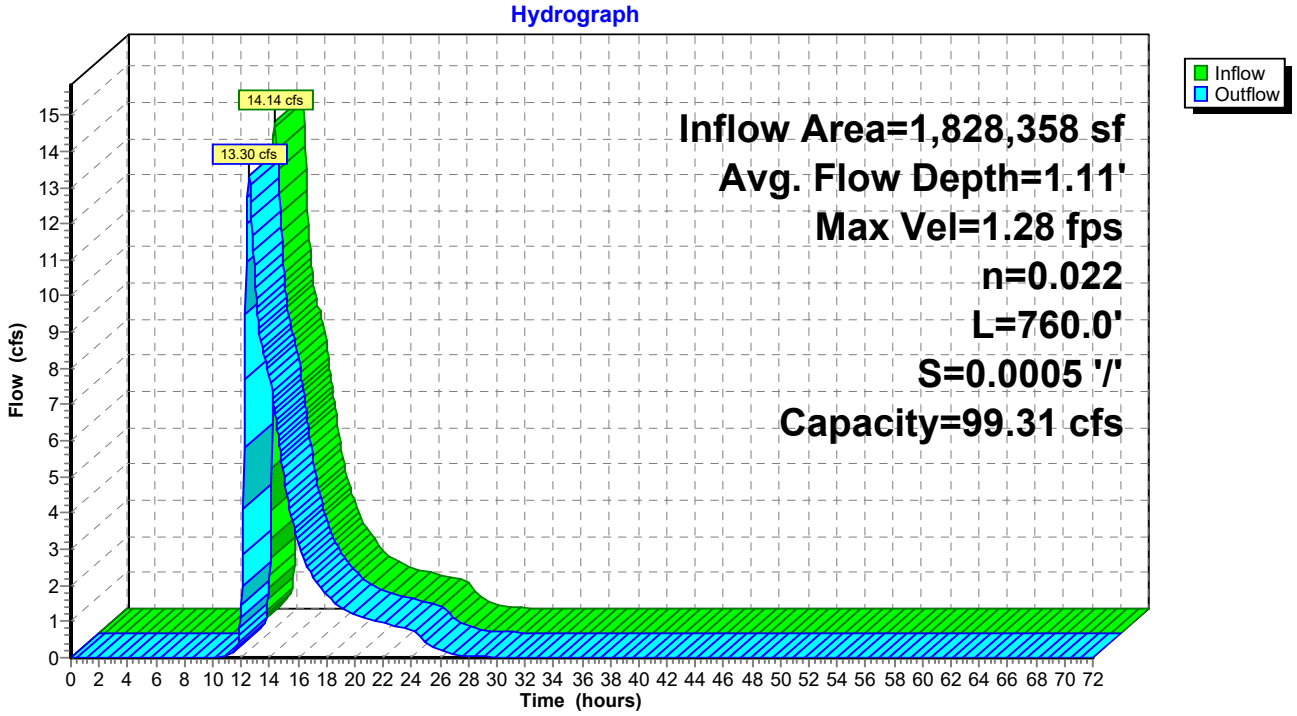
Peak Storage= 7,891 cf @ 12.56 hrs
Average Depth at Peak Storage= 1.11' , Surface Width= 12.67'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 241.41 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 99.31 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 760.0' Slope= 0.0005 '/'
Inlet Invert= 1.70', Outlet Invert= 1.33'



‡

Reach 2R: WQS Segment 2



Summary for Reach 3R: WQS Segment 3

Inflow Area = 2,385,294 sf, 36.01% Impervious, Inflow Depth = 0.93" for 2YR - 24HR event
Inflow = 18.29 cfs @ 12.50 hrs, Volume= 185,457 cf
Outflow = 17.50 cfs @ 12.59 hrs, Volume= 185,457 cf, Atten= 4%, Lag= 5.6 min
Routed to Pond CC1 : CC1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.37 fps, Min. Travel Time= 7.4 min
Avg. Velocity = 0.31 fps, Avg. Travel Time= 32.8 min

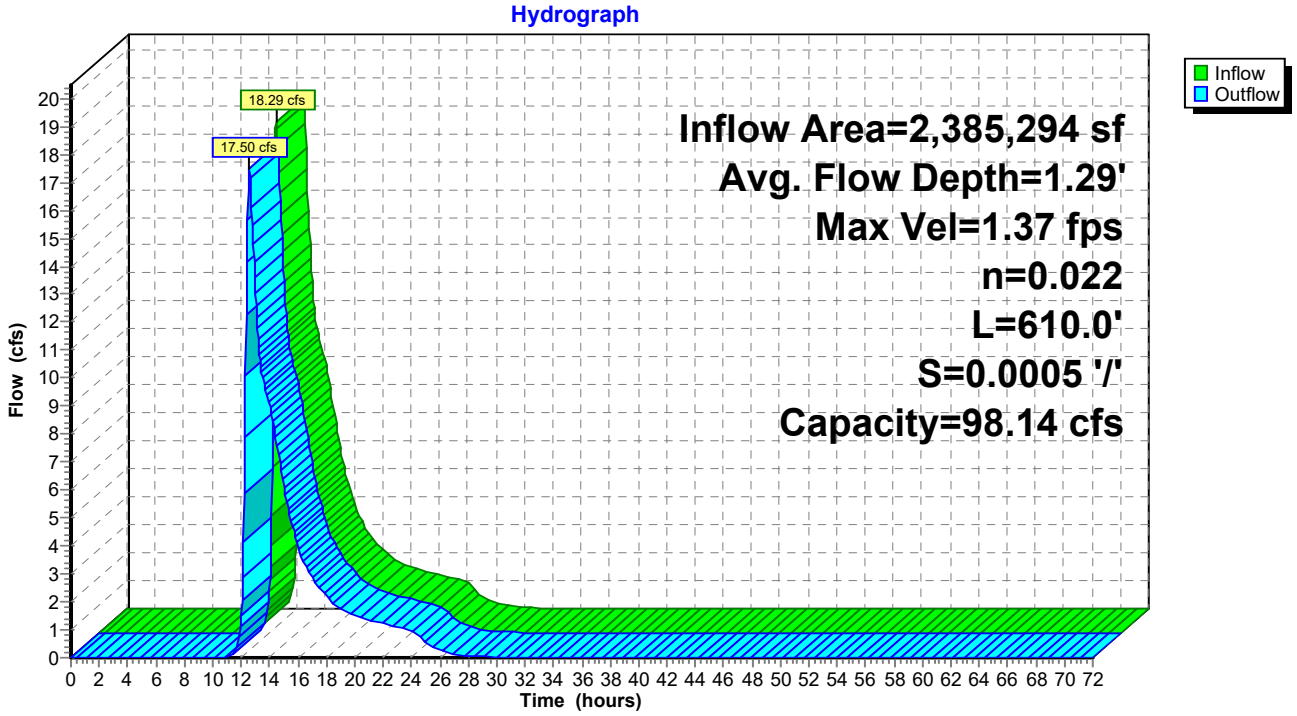
Peak Storage= 7,776 cf @ 12.59 hrs
Average Depth at Peak Storage= 1.29' , Surface Width= 13.75'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 238.55 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.14 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 610.0' Slope= 0.0005 '/'
Inlet Invert= 1.28', Outlet Invert= 0.99'



‡

Reach 3R: WQS Segment 3



Summary for Reach PT1: Overland Flow

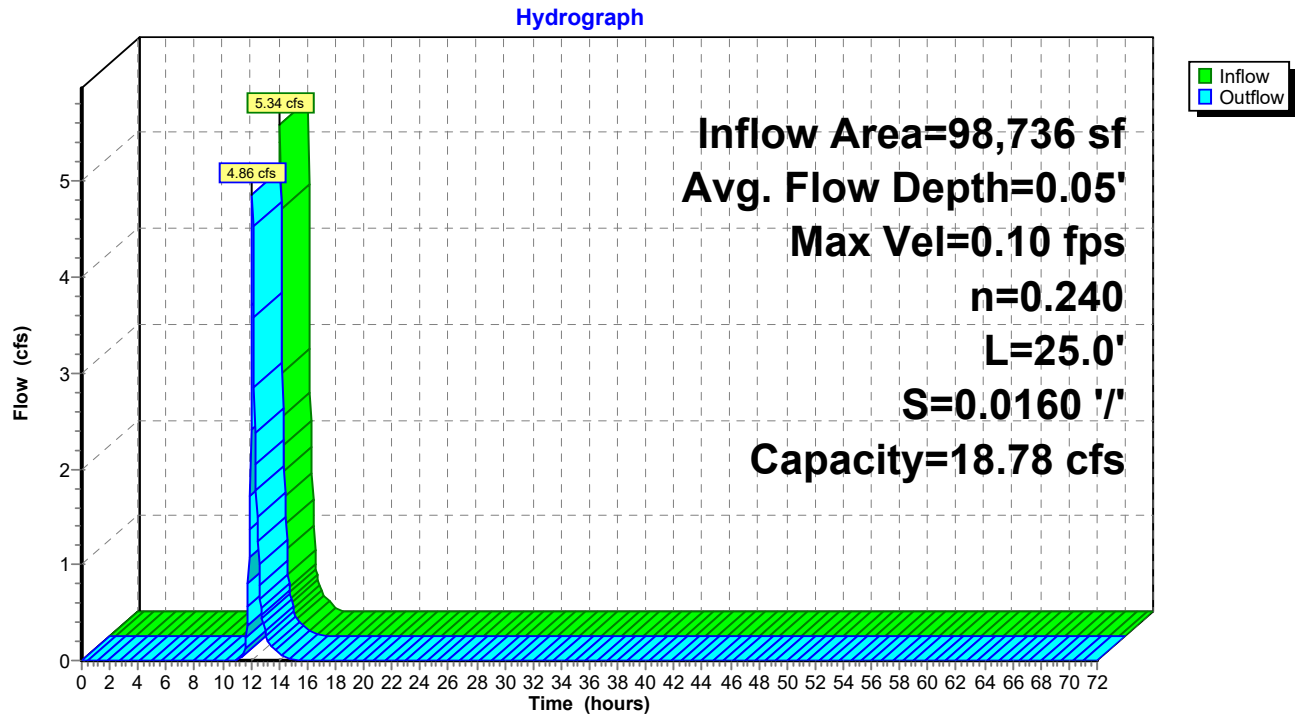
Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 1.01" for 2YR - 24HR event
Inflow = 5.34 cfs @ 12.08 hrs, Volume= 8,326 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 4.86 cfs @ 12.12 hrs, Volume= 8,326 cf, Atten= 9%, Lag= 2.4 min
Routed to Pond T1 : Sand Filter 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.10 fps, Min. Travel Time= 4.0 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 24.8 min

Peak Storage= 1,161 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 950.96'
Bank-Full Depth= 0.11' Flow Area= 104.6 sf, Capacity= 18.78 cfs

949.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 953.40'
Length= 25.0' Slope= 0.0160 '/'
Inlet Invert= 4.15', Outlet Invert= 3.75'





Summary for Reach PT2: Overland Flow

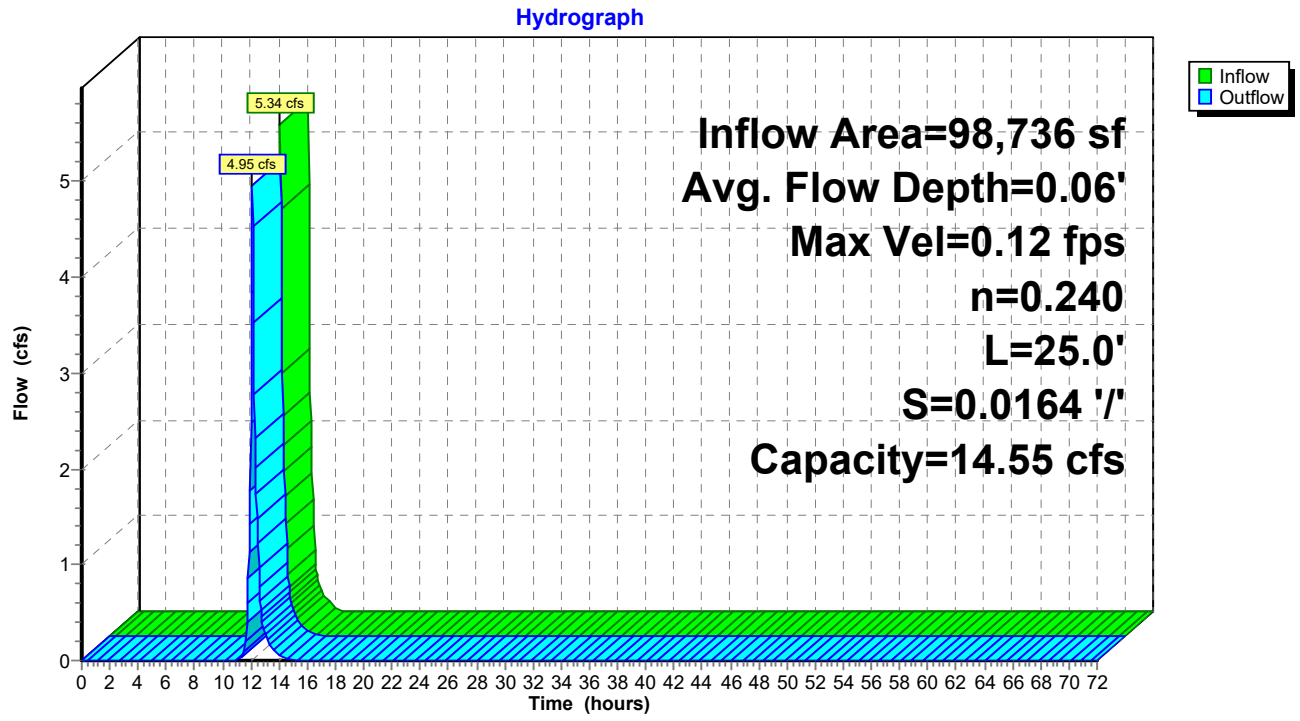
Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 1.01" for 2YR - 24HR event
Inflow = 5.34 cfs @ 12.08 hrs, Volume= 8,326 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 4.95 cfs @ 12.11 hrs, Volume= 8,326 cf, Atten= 7%, Lag= 2.2 min
Routed to Pond T2 : Sand Filter 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 22.6 min

Peak Storage= 1,047 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.06' , Surface Width= 728.30'
Bank-Full Depth= 0.11' Flow Area= 80.1 sf, Capacity= 14.55 cfs

726.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 730.40'
Length= 25.0' Slope= 0.0164 '/'
Inlet Invert= 4.15', Outlet Invert= 3.74'





Summary for Reach PT3: Overland Flow

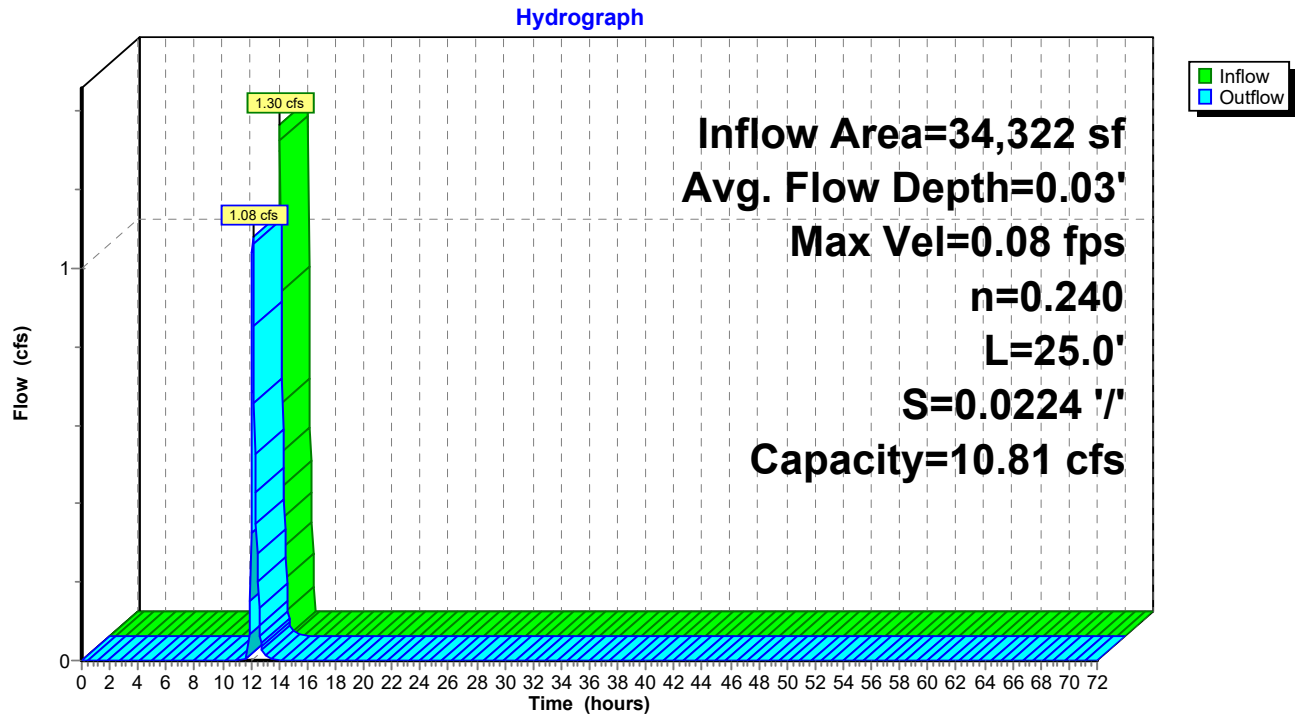
Inflow Area = 34,322 sf, 59.30% Impervious, Inflow Depth = 0.45" for 2YR - 24HR event
Inflow = 1.30 cfs @ 12.08 hrs, Volume= 1,296 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 1.08 cfs @ 12.13 hrs, Volume= 1,296 cf, Atten= 17%, Lag= 3.1 min
Routed to Pond T3 : Sand Filter 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.08 fps, Min. Travel Time= 5.0 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 27.6 min

Peak Storage= 319 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.03' , Surface Width= 462.11'
Bank-Full Depth= 0.11' Flow Area= 51.0 sf, Capacity= 10.81 cfs

461.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 465.40'
Length= 25.0' Slope= 0.0224 '/'
Inlet Invert= 3.86', Outlet Invert= 3.30'





Summary for Reach PT4: Overland Flow

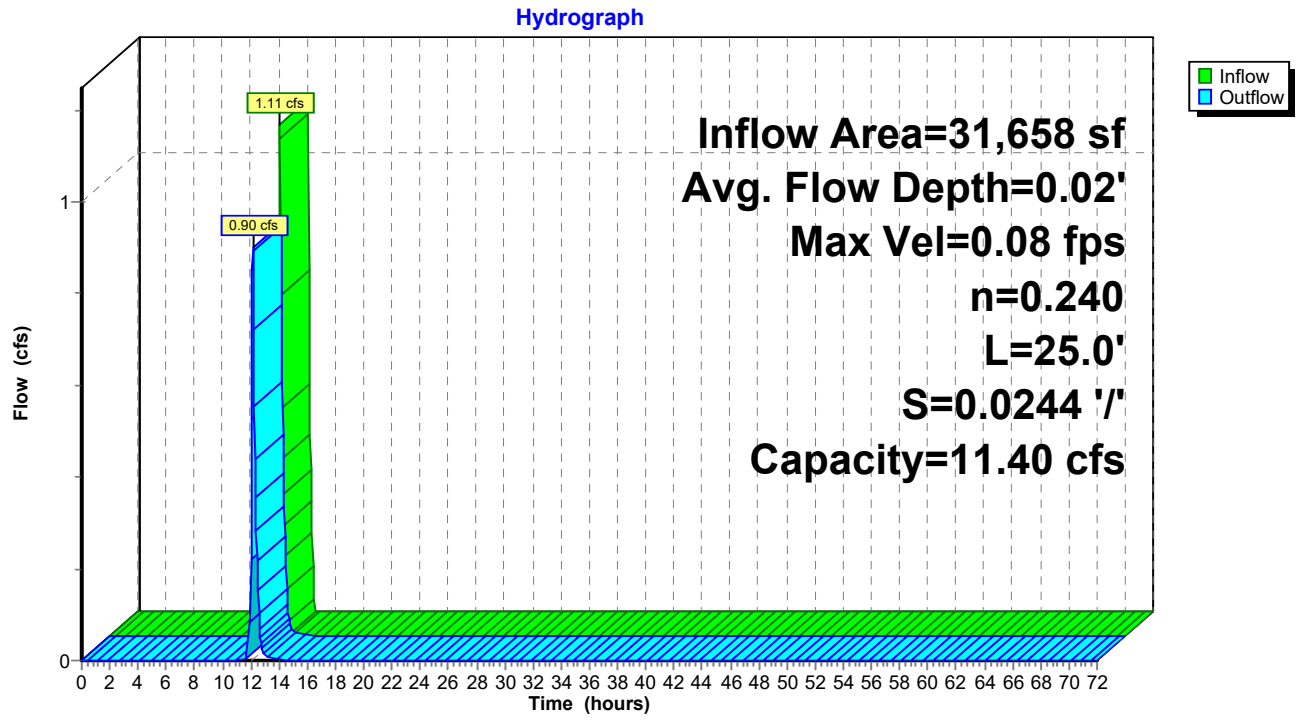
Inflow Area = 31,658 sf, 56.17% Impervious, Inflow Depth = 0.40" for 2YR - 24HR event
Inflow = 1.11 cfs @ 12.08 hrs, Volume= 1,044 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 0.90 cfs @ 12.13 hrs, Volume= 1,044 cf, Atten= 19%, Lag= 3.3 min
Routed to Pond T4 : Sand Filter 4

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.08 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 27.5 min

Peak Storage= 280 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.02' , Surface Width= 466.96'
Bank-Full Depth= 0.11' Flow Area= 51.5 sf, Capacity= 11.40 cfs

466.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 470.40'
Length= 25.0' Slope= 0.0244 '/'
Inlet Invert= 3.79', Outlet Invert= 3.18'





Summary for Pond 11P: (5) Culvert 6X3

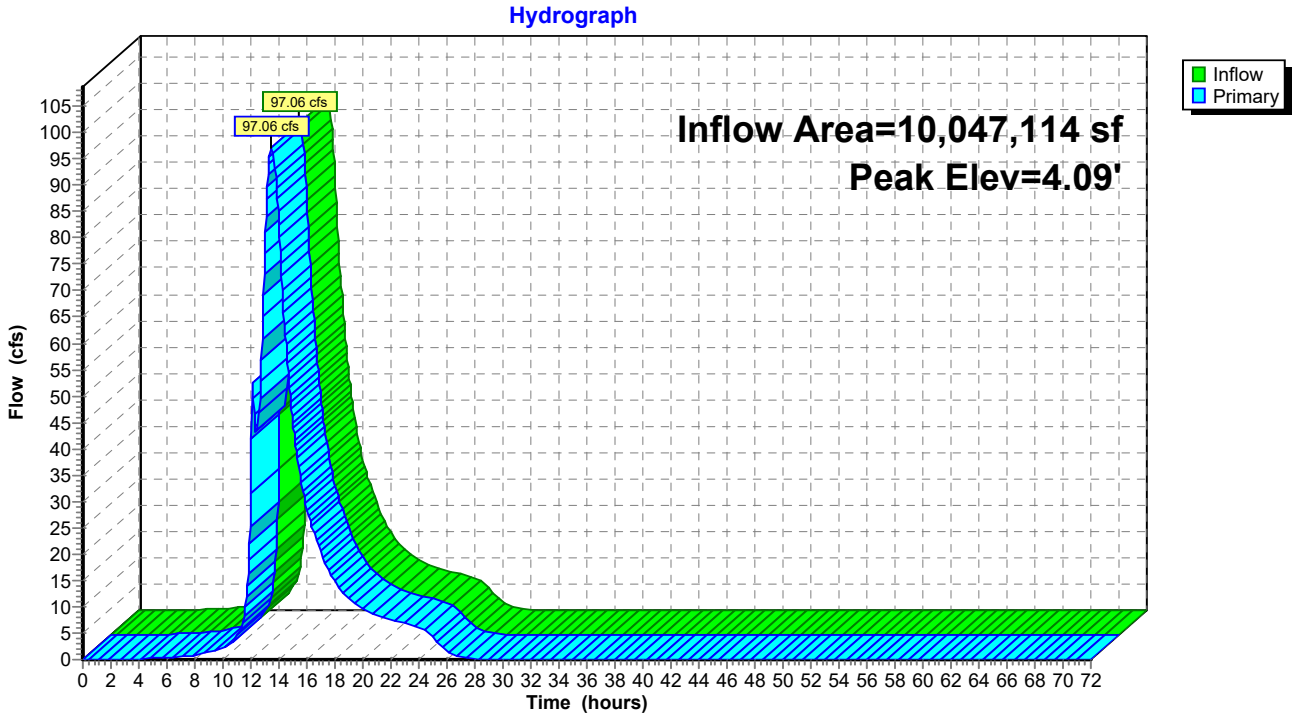
Inflow Area = 10,047,114 sf, 45.76% Impervious, Inflow Depth = 1.56" for 2YR - 24HR event
Inflow = 97.06 cfs @ 13.49 hrs, Volume= 1,307,668 cf
Outflow = 97.06 cfs @ 13.49 hrs, Volume= 1,307,668 cf, Atten= 0%, Lag= 0.0 min
Primary = 97.06 cfs @ 13.49 hrs, Volume= 1,307,668 cf
Routed to Link 3L : EAST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.09' @ 13.49 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	**72.0" W x 36.0" H Box Box 6x3, n=0.012 X 5.00** L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.80' S= 0.0033 '/' Cc= 0.900 n= 0.012, Flow Area= 18.00 sf
#2	Primary	5.51'	**1,000.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=97.03 cfs @ 13.49 hrs HW=4.09' (Free Discharge)
└─**1=Box 6x3, n=0.012** (Barrel Controls 97.03 cfs @ 3.95 fps)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: (5) Culvert 6X3



Summary for Pond CB1: Exist CB

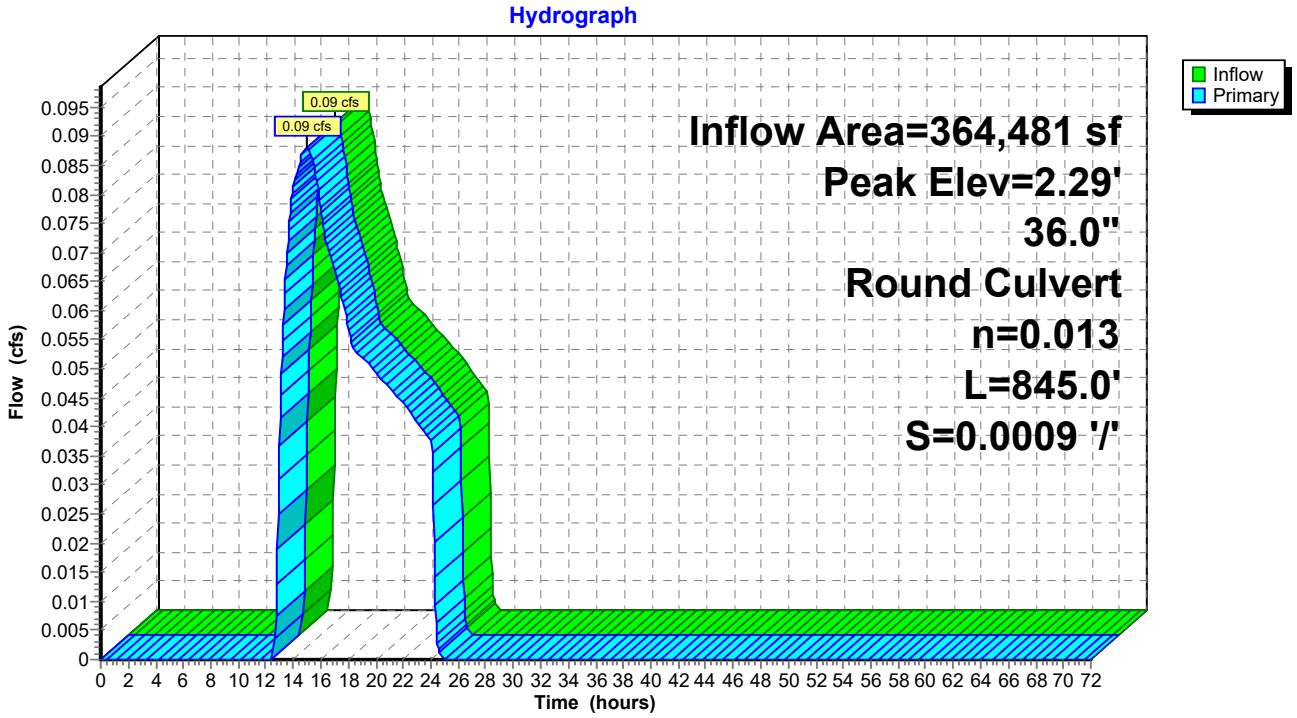
Inflow Area = 364,481 sf, 23.60% Impervious, Inflow Depth = 0.08" for 2YR - 24HR event
Inflow = 0.09 cfs @ 14.96 hrs, Volume= 2,394 cf
Outflow = 0.09 cfs @ 14.96 hrs, Volume= 2,394 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.09 cfs @ 14.96 hrs, Volume= 2,394 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.29' @ 14.96 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.10'	**36.0" Round Culvert** L= 845.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 2.10' / 1.32' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf

Primary OutFlow Max=0.09 cfs @ 14.96 hrs HW=2.29' (Free Discharge)
1=Culvert (Barrel Controls 0.09 cfs @ 0.72 fps)

Pond CB1: Exist CB



Summary for Pond CB10: Exist CB

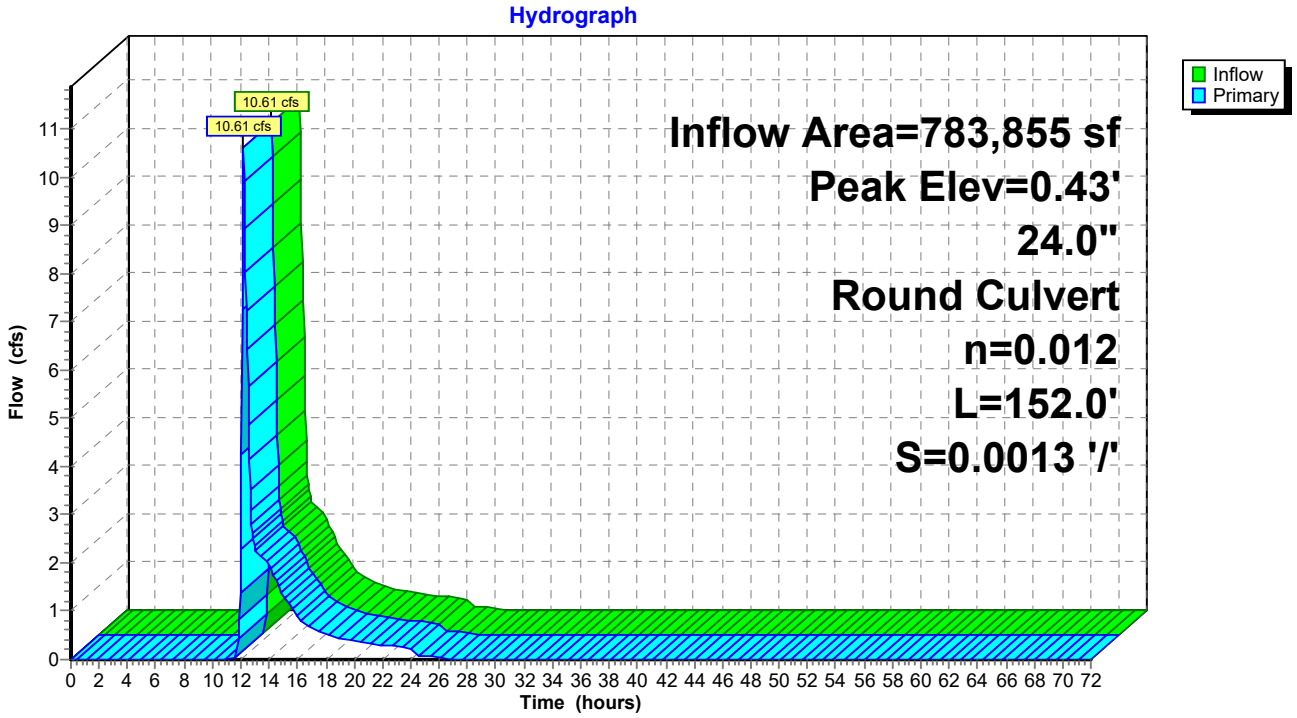
Inflow Area = 783,855 sf, 32.36% Impervious, Inflow Depth = 0.78" for 2YR - 24HR event
Inflow = 10.61 cfs @ 12.20 hrs, Volume= 50,869 cf
Outflow = 10.61 cfs @ 12.20 hrs, Volume= 50,869 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.61 cfs @ 12.20 hrs, Volume= 50,869 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.43' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.62'	**24.0" Round Culvert** L= 152.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -1.62' / -1.82' S= 0.0013 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=10.61 cfs @ 12.20 hrs HW=0.43' (Free Discharge)
1=Culvert (Barrel Controls 10.61 cfs @ 4.09 fps)

Pond CB10: Exist CB



Summary for Pond CB11: Exist CB

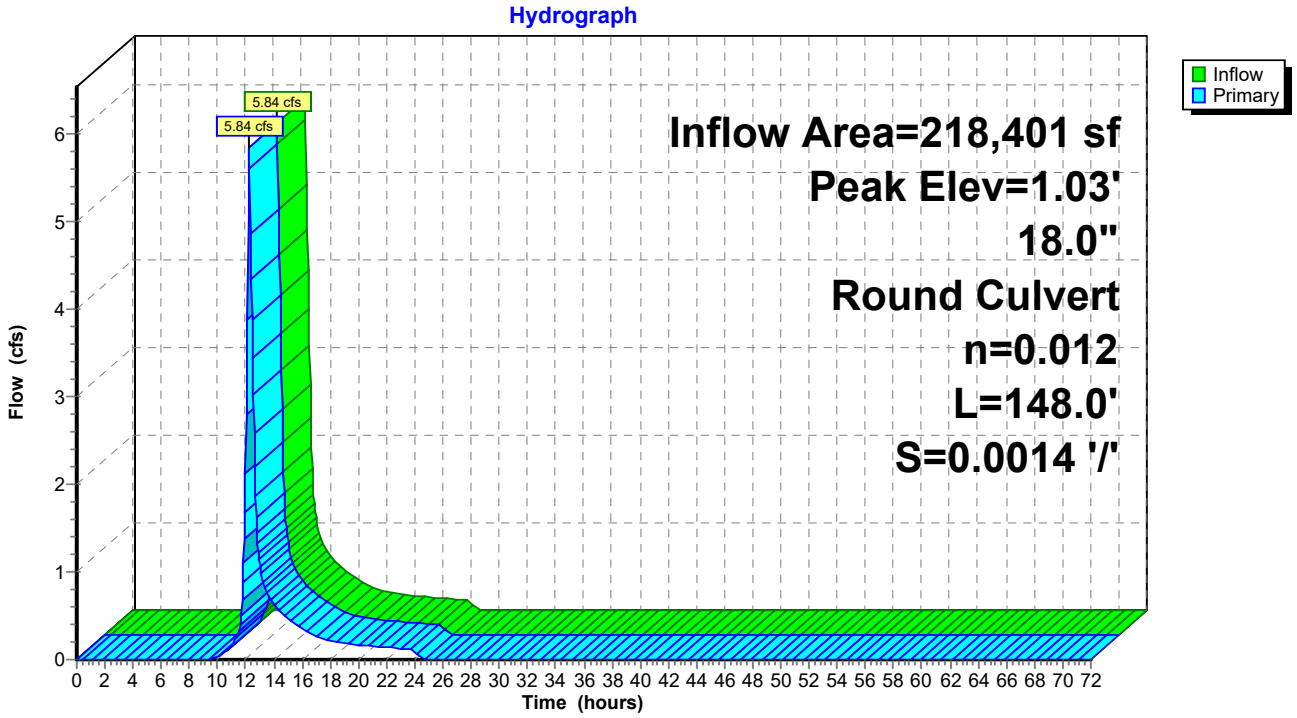
Inflow Area = 218,401 sf, 45.10% Impervious, Inflow Depth = 1.38" for 2YR - 24HR event
Inflow = 5.84 cfs @ 12.23 hrs, Volume= 25,195 cf
Outflow = 5.84 cfs @ 12.23 hrs, Volume= 25,195 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.84 cfs @ 12.23 hrs, Volume= 25,195 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.03' @ 12.23 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.73'	**18.0" Round RCP_Round 18"** L= 148.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.73' / -0.93' S= 0.0014 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=5.78 cfs @ 12.23 hrs HW=1.02' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 5.78 cfs @ 3.53 fps)

Pond CB11: Exist CB



Summary for Pond CB2: Exist CB

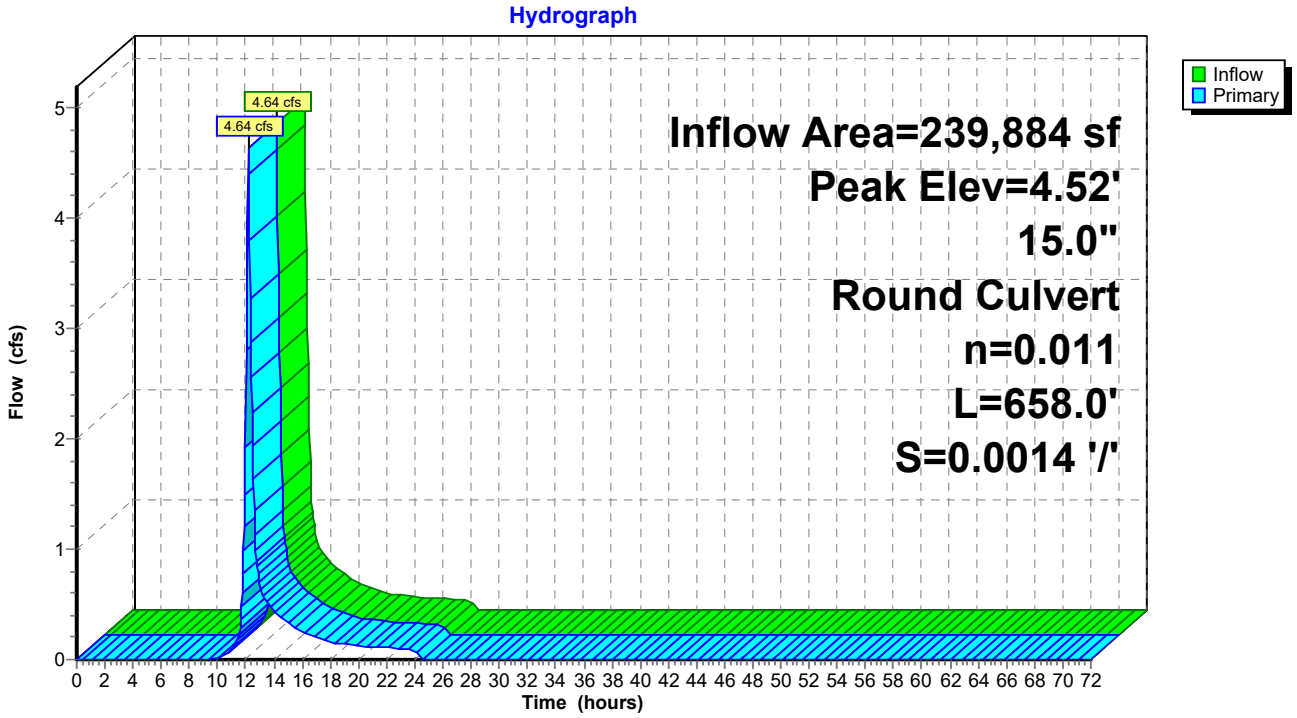
Inflow Area = 239,884 sf, 37.13% Impervious, Inflow Depth = 0.89" for 2YR - 24HR event
Inflow = 4.64 cfs @ 12.16 hrs, Volume= 17,845 cf
Outflow = 4.64 cfs @ 12.16 hrs, Volume= 17,845 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.64 cfs @ 12.16 hrs, Volume= 17,845 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.52' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.40'	**15.0" Round Culvert** L= 658.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.40' / 0.50' S= 0.0014 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=4.56 cfs @ 12.16 hrs HW=4.43' (Free Discharge)
1=Culvert (Barrel Controls 4.56 cfs @ 3.72 fps)

Pond CB2: Exist CB



Summary for Pond CB3: Exist CB

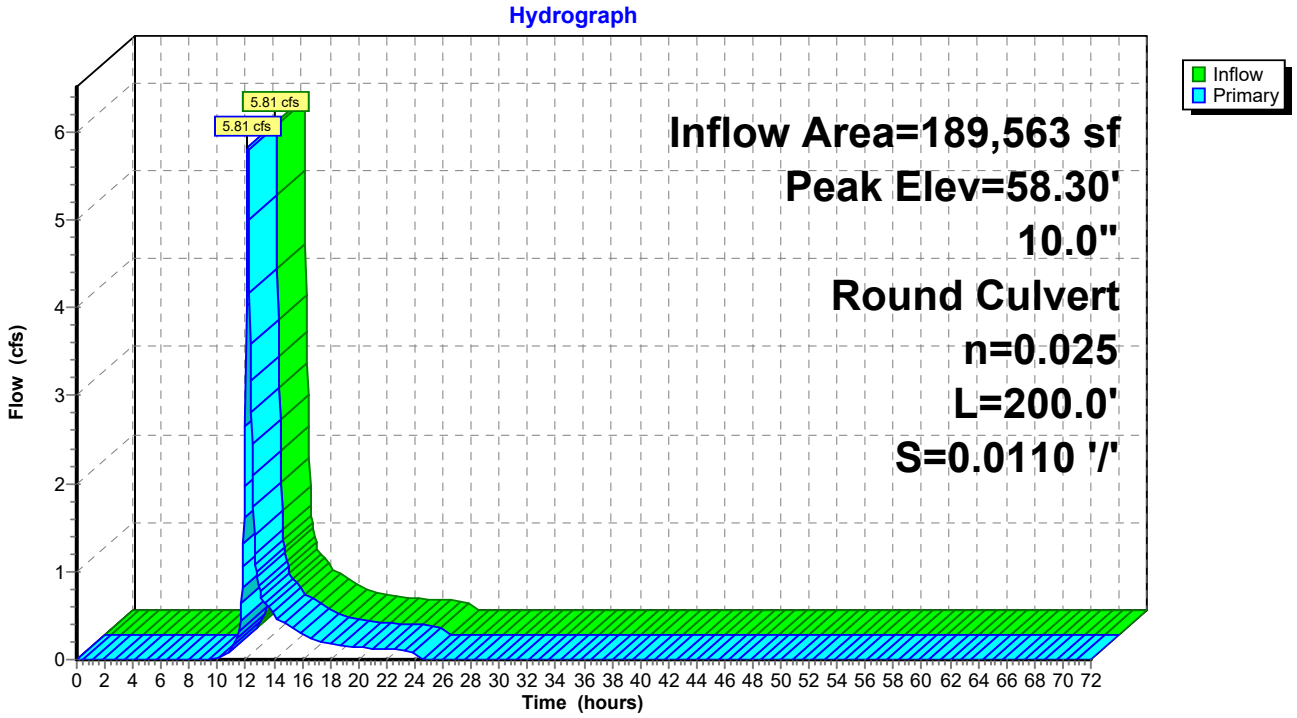
Inflow Area = 189,563 sf, 41.96% Impervious, Inflow Depth = 1.32" for 2YR - 24HR event
Inflow = 5.81 cfs @ 12.14 hrs, Volume= 20,853 cf
Outflow = 5.81 cfs @ 12.14 hrs, Volume= 20,853 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.81 cfs @ 12.14 hrs, Volume= 20,853 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 58.30' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.14'	**10.0" Round CMP_Round 10"** L= 200.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 4.14' / 1.94' S= 0.0110 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.55 sf

Primary OutFlow Max=5.72 cfs @ 12.14 hrs HW=56.61' (Free Discharge)
1=CMP_Round 10" (Barrel Controls 5.72 cfs @ 10.49 fps)

Pond CB3: Exist CB



Summary for Pond CB4: Exist CB

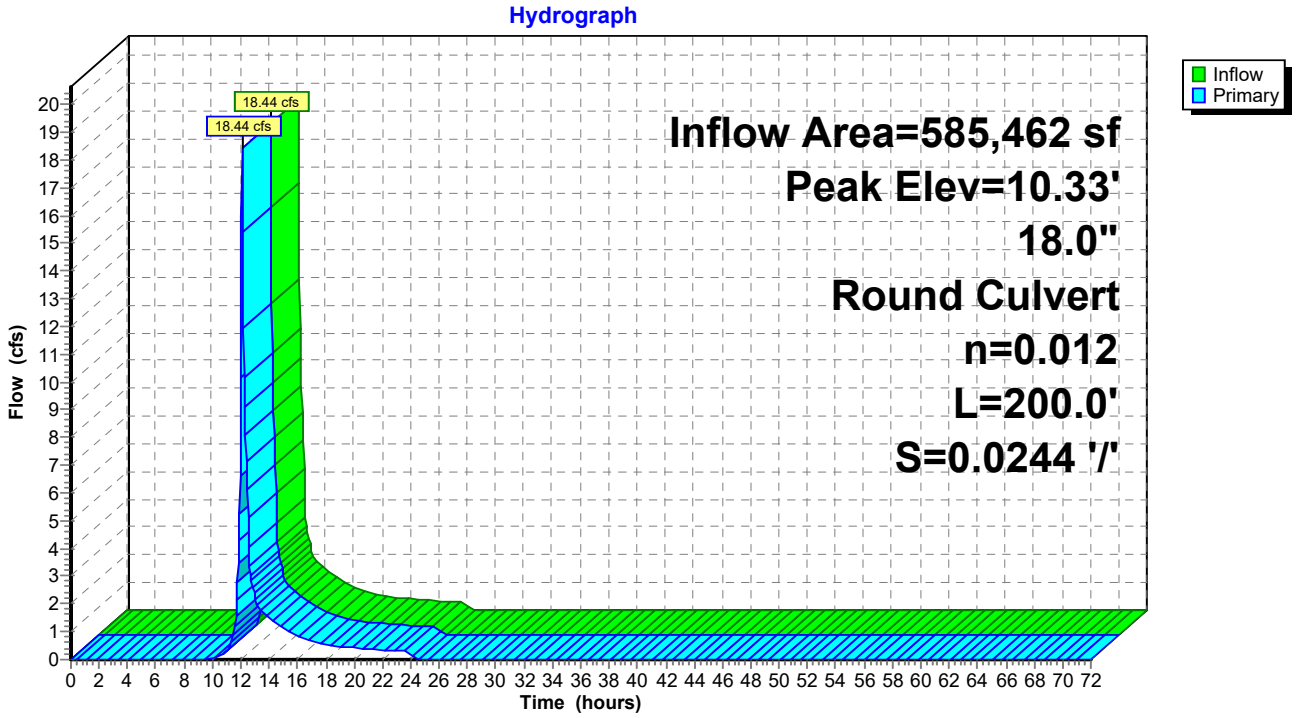
Inflow Area = 585,462 sf, 39.56% Impervious, Inflow Depth = 1.23" for 2YR - 24HR event
Inflow = 18.44 cfs @ 12.10 hrs, Volume= 60,124 cf
Outflow = 18.44 cfs @ 12.10 hrs, Volume= 60,124 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.44 cfs @ 12.10 hrs, Volume= 60,124 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 10.33' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.89'	**18.0" Round RCP_Round 18"** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.89' / 0.00' S= 0.0244 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=18.30 cfs @ 12.10 hrs HW=10.27' (Free Discharge)
1=RCP_Round 18" (Inlet Controls 18.30 cfs @ 10.36 fps)

Pond CB4: Exist CB



Summary for Pond CB5: New CB

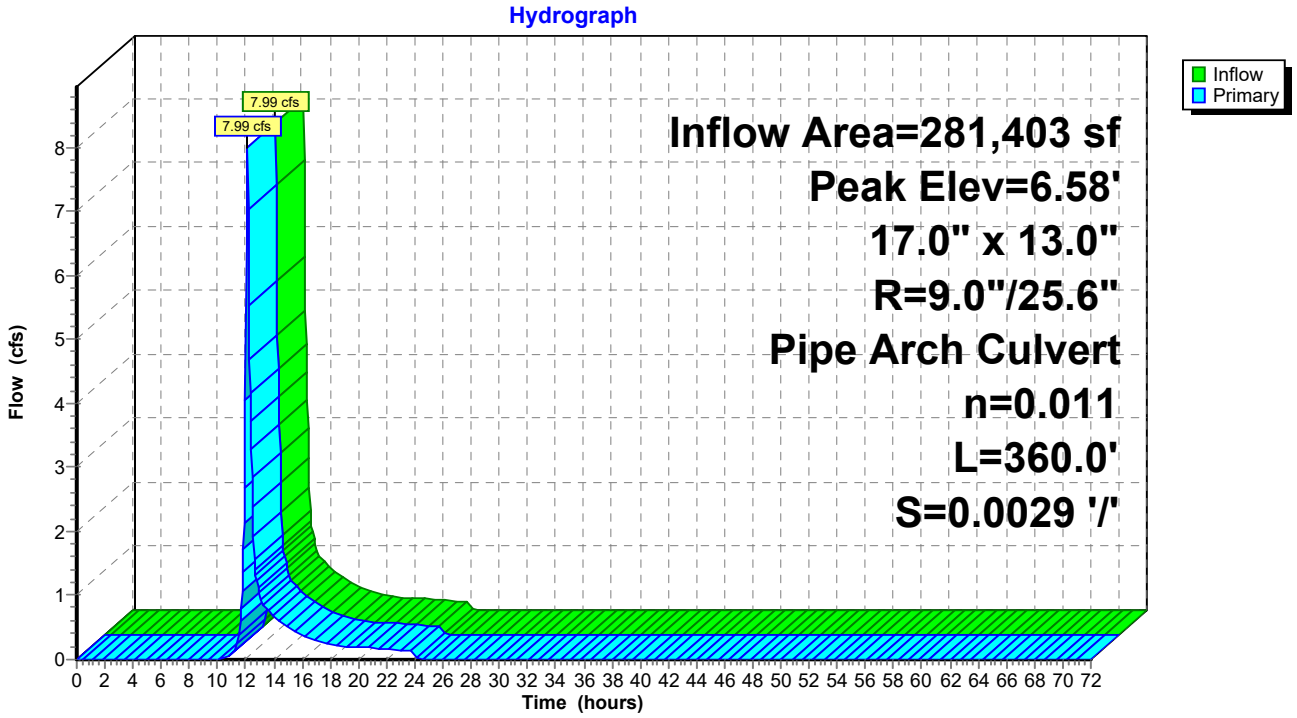
Inflow Area = 281,403 sf, 34.62% Impervious, Inflow Depth = 1.14" for 2YR - 24HR event
Inflow = 7.99 cfs @ 12.11 hrs, Volume= 26,676 cf
Outflow = 7.99 cfs @ 12.11 hrs, Volume= 26,676 cf, Atten= 0%, Lag= 0.0 min
Primary = 7.99 cfs @ 12.11 hrs, Volume= 26,676 cf
Routed to Pond CB4 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 6.58' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.55'	**17.0" W x 13.0" H, R=9.0"/25.6" Pipe Arch CMP_Arch_1/2 17x13** L= 360.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.55' / 0.50' S= 0.0029 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=7.88 cfs @ 12.11 hrs HW=6.45' (Free Discharge)
1=CMP_Arch_1/2 17x13 (Barrel Controls 7.88 cfs @ 6.41 fps)

Pond CB5: New CB



Summary for Pond CB6: New CB

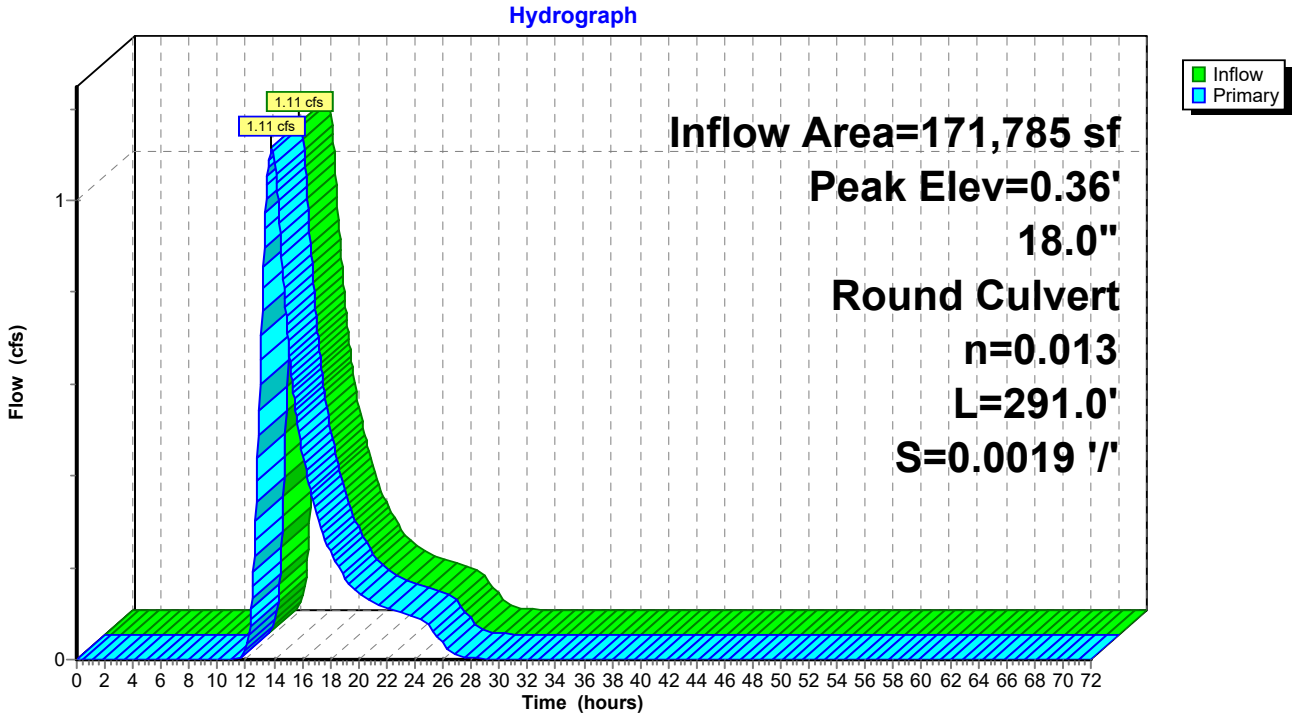
Inflow Area = 171,785 sf, 31.18% Impervious, Inflow Depth = 1.08" for 2YR - 24HR event
Inflow = 1.11 cfs @ 13.80 hrs, Volume= 15,460 cf
Outflow = 1.11 cfs @ 13.80 hrs, Volume= 15,460 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.11 cfs @ 13.80 hrs, Volume= 15,460 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.36' @ 13.80 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.30'	**18.0" Round Culvert** L= 291.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.30' / -0.85' S= 0.0019 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=1.11 cfs @ 13.80 hrs HW=0.36' (Free Discharge)
1=Culvert (Barrel Controls 1.11 cfs @ 2.20 fps)

Pond CB6: New CB



Summary for Pond CB7: Exist CB

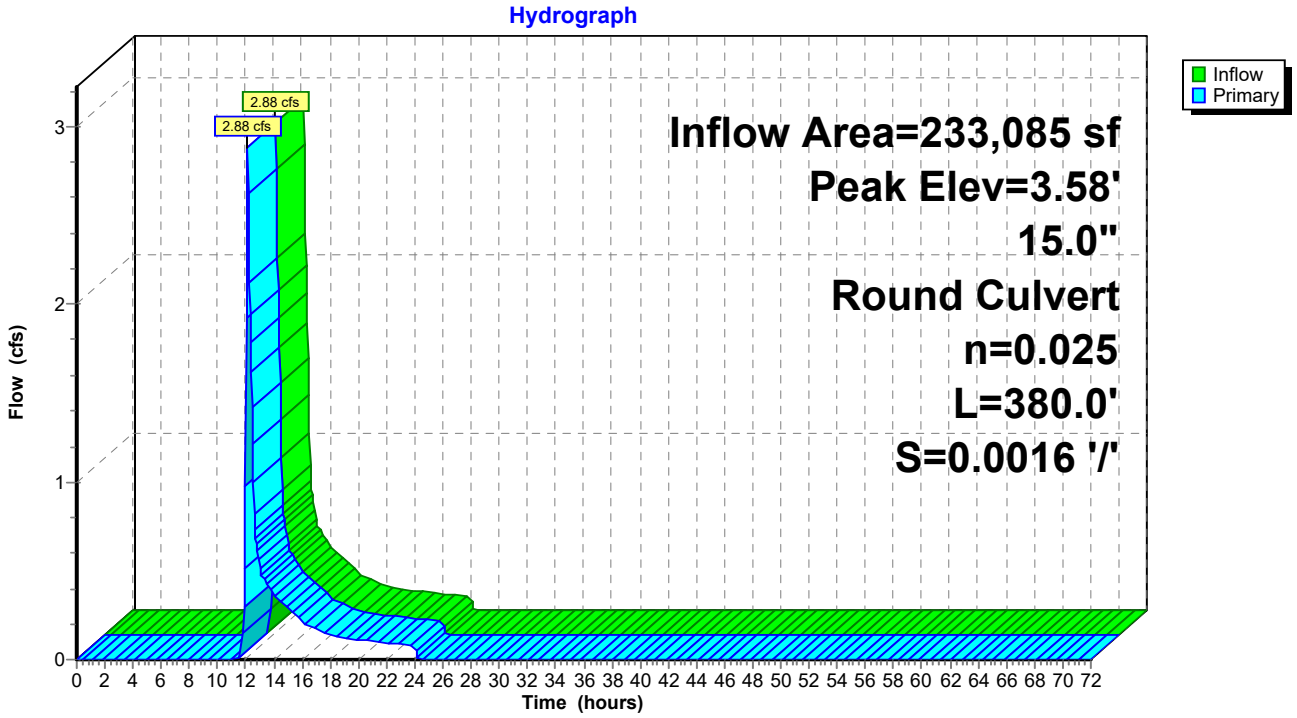
Inflow Area = 233,085 sf, 13.62% Impervious, Inflow Depth = 0.63" for 2YR - 24HR event
Inflow = 2.88 cfs @ 12.13 hrs, Volume= 12,250 cf
Outflow = 2.88 cfs @ 12.13 hrs, Volume= 12,250 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.88 cfs @ 12.13 hrs, Volume= 12,250 cf
Routed to Pond MH1 : MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.58' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**15.0" Round CMP_Round 15"** L= 380.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -0.62' S= 0.0016 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=2.82 cfs @ 12.13 hrs HW=3.48' (Free Discharge)
1=CMP_Round 15" (Barrel Controls 2.82 cfs @ 2.30 fps)

Pond CB7: Exist CB



Summary for Pond CB8: CB

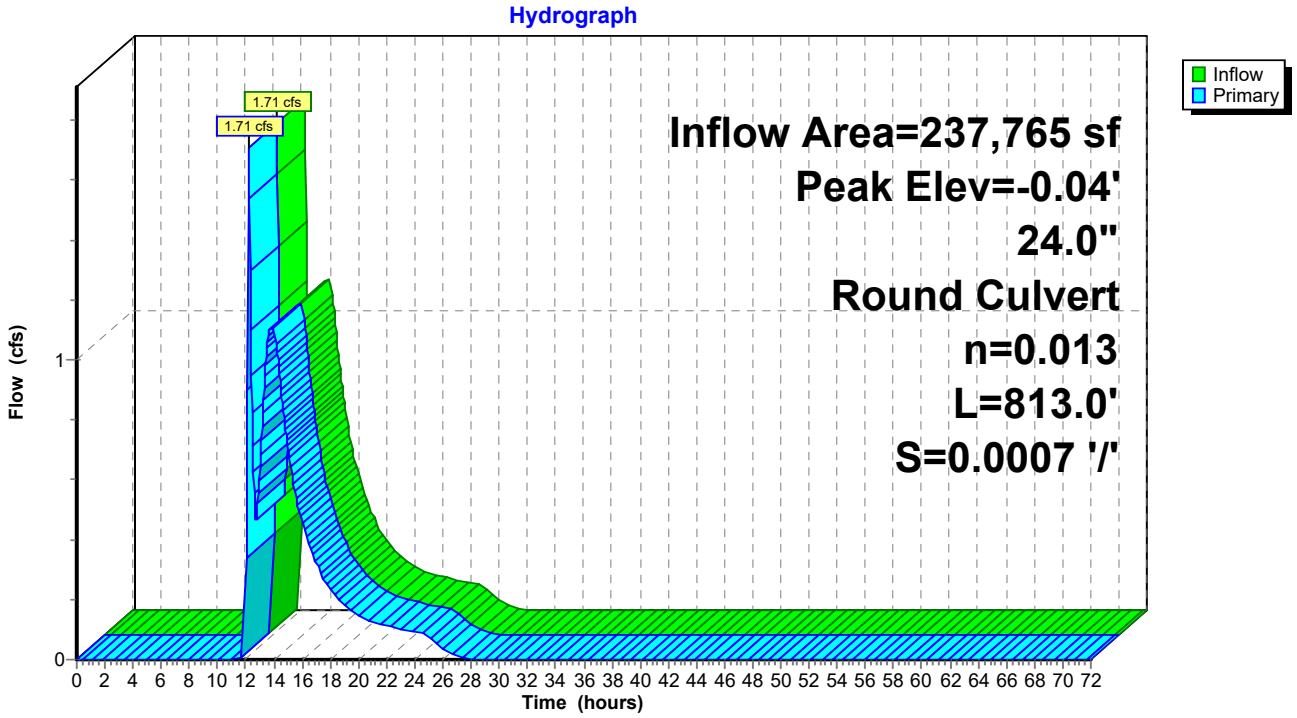
Inflow Area = 237,765 sf, 38.57% Impervious, Inflow Depth = 0.89" for 2YR - 24HR event
Inflow = 1.71 cfs @ 12.20 hrs, Volume= 17,616 cf
Outflow = 1.71 cfs @ 12.20 hrs, Volume= 17,616 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.71 cfs @ 12.20 hrs, Volume= 17,616 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -0.04' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.95'	**24.0" Round RCP_Round 24"** L= 813.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.95' / -1.52' S= 0.0007 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=1.70 cfs @ 12.20 hrs HW=-0.04' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 1.70 cfs @ 1.79 fps)

Pond CB8: CB



Summary for Pond CC1: CC1

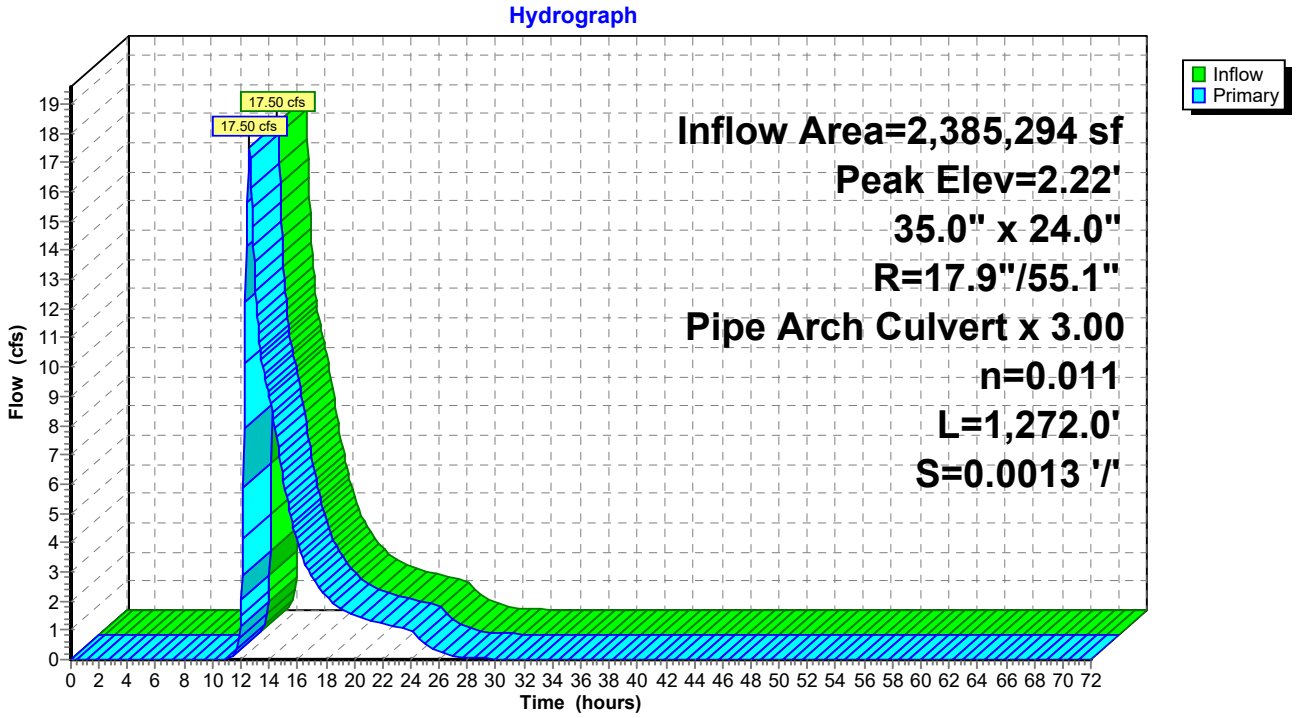
Inflow Area = 2,385,294 sf, 36.01% Impervious, Inflow Depth = 0.93" for 2YR - 24HR event
Inflow = 17.50 cfs @ 12.59 hrs, Volume= 185,457 cf
Outflow = 17.50 cfs @ 12.59 hrs, Volume= 185,457 cf, Atten= 0%, Lag= 0.0 min
Primary = 17.50 cfs @ 12.59 hrs, Volume= 185,457 cf
Routed to Link 4L : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.22' @ 12.59 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.20'	**35.0" W x 24.0" H, R=17.9"/55.1" Pipe Arch CMP_Arch_1/2 35x24 X 3.00** L= 1,272.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1.20' / -0.40' S= 0.0013 '/' Cc= 0.900 n= 0.011 Steel, smooth, Flow Area= 4.63 sf

Primary OutFlow Max=17.47 cfs @ 12.59 hrs HW=2.22' (Free Discharge)
1=CMP_Arch_1/2 35x24 (Barrel Controls 17.47 cfs @ 3.08 fps)

Pond CC1: CC1



Summary for Pond Cr-B: Robinson Driveway

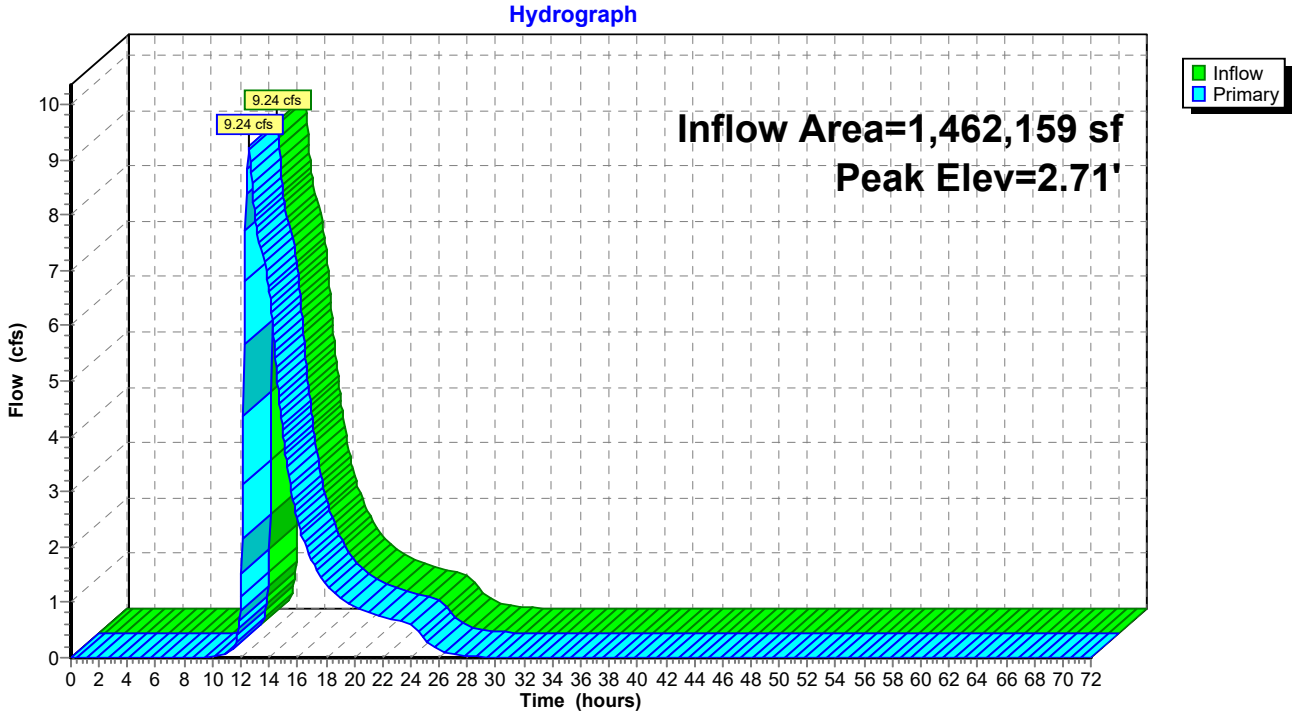
Inflow Area = 1,462,159 sf, 36.00% Impervious, Inflow Depth = 0.97" for 2YR - 24HR event
Inflow = 9.24 cfs @ 12.57 hrs, Volume= 117,742 cf
Outflow = 9.24 cfs @ 12.57 hrs, Volume= 117,742 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.24 cfs @ 12.57 hrs, Volume= 117,742 cf
Routed to Reach 2R : WQS Segment 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.71' @ 12.57 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=9.22 cfs @ 12.57 hrs HW=2.71' (Free Discharge)
- **1=RCP_Round 24"** (Barrel Controls 3.07 cfs @ 2.89 fps)
- **2=RCP_Round 24"** (Barrel Controls 3.07 cfs @ 2.89 fps)
- **3=RCP_Round 24"** (Barrel Controls 3.07 cfs @ 2.89 fps)

Pond Cr-B: Robinson Driveway



Summary for Pond Cr-CD: Utility Crossing

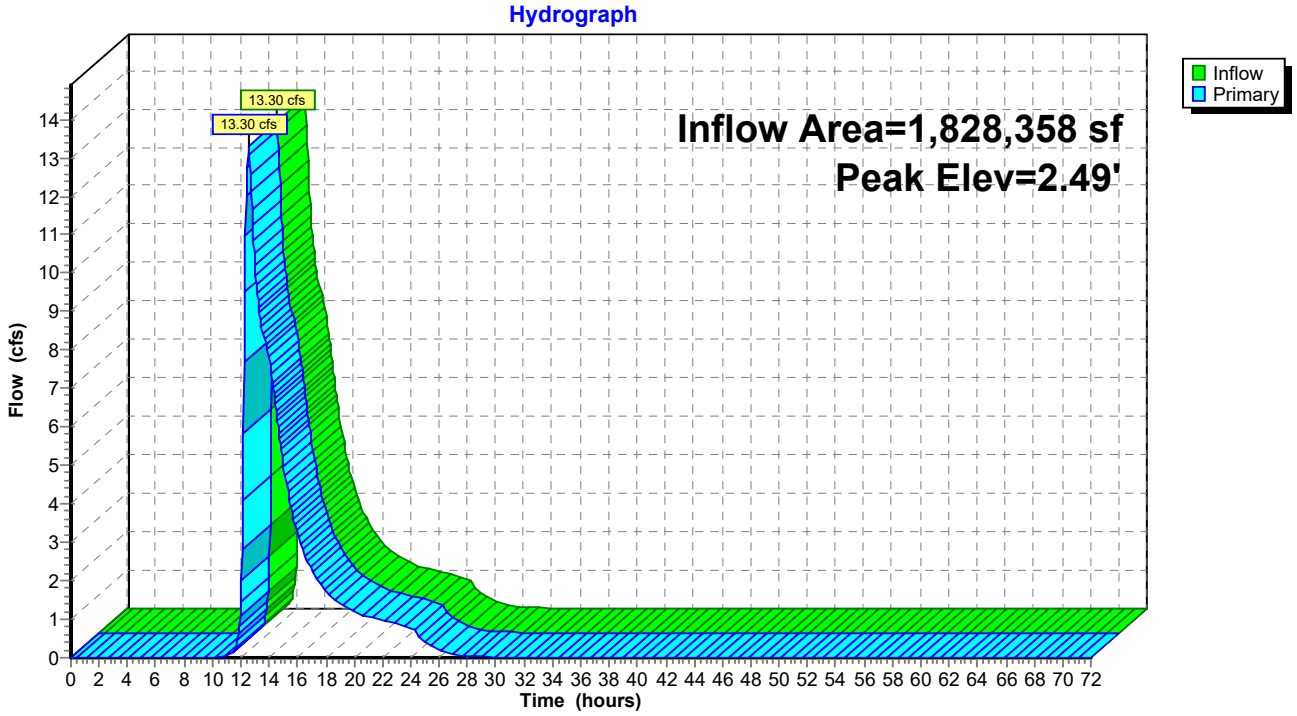
Inflow Area = 1,828,358 sf, 39.67% Impervious, Inflow Depth = 0.99" for 2YR - 24HR event
Inflow = 13.30 cfs @ 12.56 hrs, Volume= 150,700 cf
Outflow = 13.30 cfs @ 12.56 hrs, Volume= 150,700 cf, Atten= 0%, Lag= 0.0 min
Primary = 13.30 cfs @ 12.56 hrs, Volume= 150,700 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.49' @ 12.56 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#3	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=13.28 cfs @ 12.56 hrs HW=2.49' (Free Discharge)
- **1=RCP_Round 30"** (Barrel Controls 4.43 cfs @ 2.92 fps)
- **2=RCP_Round 30"** (Barrel Controls 4.43 cfs @ 2.92 fps)
- **3=RCP_Round 30"** (Barrel Controls 4.43 cfs @ 2.92 fps)

Pond Cr-CD: Utility Crossing



Summary for Pond MH1: MH

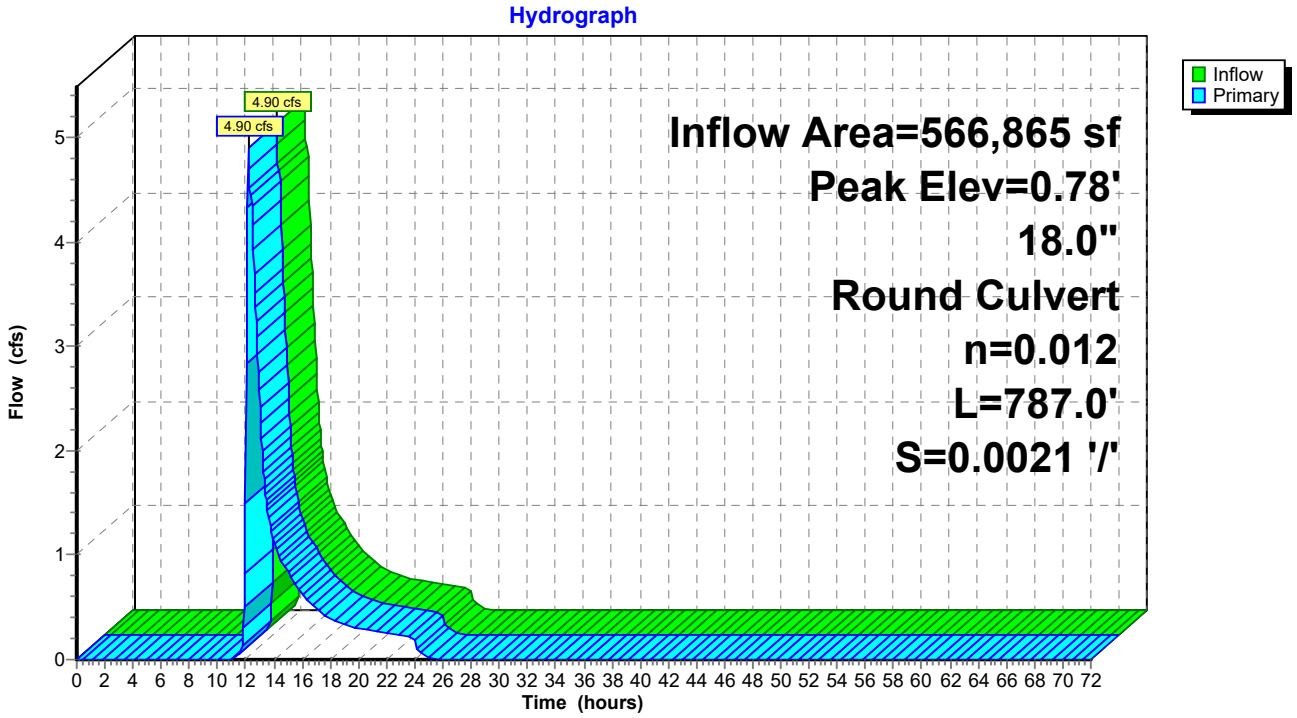
Inflow Area = 566,865 sf, 16.40% Impervious, Inflow Depth = 0.75" for 2YR - 24HR event
Inflow = 4.90 cfs @ 12.16 hrs, Volume= 35,457 cf
Outflow = 4.90 cfs @ 12.16 hrs, Volume= 35,457 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.90 cfs @ 12.16 hrs, Volume= 35,457 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.78' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.72'	**18.0" Round RCP_Round 18"** L= 787.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.72' / -2.37' S= 0.0021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=4.83 cfs @ 12.16 hrs HW=0.77' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 4.83 cfs @ 3.43 fps)

Pond MH1: MH



Summary for Pond P1: Pond 1

Inflow Area = 873,816 sf, 43.71% Impervious, Inflow Depth = 1.10" for 2YR - 24HR event
Inflow = 6.49 cfs @ 12.70 hrs, Volume= 80,277 cf
Outflow = 6.21 cfs @ 13.35 hrs, Volume= 80,277 cf, Atten= 4%, Lag= 38.9 min
Discarded = 0.67 cfs @ 13.35 hrs, Volume= 10,721 cf
Primary = 5.54 cfs @ 13.35 hrs, Volume= 69,556 cf
Routed to Pond P10 : Wetland Ditch

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.18' @ 13.35 hrs Surf.Area= 14,865 sf Storage= 5,064 cf

Plug-Flow detention time= 11.5 min calculated for 80,221 cf (100% of inflow)
Center-of-Mass det. time= 11.4 min (913.9 - 902.5)

Volume	Invert	Avail.Storage	Storage Description
#1	2.40'	69,114 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

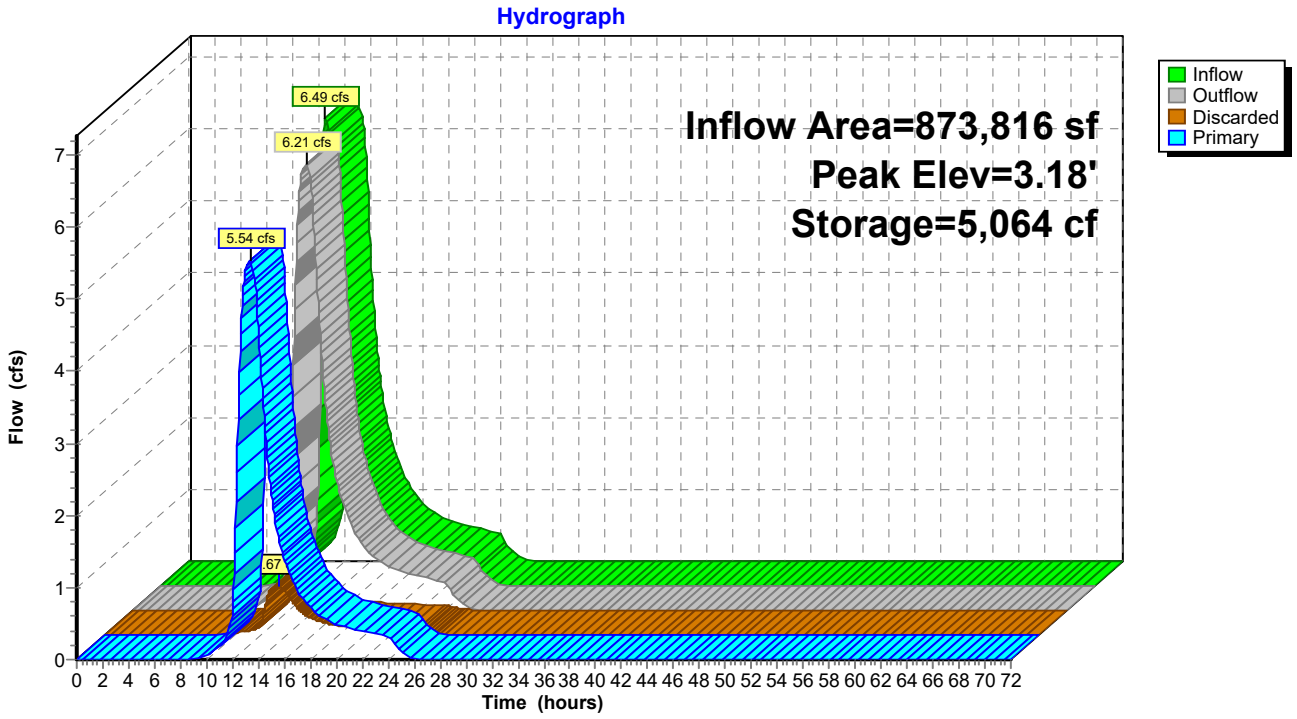
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.40	0	0.0	0	0	0
2.50	1,116	311.0	37	37	7,697
3.00	11,546	598.0	2,709	2,746	28,458
3.50	22,069	715.0	8,263	11,009	40,688
4.00	32,945	769.0	13,663	24,672	47,075
4.50	44,009	867.0	19,172	43,844	59,841
5.00	57,369	999.0	25,271	69,114	79,447

Device	Routing	Invert	Outlet Devices
#1	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#4	Discarded	2.40'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.30'

Discarded OutFlow Max=0.67 cfs @ 13.35 hrs HW=3.18' (Free Discharge)
└**4=Exfiltration** (Controls 0.67 cfs)

Primary OutFlow Max=5.53 cfs @ 13.35 hrs HW=3.18' (Free Discharge)
├**1=Culvert** (Barrel Controls 1.84 cfs @ 2.64 fps)
├**2=Culvert** (Barrel Controls 1.84 cfs @ 2.64 fps)
└**3=Culvert** (Barrel Controls 1.84 cfs @ 2.64 fps)

Pond P1: Pond 1



Summary for Pond P10: Wetland Ditch

Inflow Area = 1,049,961 sf, 38.89% Impervious, Inflow Depth = 1.01" for 2YR - 24HR event
Inflow = 6.16 cfs @ 13.03 hrs, Volume= 88,016 cf
Outflow = 6.15 cfs @ 13.10 hrs, Volume= 88,016 cf, Atten= 0%, Lag= 4.4 min
Primary = 6.15 cfs @ 13.10 hrs, Volume= 88,016 cf
Routed to Reach 1R : WQS Segment 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.16' @ 13.10 hrs Surf.Area= 3,090 sf Storage= 1,806 cf

Plug-Flow detention time= 6.4 min calculated for 87,955 cf (100% of inflow)
Center-of-Mass det. time= 6.4 min (905.8 - 899.5)

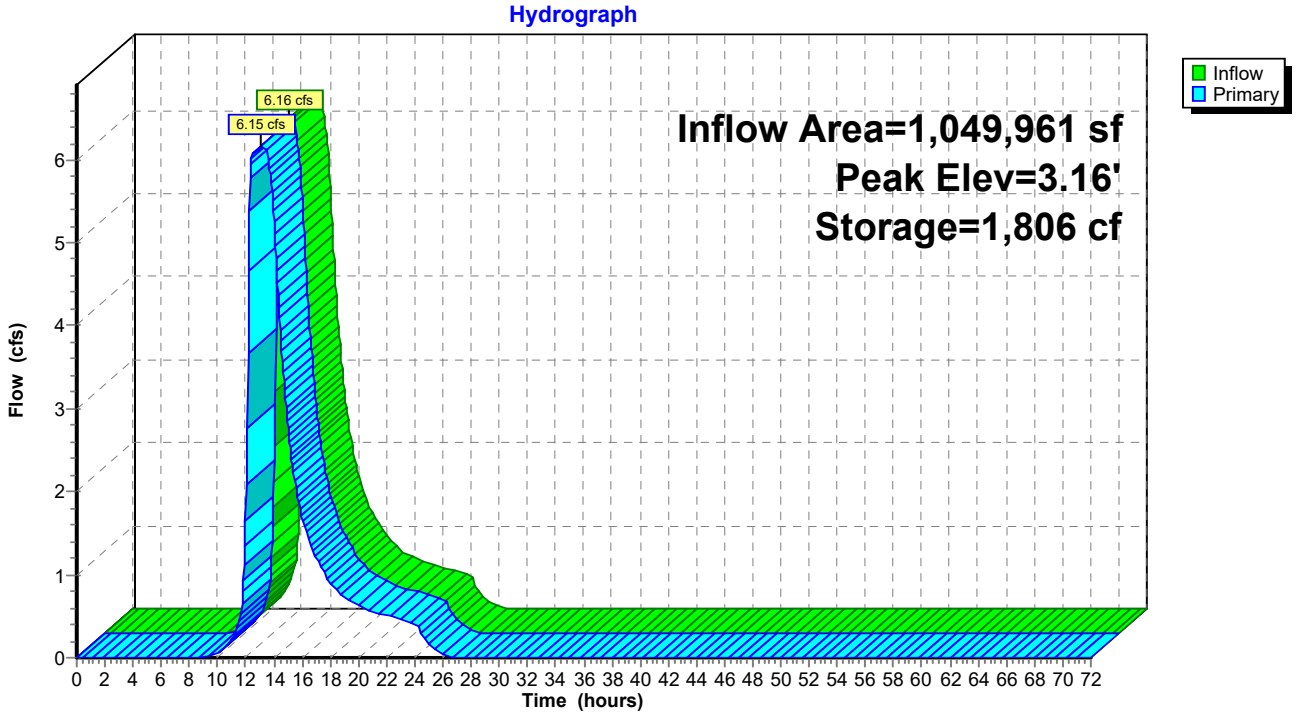
Volume	Invert	Avail.Storage	Storage Description
#1	2.33'	34,944 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.33	0	0.0	0	0	0
2.50	2,079	556.0	118	118	24,600
3.00	2,792	564.0	1,213	1,331	25,366
3.50	3,765	606.0	1,633	2,964	29,288
4.00	5,218	646.0	2,236	5,200	33,285
4.50	26,868	1,785.0	7,321	12,521	253,629
5.00	65,665	1,908.0	22,423	34,944	289,788

Device	Routing	Invert	Outlet Devices
#1	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf

Primary OutFlow Max=6.15 cfs @ 13.10 hrs HW=3.16' (Free Discharge)
- **1=RCP_Round 21"** (Barrel Controls 2.05 cfs @ 2.67 fps)
- **2=RCP_Round 21"** (Barrel Controls 2.05 cfs @ 2.67 fps)
- **3=RCP_Round 21"** (Barrel Controls 2.05 cfs @ 2.67 fps)

Pond P10: Wetland Ditch



Summary for Pond P2: Pond 2

Inflow Area = 145,656 sf, 34.19% Impervious, Inflow Depth = 1.02" for 2YR - 24HR event
Inflow = 2.50 cfs @ 12.31 hrs, Volume= 12,430 cf
Outflow = 2.02 cfs @ 12.48 hrs, Volume= 12,430 cf, Atten= 19%, Lag= 10.3 min
Discarded = 0.12 cfs @ 12.48 hrs, Volume= 629 cf
Primary = 1.89 cfs @ 12.48 hrs, Volume= 11,801 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.16' @ 12.48 hrs Surf.Area= 4,047 sf Storage= 952 cf

Plug-Flow detention time= 4.3 min calculated for 12,421 cf (100% of inflow)
Center-of-Mass det. time= 4.3 min (883.0 - 878.7)

Volume	Invert	Avail.Storage	Storage Description
#1	3.35'	13,689 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

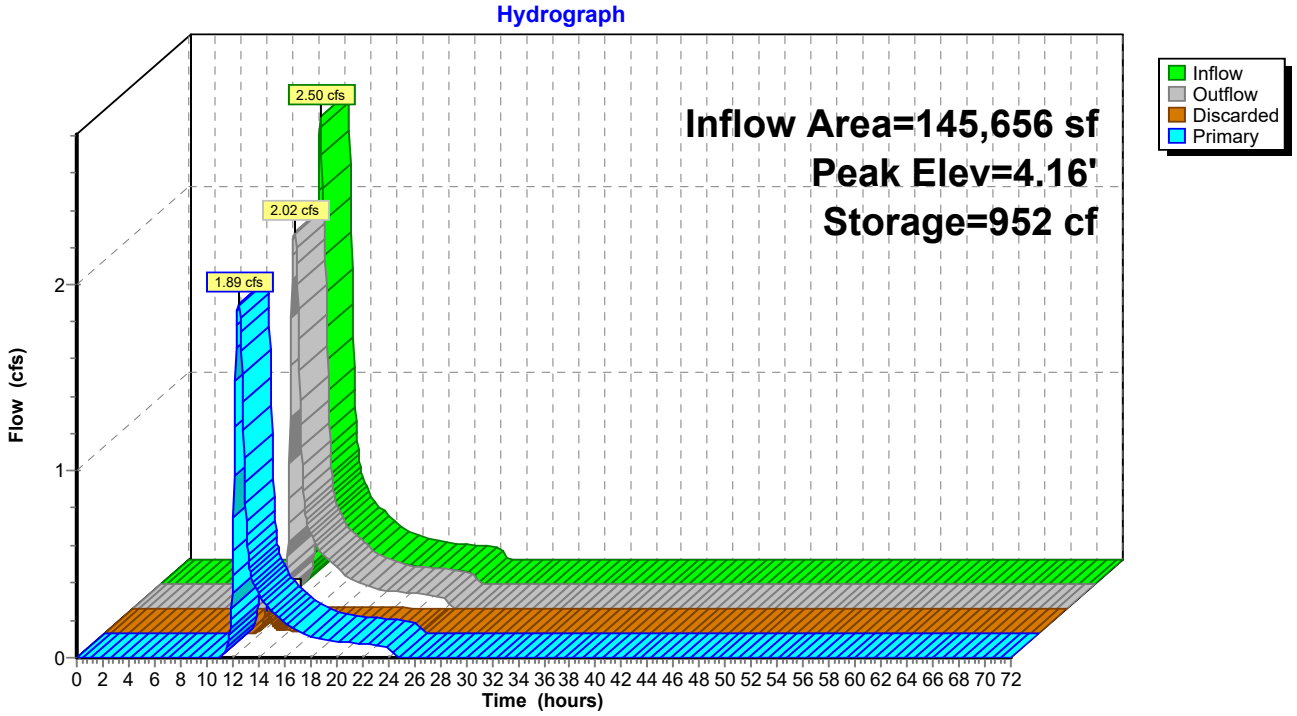
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.35	0	0.0	0	0	0
3.50	170	63.0	8	8	316
4.00	2,037	330.0	466	474	8,667
4.50	10,588	652.0	2,878	3,353	33,831
4.75	19,541	773.0	3,709	7,062	47,553
5.00	34,152	971.0	6,627	13,689	75,033

Device	Routing	Invert	Outlet Devices
#1	Primary	3.35'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 133.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.35' / 3.25' S= 0.0008 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.35'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.12 cfs @ 12.48 hrs HW=4.16' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.12 cfs)

Primary OutFlow Max=1.89 cfs @ 12.48 hrs HW=4.16' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.89 cfs @ 2.36 fps)

Pond P2: Pond 2



Summary for Pond P3: Pond 3

Inflow Area = 604,810 sf, 50.08% Impervious, Inflow Depth = 1.35" for 2YR - 24HR event
Inflow = 6.14 cfs @ 13.13 hrs, Volume= 68,061 cf
Outflow = 5.88 cfs @ 13.32 hrs, Volume= 68,061 cf, Atten= 4%, Lag= 11.3 min
Discarded = 0.44 cfs @ 13.32 hrs, Volume= 5,629 cf
Primary = 5.44 cfs @ 13.32 hrs, Volume= 62,432 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.44' @ 13.32 hrs Surf.Area= 9,862 sf Storage= 3,444 cf

Plug-Flow detention time= 7.0 min calculated for 68,014 cf (100% of inflow)
Center-of-Mass det. time= 7.0 min (904.8 - 897.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2.65'	46,661 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

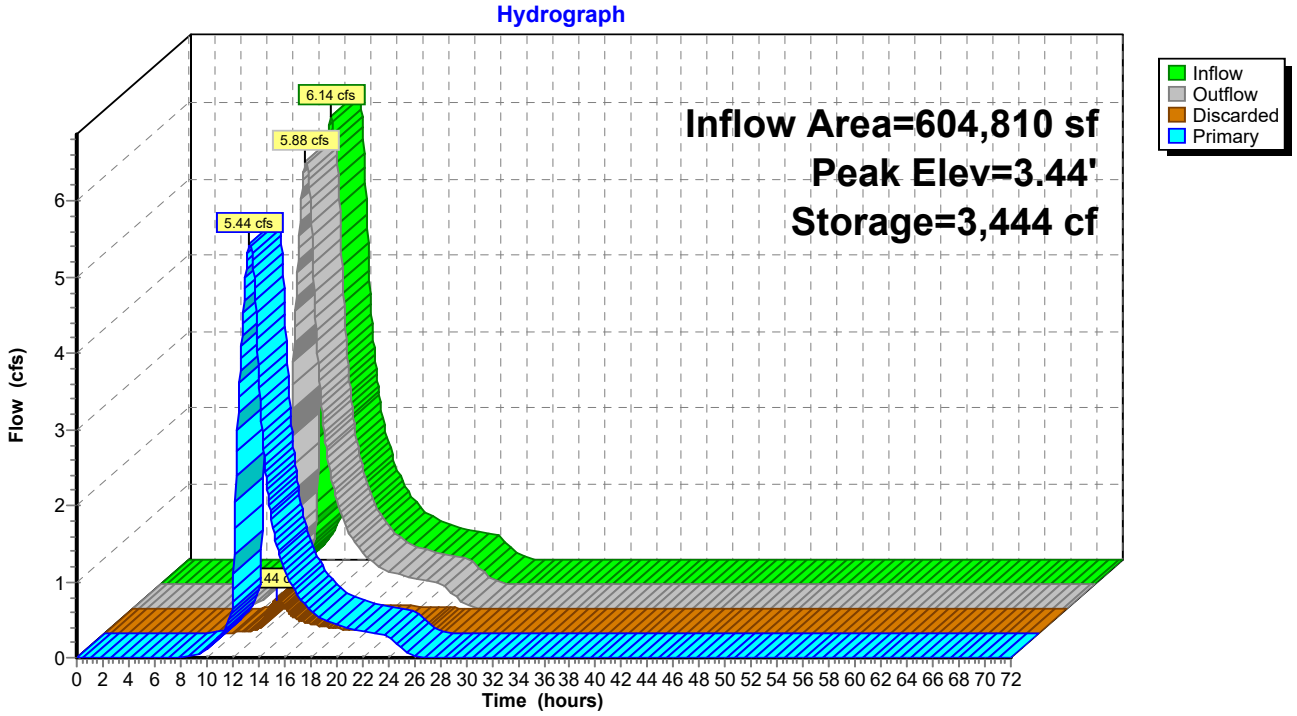
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.65	0	0.0	0	0	0
3.00	4,059	888.0	474	474	62,751
3.50	10,848	1,191.0	3,590	4,064	112,882
4.00	19,089	1,350.0	7,388	11,452	145,039
4.50	33,127	1,447.0	12,894	24,346	166,641
5.00	57,227	1,543.0	22,316	46,661	189,495

Device	Routing	Invert	Outlet Devices
#1	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#3	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#4	Discarded	2.65'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.55'

Discarded OutFlow Max=0.44 cfs @ 13.32 hrs HW=3.44' (Free Discharge)
└**4=Exfiltration** (Controls 0.44 cfs)

Primary OutFlow Max=5.44 cfs @ 13.32 hrs HW=3.44' (Free Discharge)
├**1=Culvert** (Barrel Controls 1.81 cfs @ 2.32 fps)
├**2=Culvert** (Barrel Controls 1.81 cfs @ 2.32 fps)
└**3=Culvert** (Barrel Controls 1.81 cfs @ 2.32 fps)

Pond P3: Pond 3



Summary for Pond P4: Pond 4

Inflow Area = 140,632 sf, 26.62% Impervious, Inflow Depth = 0.59" for 2YR - 24HR event
Inflow = 1.38 cfs @ 12.20 hrs, Volume= 6,891 cf
Outflow = 1.23 cfs @ 12.29 hrs, Volume= 6,891 cf, Atten= 11%, Lag= 5.2 min
Discarded = 0.04 cfs @ 12.29 hrs, Volume= 125 cf
Primary = 1.19 cfs @ 12.29 hrs, Volume= 6,765 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.81' @ 12.29 hrs Surf.Area= 1,243 sf Storage= 203 cf

Plug-Flow detention time= 1.1 min calculated for 6,886 cf (100% of inflow)
Center-of-Mass det. time= 1.1 min (905.4 - 904.3)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	12,438 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

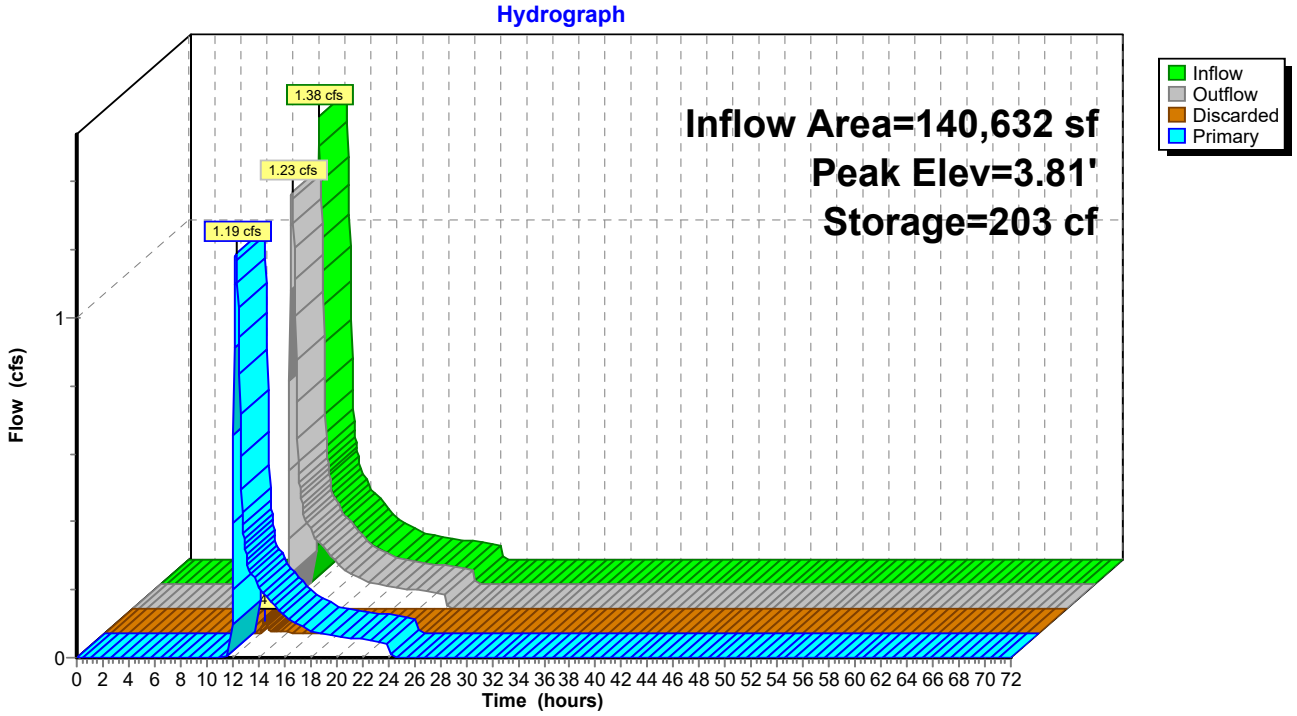
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.20	0	0.0	0	0	0
3.50	149	61.0	15	15	296
4.00	2,440	293.0	532	547	6,832
4.50	9,823	539.0	2,860	3,407	23,121
4.75	16,825	666.0	3,292	6,699	35,300
5.00	29,698	866.0	5,740	12,438	59,683

Device	Routing	Invert	Outlet Devices
#1	Primary	3.20'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 134.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.20' / 3.10' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.20'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.04 cfs @ 12.29 hrs HW=3.81' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.04 cfs)

Primary OutFlow Max=1.19 cfs @ 12.29 hrs HW=3.81' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.19 cfs @ 2.02 fps)

Pond P4: Pond 4



Summary for Pond P5: Pond 5

Inflow Area = 127,978 sf, 26.51% Impervious, Inflow Depth = 0.59" for 2YR - 24HR event
Inflow = 1.05 cfs @ 12.33 hrs, Volume= 6,271 cf
Outflow = 1.05 cfs @ 12.36 hrs, Volume= 6,271 cf, Atten= 0%, Lag= 1.9 min
Discarded = 0.01 cfs @ 12.36 hrs, Volume= 59 cf
Primary = 1.03 cfs @ 12.36 hrs, Volume= 6,211 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.42' @ 12.36 hrs Surf.Area= 321 sf Storage= 61 cf

Plug-Flow detention time= 0.5 min calculated for 6,266 cf (100% of inflow)
Center-of-Mass det. time= 0.5 min (911.7 - 911.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2.85'	12,246 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

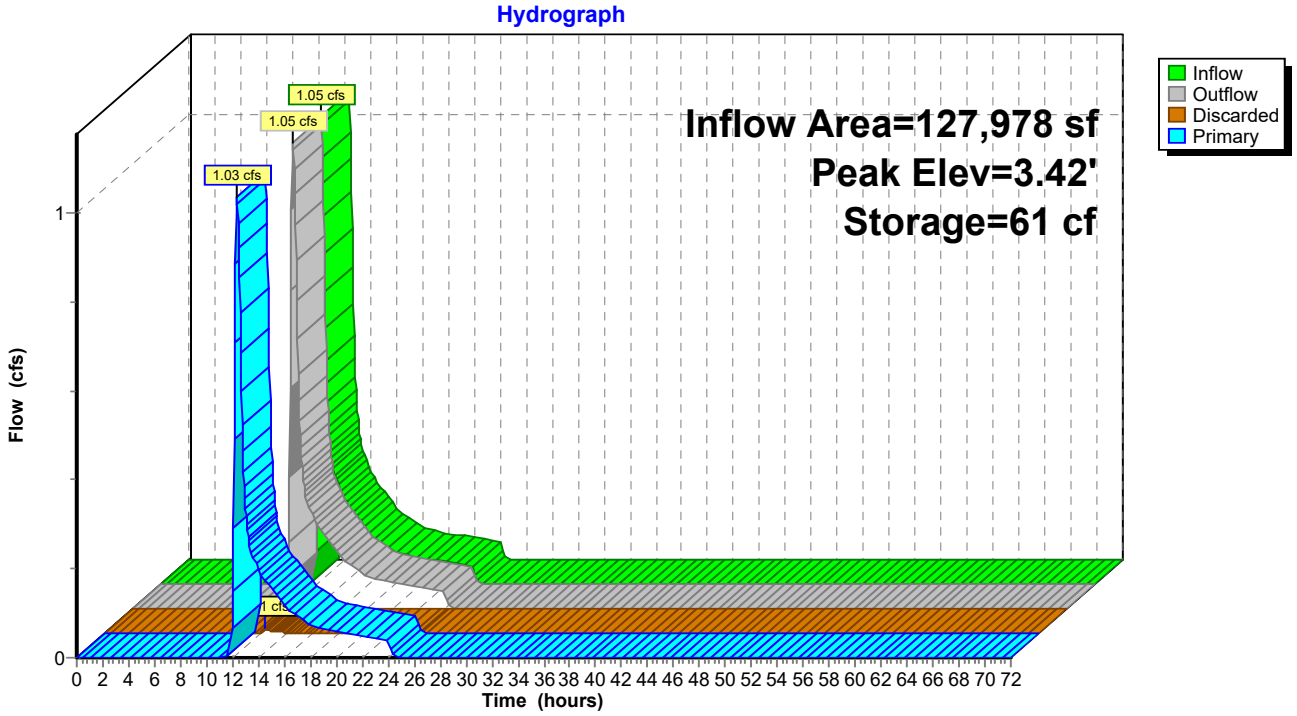
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.85	0	0.0	0	0	0
3.00	22	19.0	1	1	29
3.50	418	102.0	89	90	829
4.00	2,904	284.0	737	828	6,420
4.50	9,309	476.0	2,902	3,730	18,033
4.90	21,881	695.0	6,062	9,791	38,442
5.00	27,310	796.0	2,455	12,246	50,426

Device	Routing	Invert	Outlet Devices
#1	Primary	2.85'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 142.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.85' / 2.75' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.85'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.75'

Discarded OutFlow Max=0.01 cfs @ 12.36 hrs HW=3.42' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.01 cfs)

Primary OutFlow Max=1.03 cfs @ 12.36 hrs HW=3.42' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 1.03 cfs @ 1.90 fps)

Pond P5: Pond 5



Summary for Pond P6: Pond 6

Inflow Area = 294,705 sf, 29.95% Impervious, Inflow Depth = 0.84" for 2YR - 24HR event
Inflow = 3.23 cfs @ 12.41 hrs, Volume= 20,684 cf
Outflow = 3.23 cfs @ 12.41 hrs, Volume= 20,684 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 12.41 hrs, Volume= 1 cf
Primary = 3.23 cfs @ 12.41 hrs, Volume= 20,683 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.51' @ 12.41 hrs Surf.Area= 3 sf Storage= 0 cf

Plug-Flow detention time= 0.0 min calculated for 20,670 cf (100% of inflow)
Center-of-Mass det. time= 0.0 min (891.4 - 891.4)

Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	48,739 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

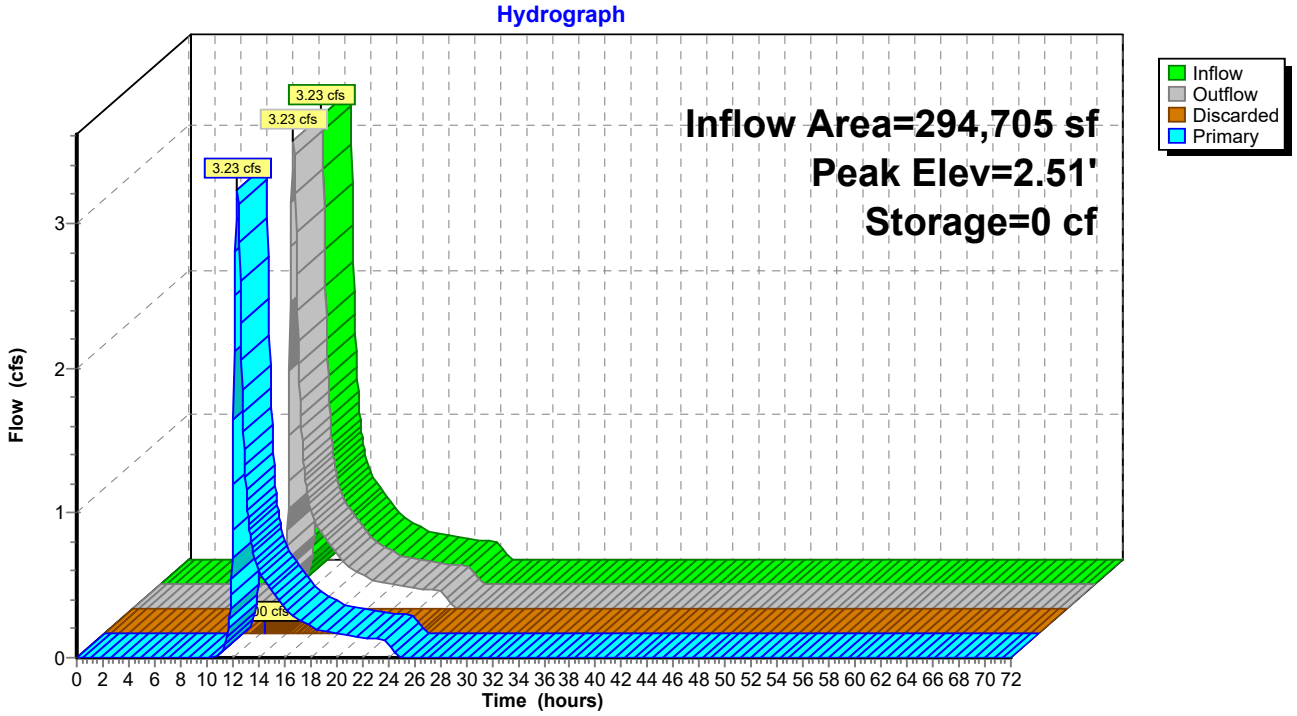
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
3.00	3,571	520.0	595	595	21,518
3.50	9,437	727.0	3,136	3,731	42,062
4.00	24,344	1,116.0	8,156	11,887	99,115
4.50	57,812	1,402.0	19,945	31,832	156,426
4.75	77,941	1,580.0	16,907	48,739	198,667

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**15.0" Round CMP_Round 15"** L= 265.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 0.50' / -0.40' S= 0.0034 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	2.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.40'

Discarded OutFlow Max=0.00 cfs @ 12.41 hrs HW=2.51' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=4.89 cfs @ 12.41 hrs HW=2.51' (Free Discharge)
↑—**1=CMP_Round 15"** (Barrel Controls 4.89 cfs @ 3.98 fps)

Pond P6: Pond 6



Summary for Pond P7: Pond 7

Inflow Area = 110,829 sf, 40.07% Impervious, Inflow Depth = 1.14" for 2YR - 24HR event
Inflow = 2.62 cfs @ 12.18 hrs, Volume= 10,506 cf
Outflow = 2.17 cfs @ 12.28 hrs, Volume= 10,506 cf, Atten= 17%, Lag= 5.9 min
Discarded = 0.07 cfs @ 12.28 hrs, Volume= 161 cf
Primary = 2.11 cfs @ 12.28 hrs, Volume= 10,345 cf
Routed to Pond P6 : Pond 6

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.69' @ 12.28 hrs Surf.Area= 2,072 sf Storage= 491 cf

Plug-Flow detention time= 1.3 min calculated for 10,499 cf (100% of inflow)
Center-of-Mass det. time= 1.3 min (866.0 - 864.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2.75'	16,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

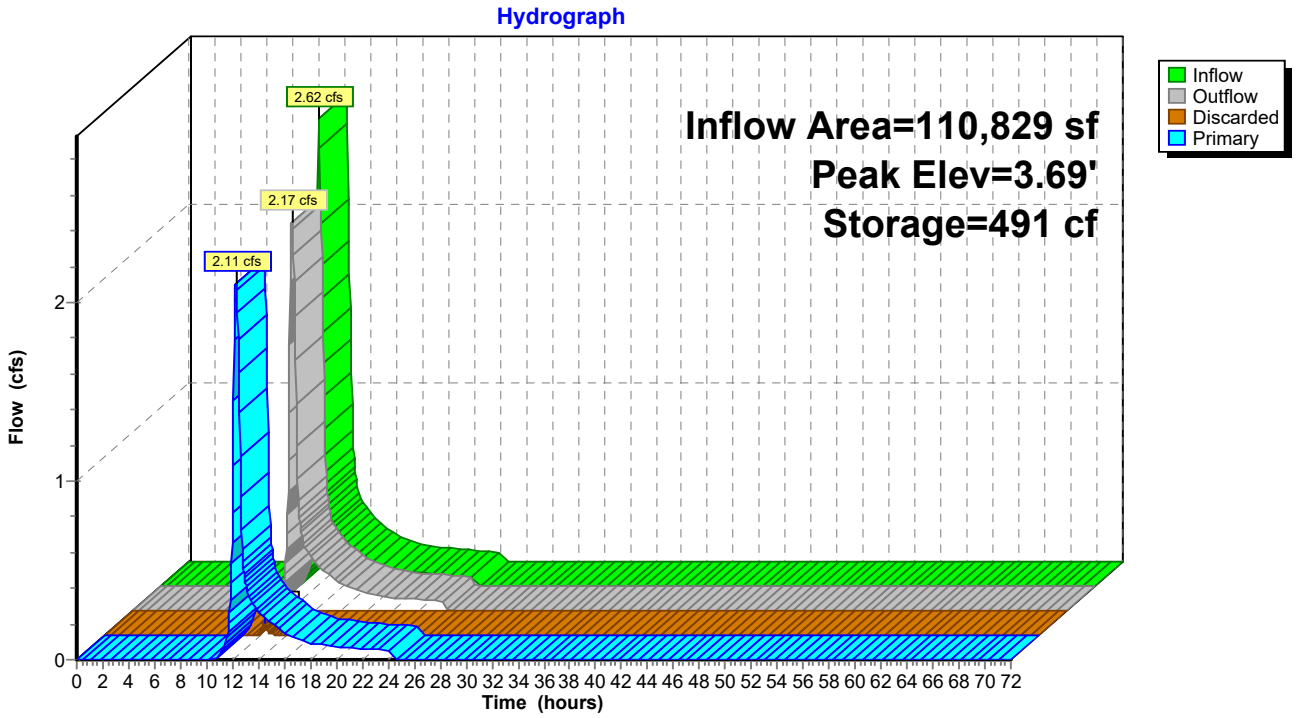
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.75	0	0.0	0	0	0
3.00	47	29.0	4	4	67
3.50	992	154.0	209	213	1,888
4.00	4,809	305.0	1,331	1,544	7,405
4.50	13,313	480.0	4,354	5,898	18,338
4.90	25,536	679.0	7,638	13,536	36,694
5.00	29,518	743.0	2,750	16,286	43,936

Device	Routing	Invert	Outlet Devices
#1	Primary	2.75'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 180.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.75' / 2.65' S= 0.0006 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.75'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.65'

Discarded OutFlow Max=0.07 cfs @ 12.28 hrs HW=3.68' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.07 cfs)

Primary OutFlow Max=2.10 cfs @ 12.28 hrs HW=3.68' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.10 cfs @ 2.29 fps)

Pond P7: Pond 7



Summary for Pond P8: Pond 8

Inflow Area = 408,559 sf, 31.11% Impervious, Inflow Depth = 0.89" for 2YR - 24HR event
Inflow = 4.91 cfs @ 12.30 hrs, Volume= 30,290 cf
Outflow = 4.79 cfs @ 12.38 hrs, Volume= 30,290 cf, Atten= 2%, Lag= 4.9 min
Primary = 4.79 cfs @ 12.38 hrs, Volume= 30,290 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.63' @ 12.38 hrs Surf.Area= 1,057 sf Storage= 193 cf

Plug-Flow detention time= 0.1 min calculated for 30,269 cf (100% of inflow)
Center-of-Mass det. time= 0.1 min (889.5 - 889.4)

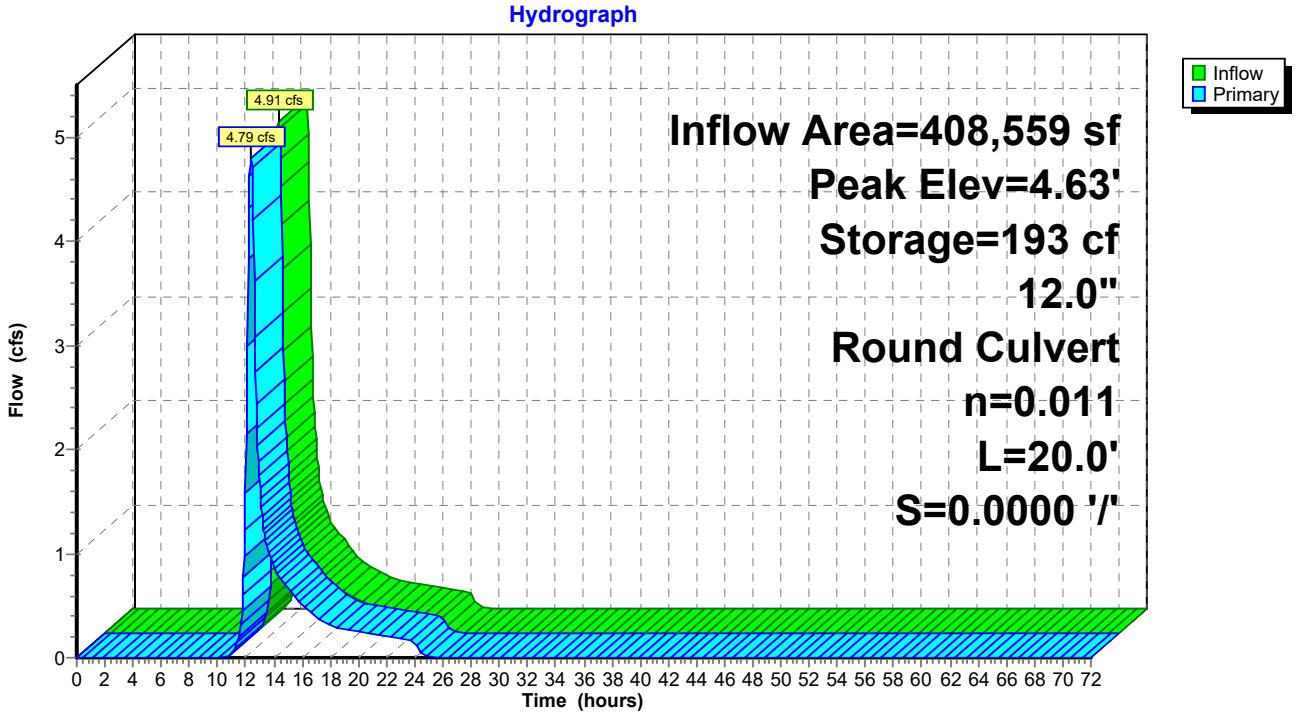
Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	4,397 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
4.00	44	40.0	22	22	131
4.50	348	192.0	86	108	2,938
5.00	5,358	771.0	1,179	1,287	47,309
5.25	21,292	781.0	3,111	4,397	48,559

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 2.50' / 2.50' S= 0.0000 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=4.79 cfs @ 12.38 hrs HW=4.62' (Free Discharge)
1=Culvert (Barrel Controls 4.79 cfs @ 6.09 fps)

Pond P8: Pond 8



Summary for Pond P9: Pond 9

Inflow Area = 18,400 sf, 27.62% Impervious, Inflow Depth = 0.63" for 2YR - 24HR event
Inflow = 0.19 cfs @ 12.22 hrs, Volume= 967 cf
Outflow = 0.03 cfs @ 14.65 hrs, Volume= 558 cf, Atten= 82%, Lag= 145.6 min
Primary = 0.03 cfs @ 14.65 hrs, Volume= 558 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.77' @ 14.65 hrs Surf.Area= 2,618 sf Storage= 532 cf

Plug-Flow detention time= 406.6 min calculated for 558 cf (58% of inflow)
Center-of-Mass det. time= 273.4 min (1,175.3 - 901.8)

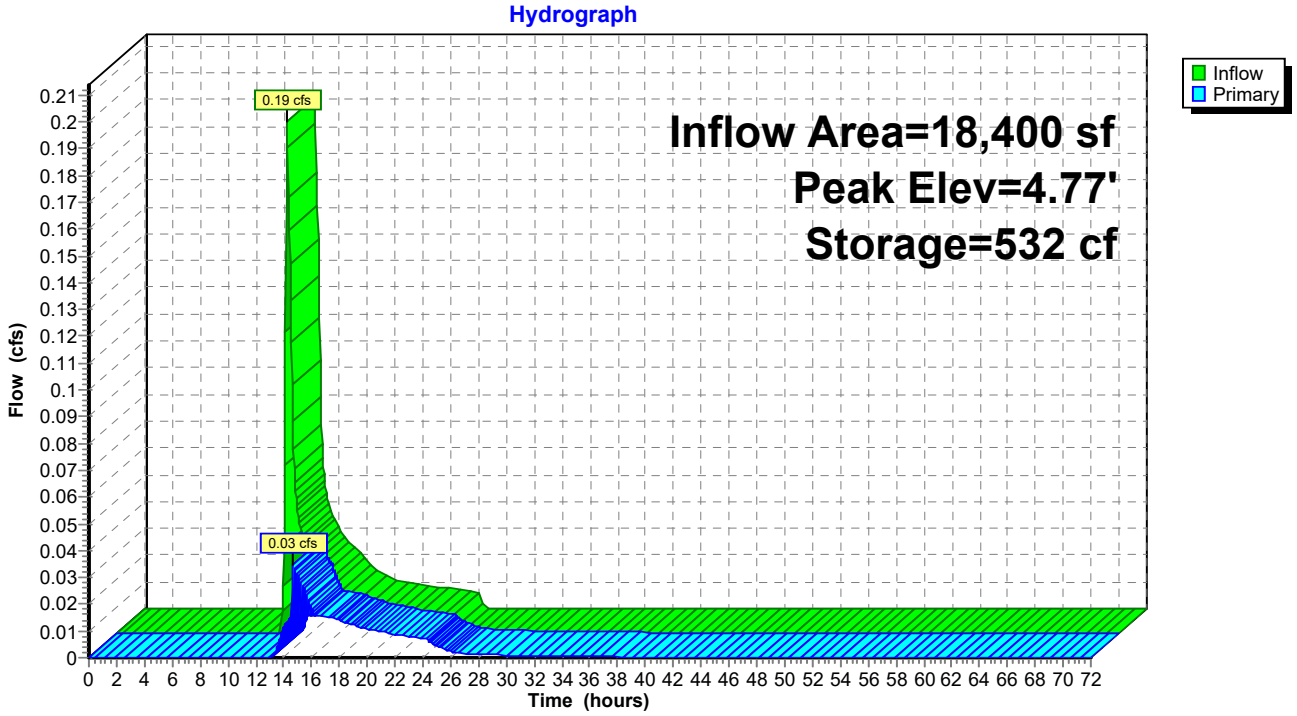
Volume	Invert	Avail.Storage	Storage Description
#1	1.60'	532 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1.60	12	12.0	0	0	12
4.45	12	12.0	34	34	46
4.50	1,258	168.0	23	57	2,281
4.75	2,618	234.0	474	532	4,393

Device	Routing	Invert	Outlet Devices
#1	Primary	4.70'	**12.0" Round Culvert** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	4.70'	**12.0" Round RCP_Round 12"** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.03 cfs @ 14.65 hrs HW=4.77' (Free Discharge)
└**1=Culvert** (Barrel Controls 0.02 cfs @ 1.02 fps)
└**2=RCP_Round 12"** (Barrel Controls 0.02 cfs @ 1.02 fps)

Pond P9: Pond 9



Summary for Pond SF2: Sand Filter Area 2

Inflow Area = 168,577 sf, 97.16% Impervious, Inflow Depth = 3.01" for 2YR - 24HR event
Inflow = 12.50 cfs @ 12.07 hrs, Volume= 42,221 cf
Outflow = 9.99 cfs @ 12.14 hrs, Volume= 42,221 cf, Atten= 20%, Lag= 3.9 min
Primary = 9.99 cfs @ 12.14 hrs, Volume= 42,221 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.76' @ 12.14 hrs Surf.Area= 0.220 ac Storage= 0.107 af

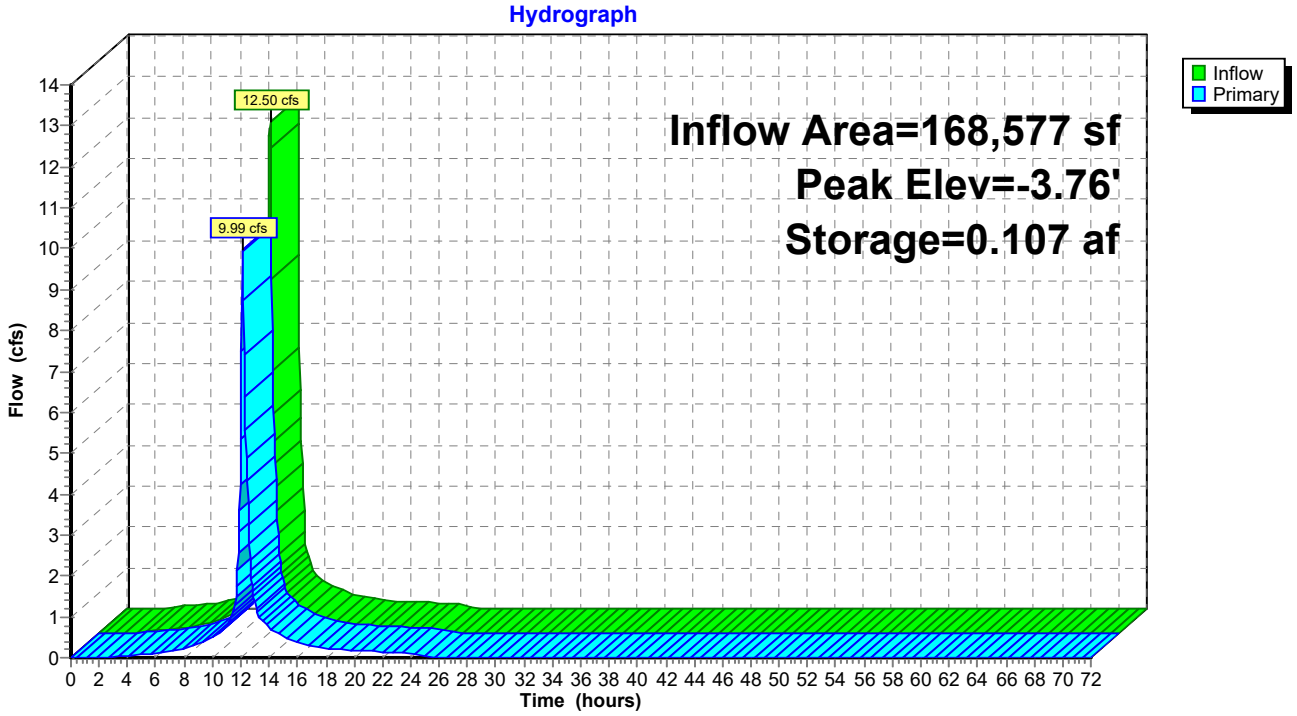
Plug-Flow detention time= 17.4 min calculated for 42,192 cf (100% of inflow)
Center-of-Mass det. time= 17.5 min (781.4 - 764.0)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.582 af	**StormTrap SingleTrap 4-0** x 54 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 54 Chambers in 8 Rows 67.83' x 107.77' Core + 6.66' Border = 81.15' x 121.08' System 0.979 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=9.83 cfs @ 12.14 hrs HW=-3.77' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.83 cfs @ 2.69 fps)

Pond SF2: Sand Filter Area 2



Summary for Pond SF3: Sand Filter Area 3

Inflow Area = 182,081 sf, 91.63% Impervious, Inflow Depth = 2.79" for 2YR - 24HR event
Inflow = 12.98 cfs @ 12.07 hrs, Volume= 42,362 cf
Outflow = 9.36 cfs @ 12.15 hrs, Volume= 42,362 cf, Atten= 28%, Lag= 5.0 min
Primary = 9.36 cfs @ 12.15 hrs, Volume= 42,362 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.79' @ 12.15 hrs Surf.Area= 0.305 ac Storage= 0.145 af

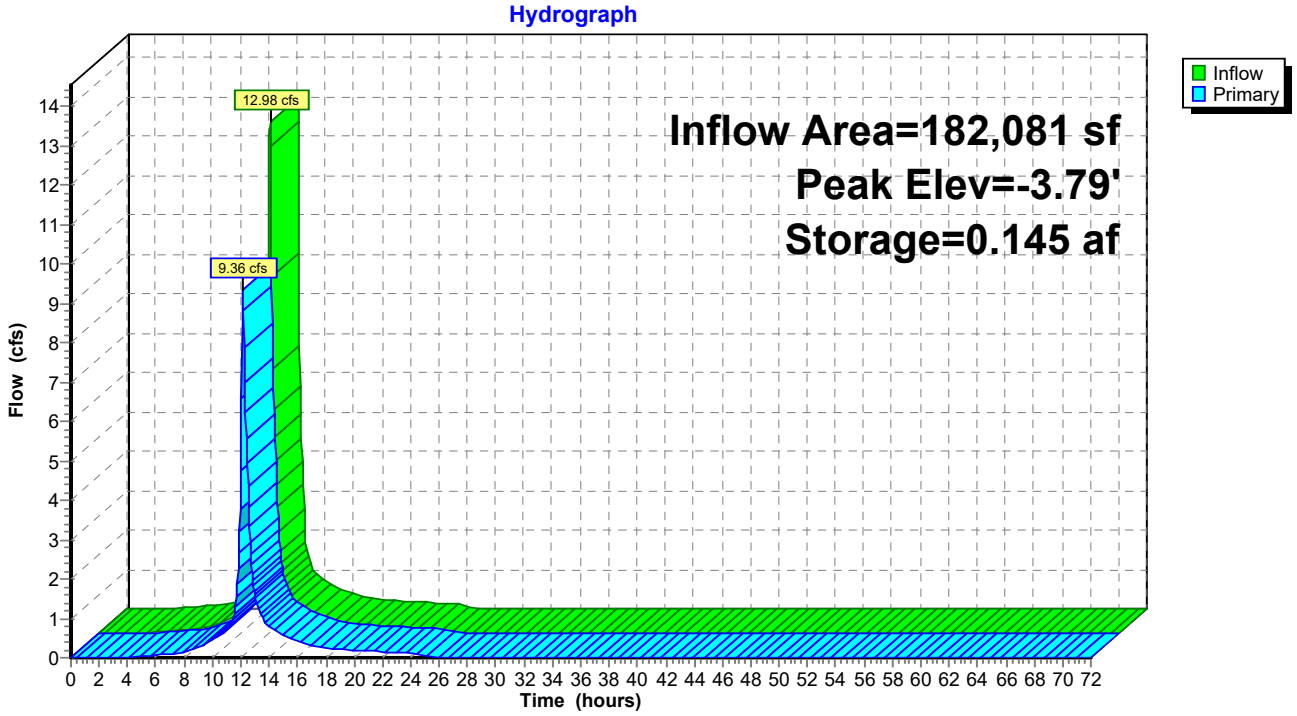
Plug-Flow detention time= 24.0 min calculated for 42,333 cf (100% of inflow)
Center-of-Mass det. time= 24.1 min (802.7 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.815 af	**StormTrap SingleTrap 4-0** x 77 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 77 Chambers in 7 Rows 59.35' x 169.35' Core + 6.66' Border = 72.67' x 182.67' System 1.371 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=9.30 cfs @ 12.15 hrs HW=-3.79' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.30 cfs @ 2.63 fps)

Pond SF3: Sand Filter Area 3



Summary for Pond SF5: SAND FILTER AREA 5

Inflow Area = 109,336 sf, 91.63% Impervious, Inflow Depth = 2.79" for 2YR - 24HR event
Inflow = 7.79 cfs @ 12.07 hrs, Volume= 25,438 cf
Outflow = 5.94 cfs @ 12.15 hrs, Volume= 25,438 cf, Atten= 24%, Lag= 4.4 min
Primary = 5.94 cfs @ 12.15 hrs, Volume= 25,438 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.96' @ 12.15 hrs Surf.Area= 0.205 ac Storage= 0.073 af

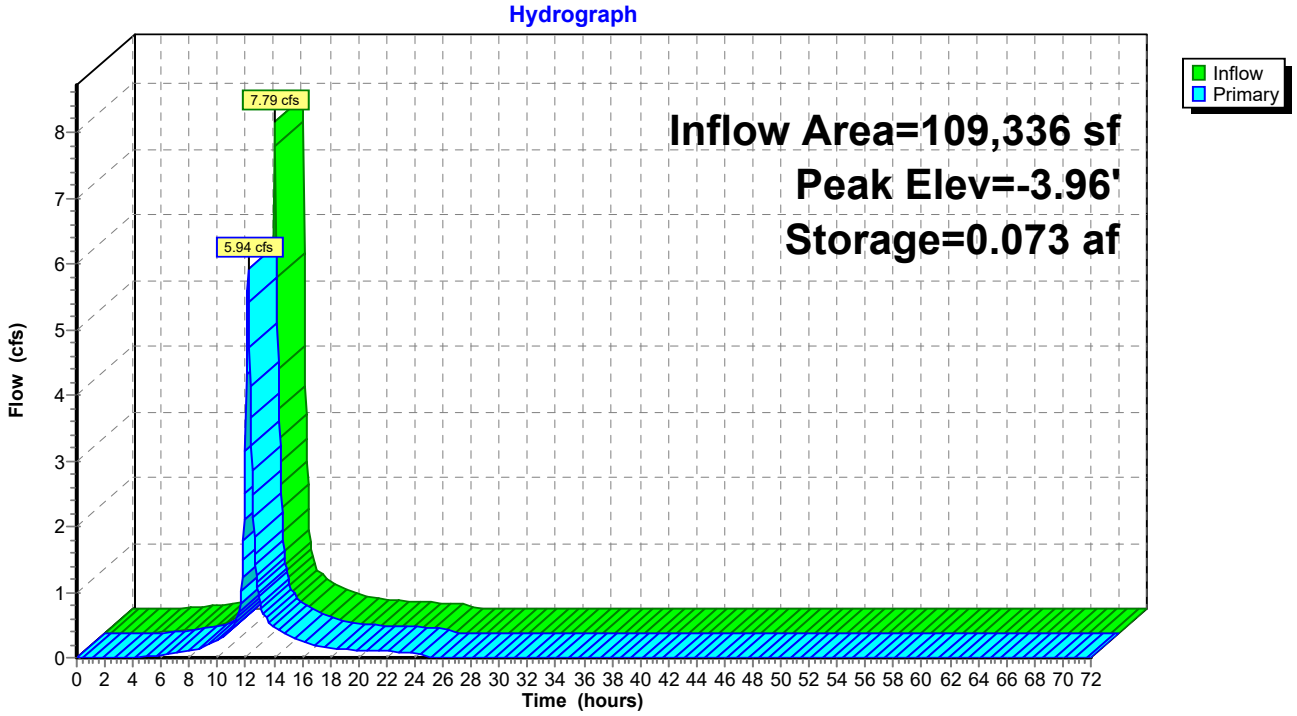
Plug-Flow detention time= 18.3 min calculated for 25,420 cf (100% of inflow)
Center-of-Mass det. time= 18.4 min (797.0 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.538 af	**StormTrap SingleTrap 4-0** x 50 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 50 Chambers in 9 Rows 76.31' x 92.38' Core + 6.66' Border = 89.63' x 105.69' System 0.906 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=5.90 cfs @ 12.15 hrs HW=-3.96' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.90 cfs @ 2.18 fps)

Pond SF5: SAND FILTER AREA 5



Summary for Pond SF6: SAND FILTER AREA 6

Inflow Area = 171,191 sf, 92.11% Impervious, Inflow Depth = 2.90" for 2YR - 24HR event
Inflow = 12.47 cfs @ 12.07 hrs, Volume= 41,330 cf
Outflow = 9.07 cfs @ 12.15 hrs, Volume= 41,330 cf, Atten= 27%, Lag= 4.9 min
Primary = 9.07 cfs @ 12.15 hrs, Volume= 41,330 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.80' @ 12.15 hrs Surf.Area= 0.296 ac Storage= 0.137 af

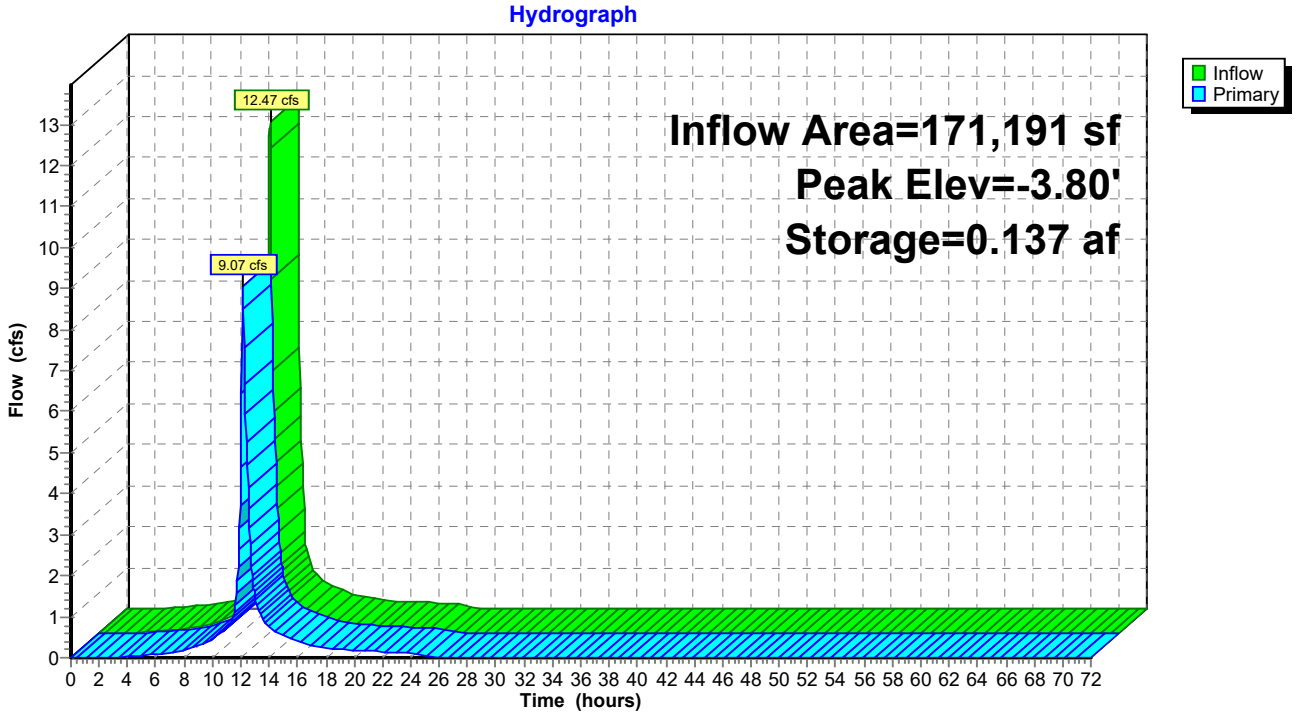
Plug-Flow detention time= 23.9 min calculated for 41,330 cf (100% of inflow)
Center-of-Mass det. time= 23.5 min (795.4 - 771.8)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.784 af	**StormTrap SingleTrap 4-0** x 74 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 74 Chambers in 7 Rows 59.35' x 169.35' Core + 6.66' Border = 72.67' x 182.67' System 1.318 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=9.04 cfs @ 12.15 hrs HW=-3.80' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.04 cfs @ 2.60 fps)

Pond SF6: SAND FILTER AREA 6



Summary for Pond SF7: SAND FILTER AREA 7

Inflow Area = 67,954 sf, 92.31% Impervious, Inflow Depth = 2.90" for 2YR - 24HR event
Inflow = 4.95 cfs @ 12.07 hrs, Volume= 16,406 cf
Outflow = 4.02 cfs @ 12.13 hrs, Volume= 16,406 cf, Atten= 19%, Lag= 3.7 min
Primary = 4.02 cfs @ 12.13 hrs, Volume= 16,406 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -4.08' @ 12.13 hrs Surf.Area= 0.131 ac Storage= 0.037 af

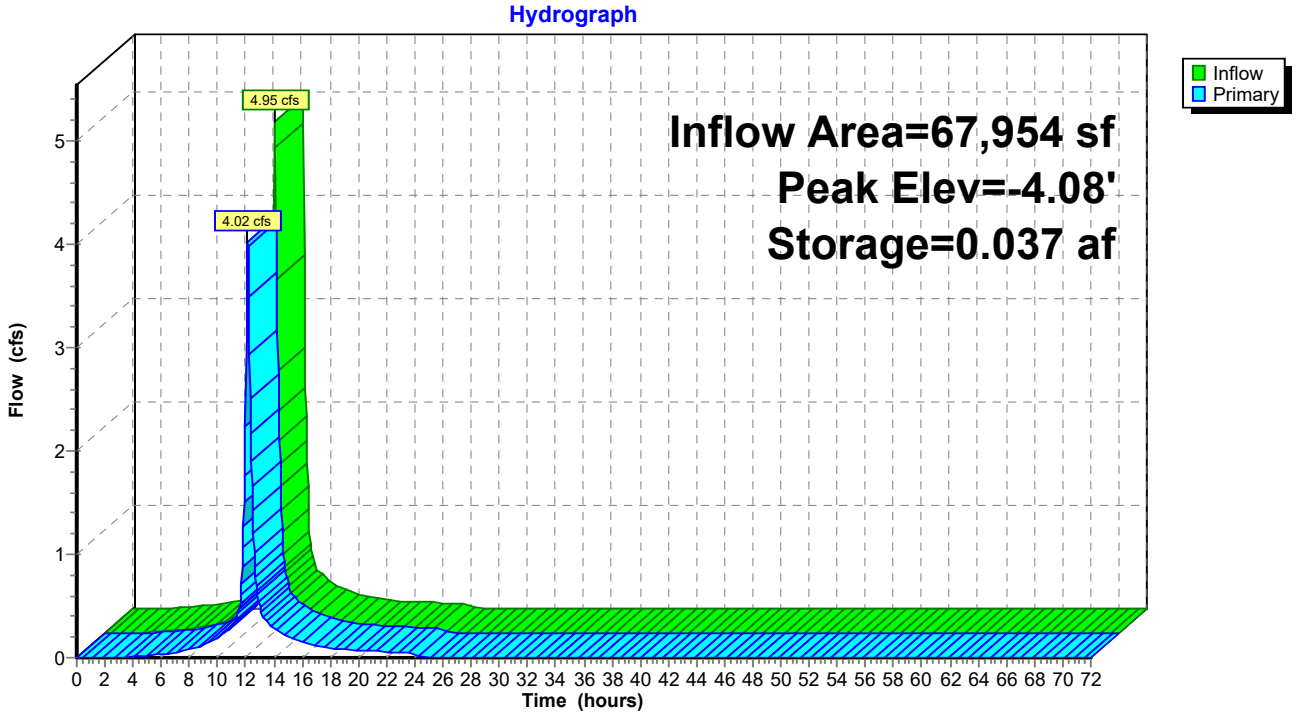
Plug-Flow detention time= 13.5 min calculated for 16,406 cf (100% of inflow)
Center-of-Mass det. time= 13.4 min (785.2 - 771.8)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.350 af	**StormTrap SingleTrap 4-0** x 28 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 28 Chambers in 4 Rows 33.92' x 107.77' Core + 6.66' Border = 47.23' x 121.08' System 0.591 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=3.95 cfs @ 12.13 hrs HW=-4.08' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 3.95 cfs @ 1.89 fps)

Pond SF7: SAND FILTER AREA 7



Summary for Pond SF8: SAND FILTER AREA 8

Inflow Area = 53,579 sf, 90.24% Impervious, Inflow Depth = 2.79" for 2YR - 24HR event
Inflow = 3.82 cfs @ 12.07 hrs, Volume= 12,465 cf
Outflow = 3.04 cfs @ 12.14 hrs, Volume= 12,465 cf, Atten= 20%, Lag= 3.9 min
Primary = 3.04 cfs @ 12.14 hrs, Volume= 12,465 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -4.15' @ 12.14 hrs Surf.Area= 0.131 ac Storage= 0.031 af

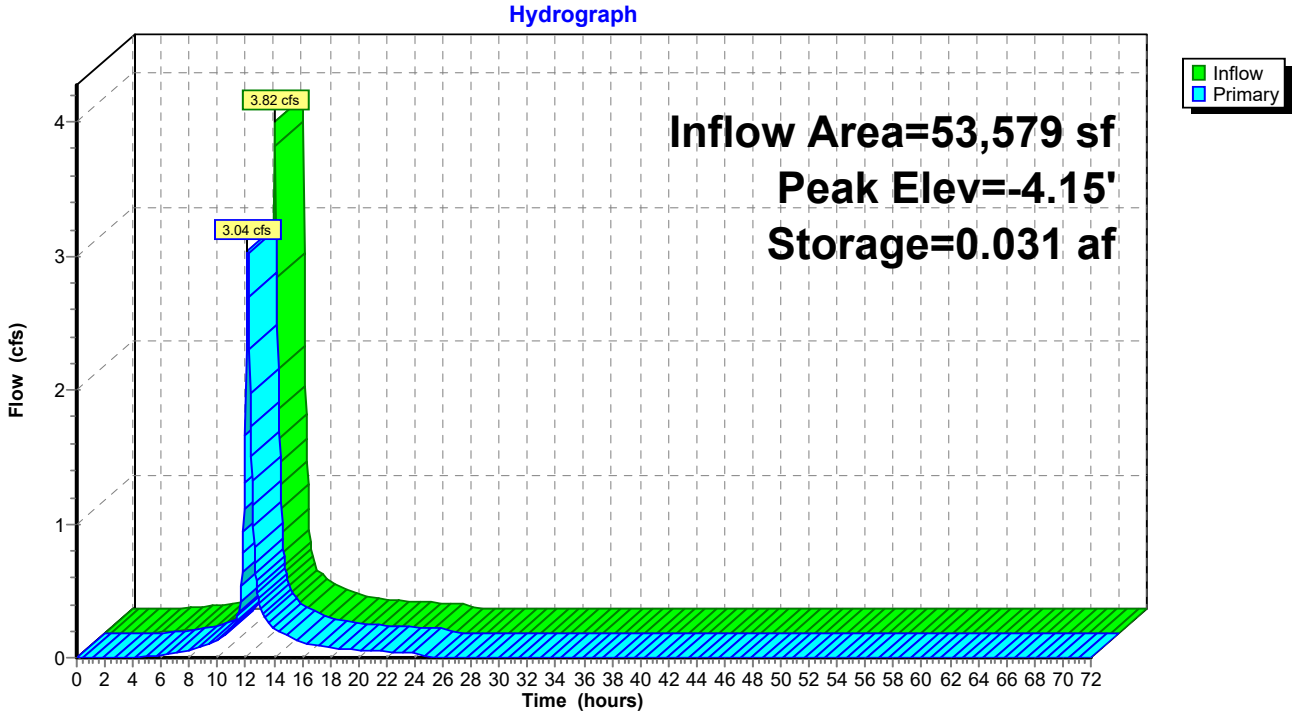
Plug-Flow detention time= 14.1 min calculated for 12,457 cf (100% of inflow)
Center-of-Mass det. time= 14.2 min (792.8 - 778.6)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.350 af	**StormTrap SingleTrap 4-0** x 28 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 28 Chambers in 4 Rows 33.92' x 107.77' Core + 6.66' Border = 47.23' x 121.08' System 0.591 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=2.99 cfs @ 12.14 hrs HW=-4.15' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 2.99 cfs @ 1.72 fps)

Pond SF8: SAND FILTER AREA 8



Summary for Pond SFA1: SAND FILTER AREA A1

Inflow Area = 202,990 sf, 83.69% Impervious, Inflow Depth = 2.59" for 2YR - 24HR event
Inflow = 13.74 cfs @ 12.07 hrs, Volume= 43,814 cf
Outflow = 10.70 cfs @ 12.14 hrs, Volume= 43,814 cf, Atten= 22%, Lag= 4.2 min
Primary = 10.70 cfs @ 12.14 hrs, Volume= 43,814 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.73' @ 12.14 hrs Surf.Area= 0.248 ac Storage= 0.127 af

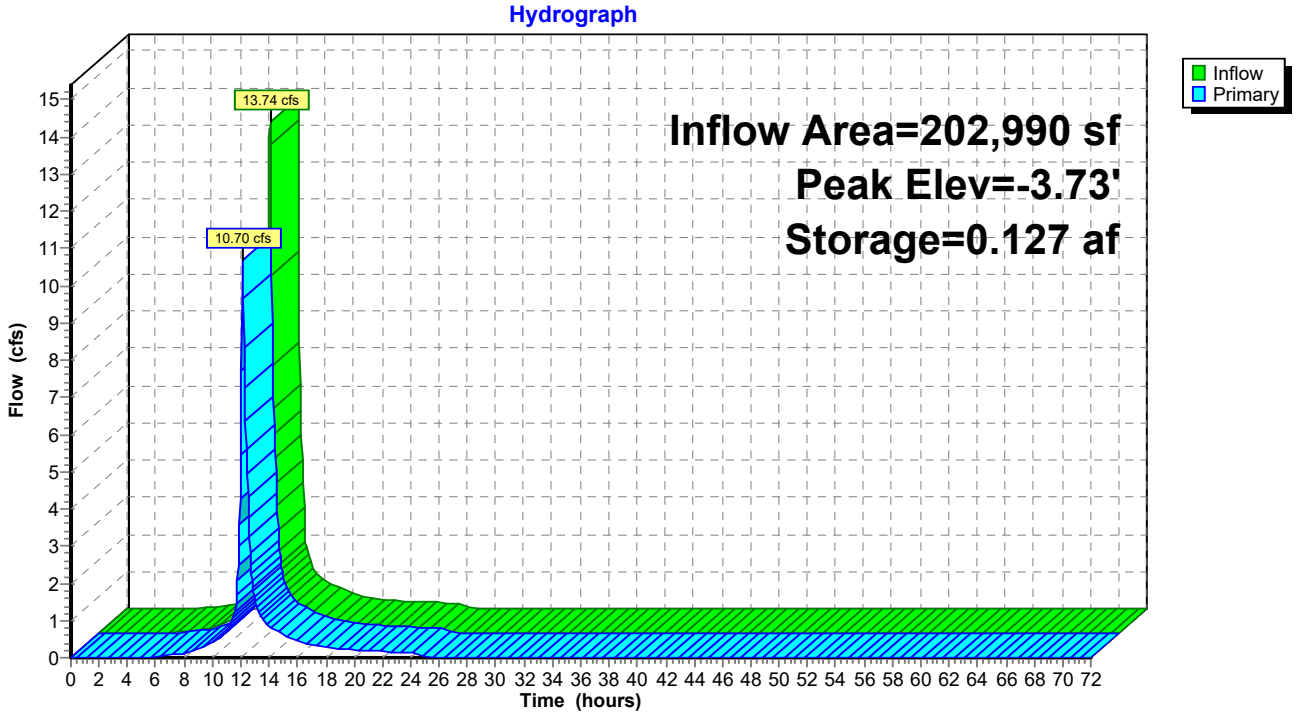
Plug-Flow detention time= 18.8 min calculated for 43,784 cf (100% of inflow)
Center-of-Mass det. time= 18.8 min (809.0 - 790.2)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.659 af	**StormTrap SingleTrap 4-0** x 62 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 62 Chambers in 8 Rows 67.83' x 123.17' Core + 6.66' Border = 81.15' x 136.48' System 1.108 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=10.59 cfs @ 12.14 hrs HW=-3.74' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 10.59 cfs @ 2.77 fps)

Pond SFA1: SAND FILTER AREA A1



Summary for Pond SFA2: SAND FILTER AREA A2

Inflow Area = 190,357 sf,100.00% Impervious, Inflow Depth = 3.12" for 2YR - 24HR event
Inflow = 14.32 cfs @ 12.07 hrs, Volume= 49,445 cf
Outflow = 9.64 cfs @ 12.16 hrs, Volume= 49,445 cf, Atten= 33%, Lag= 5.5 min
Primary = 9.64 cfs @ 12.16 hrs, Volume= 49,445 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.78' @ 12.16 hrs Surf.Area= 0.382 ac Storage= 0.186 af

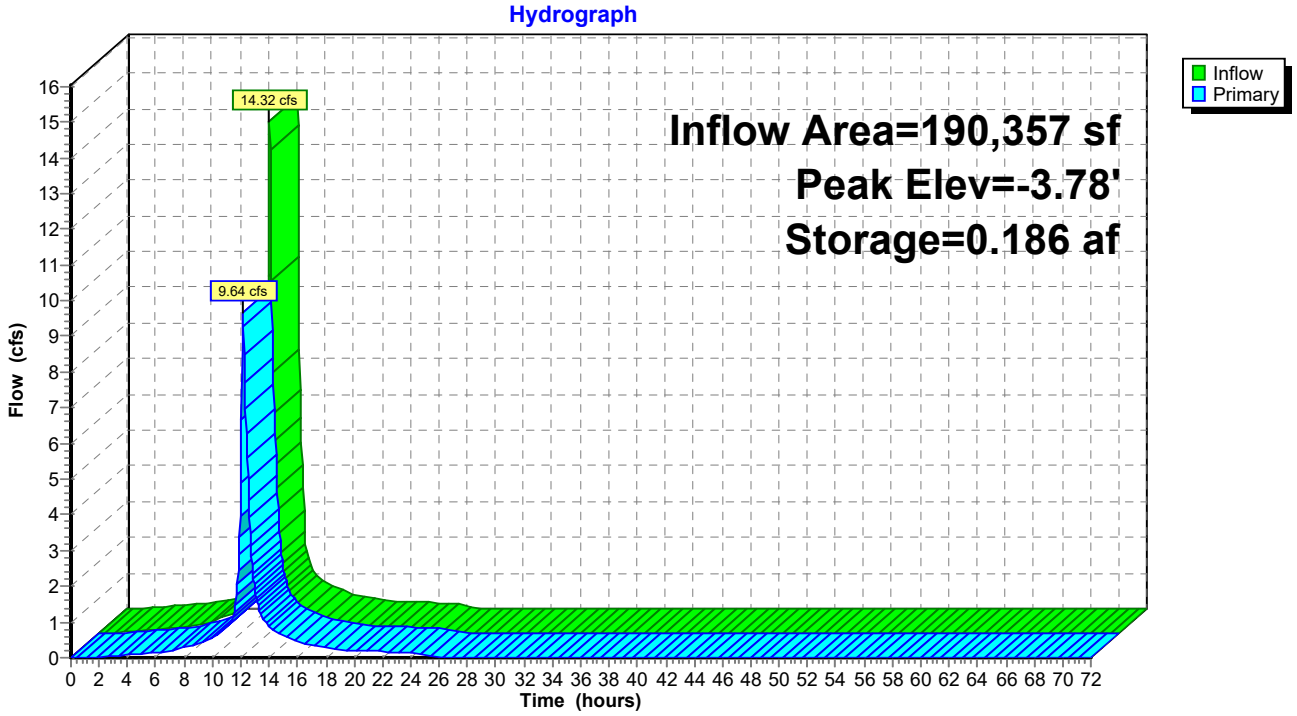
Plug-Flow detention time= 30.5 min calculated for 49,445 cf (100% of inflow)
Center-of-Mass det. time= 30.1 min (784.6 - 754.5)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	1.027 af	**StormTrap SingleTrap 4-0** x 101 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 101 Chambers in 9 Rows 76.31' x 169.35' Core + 6.66' Border = 89.63' x 182.67' System 1.725 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=9.53 cfs @ 12.16 hrs HW=-3.78' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 9.53 cfs @ 2.65 fps)

Pond SFA2: SAND FILTER AREA A2



Summary for Pond T1: Sand Filter 1

Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 1.01" for 2YR - 24HR event
Inflow = 4.86 cfs @ 12.12 hrs, Volume= 8,326 cf
Outflow = 3.02 cfs @ 12.24 hrs, Volume= 8,073 cf, Atten= 38%, Lag= 7.8 min
Primary = 3.02 cfs @ 12.24 hrs, Volume= 8,073 cf
Routed to Link 2L : TUTTLE BROOK
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.82' @ 12.24 hrs Surf.Area= 4,723 sf Storage= 2,918 cf

Plug-Flow detention time= 37.9 min calculated for 8,068 cf (97% of inflow)
Center-of-Mass det. time= 36.4 min (775.5 - 739.1)

Volume	Invert	Avail.Storage	Storage Description
#1	0.04'	5,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,428 cf Overall - 749 cf Embedded = 16,679 cf x 30.0% Voids
#2	0.21'	648 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 928.0' S= 0.0014 '/' 749 cf Overall - 0.3" Wall Thickness = 648 cf
		5,652 cf	Total Available Storage

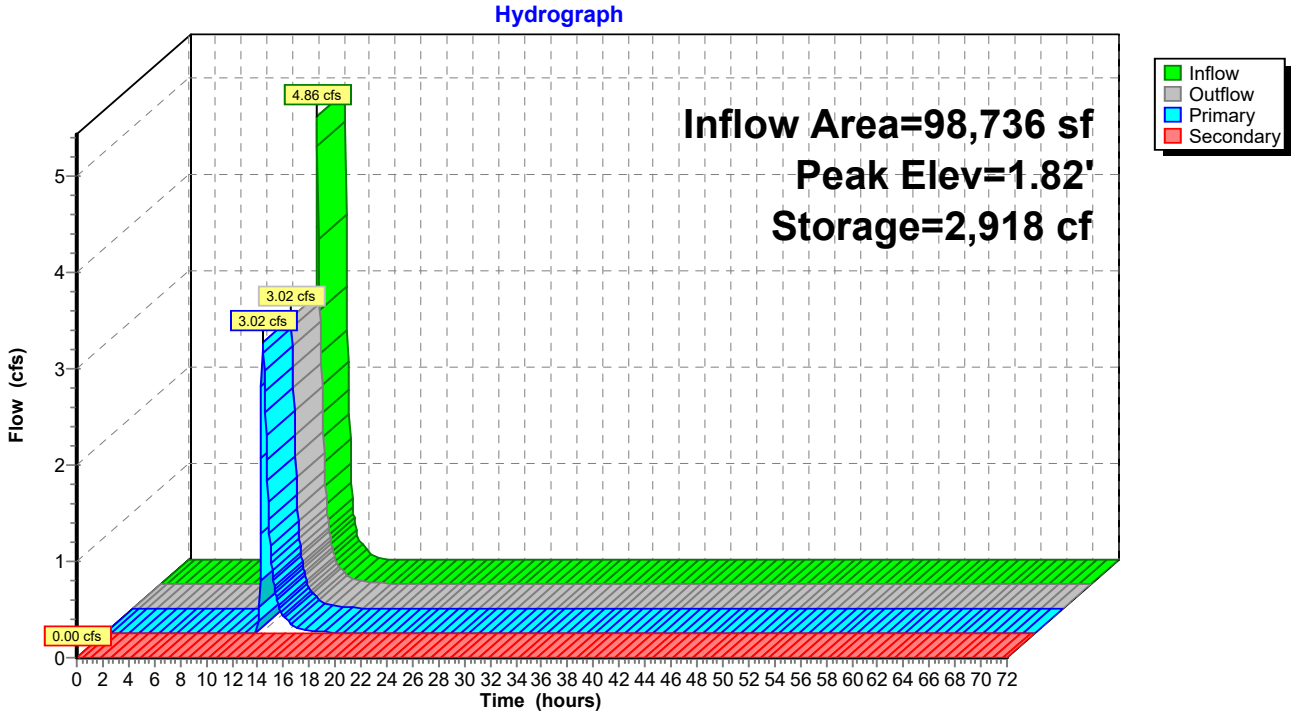
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.04	4,723	0	0
1.50	4,723	6,896	6,896
3.50	4,723	9,446	16,342
3.73	4,723	1,086	17,428

Device	Routing	Invert	Outlet Devices
#1	Primary	0.21'	**18.0" Round Culvert** L= 202.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 0.21' / 0.11' S= 0.0005 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Secondary	3.73'	**928.0' long overflow** 2 End Contraction(s)
#3	Device 1	0.21'	**0.5" Vert. perf pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.01 cfs @ 12.24 hrs HW=1.82' (Free Discharge)
└**1=Culvert** (Barrel Controls 3.01 cfs @ 1.98 fps)
└**3=perf pipe holes** (Passes 3.01 cfs of 8.26 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.04' (Free Discharge)
└**2=overflow** (Controls 0.00 cfs)

Pond T1: Sand Filter 1



Summary for Pond T2: Sand Filter 2

Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 1.01" for 2YR - 24HR event
Inflow = 4.95 cfs @ 12.11 hrs, Volume= 8,326 cf
Outflow = 3.57 cfs @ 12.21 hrs, Volume= 8,099 cf, Atten= 28%, Lag= 5.7 min
Primary = 3.57 cfs @ 12.21 hrs, Volume= 8,099 cf
Routed to Pond CB10 : Exist CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.27' @ 12.21 hrs Surf.Area= 4,723 sf Storage= 2,310 cf

Plug-Flow detention time= 18.4 min calculated for 8,094 cf (97% of inflow)
Center-of-Mass det. time= 15.5 min (753.8 - 738.3)

Volume	Invert	Avail.Storage	Storage Description
#1	-1.26'	6,880 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 23,521 cf Overall - 586 cf Embedded = 22,935 cf x 30.0% Voids
#2	-1.10'	507 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 726.0' S= 0.0035 '/' 586 cf Overall - 0.3" Wall Thickness = 507 cf
		7,387 cf	Total Available Storage

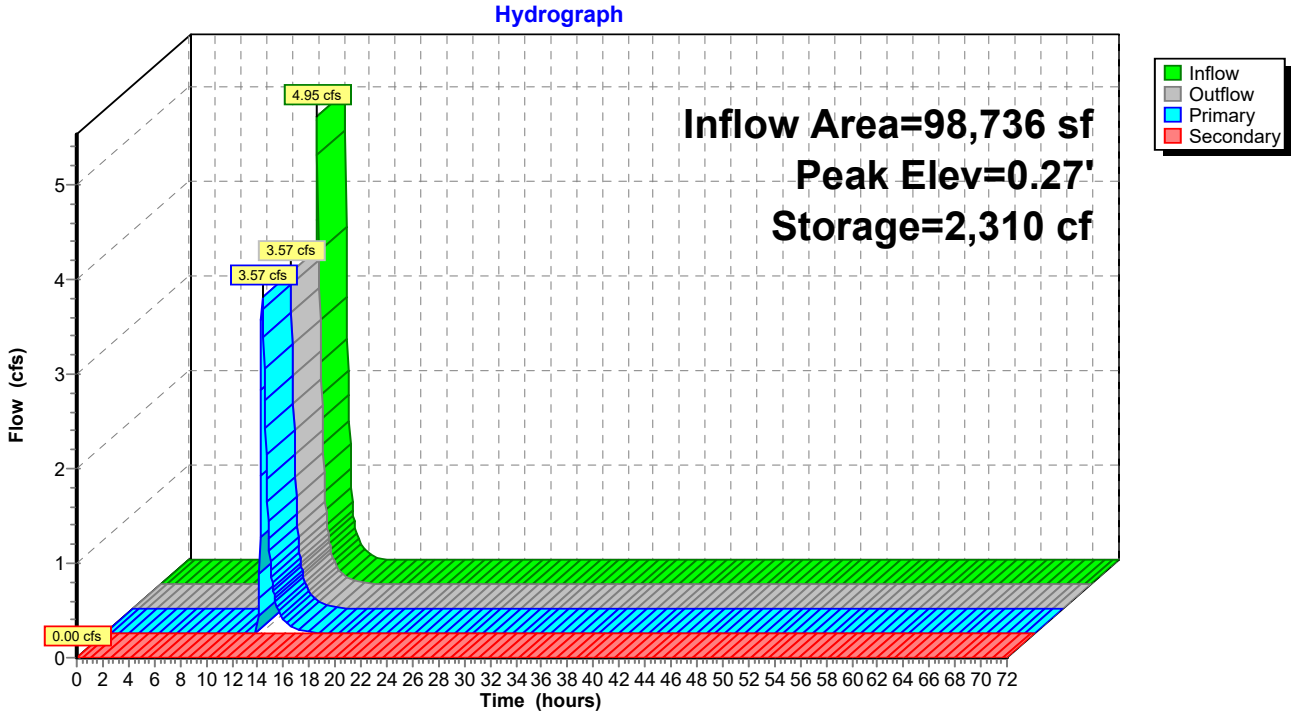
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-1.26	4,723	0	0
1.50	4,723	13,035	13,035
3.49	4,723	9,399	22,434
3.72	4,723	1,086	23,521

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.20'	**18.0" Round Culvert** L= 177.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= -1.20' / -1.59' S= 0.0022 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Secondary	3.72'	**726.0' long overflow** 2 End Contraction(s)
#3	Device 1	-1.10'	**0.5" Vert. Perf Pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.54 cfs @ 12.21 hrs HW=0.27' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.54 cfs @ 2.55 fps)
↑—**3=Perf Pipe holes** (Passes 3.54 cfs of 7.61 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-1.26' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T2: Sand Filter 2



Summary for Pond T3: Sand Filter 3

Inflow Area = 34,322 sf, 59.30% Impervious, Inflow Depth = 0.45" for 2YR - 24HR event
Inflow = 1.08 cfs @ 12.13 hrs, Volume= 1,296 cf
Outflow = 0.95 cfs @ 12.18 hrs, Volume= 1,203 cf, Atten= 12%, Lag= 3.3 min
Primary = 0.95 cfs @ 12.18 hrs, Volume= 1,203 cf
Routed to Pond CB8 : CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -0.43' @ 12.18 hrs Surf.Area= 1,808 sf Storage= 274 cf

Plug-Flow detention time= 7.3 min calculated for 1,203 cf (93% of inflow)
Center-of-Mass det. time= 4.4 min (739.2 - 734.8)

Volume	Invert	Avail.Storage	Storage Description
#1	-0.92'	2,103 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,377 cf Overall - 365 cf Embedded = 7,011 cf x 30.0% Voids
#2	-0.75'	316 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 453.0' S= 0.0050 '/' 365 cf Overall - 0.3" Wall Thickness = 316 cf
		2,420 cf	Total Available Storage

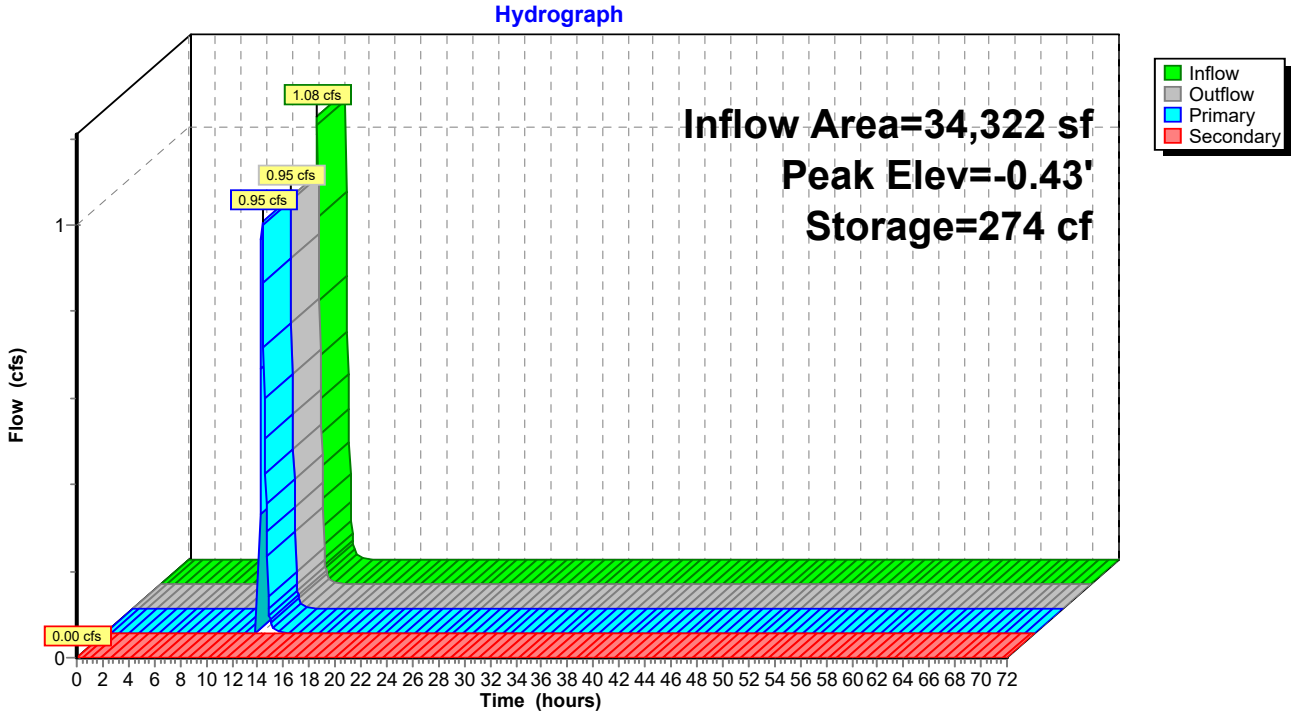
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-0.92	1,808	0	0
0.08	1,808	1,808	1,808
1.66	1,808	2,857	4,665
3.16	1,808	2,712	7,377

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.95'	**24.0" Round Culvert** L= 38.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= -0.95' / -1.01' S= 0.0016 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Secondary	3.16'	**453.0' long overflow** 2 End Contraction(s)
#3	Device 1	-0.75'	**0.5" Vert. Perf Pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.93 cfs @ 12.18 hrs HW=-0.43' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.93 cfs @ 2.17 fps)
↑—**3=Perf Pipe holes** (Passes 0.93 cfs of 3.58 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-0.92' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T3: Sand Filter 3



Summary for Pond T4: Sand Filter 4

Inflow Area = 31,658 sf, 56.17% Impervious, Inflow Depth = 0.40" for 2YR - 24HR event
Inflow = 0.90 cfs @ 12.13 hrs, Volume= 1,044 cf
Outflow = 0.72 cfs @ 12.21 hrs, Volume= 952 cf, Atten= 20%, Lag= 4.6 min
Primary = 0.72 cfs @ 12.21 hrs, Volume= 952 cf
Routed to Pond CB8 : CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -0.16' @ 12.21 hrs Surf.Area= 1,808 sf Storage= 313 cf

Plug-Flow detention time= 11.0 min calculated for 952 cf (91% of inflow)
Center-of-Mass det. time= 7.7 min (743.0 - 735.3)

Volume	Invert	Avail.Storage	Storage Description
#1	-0.72'	1,946 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 6,852 cf Overall - 365 cf Embedded = 6,487 cf x 30.0% Voids
#2	-0.55'	316 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 453.0' S= 0.0050 '/' 365 cf Overall - 0.3" Wall Thickness = 316 cf
		2,262 cf	Total Available Storage

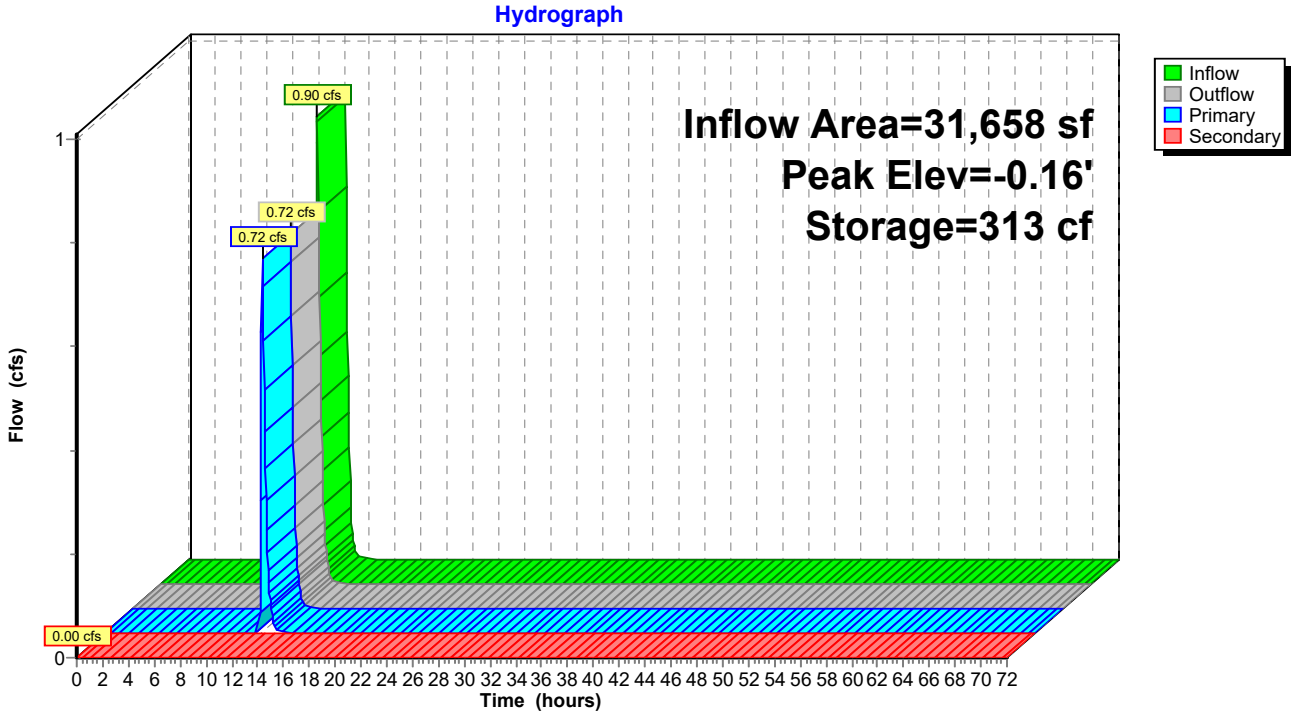
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-0.72	1,808	0	0
1.50	1,808	4,014	4,014
2.93	1,808	2,585	6,599
3.07	1,808	253	6,852

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.65'	**24.0" Round Culvert** L= 131.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= -0.65' / -0.85' S= 0.0015 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Secondary	3.07'	**453.0' long overflow** 2 End Contraction(s)
#3	Device 1	-0.55'	**0.5" Vert. Perf pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.71 cfs @ 12.21 hrs HW=-0.16' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 0.71 cfs @ 1.81 fps)
↑—**3=Perf pipe holes** (Passes 0.71 cfs of 3.96 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-0.72' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T4: Sand Filter 4

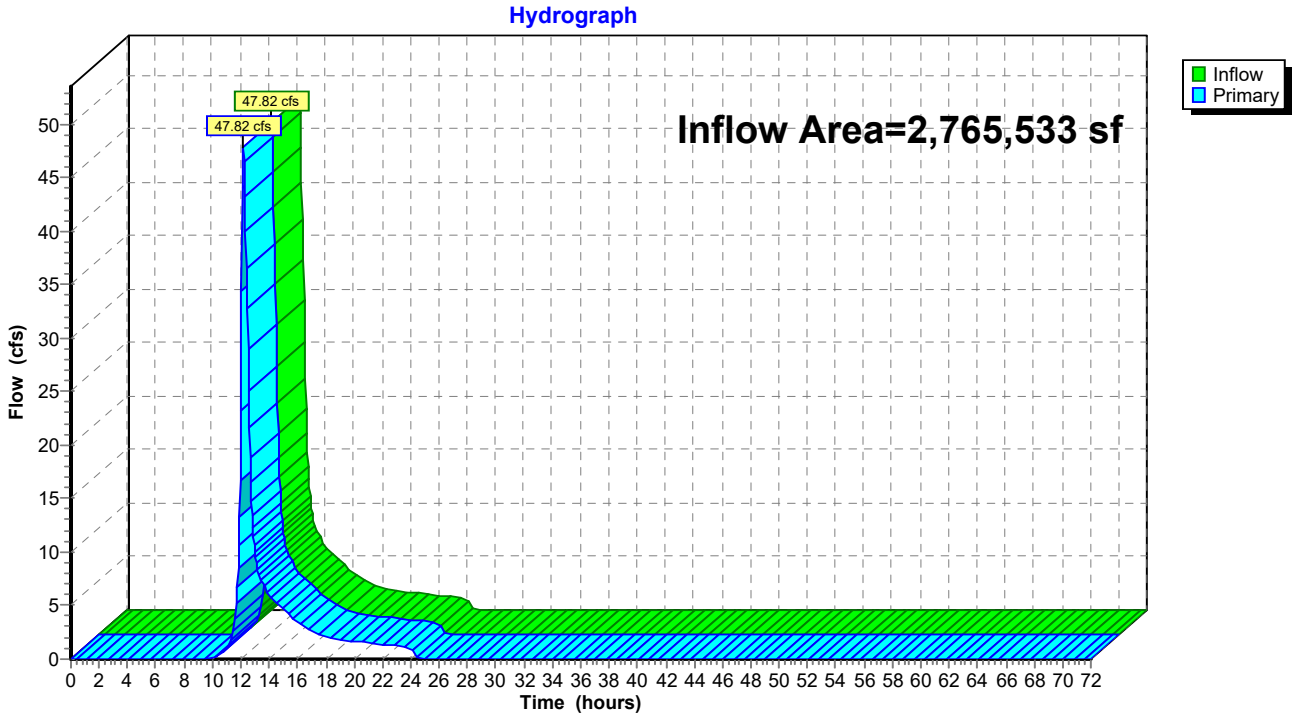


Summary for Link 1L: WEST WETL

Inflow Area = 2,765,533 sf, 39.83% Impervious, Inflow Depth = 1.02" for 2YR - 24HR event
Inflow = 47.82 cfs @ 12.17 hrs, Volume= 234,448 cf
Primary = 47.82 cfs @ 12.17 hrs, Volume= 234,448 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : TUTTLE BROOK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 1L: WEST WETL

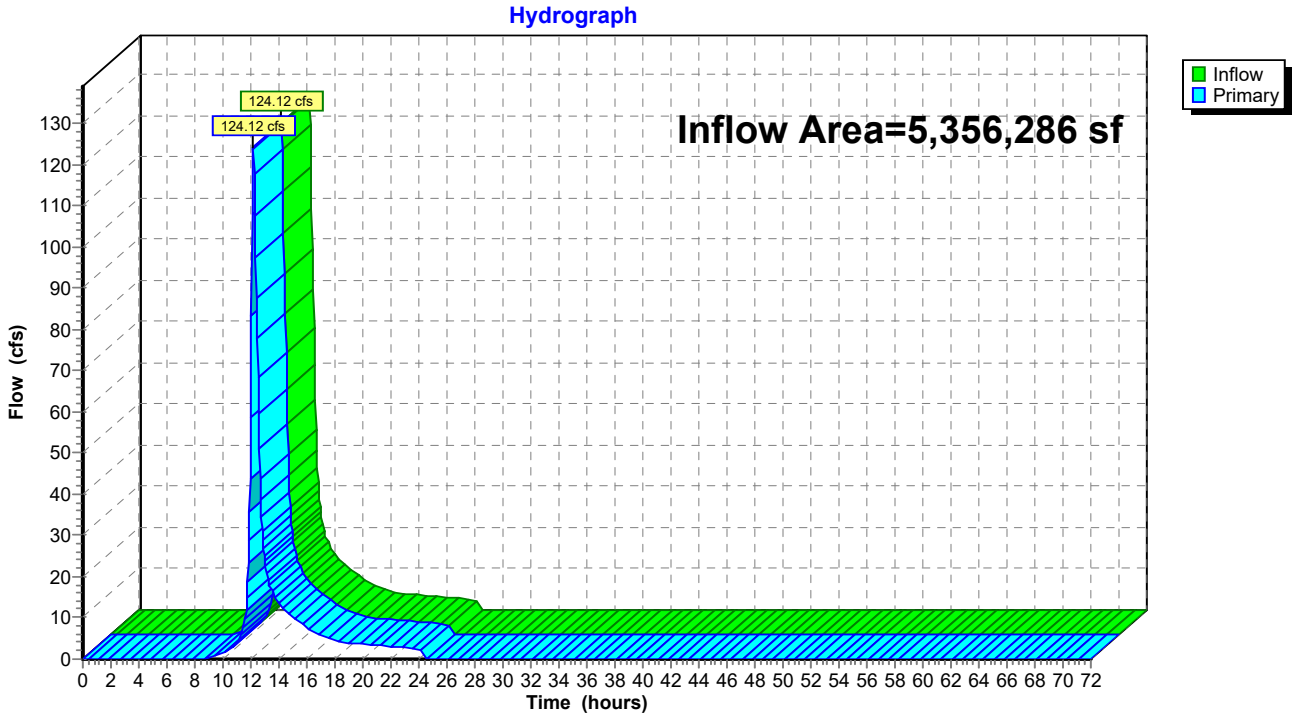


Summary for Link 2L: TUTTLE BROOK

Inflow Area = 5,356,286 sf, 27.31% Impervious, Inflow Depth = 1.27" for 2YR - 24HR event
Inflow = 124.12 cfs @ 12.19 hrs, Volume= 565,321 cf
Primary = 124.12 cfs @ 12.19 hrs, Volume= 565,321 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 2L: TUTTLE BROOK

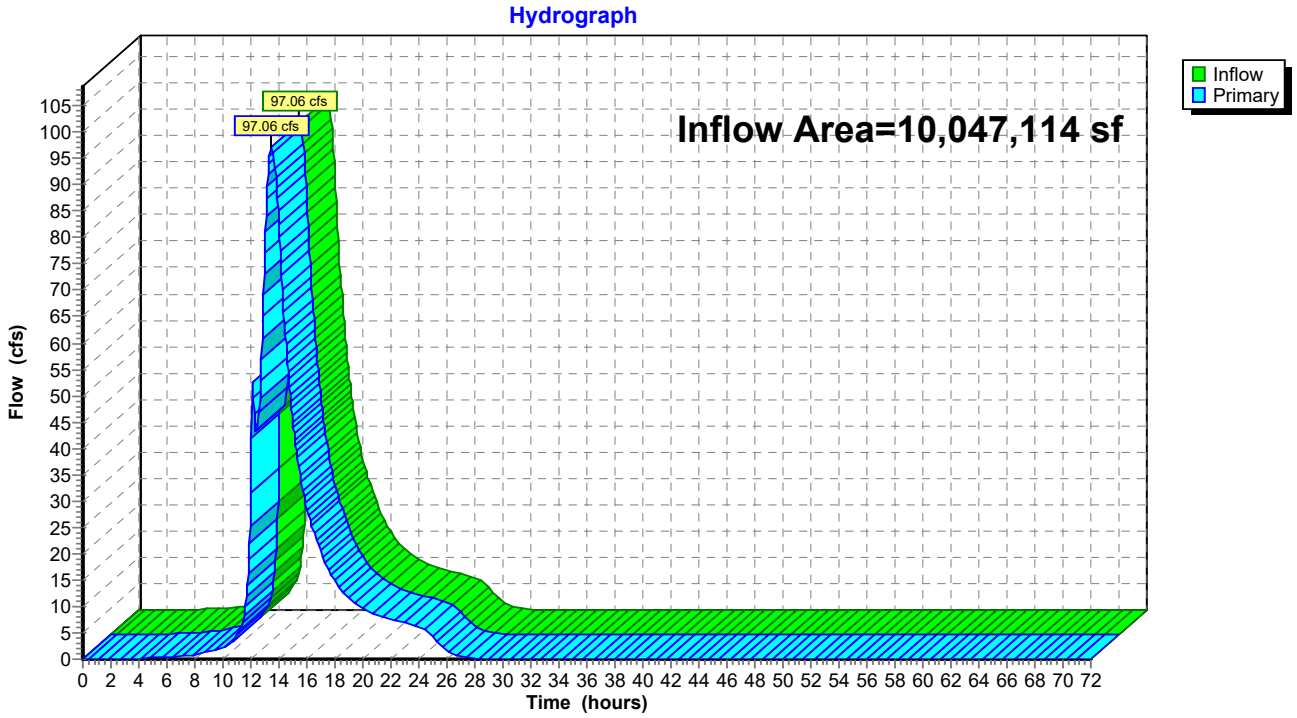


Summary for Link 3L: EAST WETL

Inflow Area = 10,047,114 sf, 45.76% Impervious, Inflow Depth = 1.56" for 2YR - 24HR event
Inflow = 97.06 cfs @ 13.49 hrs, Volume= 1,307,668 cf
Primary = 97.06 cfs @ 13.49 hrs, Volume= 1,307,668 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: EAST WETL

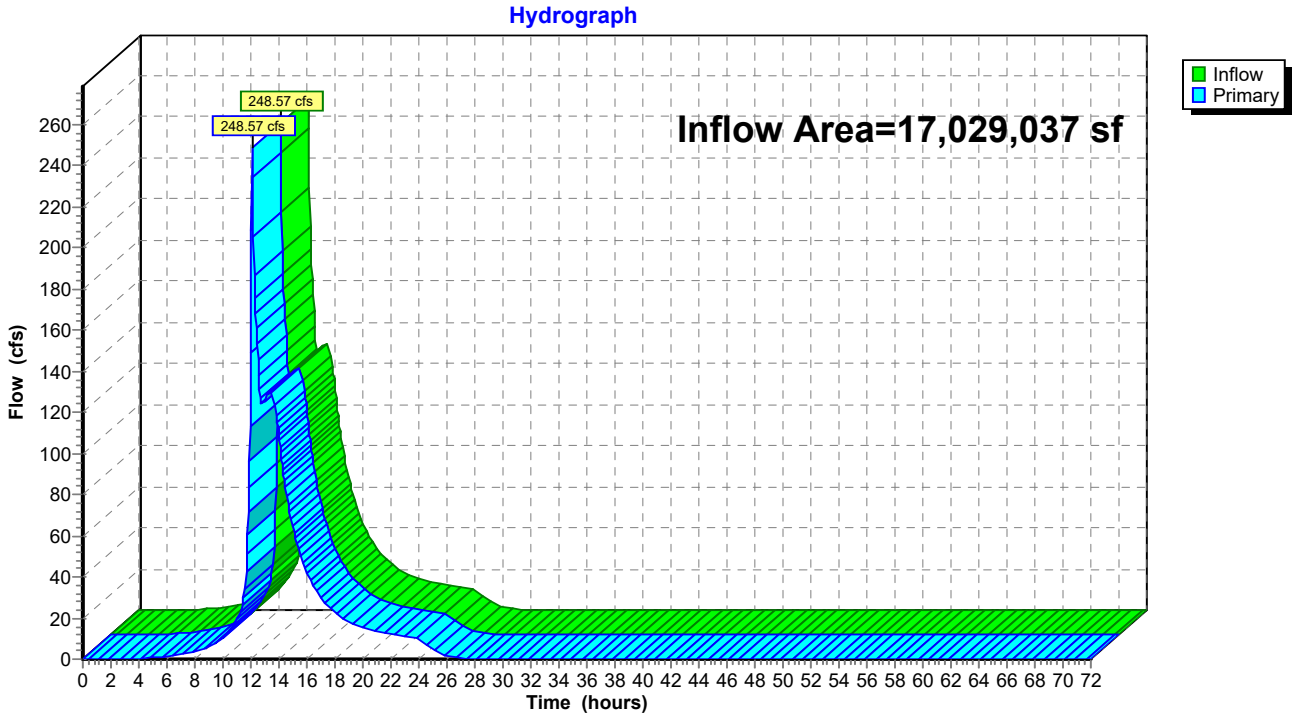


Summary for Link 4L: MORRIS CREEK

Inflow Area = 17,029,037 sf, 42.77% Impervious, Inflow Depth = 1.67" for 2YR - 24HR event
Inflow = 248.57 cfs @ 12.11 hrs, Volume= 2,365,358 cf
Primary = 248.57 cfs @ 12.11 hrs, Volume= 2,365,358 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: MORRIS CREEK



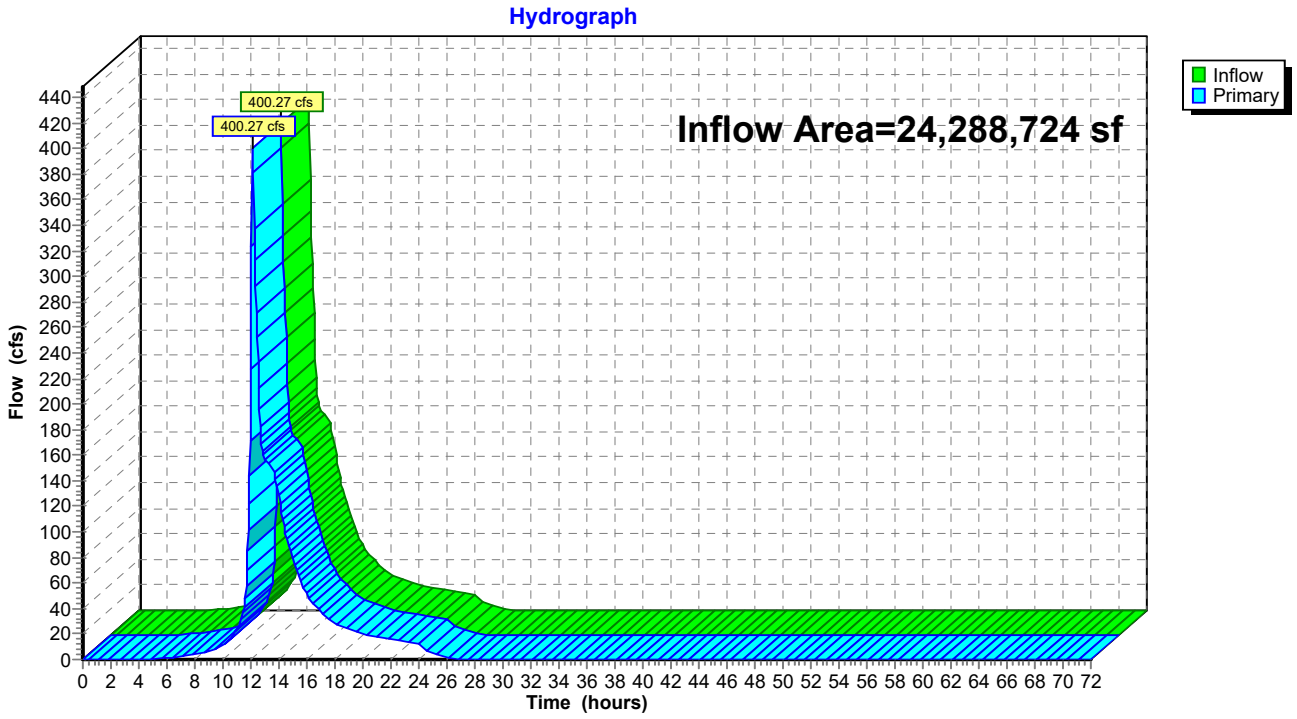
Summary for Link AP1: TIDE GATE

Inflow Area = 24,288,724 sf, 36.95% Impervious, Inflow Depth = 1.53" for 2YR - 24HR event
Inflow = 400.27 cfs @ 12.13 hrs, Volume= 3,103,967 cf
Primary = 400.27 cfs @ 12.13 hrs, Volume= 3,103,967 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 2.50'

Link AP1: TIDE GATE

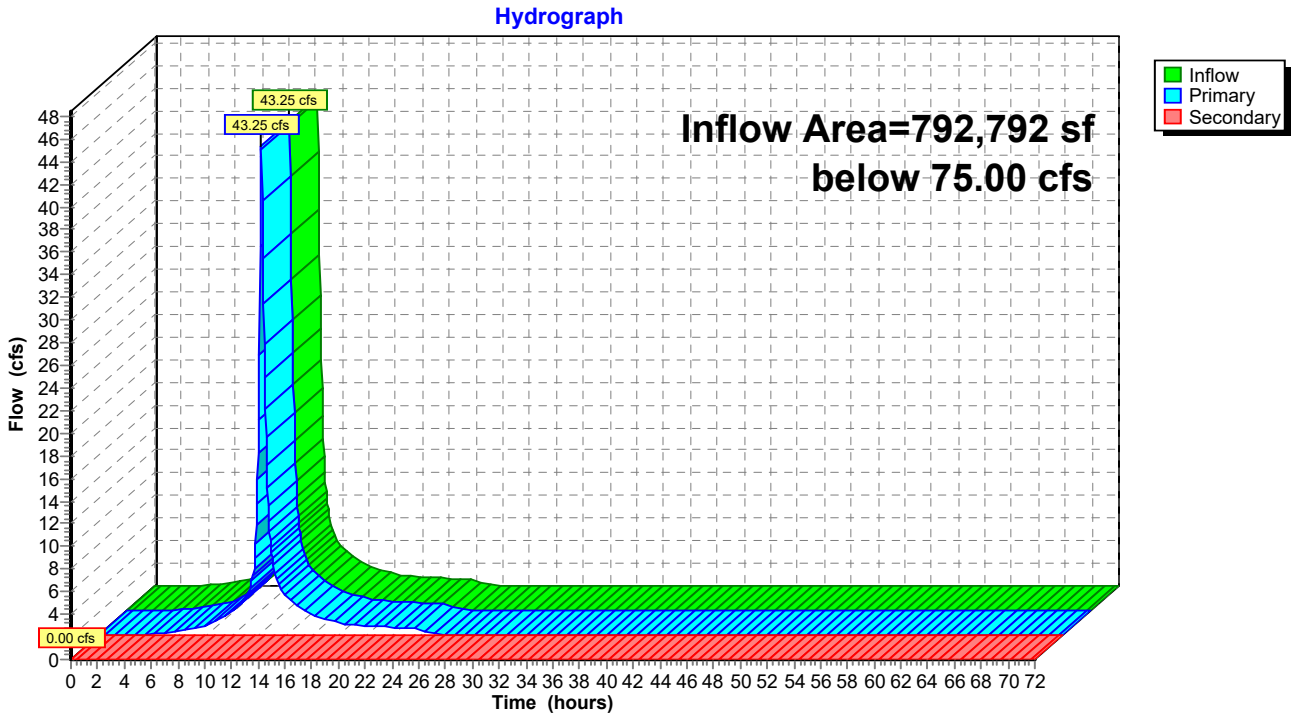


Summary for Link PS1: Pump Station 1

Inflow Area = 792,792 sf, 92.69% Impervious, Inflow Depth = 2.86" for 2YR - 24HR event
Inflow = 43.25 cfs @ 12.13 hrs, Volume= 189,145 cf
Primary = 43.25 cfs @ 12.13 hrs, Volume= 189,145 cf, Atten= 0%, Lag= 0.0 min
Routed to Link W1 : EAST WETL
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 75.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PS1: Pump Station 1

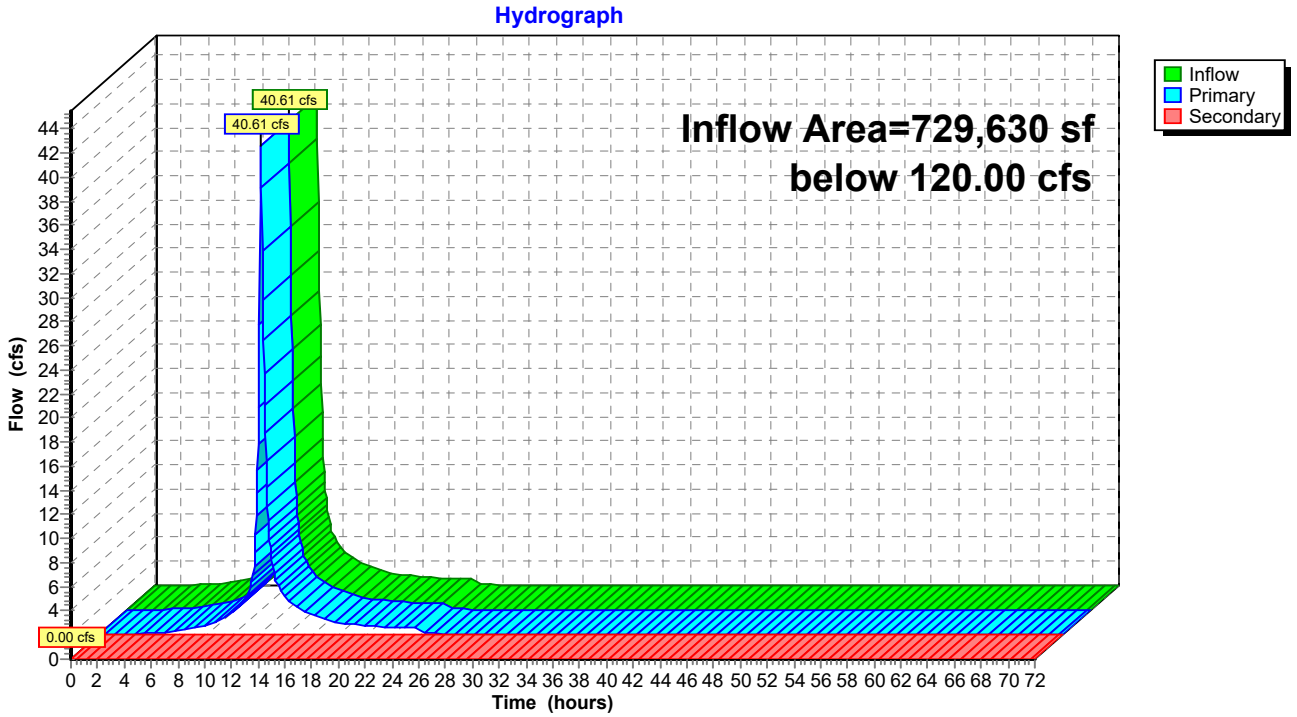


Summary for Link PS2: Pump Station 2

Inflow Area = 729,630 sf, 90.33% Impervious, Inflow Depth = 2.81" for 2YR - 24HR event
Inflow = 40.61 cfs @ 12.10 hrs, Volume= 170,611 cf
Primary = 40.61 cfs @ 12.10 hrs, Volume= 170,611 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow below 120.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PS2: Pump Station 2

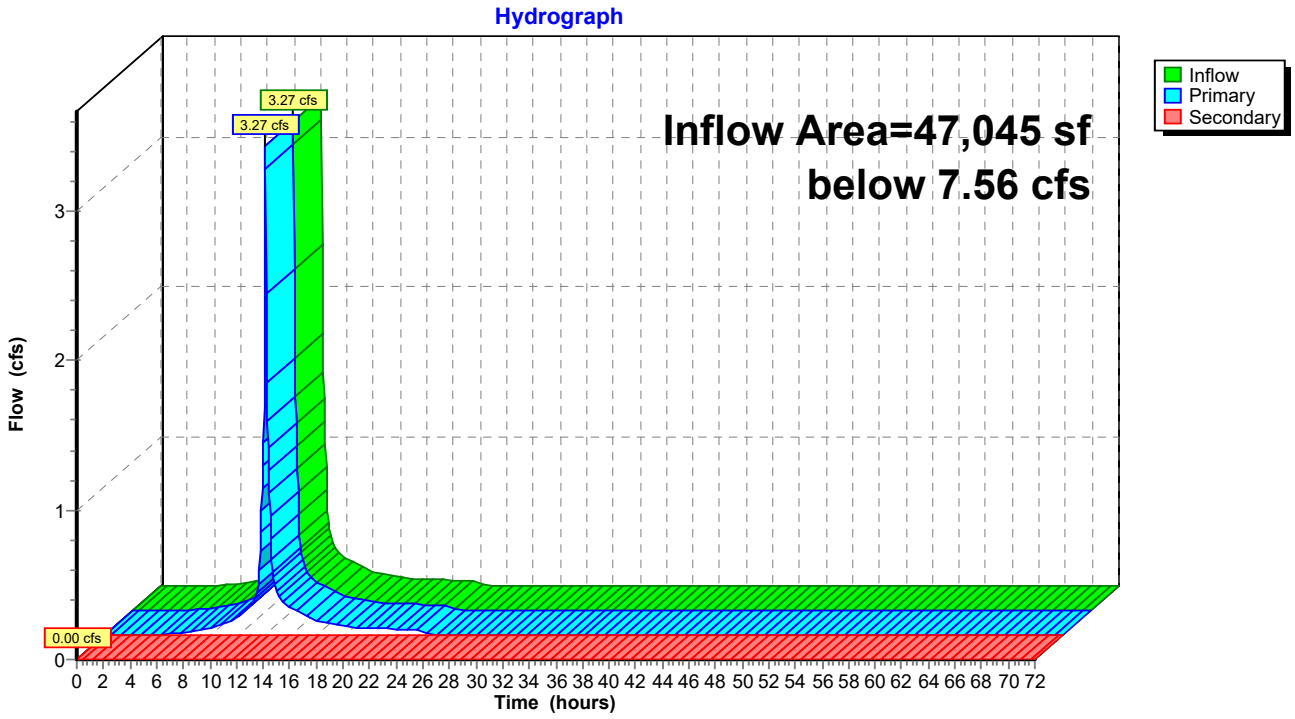


Summary for Link SS1: SITESAVER 1 - STSS-7

Inflow Area = 47,045 sf, 87.04% Impervious, Inflow Depth = 2.69" for 2YR - 24HR event
Inflow = 3.27 cfs @ 12.07 hrs, Volume= 10,544 cf
Primary = 3.27 cfs @ 12.07 hrs, Volume= 10,544 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS1 : Pump Station 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS1: SITESAVER 1 - STSS-7

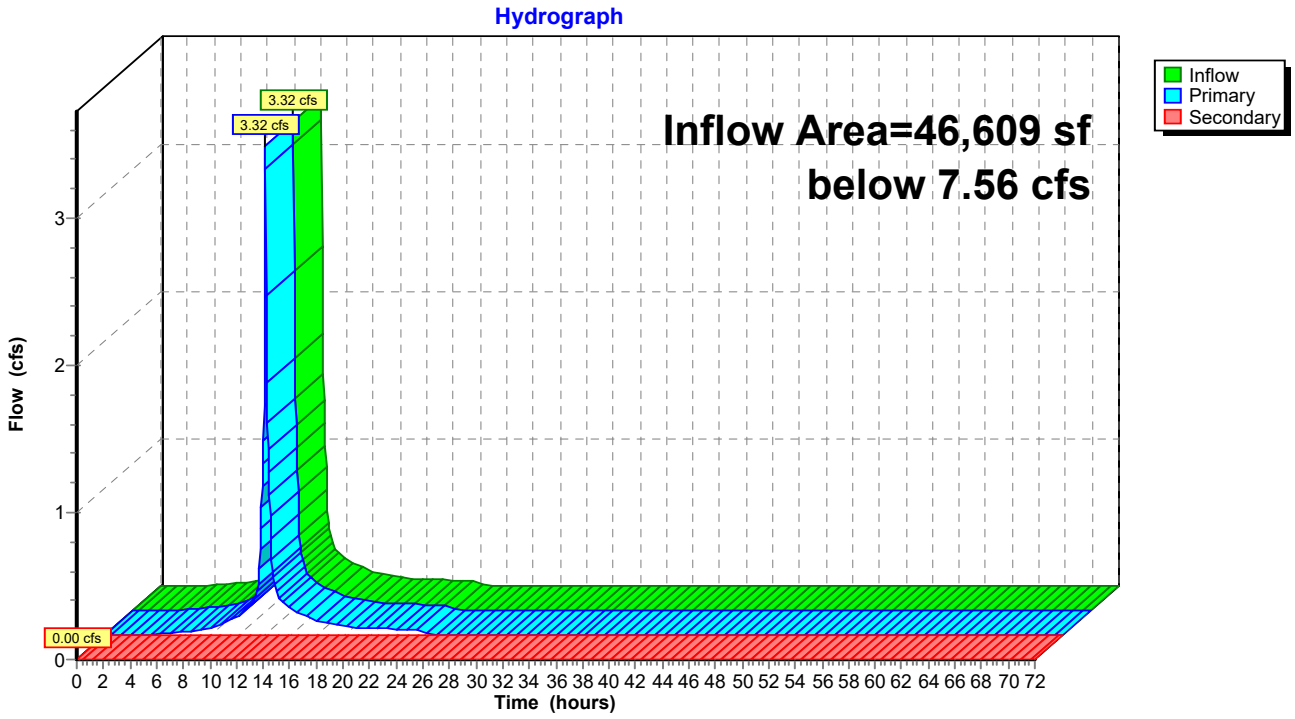


Summary for Link SS2: SITESAVER 2 - STSS-7

Inflow Area = 46,609 sf, 91.59% Impervious, Inflow Depth = 2.79" for 2YR - 24HR event
Inflow = 3.32 cfs @ 12.07 hrs, Volume= 10,844 cf
Primary = 3.32 cfs @ 12.07 hrs, Volume= 10,844 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS1 : Pump Station 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS2: SITESAVER 2 - STSS-7

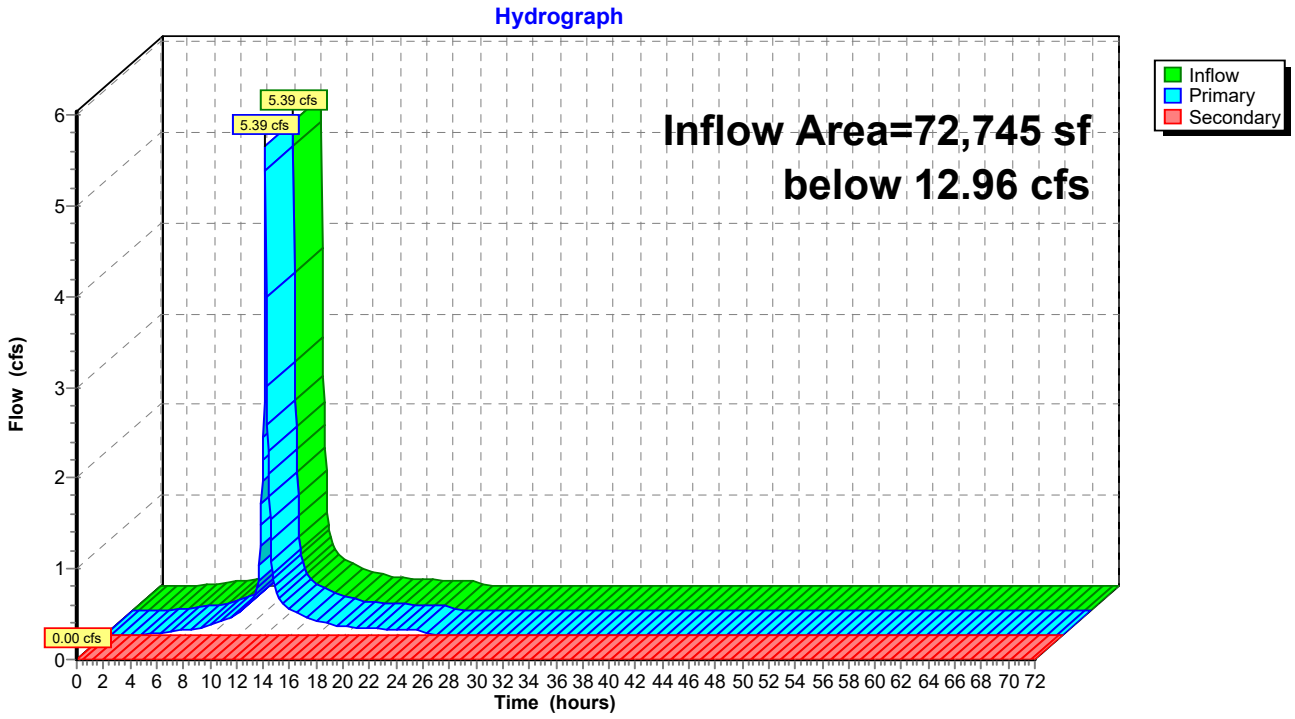


Summary for Link SS3: SITESAVER 3 - STSS-12

Inflow Area = 72,745 sf, 95.21% Impervious, Inflow Depth = 3.01" for 2YR - 24HR event
Inflow = 5.39 cfs @ 12.07 hrs, Volume= 18,219 cf
Primary = 5.39 cfs @ 12.07 hrs, Volume= 18,219 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 12.96 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS3: SITESAVER 3 - STSS-12

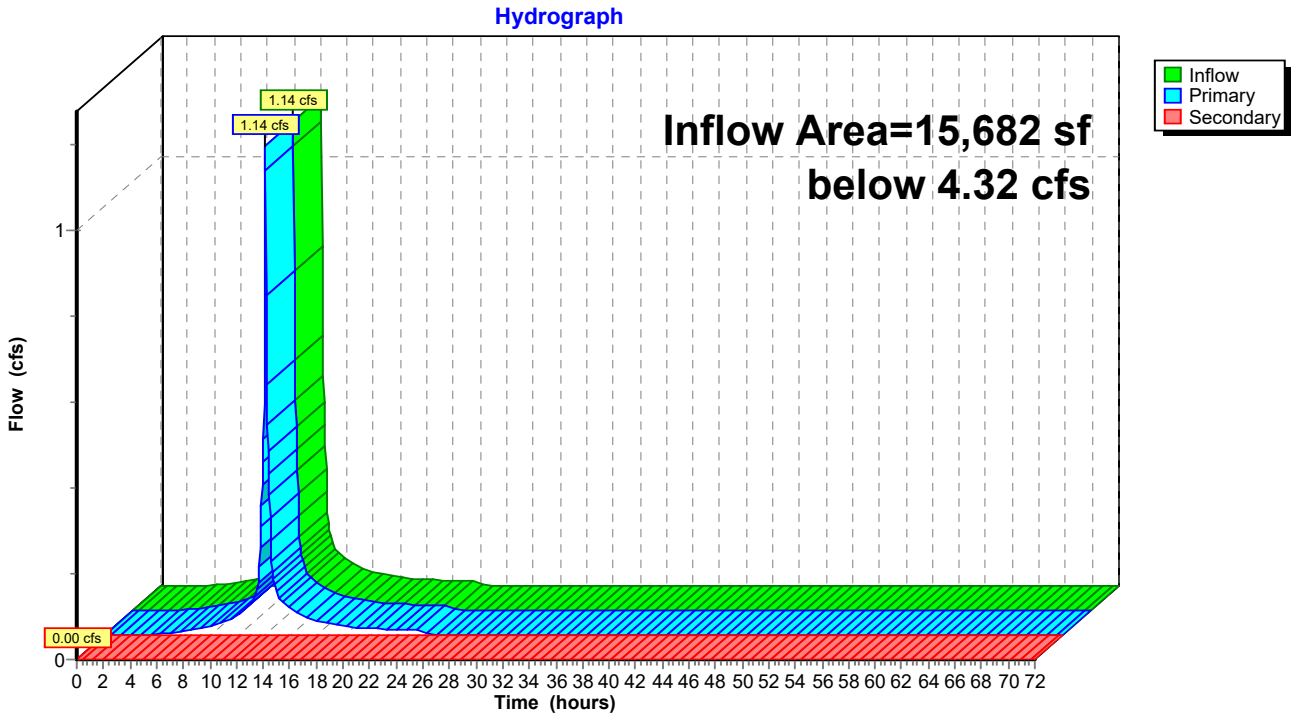


Summary for Link SS4: SITESAVER 4 - STSS-4

Inflow Area = 15,682 sf, 91.67% Impervious, Inflow Depth = 2.90" for 2YR - 24HR event
Inflow = 1.14 cfs @ 12.07 hrs, Volume= 3,786 cf
Primary = 1.14 cfs @ 12.07 hrs, Volume= 3,786 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS4: SITESAVER 4 - STSS-4

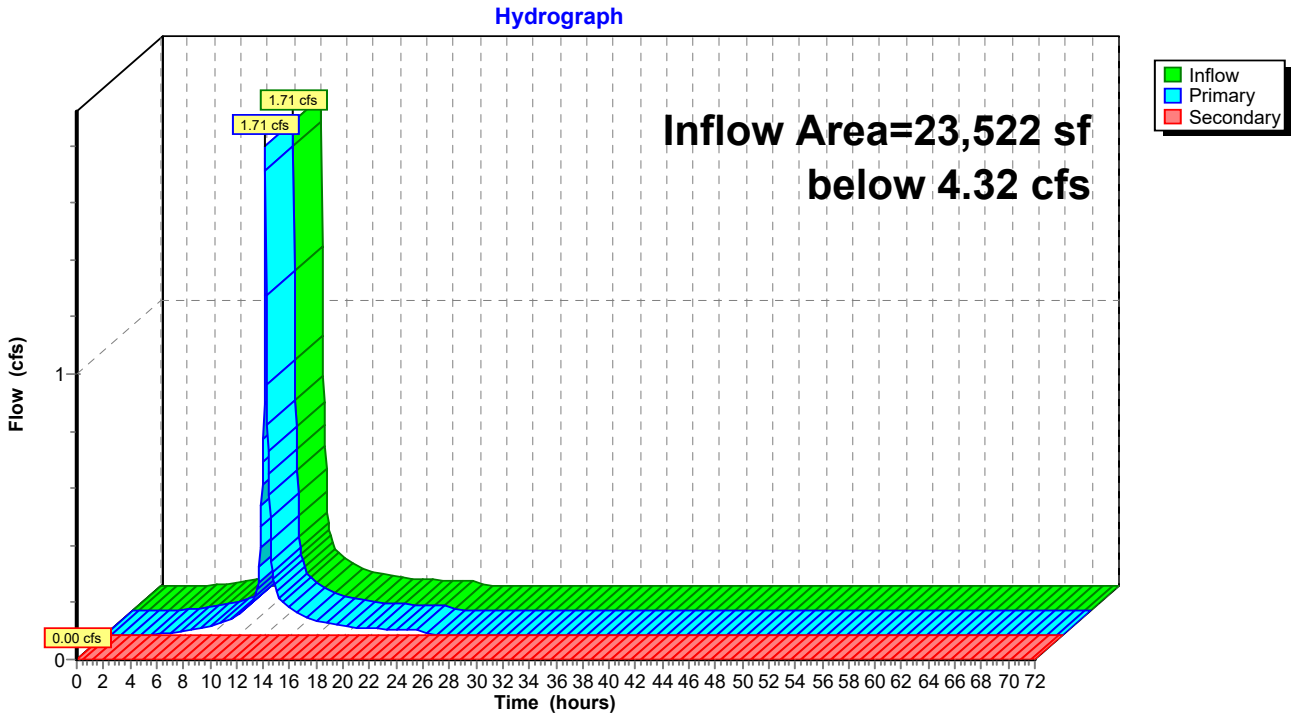


Summary for Link SS5: SITESAVER 5 - STSS-4

Inflow Area = 23,522 sf, 94.44% Impervious, Inflow Depth = 2.90" for 2YR - 24HR event
Inflow = 1.71 cfs @ 12.07 hrs, Volume= 5,679 cf
Primary = 1.71 cfs @ 12.07 hrs, Volume= 5,679 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS5: SITESAVER 5 - STSS-4

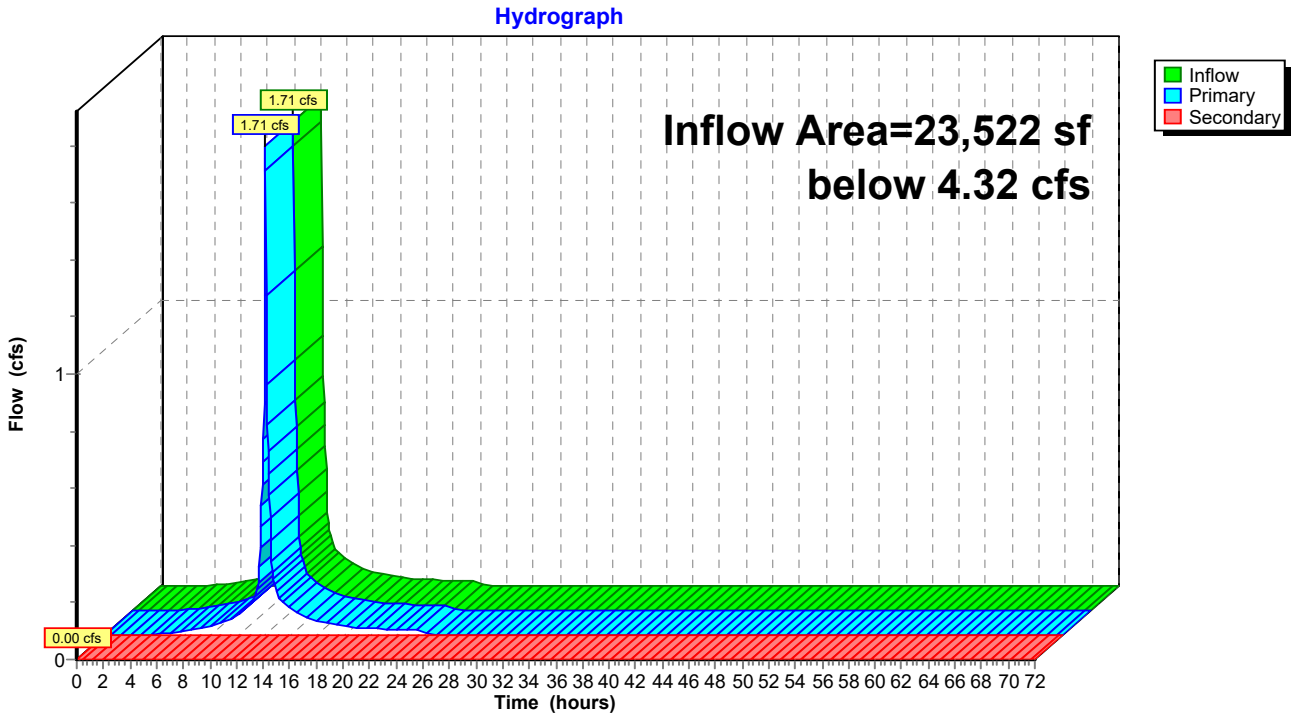


Summary for Link SS6: SITESAVER 6 - STSS-4

Inflow Area = 23,522 sf, 94.44% Impervious, Inflow Depth = 2.90" for 2YR - 24HR event
Inflow = 1.71 cfs @ 12.07 hrs, Volume= 5,679 cf
Primary = 1.71 cfs @ 12.07 hrs, Volume= 5,679 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS6: SITESAVER 6 - STSS-4

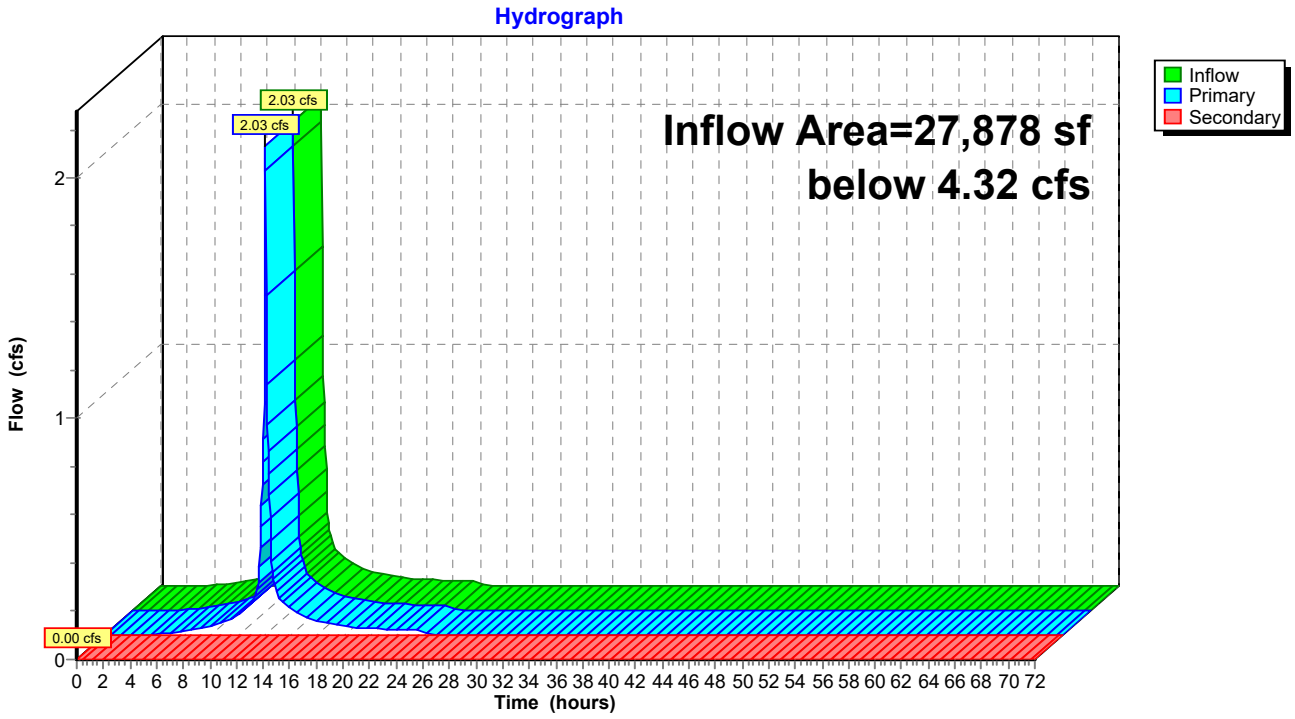


Summary for Link SS7: SITESAVER 7 - STSS-4

Inflow Area = 27,878 sf, 93.75% Impervious, Inflow Depth = 2.90" for 2YR - 24HR event
Inflow = 2.03 cfs @ 12.07 hrs, Volume= 6,731 cf
Primary = 2.03 cfs @ 12.07 hrs, Volume= 6,731 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS7: SITESAVER 7 - STSS-4

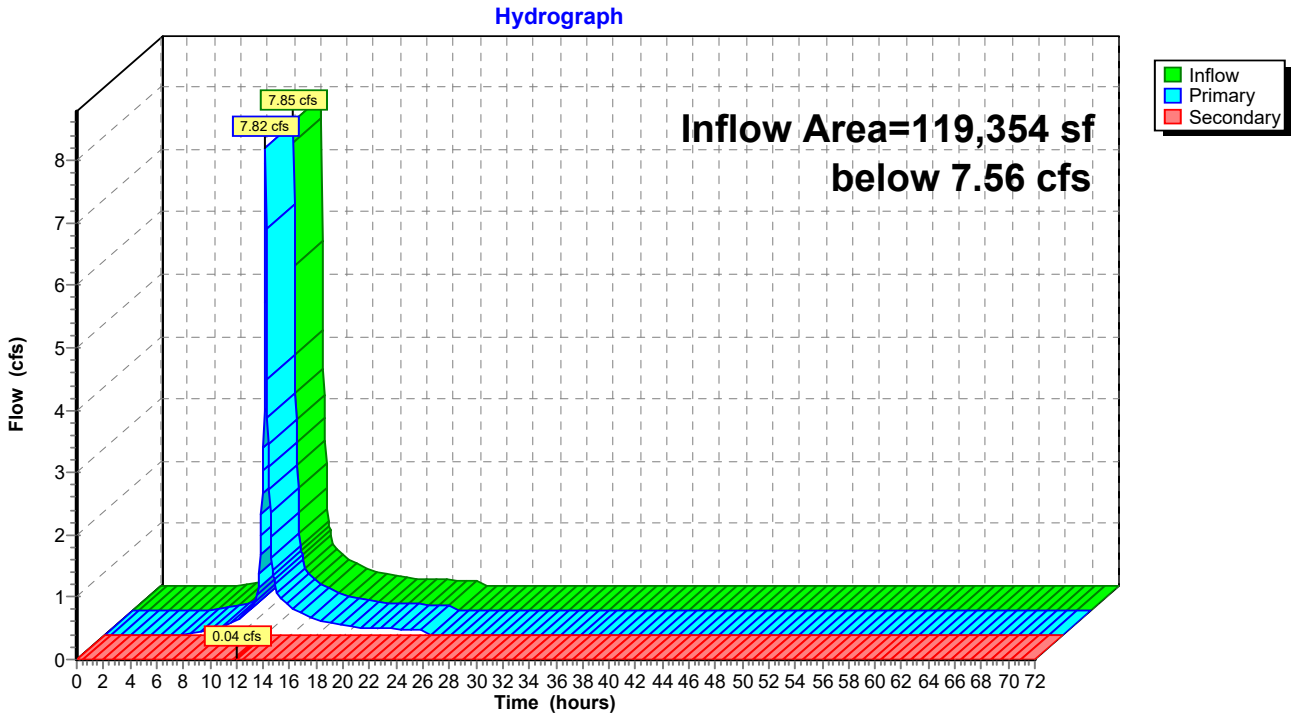


Summary for Link SS8: SITESAVER 8 - STSS-7

Inflow Area = 119,354 sf, 80.66% Impervious, Inflow Depth = 2.49" for 2YR - 24HR event
Inflow = 7.85 cfs @ 12.07 hrs, Volume= 24,800 cf
Primary = 7.82 cfs @ 12.07 hrs, Volume= 24,793 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.04 cfs @ 12.05 hrs, Volume= 7 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS8: SITESAVER 8 - STSS-7

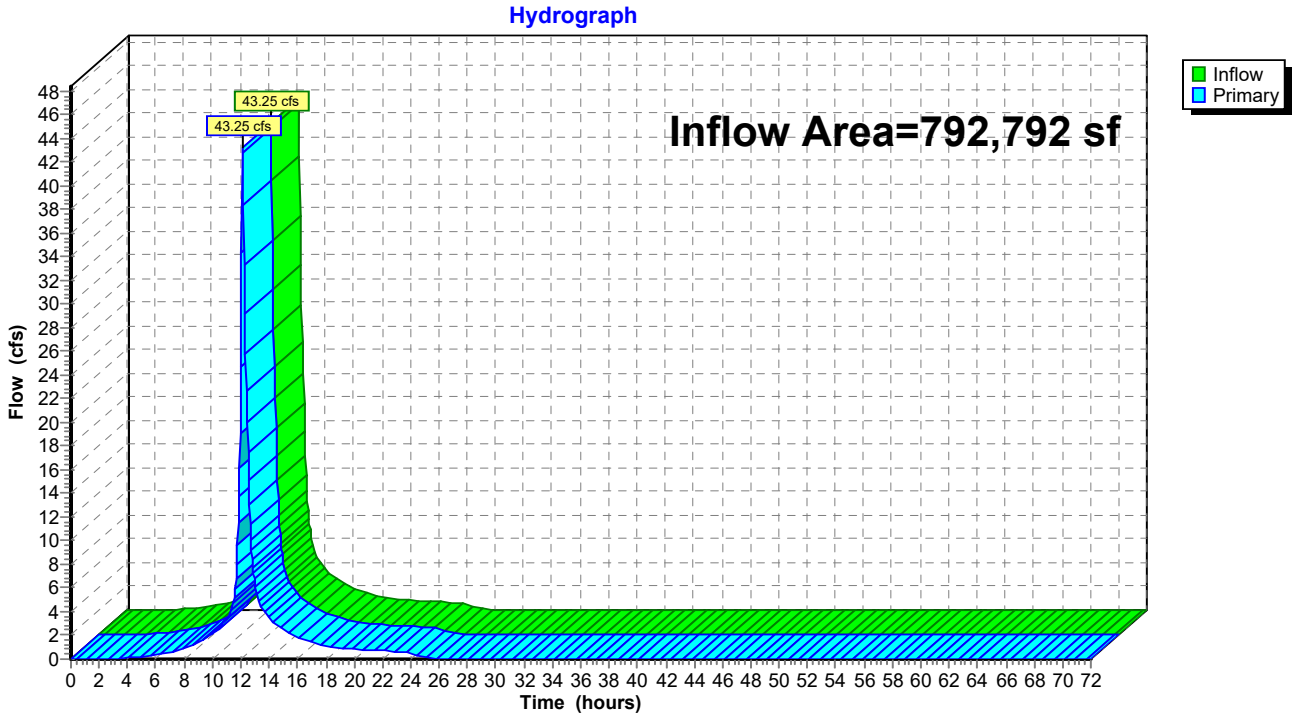


Summary for Link W1: EAST WETL

Inflow Area = 792,792 sf, 92.69% Impervious, Inflow Depth = 2.86" for 2YR - 24HR event
Inflow = 43.25 cfs @ 12.13 hrs, Volume= 189,145 cf
Primary = 43.25 cfs @ 12.13 hrs, Volume= 189,145 cf, Atten= 0%, Lag= 0.0 min
Routed to Pond 11P : (5) Culvert 6X3

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link W1: EAST WETL



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1: Area 1 Runoff Area=1.080 ac 87.04% Impervious Runoff Depth=4.54"
Tc=5.0 min CN=94 Runoff=5.36 cfs 17,779 cf

Subcatchment1S: SC 1 Runoff Area=1,993,439 sf 2.18% Impervious Runoff Depth=4.42"
Flow Length=161' Tc=6.9 min CN=93 Runoff=212.62 cfs 734,900 cf

Subcatchment2: Area 2 Runoff Area=3.870 ac 97.16% Impervious Runoff Depth=4.88"
Tc=5.0 min CN=97 Runoff=19.81 cfs 68,503 cf

Subcatchment2S: SC 2 Runoff Area=218,401 sf 45.10% Impervious Runoff Depth=2.91"
Flow Length=568' Tc=16.0 min CN=78 Runoff=12.58 cfs 52,926 cf

Subcatchment3: Area 3 Runoff Area=4.180 ac 91.63% Impervious Runoff Depth=4.65"
Tc=5.0 min CN=95 Runoff=20.99 cfs 70,517 cf

Subcatchment3A: SC 3A Runoff Area=34,322 sf 59.30% Impervious Runoff Depth=3.38"
Flow Length=143' Tc=5.0 min CN=83 Runoff=3.12 cfs 9,676 cf

Subcatchment3B: SC 3B Runoff Area=98,736 sf 72.12% Impervious Runoff Depth=3.89"
Flow Length=100' Tc=5.0 min CN=88 Runoff=10.12 cfs 31,989 cf

Subcatchment3S: SC 3 Runoff Area=447,354 sf 20.28% Impervious Runoff Depth=1.81"
Flow Length=413' Tc=11.6 min UI Adjusted CN=65 Runoff=17.16 cfs 67,417 cf

Subcatchment4: Area 4 Runoff Area=1.070 ac 91.59% Impervious Runoff Depth=4.65"
Tc=5.0 min CN=95 Runoff=5.37 cfs 18,051 cf

Subcatchment4S: SC 4 (Reduced) Runoff Area=871,304 sf 88.65% Impervious Runoff Depth=4.54"
Tc=36.8 min CN=94 Runoff=51.16 cfs 329,281 cf

Subcatchment5: Area 5 Runoff Area=2.510 ac 91.63% Impervious Runoff Depth=4.65"
Tc=5.0 min CN=95 Runoff=12.60 cfs 42,344 cf

Subcatchment6: Area 6 Runoff Area=3.930 ac 92.11% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=96 Runoff=19.94 cfs 67,923 cf

Subcatchment7: Area 7 Runoff Area=1.560 ac 92.31% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=96 Runoff=7.92 cfs 26,962 cf

Subcatchment7A: SC 7A Runoff Area=31,658 sf 56.17% Impervious Runoff Depth=3.29"
Flow Length=105' Tc=5.0 min CN=82 Runoff=2.79 cfs 8,668 cf

Subcatchment7B: SC 7 Runoff Area=171,281 sf 3.53% Impervious Runoff Depth=1.58"
Flow Length=162' Tc=10.5 min CN=62 Runoff=5.78 cfs 22,584 cf

Subcatchment7S: SC 7 Runoff Area=171,785 sf 31.18% Impervious Runoff Depth=2.46"
Flow Length=772' Tc=127.8 min CN=73 Runoff=2.69 cfs 35,247 cf

Subcatchment8: Area 8 Runoff Area=1.230 ac 90.24% Impervious Runoff Depth=4.65"
Tc=5.0 min CN=95 Runoff=6.18 cfs 20,750 cf

Subcatchment8A: SC 8A Runoff Area=233,085 sf 13.62% Impervious Runoff Depth=1.73"
Flow Length=304' Tc=7.1 min UI Adjusted CN=64 Runoff=9.82 cfs 33,639 cf

Subcatchment8S: SC 8 Runoff Area=162,499 sf 33.95% Impervious Runoff Depth=2.55"
Flow Length=721' Tc=43.3 min CN=74 Runoff=5.23 cfs 34,518 cf

Subcatchment9A: Area 9A Runoff Area=1.670 ac 95.21% Impervious Runoff Depth=4.88"
Tc=5.0 min CN=97 Runoff=8.55 cfs 29,561 cf

Subcatchment9b: Area 9b Runoff Area=0.360 ac 91.67% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=96 Runoff=1.83 cfs 6,222 cf

Subcatchment9c: Area 9c Runoff Area=0.540 ac 94.44% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=96 Runoff=2.74 cfs 9,333 cf

Subcatchment9d: Area 9d Runoff Area=0.540 ac 94.44% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=96 Runoff=2.74 cfs 9,333 cf

Subcatchment9e: Area 9e Runoff Area=0.640 ac 93.75% Impervious Runoff Depth=4.76"
Tc=5.0 min CN=96 Runoff=3.25 cfs 11,061 cf

Subcatchment9S: SC Culvert Runoff Area=212.450 ac 41.73% Impervious Runoff Depth=3.00"
Tc=110.6 min CN=79 Runoff=197.06 cfs 2,314,082 cf

Subcatchment14S: SC 14 Runoff Area=364,481 sf 23.60% Impervious Runoff Depth=0.57"
Flow Length=594' Tc=18.6 min UI Adjusted CN=46 Runoff=2.14 cfs 17,256 cf

Subcatchment15S: SC 15 Runoff Area=974,157 sf 40.31% Impervious Runoff Depth=2.29"
Flow Length=592' Tc=15.7 min CN=71 Runoff=43.88 cfs 186,054 cf

Subcatchment16A: SC 16A Runoff Area=281,403 sf 34.62% Impervious Runoff Depth=2.55"
Flow Length=629' Tc=6.5 min CN=74 Runoff=18.64 cfs 59,776 cf

Subcatchment16B: SC 16B Runoff Area=304,059 sf 44.14% Impervious Runoff Depth=2.82"
Flow Length=370' Tc=5.5 min CN=77 Runoff=22.85 cfs 71,366 cf

Subcatchment16S: SC 16 Runoff Area=189,563 sf 41.96% Impervious Runoff Depth=2.82"
Flow Length=466' Tc=9.1 min CN=77 Runoff=12.68 cfs 44,493 cf

Subcatchment17S: SC 17 Runoff Area=411,986 sf 54.00% Impervious Runoff Depth=3.19"
Flow Length=444' Tc=22.6 min CN=81 Runoff=22.59 cfs 109,500 cf

Subcatchment18S: SC 18 Runoff Area=1,697,838 sf 11.60% Impervious Runoff Depth=3.48"
Flow Length=519' Tc=14.3 min UI Adjusted CN=84 Runoff=121.10 cfs 492,583 cf

Subcatchment19A: SC 19A Runoff Area=98,736 sf 72.12% Impervious Runoff Depth=3.89"
Flow Length=98' Tc=5.0 min CN=88 Runoff=10.12 cfs 31,989 cf

Subcatchment19S: SC 19 Runoff Area=227,314 sf 0.00% Impervious Runoff Depth=3.29"
Flow Length=165' Tc=5.0 min CN=82 Runoff=20.01 cfs 62,238 cf

Subcatchment20S: SC 20 Runoff Area=404,240 sf 16.91% Impervious Runoff Depth=2.46"
Flow Length=414' Tc=7.6 min UI Adjusted CN=73 Runoff=24.89 cfs 82,943 cf

Subcatchment21S: SC 21 Runoff Area=222,583 sf 10.63% Impervious Runoff Depth=2.55"
Flow Length=472' Tc=8.8 min UI Adjusted CN=74 Runoff=13.53 cfs 47,281 cf

Subcatchment22S: SC 22 Runoff Area=253,526 sf 11.67% Impervious Runoff Depth=2.46"
Flow Length=356' Tc=14.1 min UI Adjusted CN=73 Runoff=12.85 cfs 52,019 cf

Subcatchment23S: SC 23 Runoff Area=436,850 sf 7.67% Impervious Runoff Depth=2.82"
Flow Length=384' Tc=6.1 min UI Adjusted CN=77 Runoff=32.40 cfs 102,534 cf

Subcatchment24S: SC 24 Runoff Area=325,253 sf 1.55% Impervious Runoff Depth=2.46"
Flow Length=365' Tc=11.8 min CN=73 Runoff=17.58 cfs 66,736 cf

Subcatchment27S: SC 27 Runoff Area=260,949 sf 26.73% Impervious Runoff Depth=1.89"
Flow Length=266' Tc=26.7 min UI Adjusted CN=66 Runoff=7.58 cfs 41,015 cf

SubcatchmentA1: Area A1 Runoff Area=4.660 ac 83.69% Impervious Runoff Depth=4.42"
Tc=5.0 min CN=93 Runoff=22.79 cfs 74,834 cf

SubcatchmentA2: Area A2 Runoff Area=4.370 ac 100.00% Impervious Runoff Depth=4.99"
Tc=5.0 min CN=98 Runoff=22.52 cfs 79,202 cf

SubcatchmentA3: Area A3 Runoff Area=2.740 ac 80.66% Impervious Runoff Depth=4.31"
Tc=5.0 min CN=92 Runoff=13.19 cfs 42,909 cf

SubcatchmentDS1: Ditch Segment 1 Runoff Area=412,198 sf 28.62% Impervious Runoff Depth=2.13"
Flow Length=1,385' Tc=13.4 min UI Adjusted CN=69 Runoff=18.08 cfs 73,032 cf

SubcatchmentDS2: Ditch Segment 2 Runoff Area=366,199 sf 54.34% Impervious Runoff Depth=2.46"
Flow Length=790' Tc=16.5 min CN=73 Runoff=17.45 cfs 75,137 cf

SubcatchmentDS3: Ditch Segment 3 Runoff Area=148,377 sf 4.46% Impervious Runoff Depth=1.23"
Flow Length=632' Tc=19.6 min UI Adjusted CN=57 Runoff=2.86 cfs 15,199 cf

SubcatchmentN10: DA-N10 Runoff Area=18,400 sf 27.62% Impervious Runoff Depth=1.73"
Flow Length=137' Tc=13.2 min UI Adjusted CN=64 Runoff=0.64 cfs 2,656 cf

SubcatchmentN12: DA-N12 Runoff Area=176,145 sf 14.99% Impervious Runoff Depth=2.73"
Flow Length=630' Tc=15.0 min UI Adjusted CN=76 Runoff=9.73 cfs 40,018 cf

SubcatchmentN13: DA-N13 Runoff Area=80,589 sf 15.59% Impervious Runoff Depth=0.47"
Flow Length=665' Tc=19.3 min UI Adjusted CN=44 Runoff=0.34 cfs 3,140 cf

SubcatchmentN14: DA-N14 Runoff Area=183,876 sf 23.85% Impervious Runoff Depth=1.81"
Flow Length=609' Tc=32.7 min UI Adjusted CN=65 Runoff=4.64 cfs 27,710 cf

Subcatchment N15: DA-N15 Runoff Area=95,454 sf 35.36% Impervious Runoff Depth=2.55"
Flow Length=438' Tc=14.7 min CN=74 Runoff=4.95 cfs 20,276 cf

Subcatchment N2: DA-N2 Runoff Area=159,295 sf 48.03% Impervious Runoff Depth=2.82"
Flow Length=644' Tc=11.0 min CN=77 Runoff=10.15 cfs 37,388 cf

Subcatchment N3: DA-N3 Runoff Area=145,656 sf 34.19% Impervious Runoff Depth=2.38"
Flow Length=440' Tc=20.1 min CN=72 Runoff=6.18 cfs 28,845 cf

Subcatchment N4: DA-N4 Runoff Area=140,632 sf 26.62% Impervious Runoff Depth=1.66"
Flow Length=358' Tc=11.1 min UI Adjusted CN=63 Runoff=4.93 cfs 19,413 cf

Subcatchment N6: DA-N6 Runoff Area=127,978 sf 26.51% Impervious Runoff Depth=1.66"
Flow Length=365' Tc=18.6 min UI Adjusted CN=63 Runoff=3.69 cfs 17,666 cf

Subcatchment N7: DA-N7 Runoff Area=336,200 sf 68.86% Impervious Runoff Depth=3.68"
Flow Length=1,058' Tc=86.5 min CN=86 Runoff=10.38 cfs 103,163 cf

Subcatchment N8: DA-N8 Runoff Area=110,829 sf 40.07% Impervious Runoff Depth=2.55"
Flow Length=241' Tc=11.9 min CN=74 Runoff=6.20 cfs 23,542 cf

Subcatchment N9: DA-N9 Runoff Area=123,350 sf 23.73% Impervious Runoff Depth=1.66"
Flow Length=368' Tc=34.5 min UI Adjusted CN=63 Runoff=2.74 cfs 17,027 cf

Reach 1R: WQS Segment 1 Avg. Flow Depth=1.53' Max Vel=1.51 fps Inflow=30.40 cfs 264,390 cf
n=0.022 L=1,255.0' S=0.0005 '/' Capacity=98.41 cfs Outflow=24.42 cfs 264,390 cf

Reach 2R: WQS Segment 2 Avg. Flow Depth=1.86' Max Vel=1.69 fps Inflow=38.74 cfs 339,527 cf
n=0.022 L=760.0' S=0.0005 '/' Capacity=99.31 cfs Outflow=36.40 cfs 339,527 cf

Reach 3R: WQS Segment 3 Avg. Flow Depth=2.11' Max Vel=1.79 fps Inflow=51.80 cfs 427,264 cf
n=0.022 L=610.0' S=0.0005 '/' Capacity=98.14 cfs Outflow=46.55 cfs 427,264 cf

Reach PT1: Overland Flow Avg. Flow Depth=0.07' Max Vel=0.14 fps Inflow=9.82 cfs 18,843 cf
n=0.240 L=25.0' S=0.0160 '/' Capacity=18.78 cfs Outflow=9.22 cfs 18,843 cf

Reach PT2: Overland Flow Avg. Flow Depth=0.08' Max Vel=0.15 fps Inflow=9.82 cfs 18,843 cf
n=0.240 L=25.0' S=0.0164 '/' Capacity=14.55 cfs Outflow=9.34 cfs 18,843 cf

Reach PT3: Overland Flow Avg. Flow Depth=0.05' Max Vel=0.12 fps Inflow=2.82 cfs 3,551 cf
n=0.240 L=25.0' S=0.0224 '/' Capacity=10.81 cfs Outflow=2.59 cfs 3,551 cf

Reach PT4: Overland Flow Avg. Flow Depth=0.04' Max Vel=0.12 fps Inflow=2.49 cfs 3,041 cf
n=0.240 L=25.0' S=0.0244 '/' Capacity=11.40 cfs Outflow=2.29 cfs 3,041 cf

Pond 11P: (5) Culvert 6X3 Peak Elev=4.85' Inflow=203.85 cfs 2,626,162 cf
Outflow=203.85 cfs 2,626,162 cf

Pond CB1: Exist CB Peak Elev=2.95' Inflow=2.14 cfs 17,256 cf
36.0" Round Culvert n=0.013 L=845.0' S=0.0009 '/' Outflow=2.14 cfs 17,256 cf

Pond CB10: Exist CB Peak Elev=3.94' Inflow=27.73 cfs 127,687 cf
24.0" Round Culvert n=0.012 L=152.0' S=0.0013 '/' Outflow=27.73 cfs 127,687 cf

Pond CB11: Exist CB Peak Elev=3.56' Inflow=12.58 cfs 52,926 cf
18.0" Round Culvert n=0.012 L=148.0' S=0.0014 '/' Outflow=12.58 cfs 52,926 cf

Pond CB2: Exist CB Peak Elev=15.12' Inflow=10.19 cfs 40,529 cf
15.0" Round Culvert n=0.011 L=658.0' S=0.0014 '/' Outflow=10.19 cfs 40,529 cf

Pond CB3: Exist CB Peak Elev=266.73' Inflow=12.68 cfs 44,493 cf
10.0" Round Culvert n=0.025 L=200.0' S=0.0110 '/' Outflow=12.68 cfs 44,493 cf

Pond CB4: Exist CB Peak Elev=40.74' Inflow=41.37 cfs 131,142 cf
18.0" Round Culvert n=0.012 L=200.0' S=0.0244 '/' Outflow=41.37 cfs 131,142 cf

Pond CB5: New CB Peak Elev=28.83' Inflow=18.64 cfs 59,776 cf
17.0" x 13.0", R=9.0"/25.6" Pipe Arch Culvert n=0.011 L=360.0' S=0.0029 '/' Outflow=18.64 cfs 59,776 cf

Pond CB6: New CB Peak Elev=0.76' Inflow=2.69 cfs 35,247 cf
18.0" Round Culvert n=0.013 L=291.0' S=0.0019 '/' Outflow=2.69 cfs 35,247 cf

Pond CB7: Exist CB Peak Elev=34.96' Inflow=9.82 cfs 33,639 cf
15.0" Round Culvert n=0.025 L=380.0' S=0.0016 '/' Outflow=9.82 cfs 33,639 cf

Pond CB8: CB Peak Elev=0.64' Inflow=4.80 cfs 41,654 cf
24.0" Round Culvert n=0.013 L=813.0' S=0.0007 '/' Outflow=4.80 cfs 41,654 cf

Pond CC1: CC1 Peak Elev=3.22' Inflow=46.55 cfs 427,264 cf
35.0" x 24.0", R=17.9"/55.1" Pipe Arch Culvert x 3.00 n=0.011 L=1,272.0' S=0.0013 '/' Outflow=46.55 cfs 427,264 cf

Pond Cr-B: Robinson Driveway Peak Elev=3.40' Inflow=24.42 cfs 264,390 cf
Outflow=24.42 cfs 264,390 cf

Pond Cr-CD: Utility Crossing Peak Elev=3.30' Inflow=36.40 cfs 339,527 cf
Outflow=36.40 cfs 339,527 cf

Pond MH1: MH Peak Elev=18.12' Inflow=16.67 cfs 90,742 cf
18.0" Round Culvert n=0.012 L=787.0' S=0.0021 '/' Outflow=16.67 cfs 90,742 cf

Pond P1: Pond 1 Peak Elev=3.55' Storage=12,176 cf Inflow=13.56 cfs 170,894 cf
Discarded=1.18 cfs 19,554 cf Primary=11.66 cfs 151,340 cf Outflow=12.84 cfs 170,894 cf

Pond P10: Wetland Ditch Peak Elev=3.60' Storage=3,370 cf Inflow=14.17 cfs 191,357 cf
Outflow=13.75 cfs 191,357 cf

Pond P2: Pond 2 Peak Elev=4.61' Storage=4,662 cf Inflow=6.18 cfs 28,845 cf
Discarded=0.44 cfs 2,112 cf Primary=2.87 cfs 26,734 cf Outflow=3.31 cfs 28,845 cf

Pond P3: Pond 3 Peak Elev=4.04' Storage=12,292 cf Inflow=12.54 cfs 139,269 cf
Discarded=1.03 cfs 12,136 cf Primary=9.79 cfs 127,133 cf Outflow=10.83 cfs 139,269 cf

Pond P4: Pond 4 Peak Elev=4.33' Storage=2,012 cf Inflow=4.93 cfs 19,413 cf
Discarded=0.21 cfs 673 cf Primary=2.78 cfs 18,740 cf Outflow=2.99 cfs 19,413 cf

Pond P5: Pond 5 Peak Elev=4.05' Storage=981 cf Inflow=3.69 cfs 17,666 cf
Discarded=0.10 cfs 300 cf Primary=2.78 cfs 17,366 cf Outflow=2.88 cfs 17,666 cf

Pond P6: Pond 6 Peak Elev=3.33' Storage=2,306 cf Inflow=7.79 cfs 50,464 cf
Discarded=0.29 cfs 656 cf Primary=5.96 cfs 49,993 cf Outflow=6.25 cfs 50,649 cf

Pond P7: Pond 7 Peak Elev=4.22' Storage=2,965 cf Inflow=6.20 cfs 23,542 cf
Discarded=0.27 cfs 789 cf Primary=3.17 cfs 22,754 cf Outflow=3.44 cfs 23,542 cf

Pond P8: Pond 8 Peak Elev=14.74' Storage=4,397 cf Inflow=10.90 cfs 72,517 cf
12.0" Round Culvert n=0.011 L=20.0' S=0.0000 '/' Outflow=12.96 cfs 72,537 cf

Pond P9: Pond 9 Peak Elev=5.08' Storage=532 cf Inflow=0.64 cfs 2,656 cf
Outflow=0.91 cfs 2,247 cf

Pond SF2: Sand Filter Area 2 Peak Elev=-3.50' Storage=0.145 af Inflow=19.81 cfs 68,503 cf
Outflow=16.82 cfs 68,503 cf

Pond SF3: Sand Filter Area 3 Peak Elev=-3.52' Storage=0.200 af Inflow=20.99 cfs 70,517 cf
Outflow=16.36 cfs 70,517 cf

Pond SF5: SAND FILTER AREA 5 Peak Elev=-3.75' Storage=0.101 af Inflow=12.60 cfs 42,344 cf
Outflow=10.28 cfs 42,344 cf

Pond SF6: SAND FILTER AREA 6 Peak Elev=-3.54' Storage=0.187 af Inflow=19.94 cfs 67,923 cf
Outflow=15.63 cfs 67,923 cf

Pond SF7: SAND FILTER AREA 7 Peak Elev=-3.91' Storage=0.052 af Inflow=7.92 cfs 26,962 cf
Outflow=6.81 cfs 26,962 cf

Pond SF8: SAND FILTER AREA 8 Peak Elev=-4.00' Storage=0.043 af Inflow=6.18 cfs 20,750 cf
Outflow=5.10 cfs 20,750 cf

Pond SFA1: SAND FILTER AREA A1 Peak Elev=-3.43' Storage=0.176 af Inflow=22.79 cfs 74,834 cf
Outflow=18.82 cfs 74,834 cf

Pond SFA2: SAND FILTER AREA A2 Peak Elev=-3.51' Storage=0.253 af Inflow=22.52 cfs 79,202 cf
Outflow=16.52 cfs 79,202 cf

Pond T1: Sand Filter 1 Peak Elev=3.33' Storage=5,079 cf Inflow=9.22 cfs 18,843 cf
Primary=5.81 cfs 18,590 cf Secondary=0.00 cfs 0 cf Outflow=5.81 cfs 18,590 cf

Pond T2: Sand Filter 2 Peak Elev=1.53' Storage=4,248 cf Inflow=9.34 cfs 18,843 cf
Primary=5.96 cfs 18,616 cf Secondary=0.00 cfs 0 cf Outflow=5.96 cfs 18,616 cf

Pond T3: Sand Filter 3 Peak Elev=-0.11' Storage=468 cf Inflow=2.59 cfs 3,551 cf
Primary=2.42 cfs 3,459 cf Secondary=0.00 cfs 0 cf Outflow=2.42 cfs 3,459 cf

Pond T4: Sand Filter 4 Peak Elev=0.18' Storage=524 cf Inflow=2.29 cfs 3,041 cf
Primary=2.11 cfs 2,948 cf Secondary=0.00 cfs 0 cf Outflow=2.11 cfs 2,948 cf

Link 1L: WEST WETL Inflow=111.42 cfs 528,974 cf
Primary=111.42 cfs 528,974 cf

Link 2L: TUTTLE BROOK Inflow=265.06 cfs 1,193,126 cf
Primary=265.06 cfs 1,193,126 cf

Link 3L: EAST WETL Inflow=203.85 cfs 2,626,162 cf
Primary=203.85 cfs 2,626,162 cf

Link 4L: MORRIS CREEK Inflow=450.97 cfs 4,579,010 cf
Primary=450.97 cfs 4,579,010 cf

Link AP1: TIDE GATE Inflow=793.57 cfs 6,164,664 cf
Primary=793.57 cfs 6,164,664 cf

Link PS1: Pump Station 1 below 75.00 cfs Inflow=75.02 cfs 312,080 cf
Primary=75.02 cfs 312,080 cf Secondary=0.00 cfs 0 cf

Link PS2: Pump Station 2 below 120.00 cfs Inflow=64.63 cfs 280,790 cf
Primary=64.63 cfs 280,790 cf Secondary=0.00 cfs 0 cf

Link SS1: SITESAVER1 - STSS-7 below 7.56 cfs Inflow=5.36 cfs 17,779 cf
Primary=5.36 cfs 17,779 cf Secondary=0.00 cfs 0 cf

Link SS2: SITESAVER2 - STSS-7 below 7.56 cfs Inflow=5.37 cfs 18,051 cf
Primary=5.37 cfs 18,051 cf Secondary=0.00 cfs 0 cf

Link SS3: SITESAVER3 - STSS-12 below 12.96 cfs Inflow=8.55 cfs 29,561 cf
Primary=8.55 cfs 29,561 cf Secondary=0.00 cfs 0 cf

Link SS4: SITESAVER4 - STSS-4 below 4.32 cfs Inflow=1.83 cfs 6,222 cf
Primary=1.83 cfs 6,222 cf Secondary=0.00 cfs 0 cf

Link SS5: SITESAVER5 - STSS-4 below 4.32 cfs Inflow=2.74 cfs 9,333 cf
Primary=2.74 cfs 9,333 cf Secondary=0.00 cfs 0 cf

Link SS6: SITESAVER6 - STSS-4 below 4.32 cfs Inflow=2.74 cfs 9,333 cf
Primary=2.74 cfs 9,333 cf Secondary=0.00 cfs 0 cf

Link SS7: SITESAVER7 - STSS-4 below 4.32 cfs Inflow=3.25 cfs 11,061 cf
Primary=3.25 cfs 11,061 cf Secondary=0.00 cfs 0 cf

Link SS8: SITESAVER8 - STSS-7 below 7.56 cfs Inflow=13.19 cfs 42,909 cf
Primary=7.56 cfs 40,494 cf Secondary=5.63 cfs 2,415 cf

Link W1: EAST WETL Inflow=75.02 cfs 312,080 cf
Primary=75.02 cfs 312,080 cf

Total Runoff Area = 24,288,724 sf Runoff Volume = 6,242,210 cf Average Runoff Depth = 3.08"
63.05% Pervious = 15,313,137 sf 36.95% Impervious = 8,975,587 sf

Summary for Subcatchment 1: Area 1

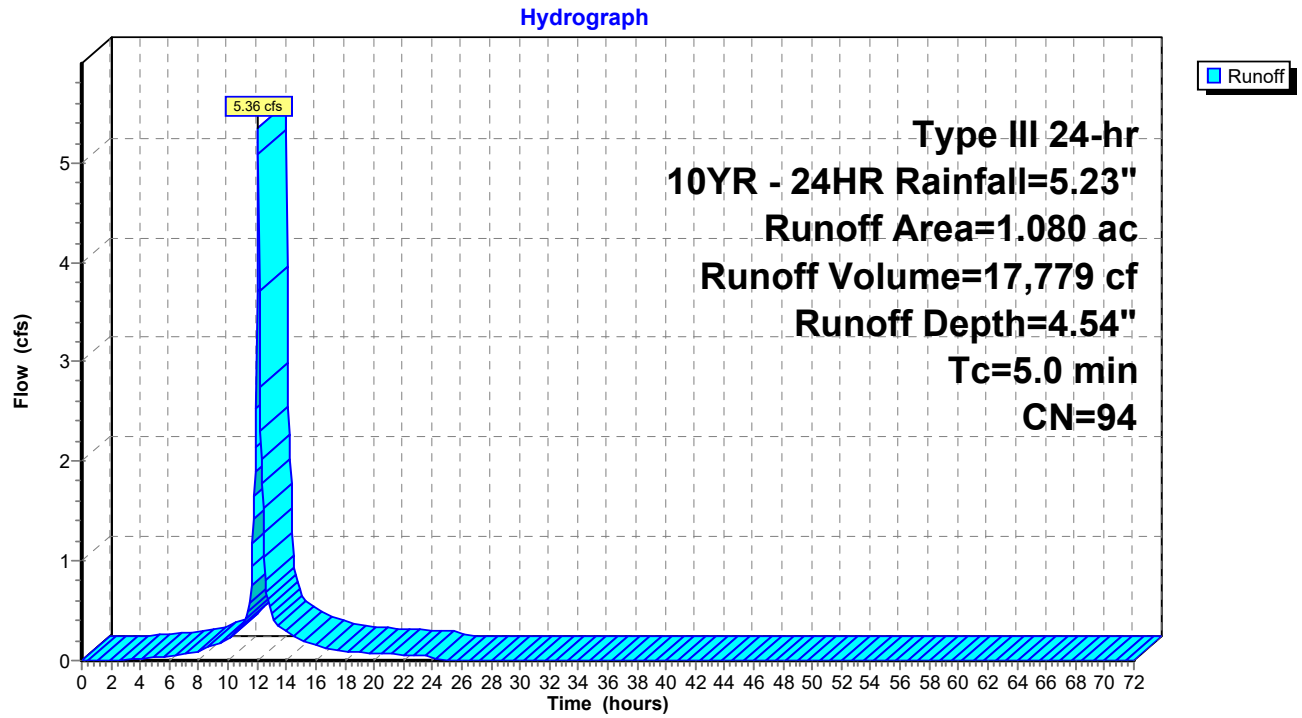
Runoff = 5.36 cfs @ 12.07 hrs, Volume= 17,779 cf, Depth= 4.54"
Routed to Link SS1 : SITESAVER 1 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
0.940	98	Paved parking, HSG A
0.140	68	<50% Grass cover, Poor, HSG A
1.080	94	Weighted Average
0.140		12.96% Pervious Area
0.940		87.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1: Area 1



Summary for Subcatchment 1S: SC 1

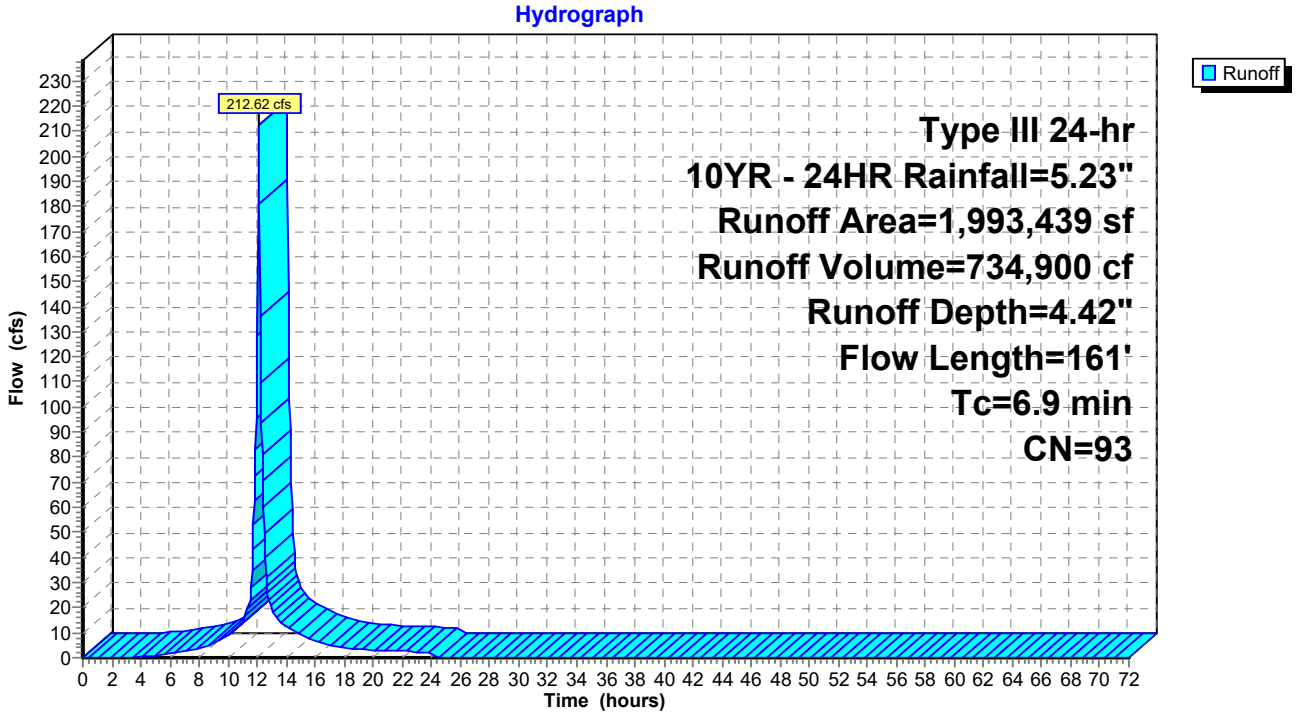
Runoff = 212.62 cfs @ 12.10 hrs, Volume= 734,900 cf, Depth= 4.42"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	210,509	80	>75% Grass cover, Good, HSG D
	40,323	96	Gravel surface, HSG D
	176,389	98	Water Surface, 0% imp, HSG D
	10,474	98	Unconnected pavement, HSG A
	32,944	98	Unconnected pavement, HSG D
	248,525	77	Woods, Good, HSG D
*	1,274,275	98	Wetland/Water Surface, 0% imp, HSG D
	1,993,439	93	Weighted Average
	1,950,021		97.82% Pervious Area
	43,418		2.18% Impervious Area
	43,418		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	23	0.1335	2.22		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
6.7	138	0.0024	0.34		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.9	161	Total			

Subcatchment 1S: SC 1



Summary for Subcatchment 2: Area 2

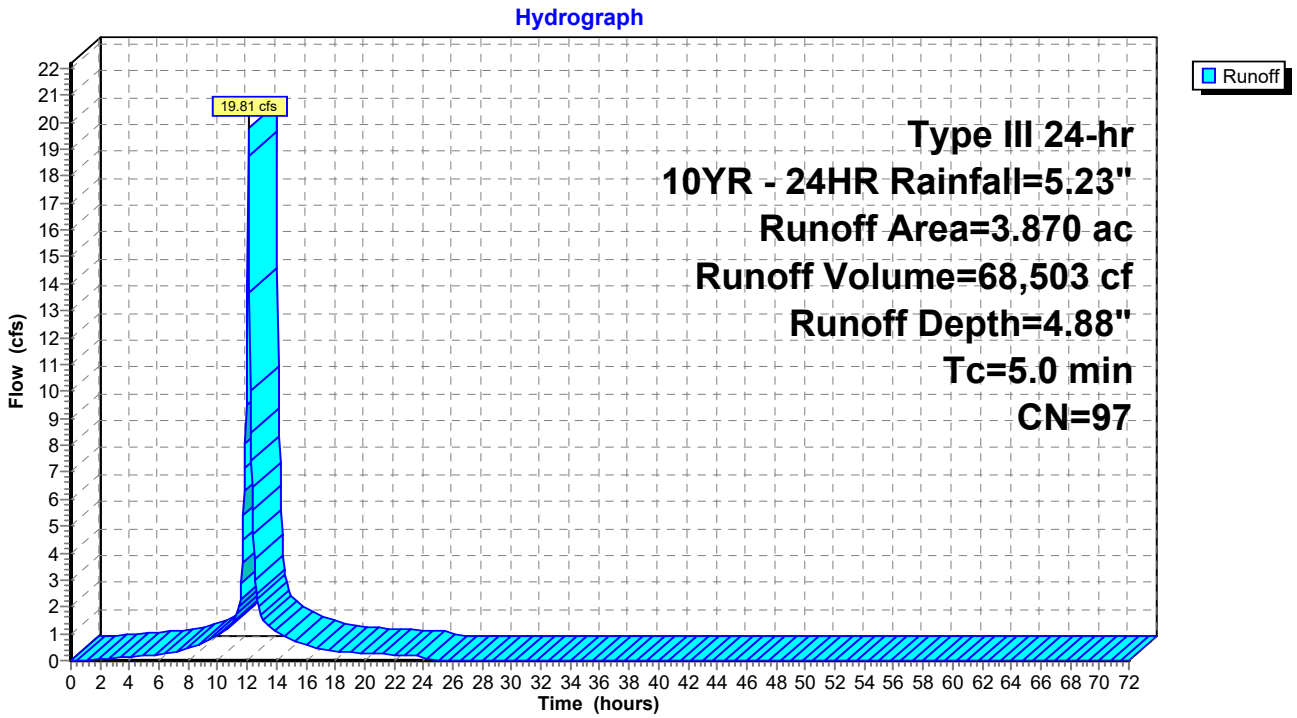
Runoff = 19.81 cfs @ 12.07 hrs, Volume= 68,503 cf, Depth= 4.88"
Routed to Pond SF2 : Sand Filter Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
3.760	98	Paved parking, HSG A
0.110	68	<50% Grass cover, Poor, HSG A
3.870	97	Weighted Average
0.110		2.84% Pervious Area
3.760		97.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Area 2



Summary for Subcatchment 2S: SC 2

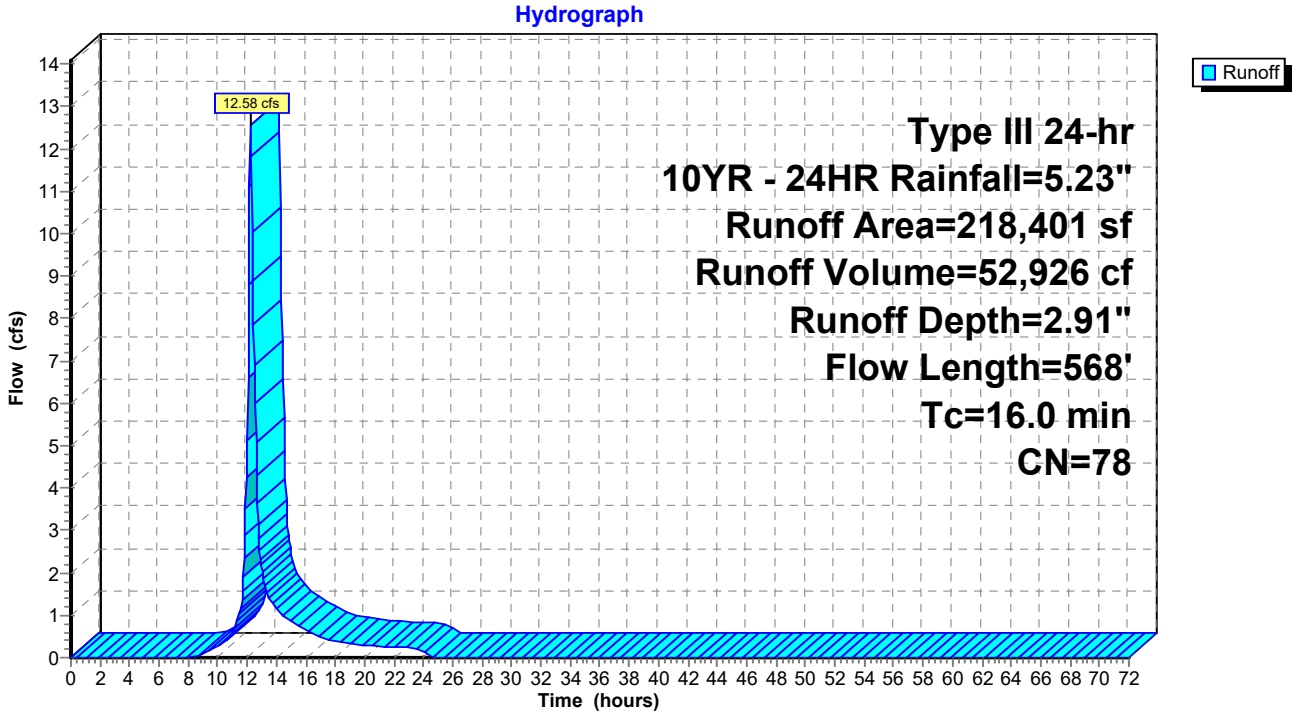
Runoff = 12.58 cfs @ 12.22 hrs, Volume= 52,926 cf, Depth= 2.91"
Routed to Pond CB11 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
119,910	61	>75% Grass cover, Good, HSG B
84,094	98	Unconnected pavement, HSG A
14,397	98	Unconnected pavement, HSG D
218,401	78	Weighted Average
119,910		54.90% Pervious Area
98,491		45.10% Impervious Area
98,491		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	81	0.0114	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
14.7	487	0.0062	0.55		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
16.0	568	Total			

Subcatchment 2S: SC 2



Summary for Subcatchment 3: Area 3

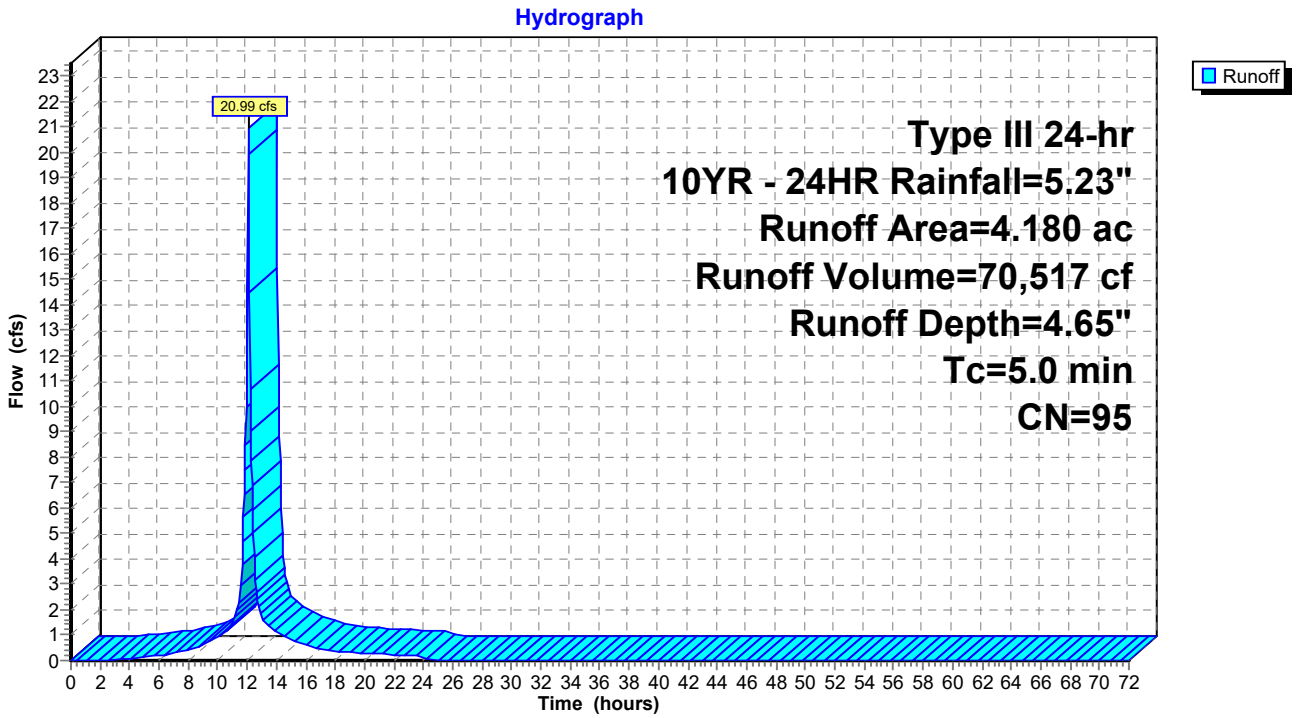
Runoff = 20.99 cfs @ 12.07 hrs, Volume= 70,517 cf, Depth= 4.65"
Routed to Pond SF3 : Sand Filter Area 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
3.830	98	Paved parking, HSG A
0.350	68	<50% Grass cover, Poor, HSG A
4.180	95	Weighted Average
0.350		8.37% Pervious Area
3.830		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Area 3



Summary for Subcatchment 3A: SC 3A

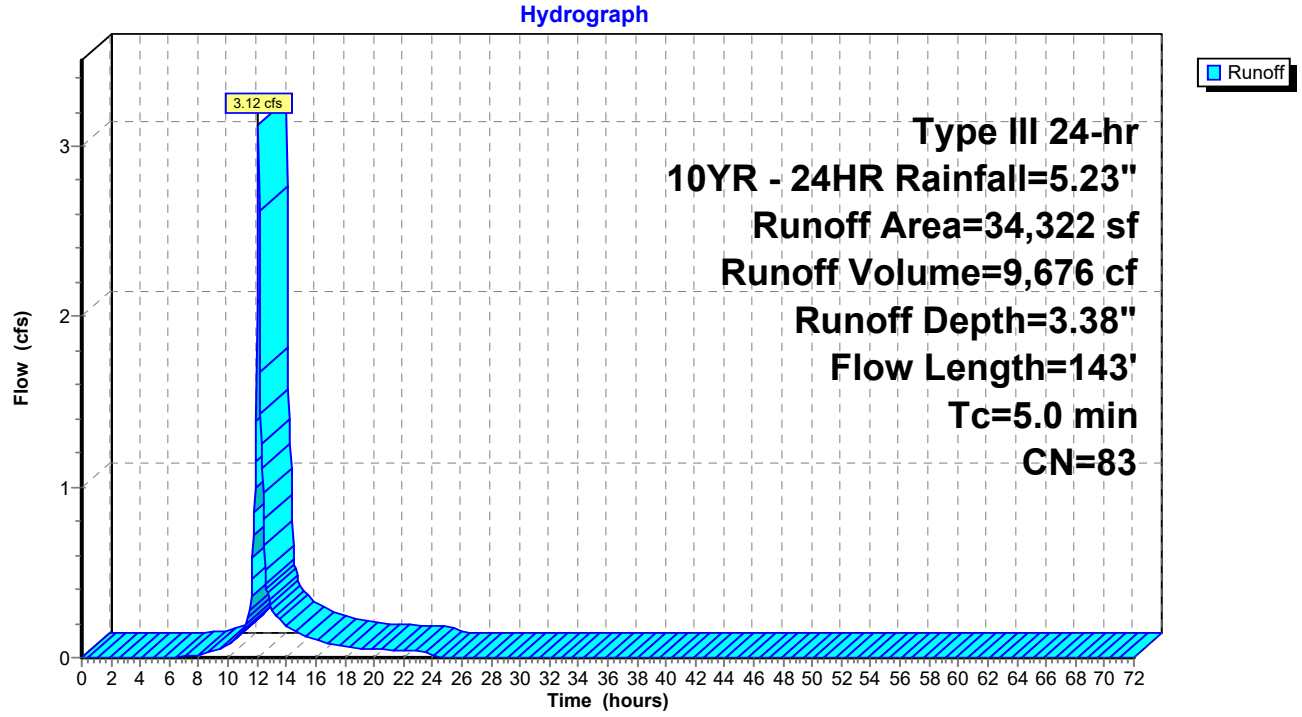
Runoff = 3.12 cfs @ 12.07 hrs, Volume= 9,676 cf, Depth= 3.38"
Routed to Reach PT3 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
13,969	61	>75% Grass cover, Good, HSG B
20,353	98	Unconnected pavement, HSG A
34,322	83	Weighted Average
13,969		40.70% Pervious Area
20,353		59.30% Impervious Area
20,353		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	84	0.0055	0.80		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.2	59	0.0145	0.84		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.1					**Direct Entry, minimum 5 min**
5.0	143	Total			

Subcatchment 3A: SC 3A



Summary for Subcatchment 3B: SC 3B

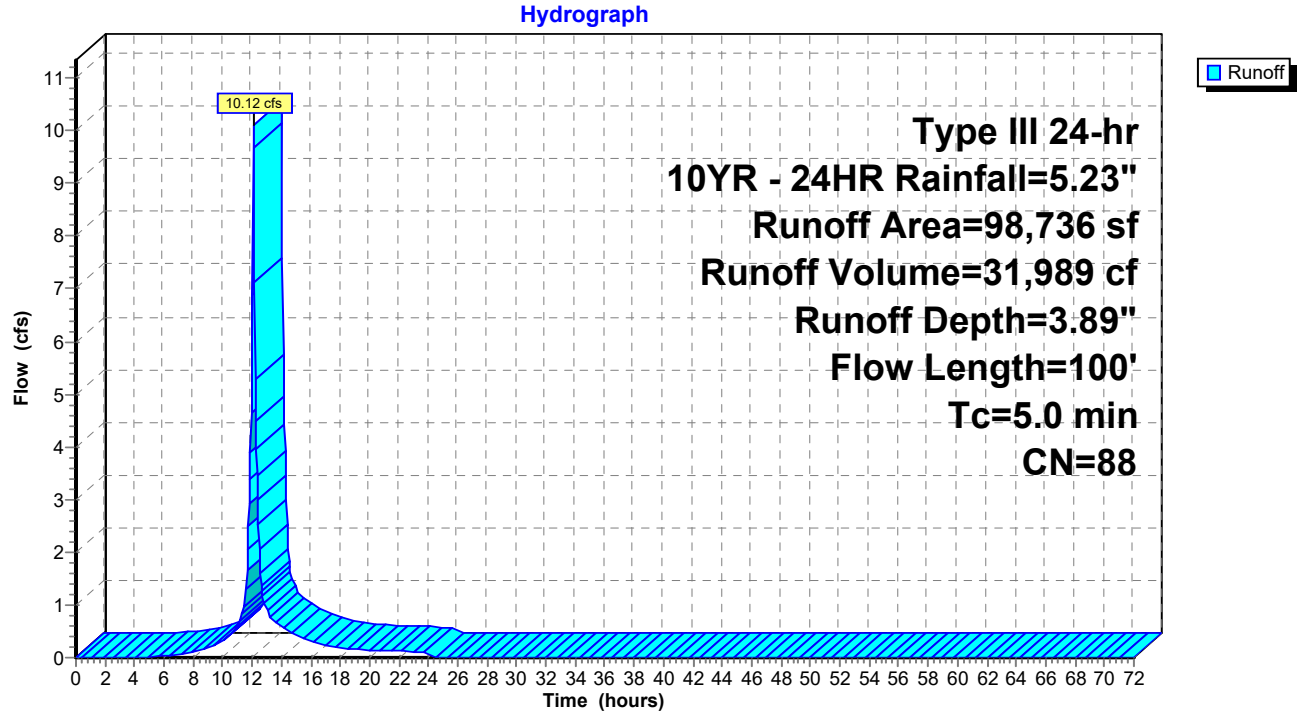
Runoff = 10.12 cfs @ 12.07 hrs, Volume= 31,989 cf, Depth= 3.89"
Routed to Reach PT2 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
27,532	61	>75% Grass cover, Good, HSG B
71,204	98	Unconnected pavement, HSG A
98,736	88	Weighted Average
27,532		27.88% Pervious Area
71,204		72.12% Impervious Area
71,204		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	71	0.0100	0.99		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	29	0.0169	0.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.3					**Direct Entry, minimum 5 min**
5.0	100	Total			

Subcatchment 3B: SC 3B



Summary for Subcatchment 3S: SC 3

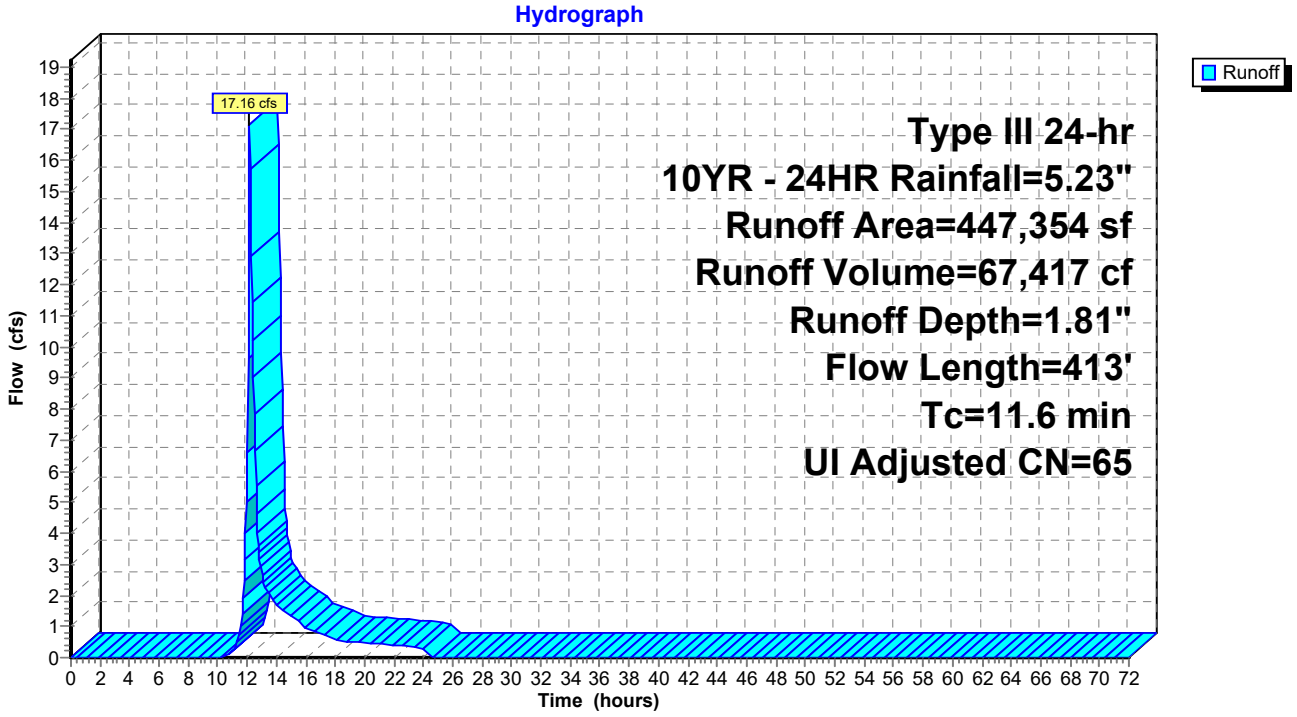
Runoff = 17.16 cfs @ 12.17 hrs, Volume= 67,417 cf, Depth= 1.81"
Routed to Pond CB10 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
356,645	61		>75% Grass cover, Good, HSG B
62,664	98		Unconnected pavement, HSG A
28,045	98		Unconnected pavement, HSG D
447,354	69	65	Weighted Average, UI Adjusted
356,645			79.72% Pervious Area
90,709			20.28% Impervious Area
90,709			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	88	0.0117	1.10		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
10.3	325	0.0056	0.52		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
11.6	413	Total			

Subcatchment 3S: SC 3



Summary for Subcatchment 4: Area 4

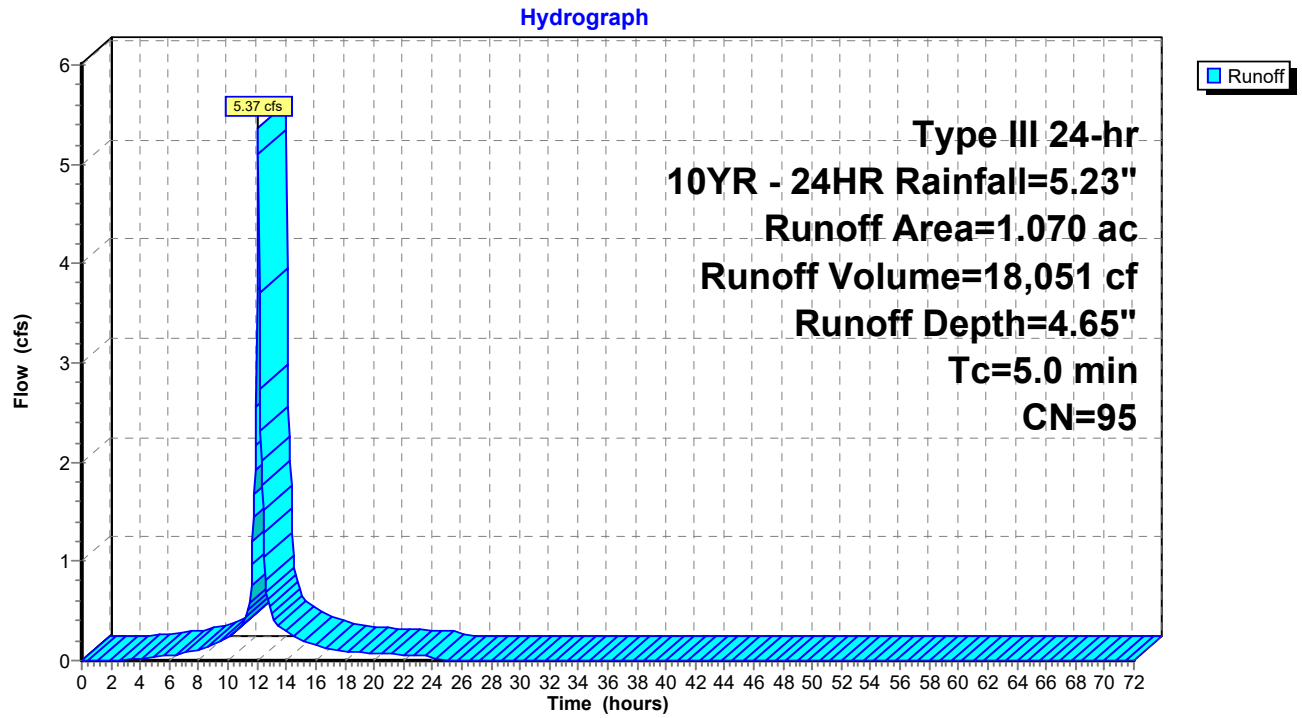
Runoff = 5.37 cfs @ 12.07 hrs, Volume= 18,051 cf, Depth= 4.65"
Routed to Link SS2 : SITESAVER 2 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
0.980	98	Paved parking, HSG A
0.090	68	<50% Grass cover, Poor, HSG A
1.070	95	Weighted Average
0.090		8.41% Pervious Area
0.980		91.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Area 4



Summary for Subcatchment 4S: SC 4 (Reduced)

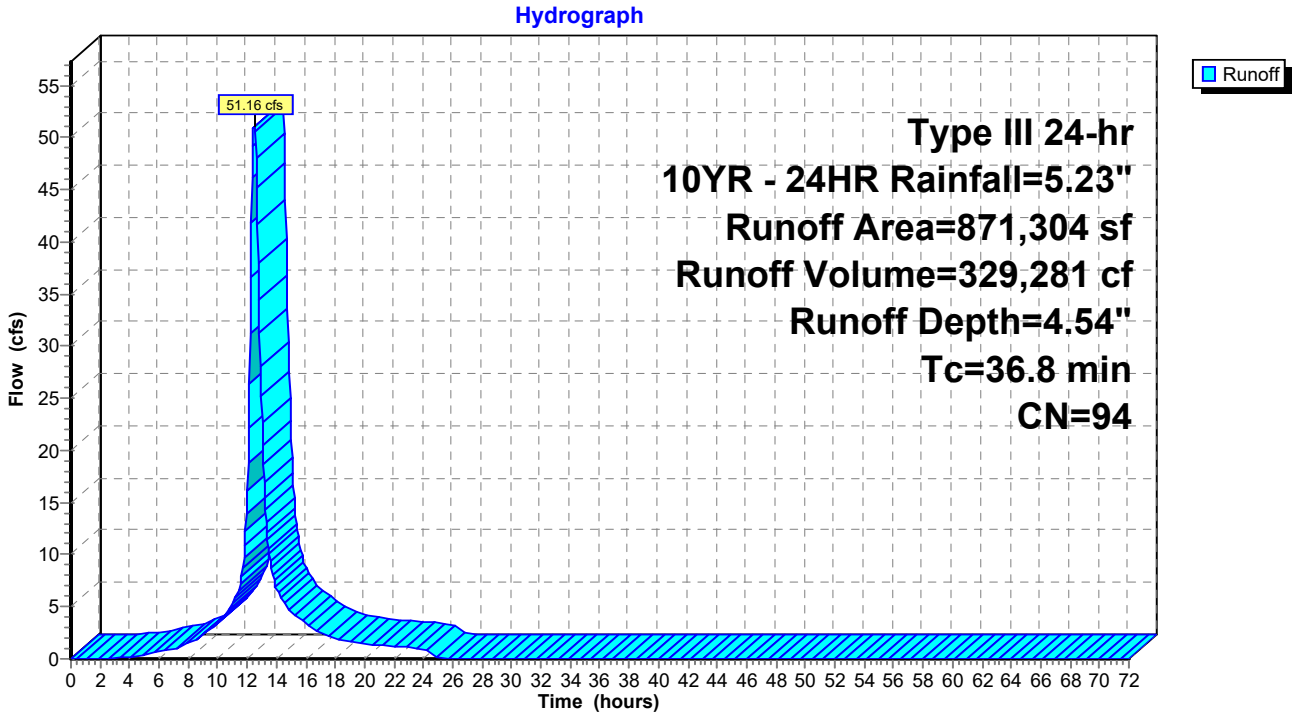
Runoff = 51.16 cfs @ 12.48 hrs, Volume= 329,281 cf, Depth= 4.54"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	98,881	61	>75% Grass cover, Good, HSG B
	18,295	98	Unconnected pavement, HSG B
*	273,992	98	Wetland/Water Surface, HSG B
*	480,136	98	Wetland/Water Surface. HSG D
	871,304	94	Weighted Average
	98,881		11.35% Pervious Area
	772,423		88.65% Impervious Area
	18,295		2.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8					**Direct Entry, See Calculation Sheet**

Subcatchment 4S: SC 4 (Reduced)



Summary for Subcatchment 5: Area 5

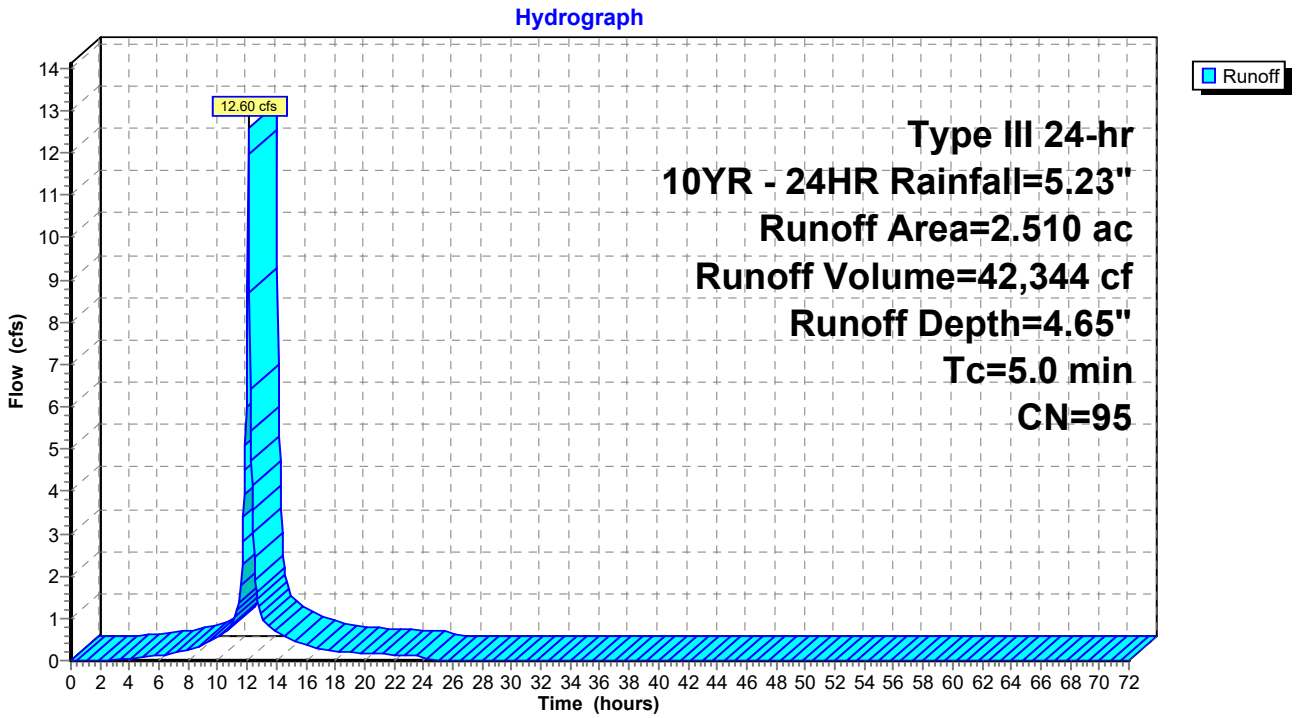
Runoff = 12.60 cfs @ 12.07 hrs, Volume= 42,344 cf, Depth= 4.65"
Routed to Pond SF5 : SAND FILTER AREA 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
2.300	98	Paved parking, HSG A
0.210	68	<50% Grass cover, Poor, HSG A
2.510	95	Weighted Average
0.210		8.37% Pervious Area
2.300		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Area 5



Summary for Subcatchment 6: Area 6

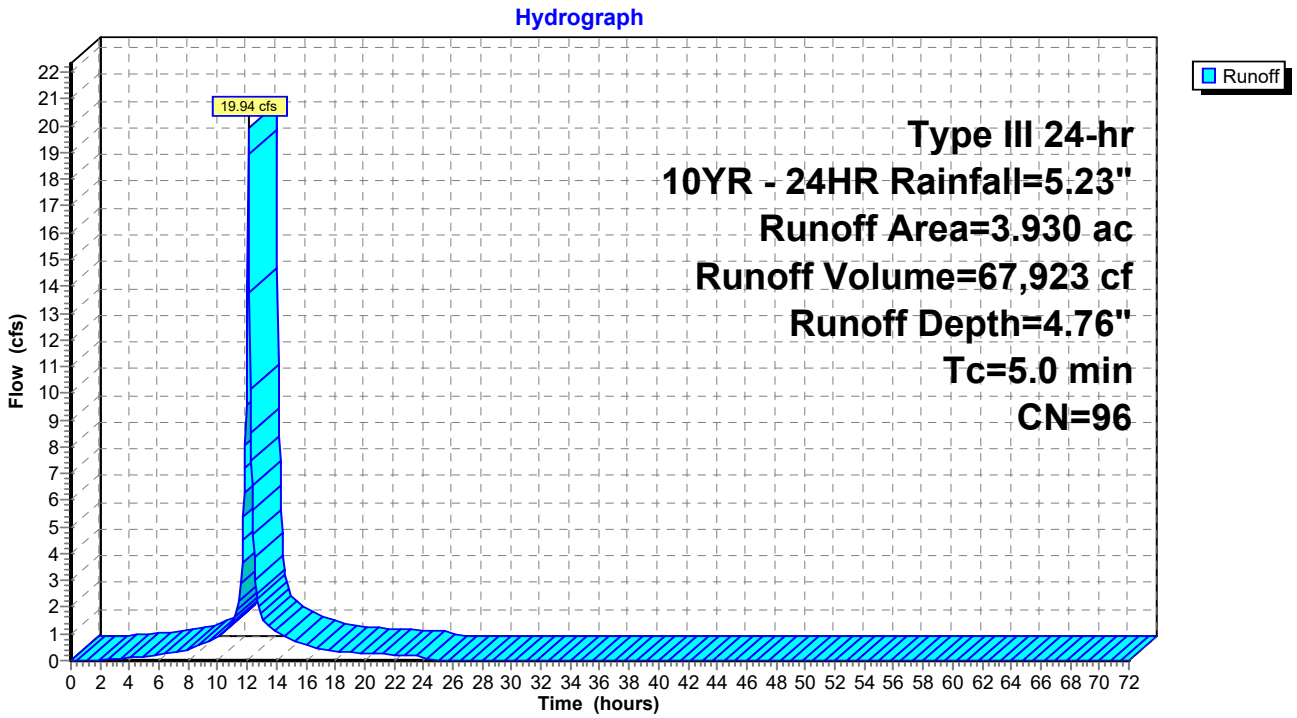
Runoff = 19.94 cfs @ 12.07 hrs, Volume= 67,923 cf, Depth= 4.76"
Routed to Pond SF6 : SAND FILTER AREA 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
3.620	98	Paved parking, HSG A
0.310	68	<50% Grass cover, Poor, HSG A
3.930	96	Weighted Average
0.310		7.89% Pervious Area
3.620		92.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Area 6



Summary for Subcatchment 7: Area 7

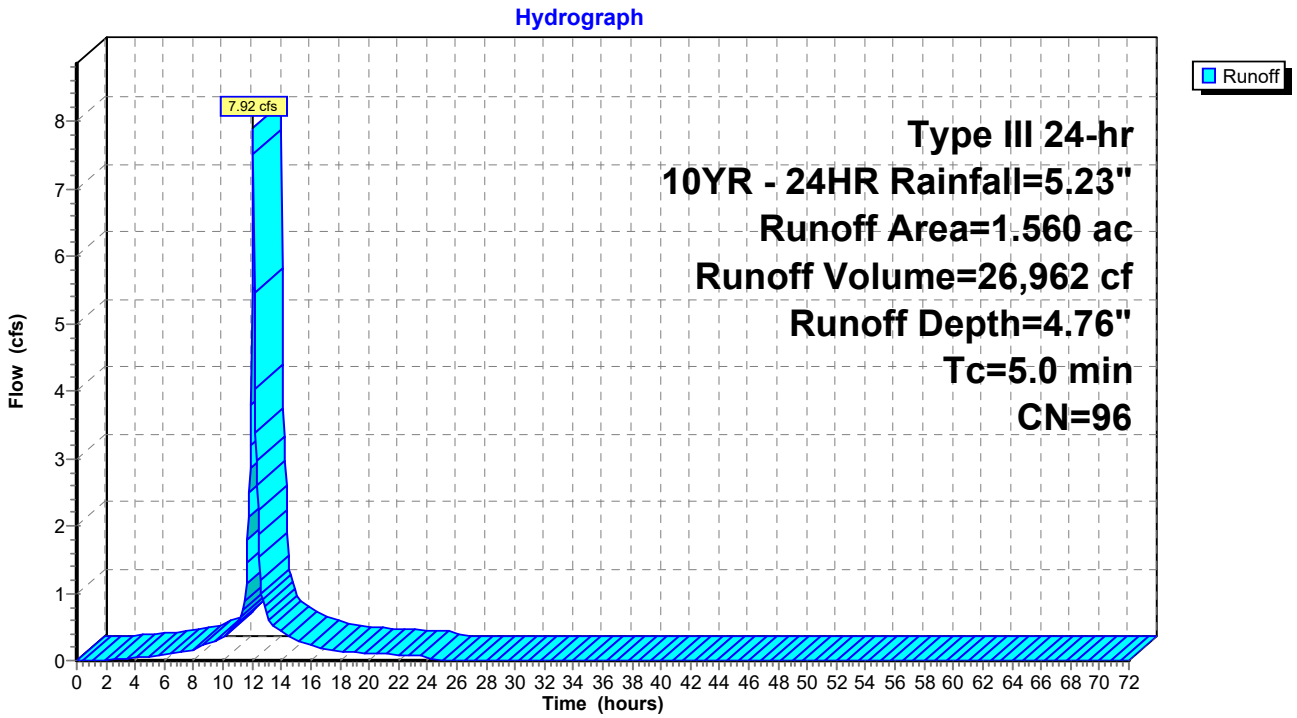
Runoff = 7.92 cfs @ 12.07 hrs, Volume= 26,962 cf, Depth= 4.76"
Routed to Pond SF7 : SAND FILTER AREA 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
1.440	98	Paved parking, HSG A
0.120	68	<50% Grass cover, Poor, HSG A
1.560	96	Weighted Average
0.120		7.69% Pervious Area
1.440		92.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Area 7



Summary for Subcatchment 7A: SC 7A

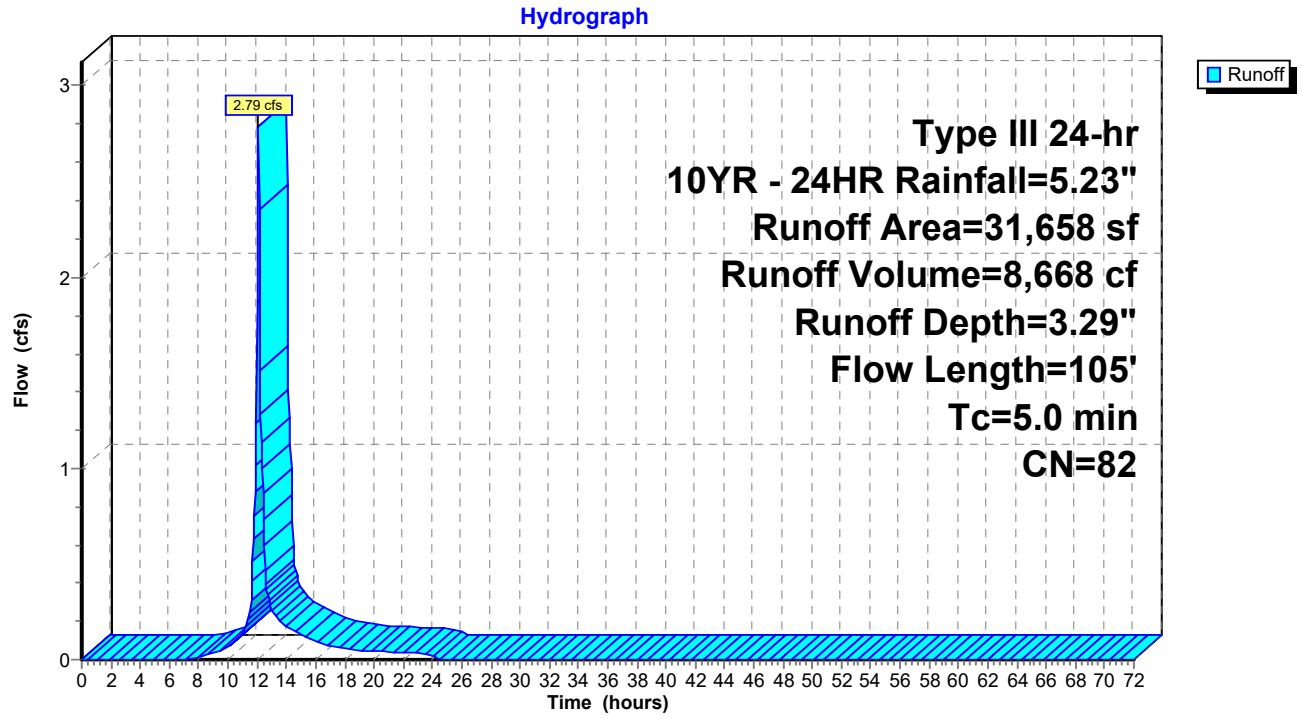
Runoff = 2.79 cfs @ 12.08 hrs, Volume= 8,668 cf, Depth= 3.29"
Routed to Reach PT4 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
13,875	61	>75% Grass cover, Good, HSG B
17,783	98	Unconnected pavement, HSG A
31,658	82	Weighted Average
13,875		43.83% Pervious Area
17,783		56.17% Impervious Area
17,783		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0123	1.08		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	33	0.0254	1.12		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.4					**Direct Entry, minimum 5 min**
5.0	105	Total			

Subcatchment 7A: SC 7A



Summary for Subcatchment 7B: SC 7

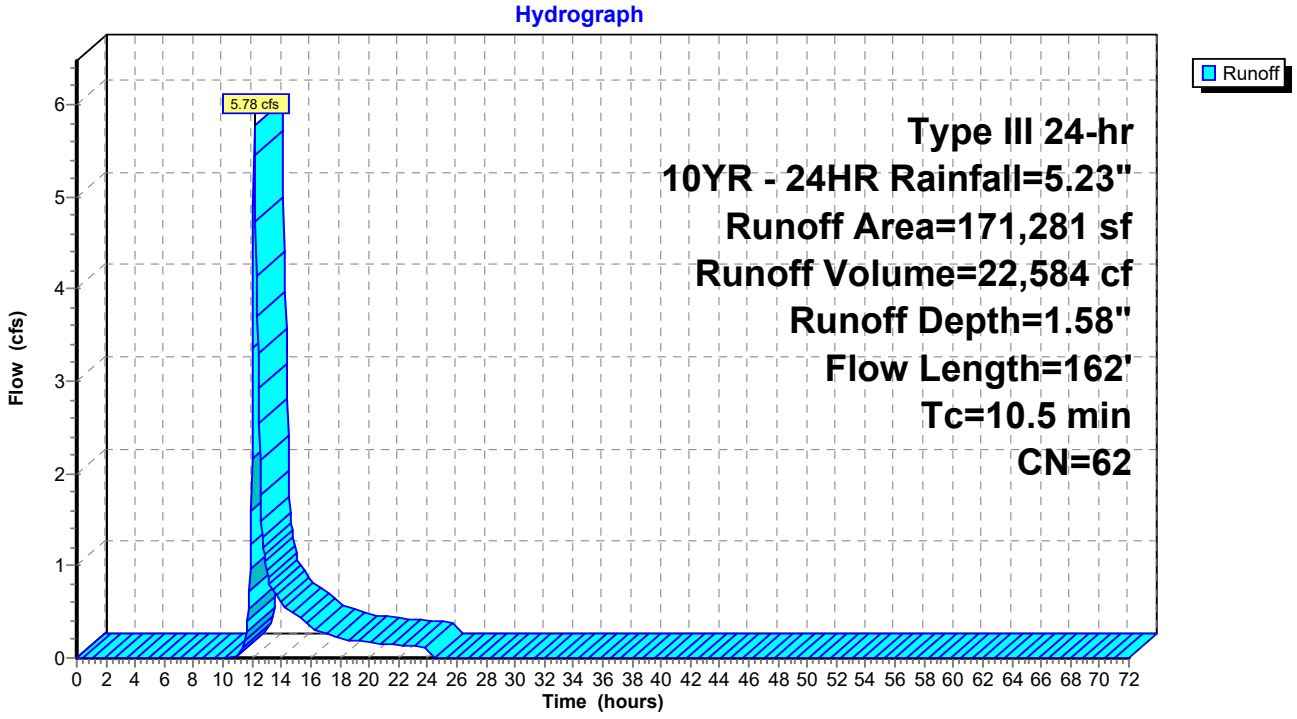
Runoff = 5.78 cfs @ 12.16 hrs, Volume= 22,584 cf, Depth= 1.58"
Routed to Pond MH1 : MH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
165,238	61	>75% Grass cover, Good, HSG B
6,043	98	Unconnected pavement, HSG D
171,281	62	Weighted Average
165,238		96.47% Pervious Area
6,043		3.53% Impervious Area
6,043		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0097	0.86		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.8	124	0.0009	0.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
10.5	162	Total			

Subcatchment 7B: SC 7



Summary for Subcatchment 7S: SC 7

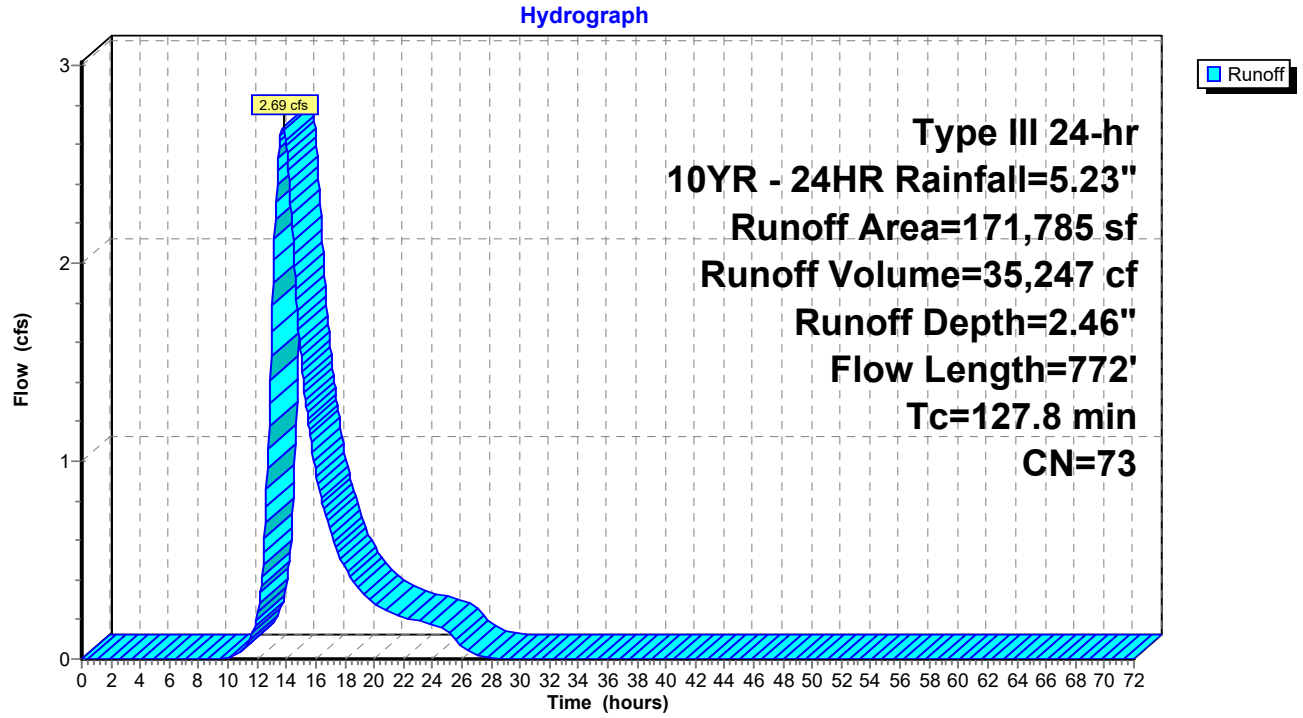
Runoff = 2.69 cfs @ 13.76 hrs, Volume= 35,247 cf, Depth= 2.46"
Routed to Pond CB6 : New CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
118,215	61	>75% Grass cover, Good, HSG B
53,570	98	Unconnected pavement, HSG A
171,785	73	Weighted Average
118,215		68.82% Pervious Area
53,570		31.18% Impervious Area
53,570		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	76	0.0118	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.5	179	0.0152	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
123.1	517	0.0001	0.07		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
127.8	772	Total			

Subcatchment 7S: SC 7



Summary for Subcatchment 8: Area 8

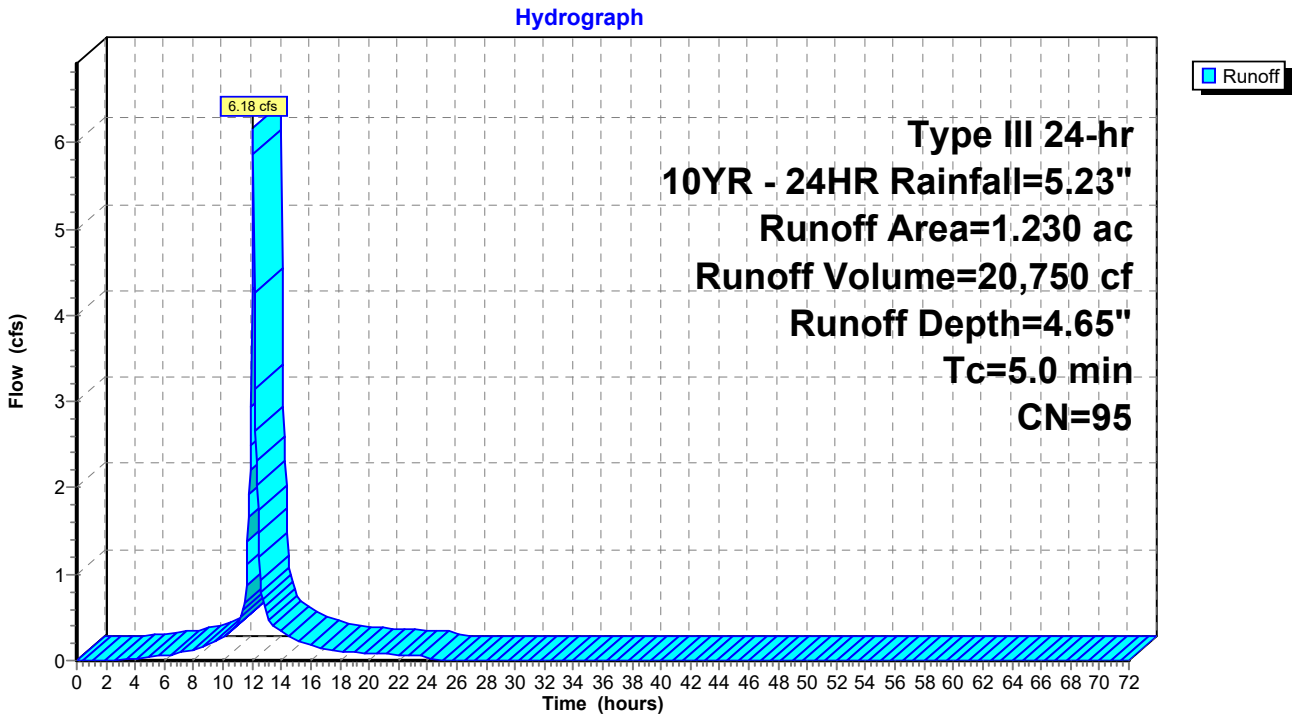
Runoff = 6.18 cfs @ 12.07 hrs, Volume= 20,750 cf, Depth= 4.65"
Routed to Pond SF8 : SAND FILTER AREA 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG A
0.120	68	<50% Grass cover, Poor, HSG A
1.230	95	Weighted Average
0.120		9.76% Pervious Area
1.110		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8: Area 8



Summary for Subcatchment 8A: SC 8A

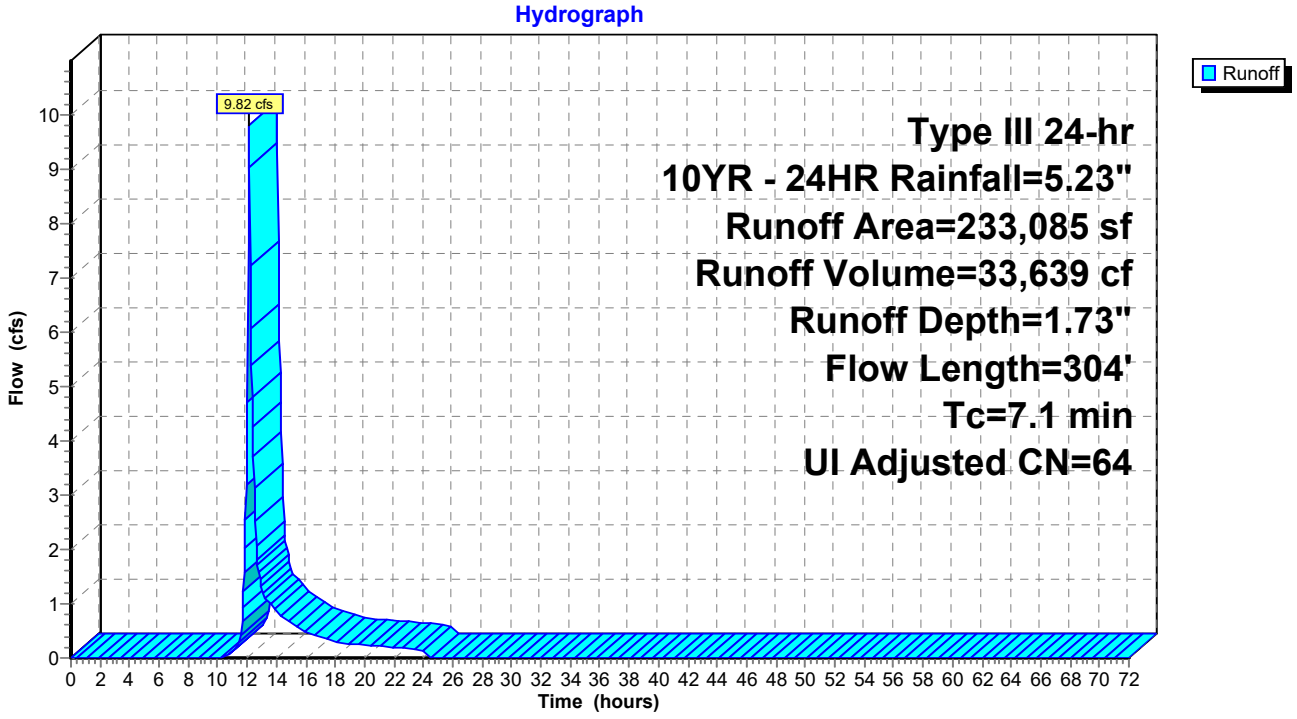
Runoff = 9.82 cfs @ 12.11 hrs, Volume= 33,639 cf, Depth= 1.73"
Routed to Pond CB7 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
201,343	61		>75% Grass cover, Good, HSG B
31,742	98		Unconnected pavement, HSG A
233,085	66	64	Weighted Average, UI Adjusted
201,343			86.38% Pervious Area
31,742			13.62% Impervious Area
31,742			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	115	0.0010	0.43		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
2.7	189	0.0274	1.16		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.1	304	Total			

Subcatchment 8A: SC 8A



Summary for Subcatchment 8S: SC 8

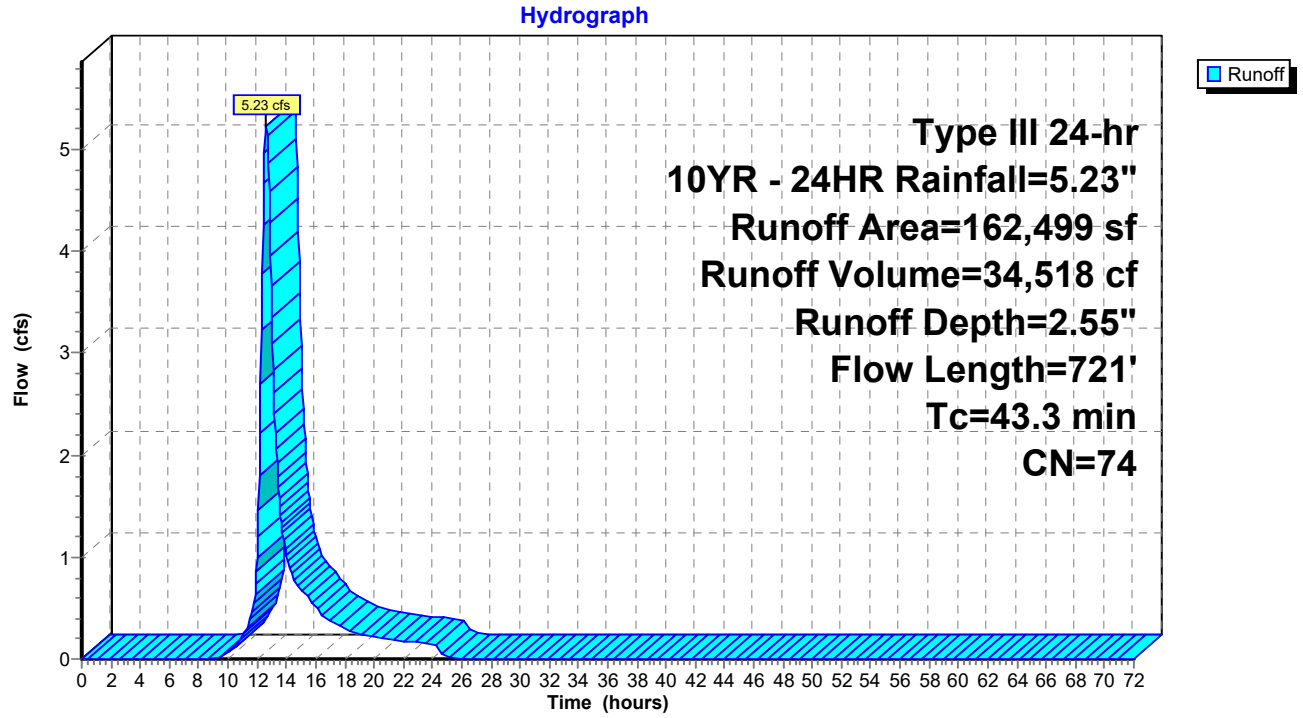
Runoff = 5.23 cfs @ 12.61 hrs, Volume= 34,518 cf, Depth= 2.55"
Routed to Pond MH1 : MH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
107,335	61	>75% Grass cover, Good, HSG B
55,164	98	Unconnected pavement, HSG A
162,499	74	Weighted Average
107,335		66.05% Pervious Area
55,164		33.95% Impervious Area
55,164		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	106	0.0093	1.04		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
5.7	246	0.0106	0.72		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
35.9	369	0.0006	0.17		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
43.3	721	Total			

Subcatchment 8S: SC 8



Summary for Subcatchment 9A: Area 9A

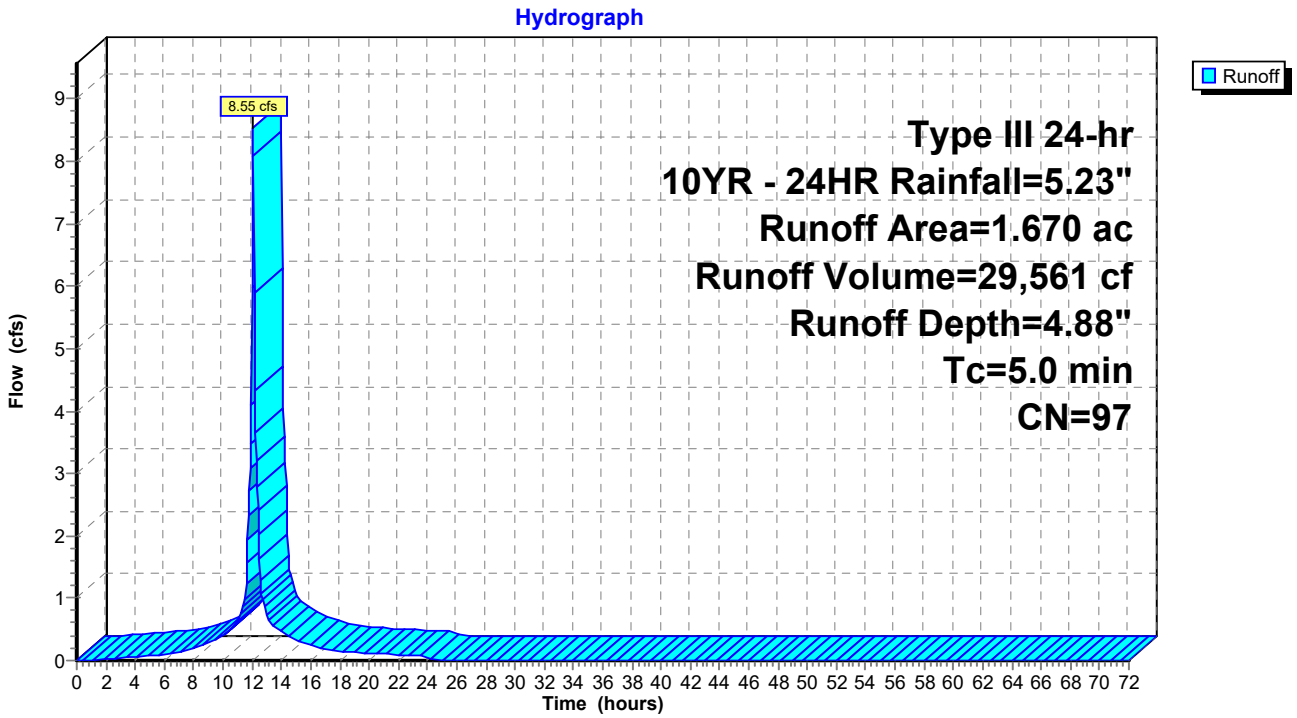
Runoff = 8.55 cfs @ 12.07 hrs, Volume= 29,561 cf, Depth= 4.88"
Routed to Link SS3 : SITESAVER 3 - STSS-12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
1.590	98	Paved parking, HSG A
0.080	68	<50% Grass cover, Poor, HSG A
1.670	97	Weighted Average
0.080		4.79% Pervious Area
1.590		95.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9A: Area 9A



Summary for Subcatchment 9b: Area 9b

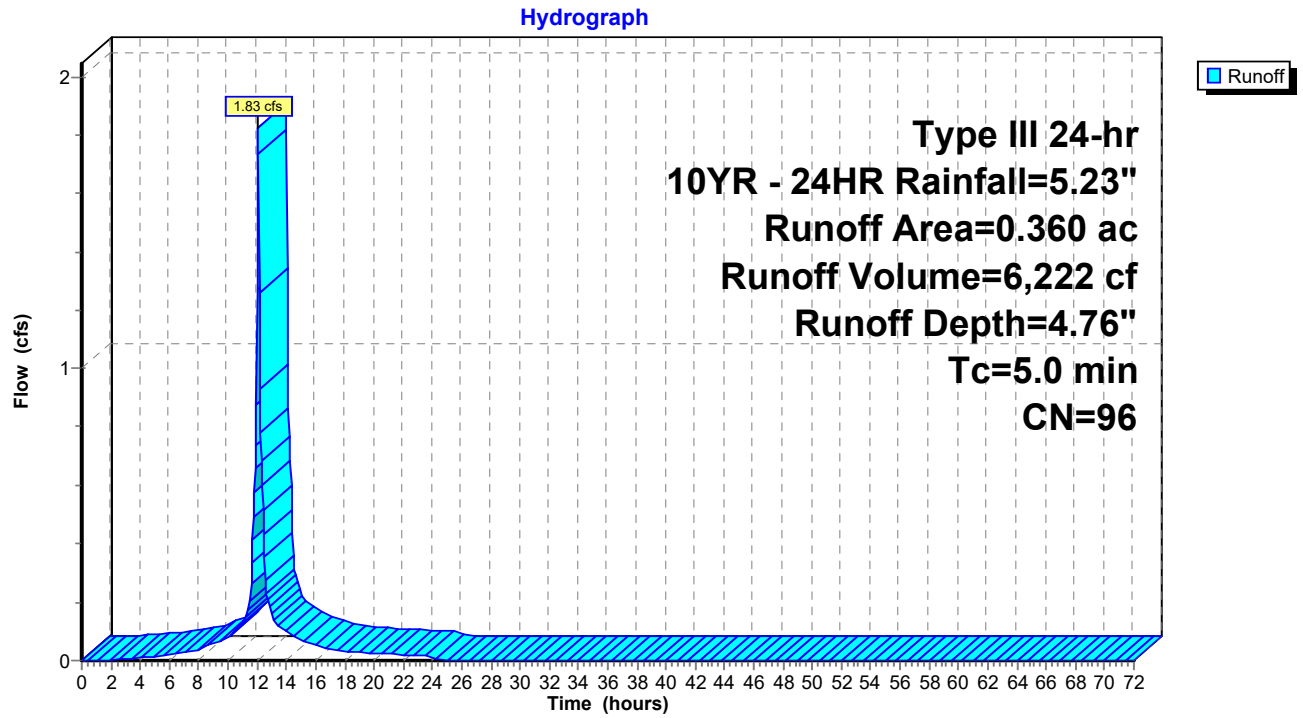
Runoff = 1.83 cfs @ 12.07 hrs, Volume= 6,222 cf, Depth= 4.76"
Routed to Link SS4 : SITESAVER 4 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
0.330	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.360	96	Weighted Average
0.030		8.33% Pervious Area
0.330		91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9b: Area 9b



Summary for Subcatchment 9c: Area 9c

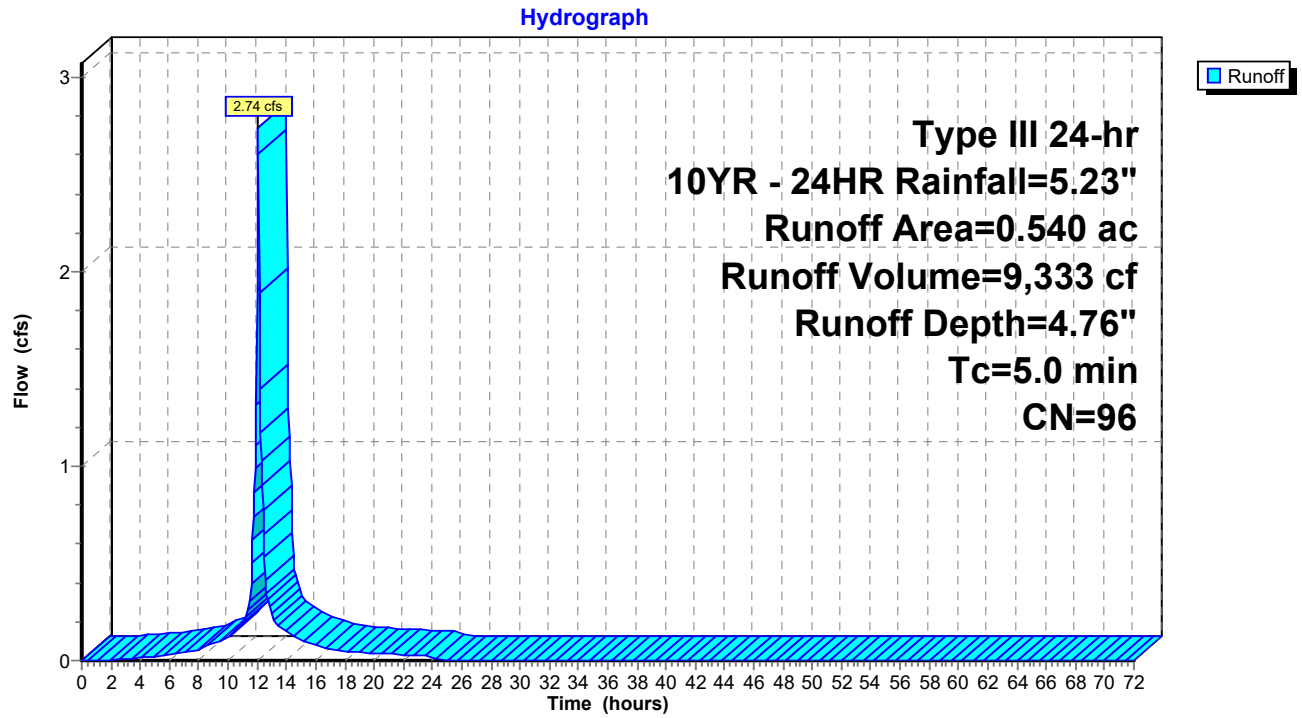
Runoff = 2.74 cfs @ 12.07 hrs, Volume= 9,333 cf, Depth= 4.76"
Routed to Link SS5 : SITESAVER 5 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.540	96	Weighted Average
0.030		5.56% Pervious Area
0.510		94.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9c: Area 9c



Summary for Subcatchment 9d: Area 9d

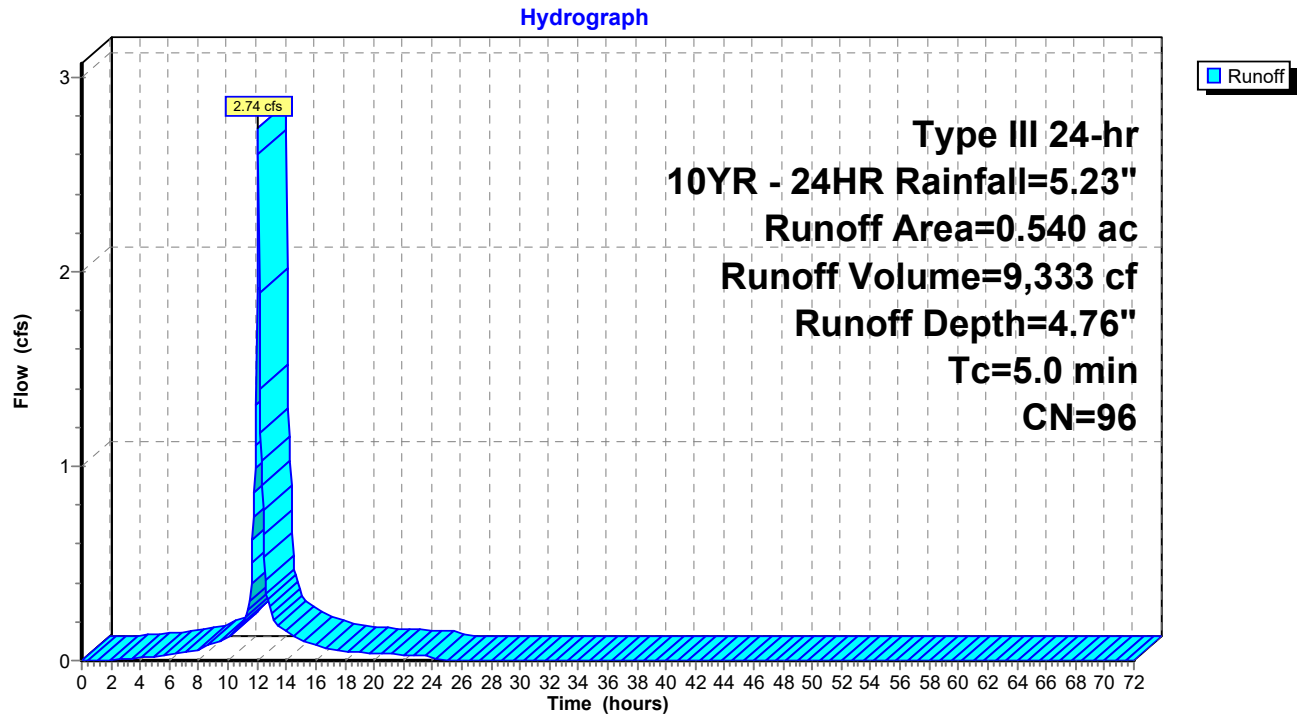
Runoff = 2.74 cfs @ 12.07 hrs, Volume= 9,333 cf, Depth= 4.76"
Routed to Link SS6 : SITESAVER 6 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.540	96	Weighted Average
0.030		5.56% Pervious Area
0.510		94.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9d: Area 9d



Summary for Subcatchment 9e: Area 9e

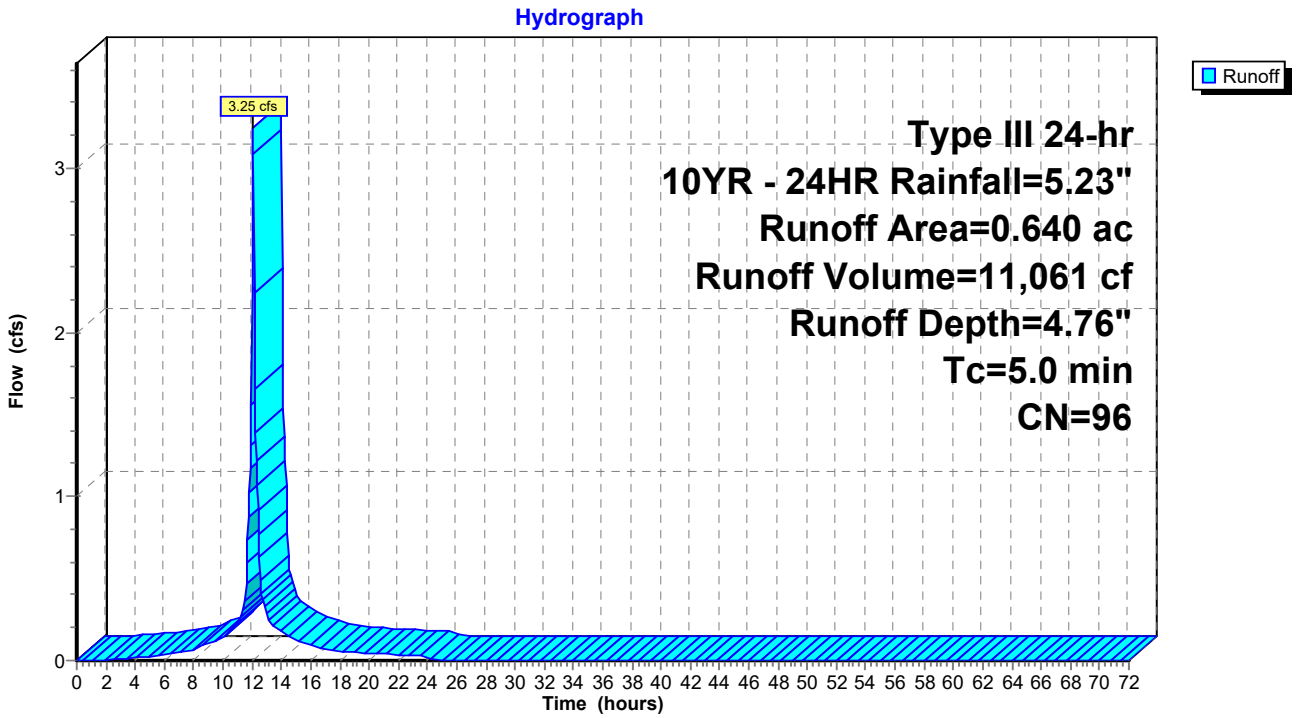
Runoff = 3.25 cfs @ 12.07 hrs, Volume= 11,061 cf, Depth= 4.76"
Routed to Link SS7 : SITESAVER 7 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
0.600	98	Paved parking, HSG A
0.040	68	<50% Grass cover, Poor, HSG A
0.640	96	Weighted Average
0.040		6.25% Pervious Area
0.600		93.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9e: Area 9e



Summary for Subcatchment 9S: SC Culvert

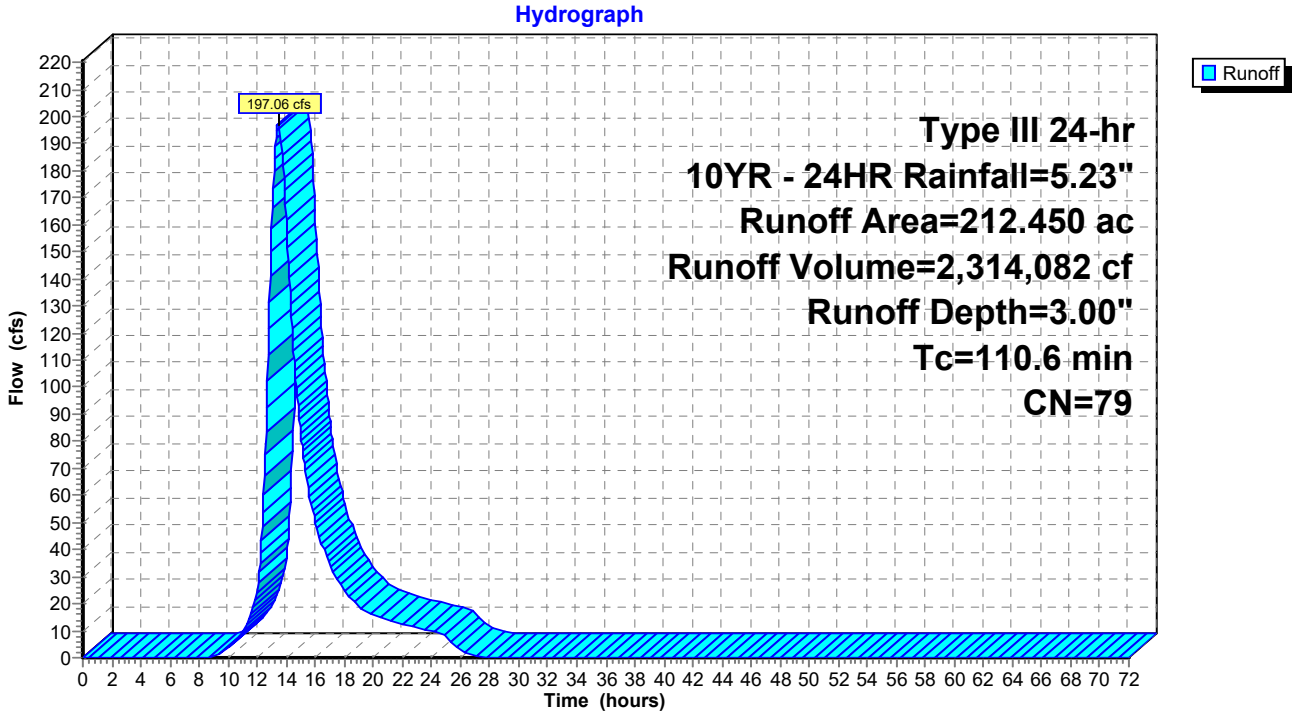
Runoff = 197.06 cfs @ 13.42 hrs, Volume= 2,314,082 cf, Depth= 3.00"
Routed to Pond 11P : (5) Culvert 6X3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (ac)	CN	Description
	8.600	54	1/2 acre lots, 25% imp, HSG A
	2.340	85	1/2 acre lots, 25% imp, HSG D
	12.290	61	1/4 acre lots, 38% imp, HSG A
	0.360	75	1/4 acre lots, 38% imp, HSG B
	0.010	87	1/4 acre lots, 38% imp, HSG D
	55.170	77	1/8 acre lots, 65% imp, HSG A
	0.490	85	1/8 acre lots, 65% imp, HSG B
	0.010	92	1/8 acre lots, 65% imp, HSG D
	2.210	67	Brush, Poor, HSG B
	0.740	83	Brush, Poor, HSG D
	2.880	89	Urban commercial, 85% imp, HSG A
	11.260	92	Urban commercial, 85% imp, HSG B
	21.000	95	Urban commercial, 85% imp, HSG D
	2.430	39	>75% Grass cover, Good, HSG A
	10.380	61	>75% Grass cover, Good, HSG B
	1.240	80	>75% Grass cover, Good, HSG D
	0.180	81	Urban industrial, 72% imp, HSG A
	0.520	93	Urban industrial, 72% imp, HSG D
	10.260	98	Paved roads w/curbs & sewers, HSG A
	2.890	98	Paved roads w/curbs & sewers, HSG B
	1.410	98	Paved roads w/curbs & sewers, HSG D
*	0.010	98	Wetland/Water Surface, 0% imp, HSG A
*	9.990	98	Wetland/Water Surface, 0% imp, HSG B
*	28.580	98	Wetland/Water Surface, 0% imp, HSG D
	5.120	30	Woods, Good, HSG A
	16.980	55	Woods, Good, HSG B
	5.100	77	Woods, Good, HSG D
	212.450	79	Weighted Average
	123.786		58.27% Pervious Area
	88.664		41.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.6					**Direct Entry, See Calculation Sheet**

Subcatchment 9S: SC Culvert



Summary for Subcatchment 14S: SC 14

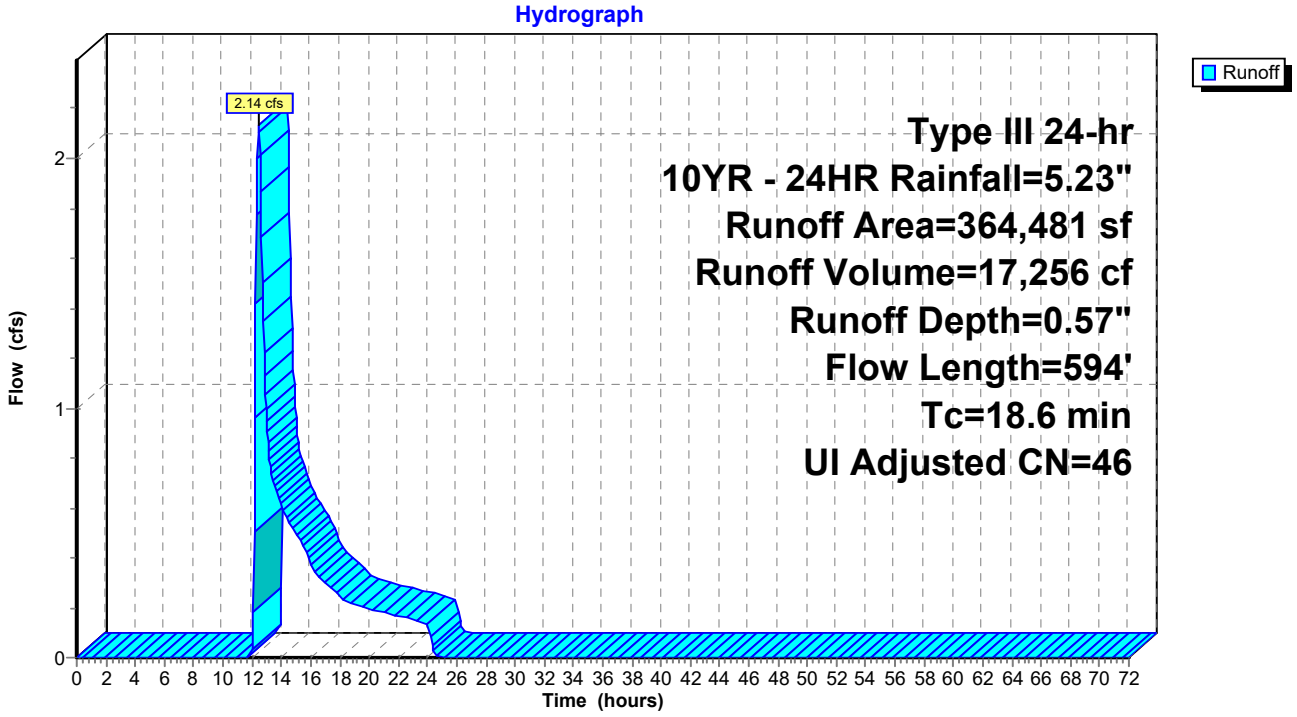
Runoff = 2.14 cfs @ 12.45 hrs, Volume= 17,256 cf, Depth= 0.57"
Routed to Pond CB1 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
278,288	39		>75% Grass cover, Good, HSG A
170	96		Gravel surface, HSG A
86,023	98		Unconnected pavement, HSG A
364,481	53	46	Weighted Average, UI Adjusted
278,458			76.40% Pervious Area
86,023			23.60% Impervious Area
86,023			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0425	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
8.2	494	0.0204	1.00		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
18.6	594	Total			

Subcatchment 14S: SC 14



Summary for Subcatchment 15S: SC 15

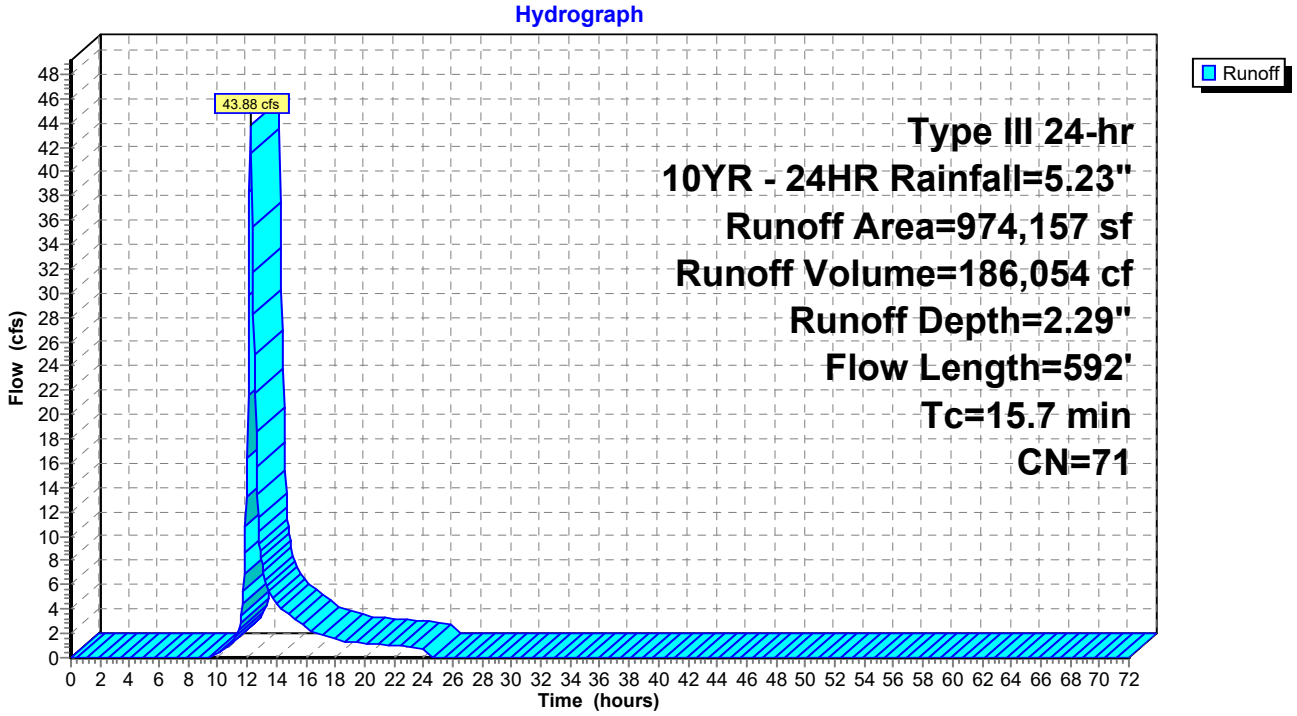
Runoff = 43.88 cfs @ 12.22 hrs, Volume= 186,054 cf, Depth= 2.29"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	428,677	39	>75% Grass cover, Good, HSG A
	1,164	76	Gravel roads, HSG A
	32,761	98	Water Surface, 0% imp, HSG A
	83,054	98	Unconnected pavement, HSG A
	309,611	98	Unconnected pavement, HSG D
	11,248	30	Woods, Good, HSG A
*	107,642	98	Wetland/water Surface, 0% imp, HSG A
	974,157	71	Weighted Average
	581,492		59.69% Pervious Area
	392,665		40.31% Impervious Area
	392,665		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0630	0.19		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
6.1	423	0.0276	1.16		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	19	0.0175	2.69		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.6	50	0.0394	1.39		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
15.7	592	Total			

Subcatchment 15S: SC 15



Summary for Subcatchment 16A: SC 16A

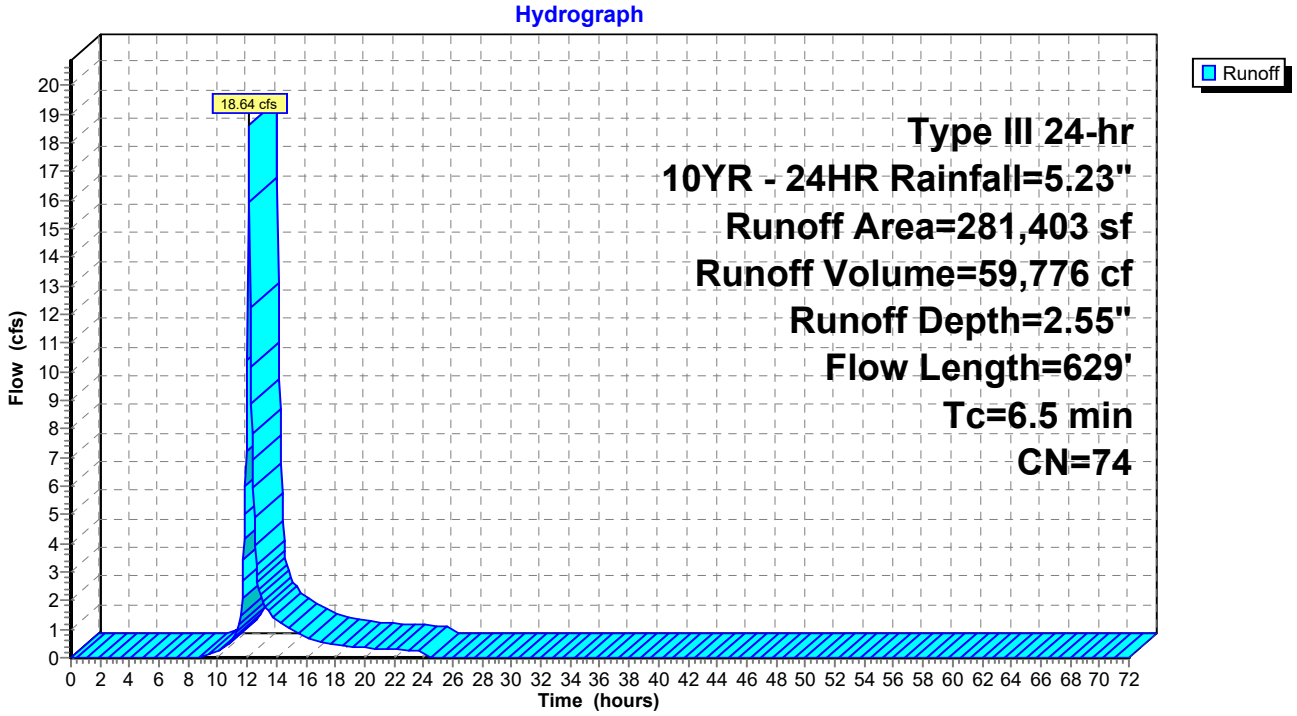
Runoff = 18.64 cfs @ 12.10 hrs, Volume= 59,776 cf, Depth= 2.55"
Routed to Pond CB5 : New CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
183,990	61	>75% Grass cover, Good, HSG B
97,294	98	Unconnected pavement, HSG A
119	98	Unconnected pavement, HSG D
281,403	74	Weighted Average
183,990		65.38% Pervious Area
97,413		34.62% Impervious Area
97,413		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0107	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.0	157	0.0160	0.89		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	372	0.0030	3.09	110.88	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
6.5	629	Total			

Subcatchment 16A: SC 16A



Summary for Subcatchment 16B: SC 16B

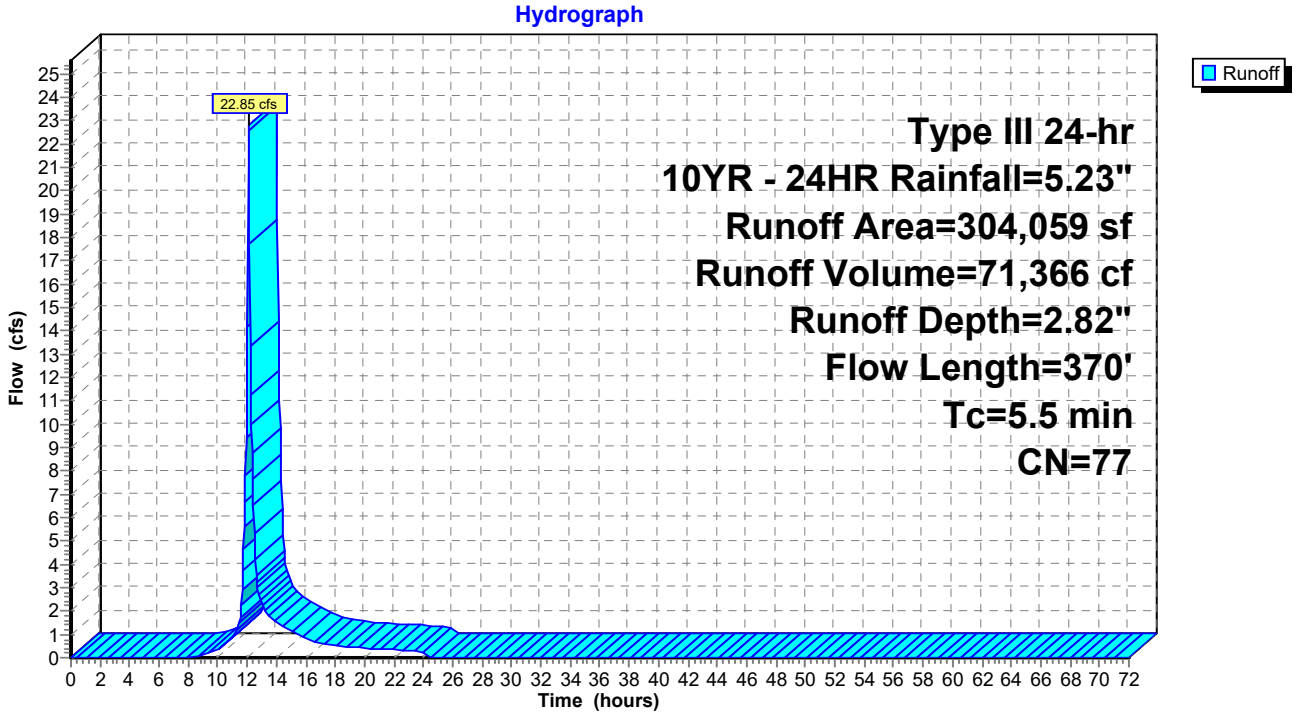
Runoff = 22.85 cfs @ 12.09 hrs, Volume= 71,366 cf, Depth= 2.82"
Routed to Pond CB4 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
169,834	61	>75% Grass cover, Good, HSG B
5	98	Unconnected pavement, HSG A
134,220	98	Unconnected pavement, HSG D
304,059	77	Weighted Average
169,834		55.86% Pervious Area
134,225		44.14% Impervious Area
134,225		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	101	0.0094	1.03		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.5	184	0.0159	0.88		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.4	85	0.0034	3.28	118.04	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
5.5	370	Total			

Subcatchment 16B: SC 16B



Summary for Subcatchment 16S: SC 16

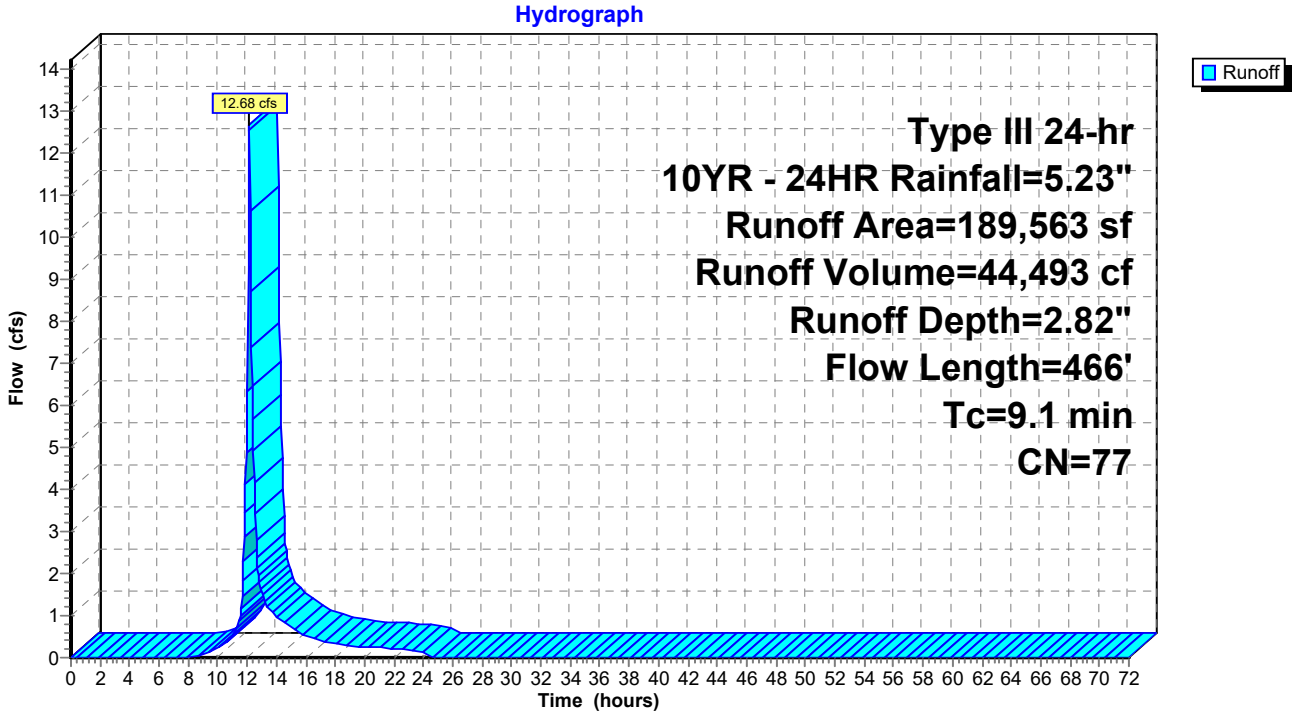
Runoff = 12.68 cfs @ 12.13 hrs, Volume= 44,493 cf, Depth= 2.82"
Routed to Pond CB3 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
110,029	61	>75% Grass cover, Good, HSG B
67,280	98	Unconnected pavement, HSG A
12,254	98	Unconnected pavement, HSG D
189,563	77	Weighted Average
110,029		58.04% Pervious Area
79,534		41.96% Impervious Area
79,534		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	117	0.0103	1.11		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	349	0.0129	0.80		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.1	466	Total			

Subcatchment 16S: SC 16



Summary for Subcatchment 17S: SC 17

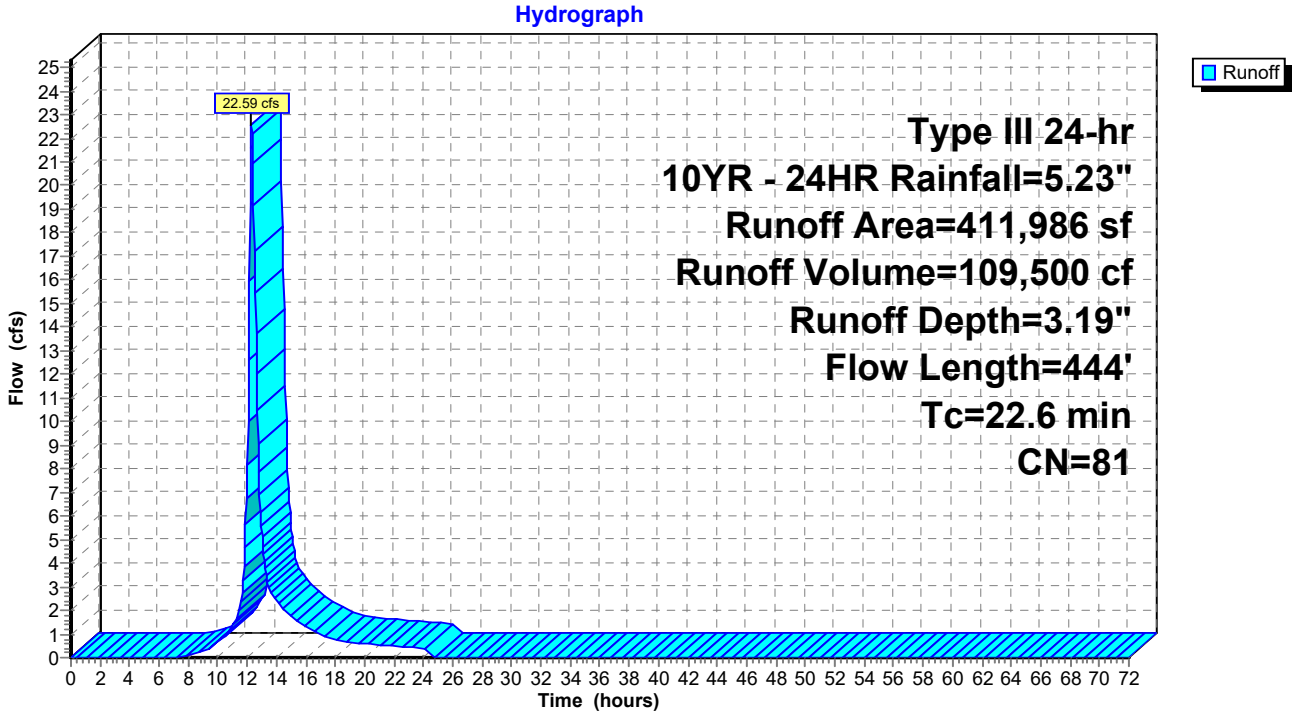
Runoff = 22.59 cfs @ 12.31 hrs, Volume= 109,500 cf, Depth= 3.19"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
189,518	61	>75% Grass cover, Good, HSG B
89,409	98	Unconnected pavement, HSG A
133,059	98	Unconnected pavement, HSG D
411,986	81	Weighted Average
189,518		46.00% Pervious Area
222,468		54.00% Impervious Area
222,468		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	115	0.0107	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
20.9	329	0.0014	0.26		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
22.6	444	Total			

Subcatchment 17S: SC 17



Summary for Subcatchment 18S: SC 18

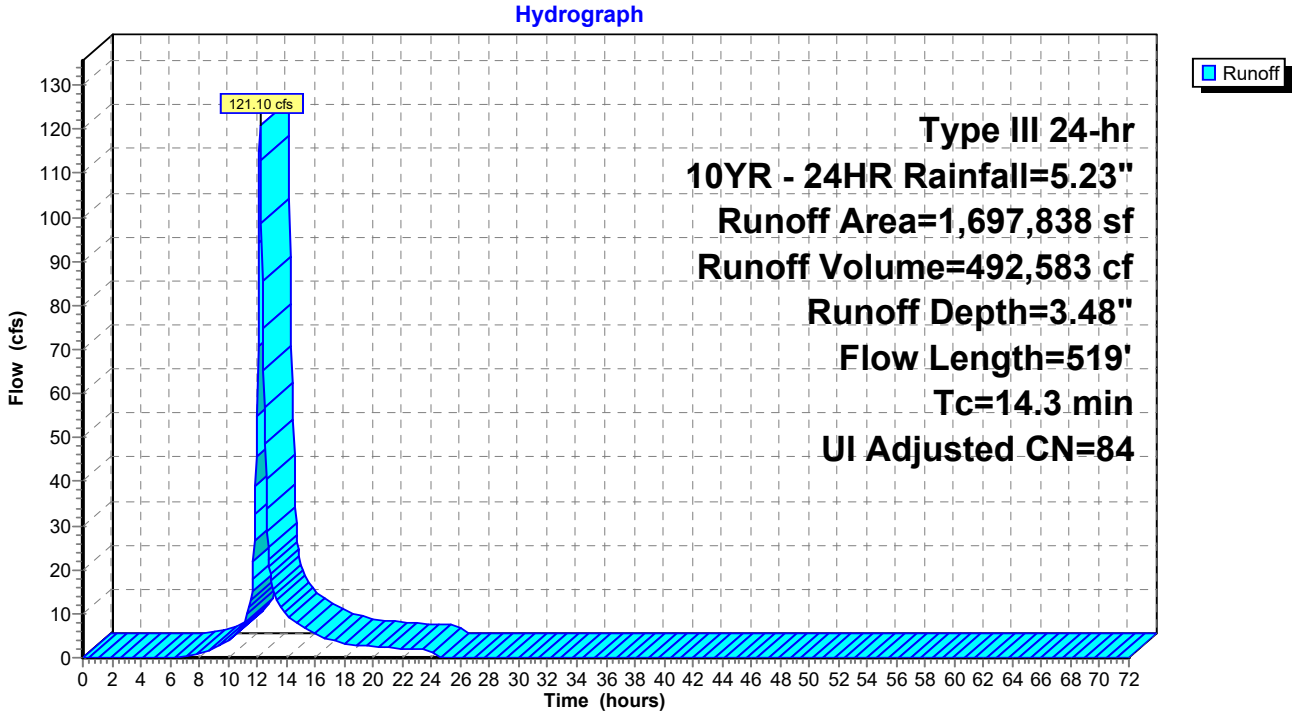
Runoff = 121.10 cfs @ 12.20 hrs, Volume= 492,583 cf, Depth= 3.48"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	528,385	61		>75% Grass cover, Good, HSG B
	145,596	98		Water Surface, 0% imp, HSG D
	108,069	98		Unconnected pavement, HSG A
	88,963	98		Unconnected pavement, HSG D
	92,068	70		Woods, Good, HSG C
*	734,757	98		Wetland/water Surface, 0% imp, HSG D
	1,697,838	85	84	Weighted Average, UI Adjusted
	1,500,806			88.40% Pervious Area
	197,032			11.60% Impervious Area
	197,032			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	69	0.0099	0.98		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
13.1	450	0.0067	0.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.3	519	Total			

Subcatchment 18S: SC 18



Summary for Subcatchment 19A: SC 19A

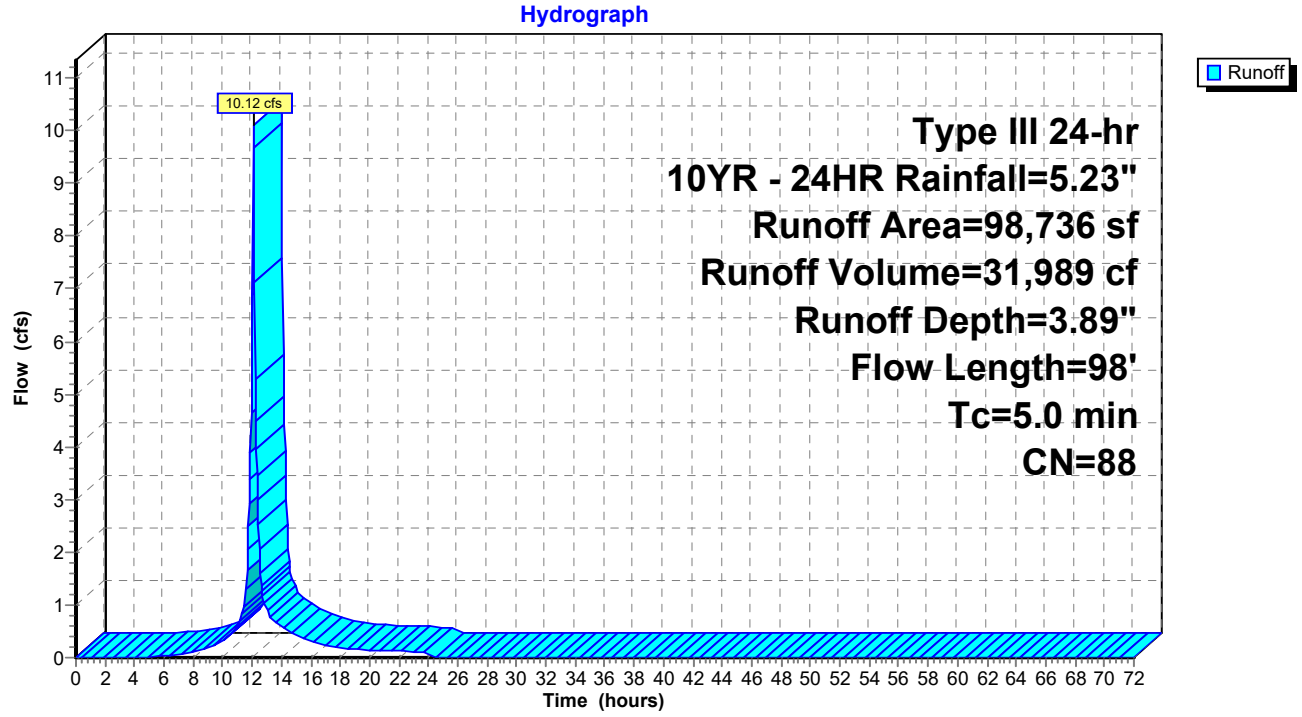
Runoff = 10.12 cfs @ 12.07 hrs, Volume= 31,989 cf, Depth= 3.89"
Routed to Reach PT1 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
27,532	61	>75% Grass cover, Good, HSG B
71,204	98	Unconnected pavement, HSG A
98,736	88	Weighted Average
27,532		27.88% Pervious Area
71,204		72.12% Impervious Area
71,204		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	69	0.0125	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	29	0.0197	0.98		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.4					**Direct Entry, minimum 5 min**
5.0	98	Total			

Subcatchment 19A: SC 19A



Summary for Subcatchment 19S: SC 19

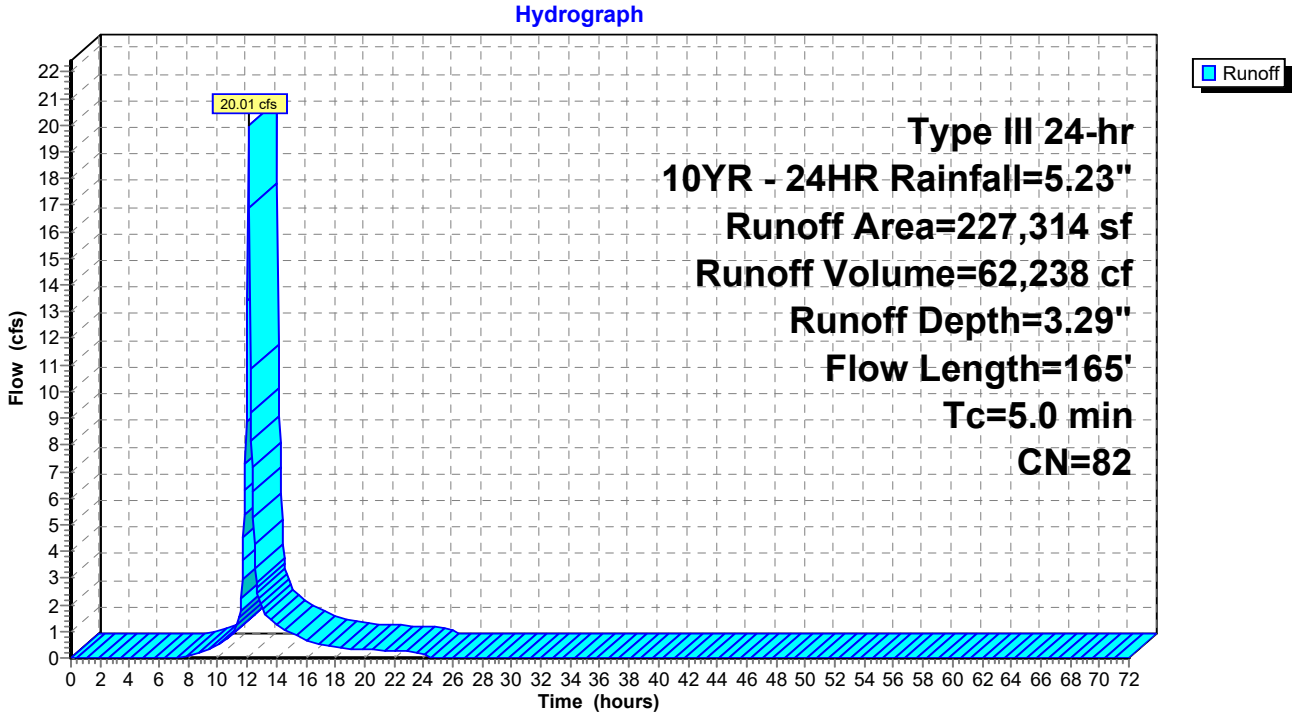
Runoff = 20.01 cfs @ 12.08 hrs, Volume= 62,238 cf, Depth= 3.29"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	98,182	61	>75% Grass cover, Good, HSG B
	15,781	98	Water Surface, 0% imp, HSG D
*	113,351	98	Wetland/water Surface, 0% imp, HSG D
	227,314	82	Weighted Average
	227,314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0075	0.94		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
2.5	65	0.0039	0.44		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7					**Direct Entry, minimum 5 min**
5.0	165	Total			

Subcatchment 19S: SC 19



Summary for Subcatchment 20S: SC 20

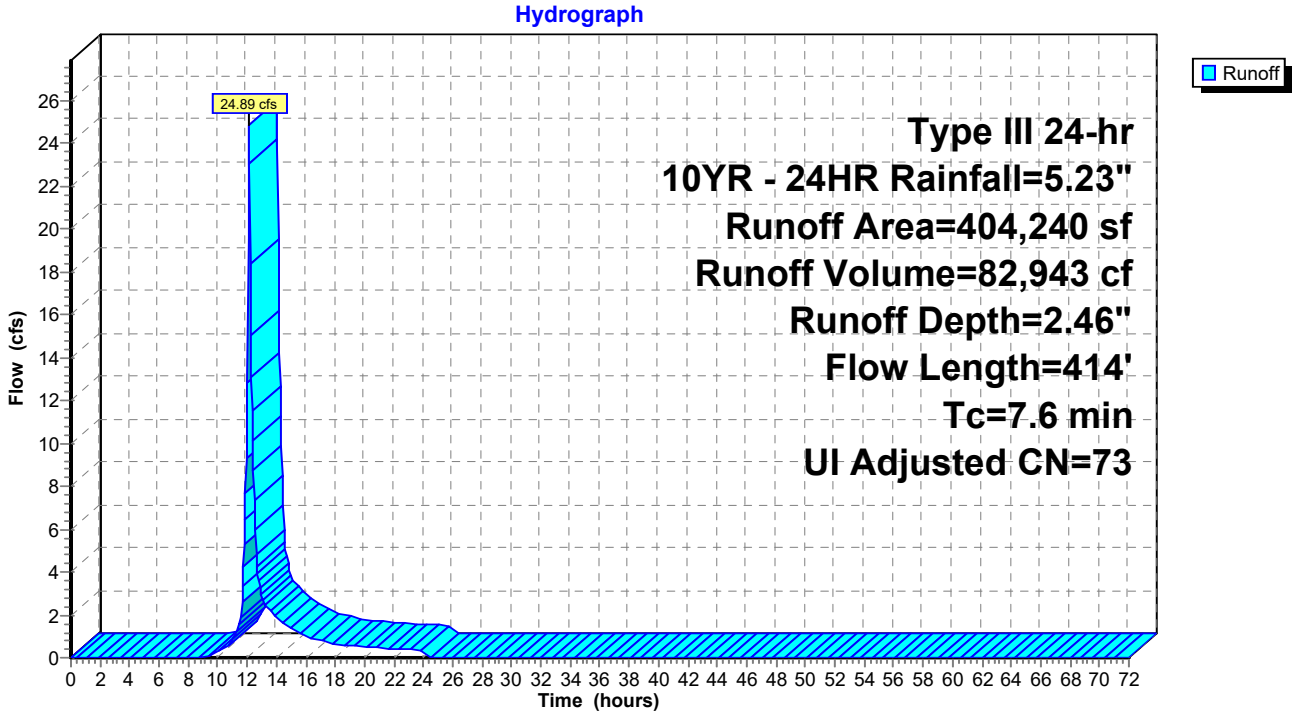
Runoff = 24.89 cfs @ 12.11 hrs, Volume= 82,943 cf, Depth= 2.46"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	246,051	61		>75% Grass cover, Good, HSG B
	2,273	96		Gravel surface, HSG B
	23,627	98		Water Surface, 0% imp, HSG D
	66,507	98		Unconnected pavement, HSG A
	1,831	98		Unconnected pavement, HSG D
	1,971	30		Woods, Good, HSG A
*	61,980	98		Wetland/water Surface, 0% imp, HSG D
	404,240	75	73	Weighted Average, UI Adjusted
	335,902			83.09% Pervious Area
	68,338			16.91% Impervious Area
	68,338			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0128	1.13		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.30"
6.4	331	0.0153	0.87		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
7.6	414	Total			

Subcatchment 20S: SC 20



Summary for Subcatchment 21S: SC 21

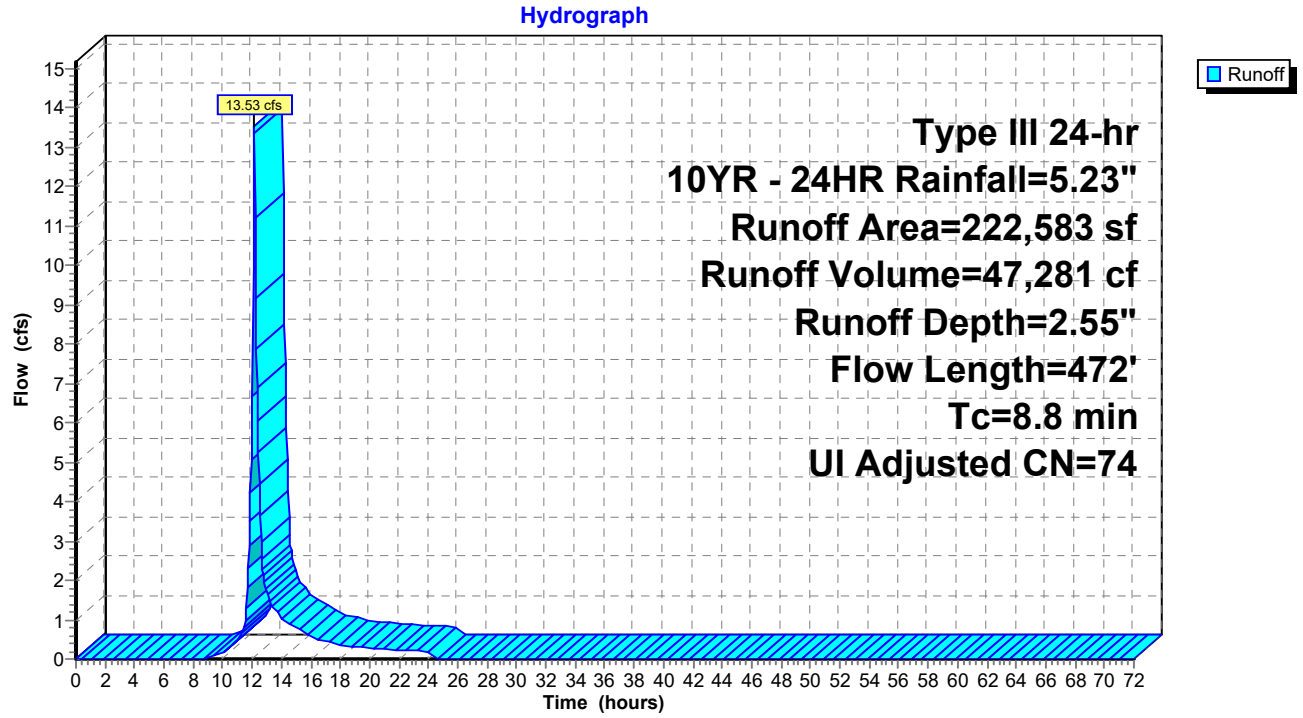
Runoff = 13.53 cfs @ 12.13 hrs, Volume= 47,281 cf, Depth= 2.55"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	138,267	61		>75% Grass cover, Good, HSG B
	16,801	98		Water Surface, 0% imp, HSG D
	23,650	98		Unconnected pavement, HSG D
*	43,865	98		Wetland/water Surface, 0% imp, HSG D
	222,583	75	74	Weighted Average, UI Adjusted
	198,933			89.37% Pervious Area
	23,650			10.63% Impervious Area
	23,650			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	73	0.0119	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.7	399	0.0152	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.8	472	Total			

Subcatchment 21S: SC 21



Summary for Subcatchment 22S: SC 22

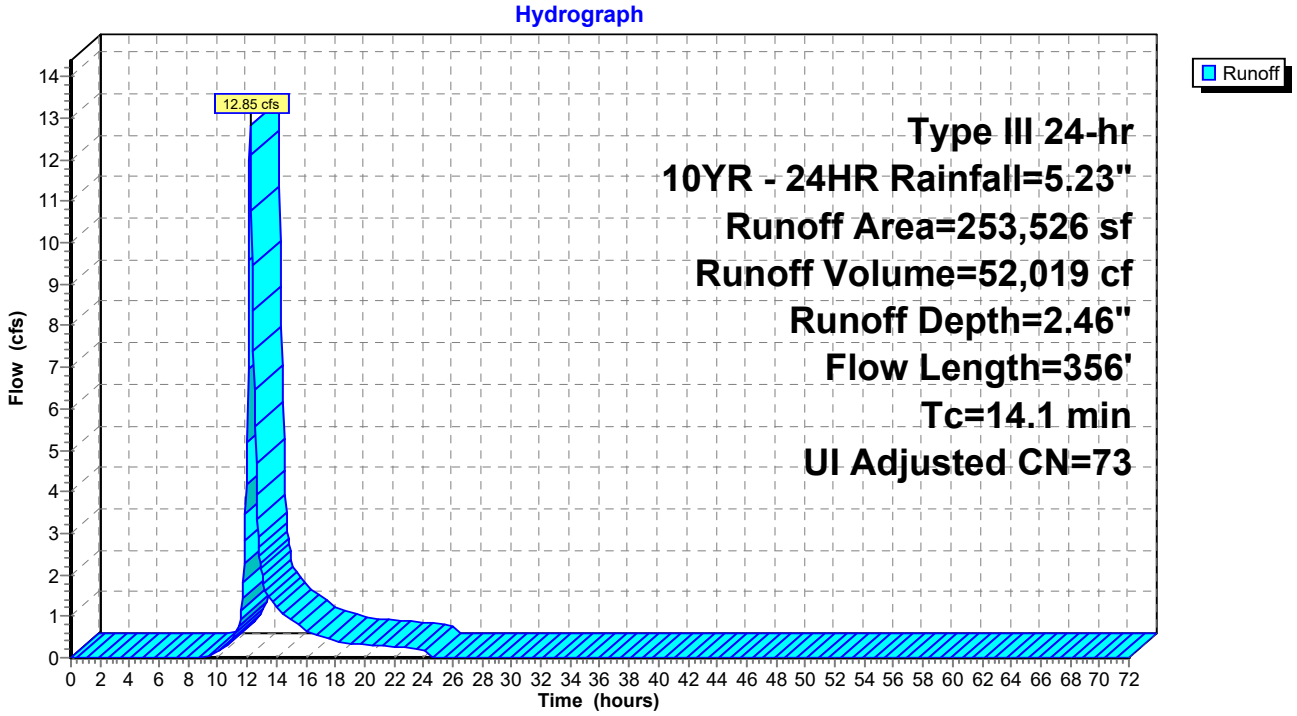
Runoff = 12.85 cfs @ 12.20 hrs, Volume= 52,019 cf, Depth= 2.46"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	162,251	61		>75% Grass cover, Good, HSG B
	9,076	96		Gravel surface, HSG B
	29,012	98		Water Surface, 0% imp, HSG D
	29,583	98		Unconnected pavement, HSG A
*	23,604	98		Wetland/water Surface, 0% imp, HSG D
	253,526	74	73	Weighted Average, UI Adjusted
	223,943			88.33% Pervious Area
	29,583			11.67% Impervious Area
	29,583			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	72	0.0102	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.4	284	0.0241	1.09		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.1	356	Total			

Subcatchment 22S: SC 22



Summary for Subcatchment 23S: SC 23

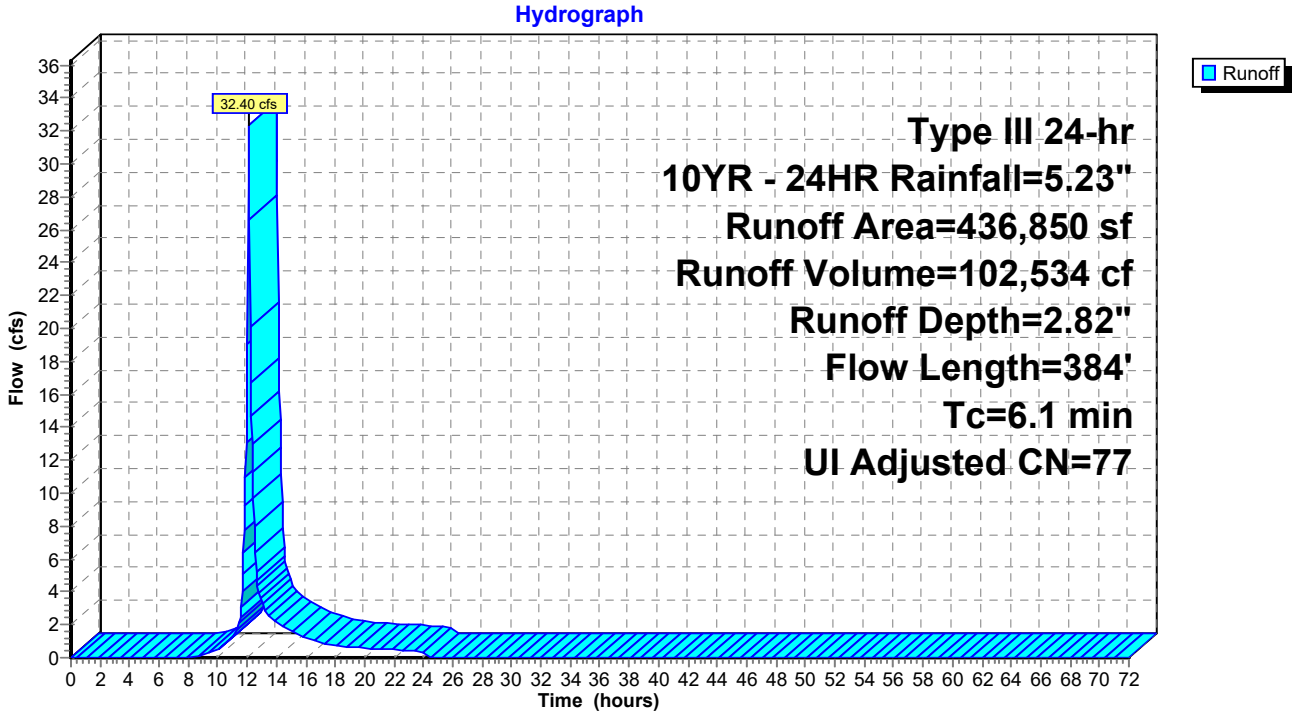
Runoff = 32.40 cfs @ 12.09 hrs, Volume= 102,534 cf, Depth= 2.82"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	172,047	61		>75% Grass cover, Good, HSG B
	16,592	96		Gravel surface, HSG B
	53,251	98		Water Surface, 0% imp, HSG D
	33,520	98		Unconnected pavement, HSG A
	59,182	55		Woods, Good, HSG B
*	102,258	98		Wetland/water Surface, 0% imp, HSG D
	436,850	78	77	Weighted Average, UI Adjusted
	403,330			92.33% Pervious Area
	33,520			7.67% Impervious Area
	33,520			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	88	0.0090	0.99		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.6	296	0.0234	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.1	384	Total			

Subcatchment 23S: SC 23



Summary for Subcatchment 24S: SC 24

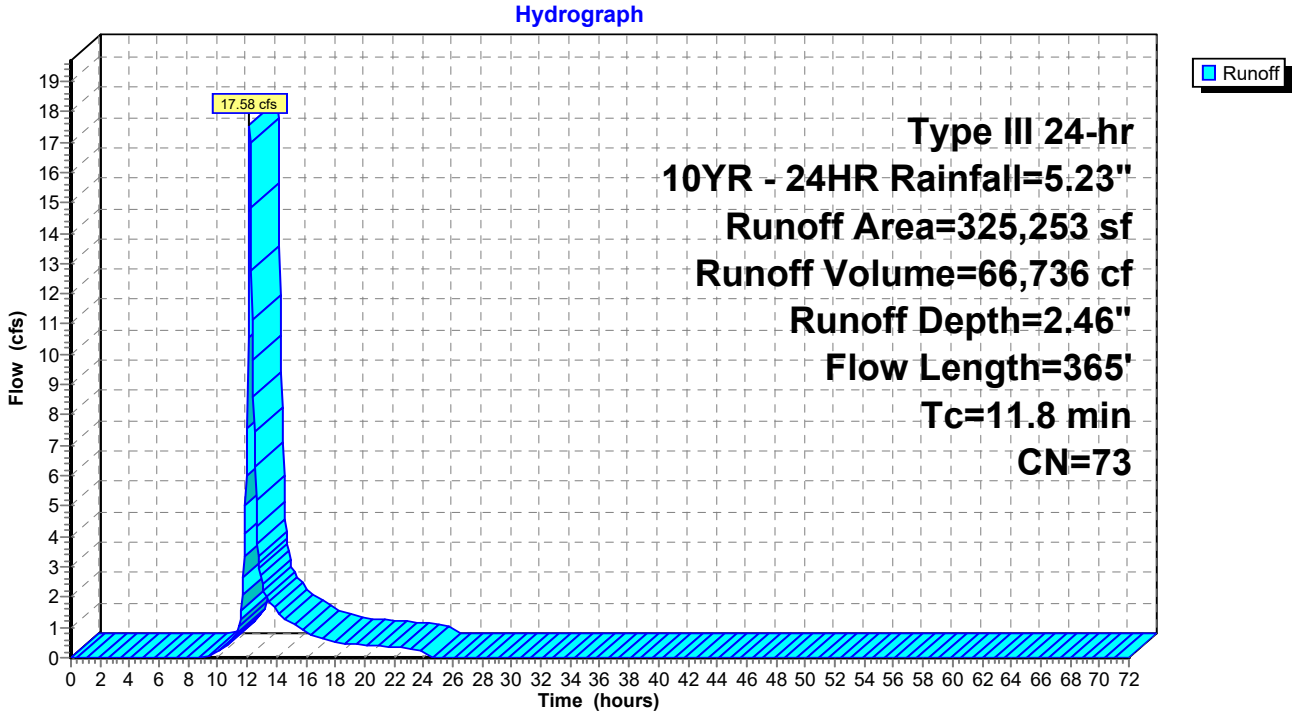
Runoff = 17.58 cfs @ 12.17 hrs, Volume= 66,736 cf, Depth= 2.46"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Description
	65,366	61	>75% Grass cover, Good, HSG B
	13,384	96	Gravel surface, HSG B
	56,260	98	Water Surface, 0% imp, HSG D
	5,050	98	Unconnected pavement, HSG A
	129,703	55	Woods, Good, HSG B
*	55,490	98	Wetland/water Surface, 0% imp, HSG D
	325,253	73	Weighted Average
	320,203		98.45% Pervious Area
	5,050		1.55% Impervious Area
	5,050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0171	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
0.1	21	0.0152	2.50		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.0	89	0.0115	0.75		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0120	2.22		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
4.7	215	0.0120	0.77		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
11.8	365	Total			

Subcatchment 24S: SC 24



Summary for Subcatchment 27S: SC 27

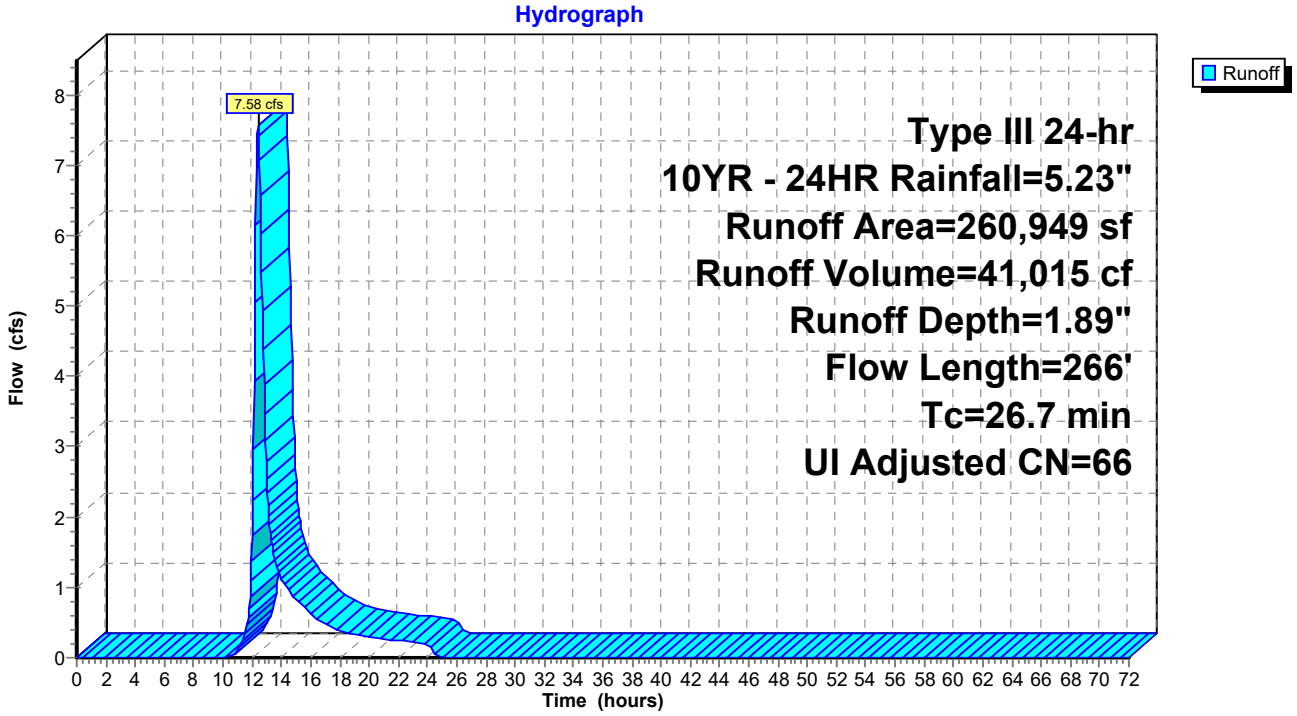
Runoff = 7.58 cfs @ 12.40 hrs, Volume= 41,015 cf, Depth= 1.89"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	189,955	61		>75% Grass cover, Good, HSG B
	364	96		Gravel surface, HSG B
	69,758	98		Unconnected pavement, HSG A
	0	98		Unconnected pavement, HSG D
*	872	98		Wetland/Water Surface, 0% imp, HSG A
	260,949	71	66	Weighted Average, UI Adjusted
	191,191			73.27% Pervious Area
	69,758			26.73% Impervious Area
	69,758			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	100	0.0052	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
2.6	166	0.0233	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
26.7	266	Total			

Subcatchment 27S: SC 27



Summary for Subcatchment A1: Area A1

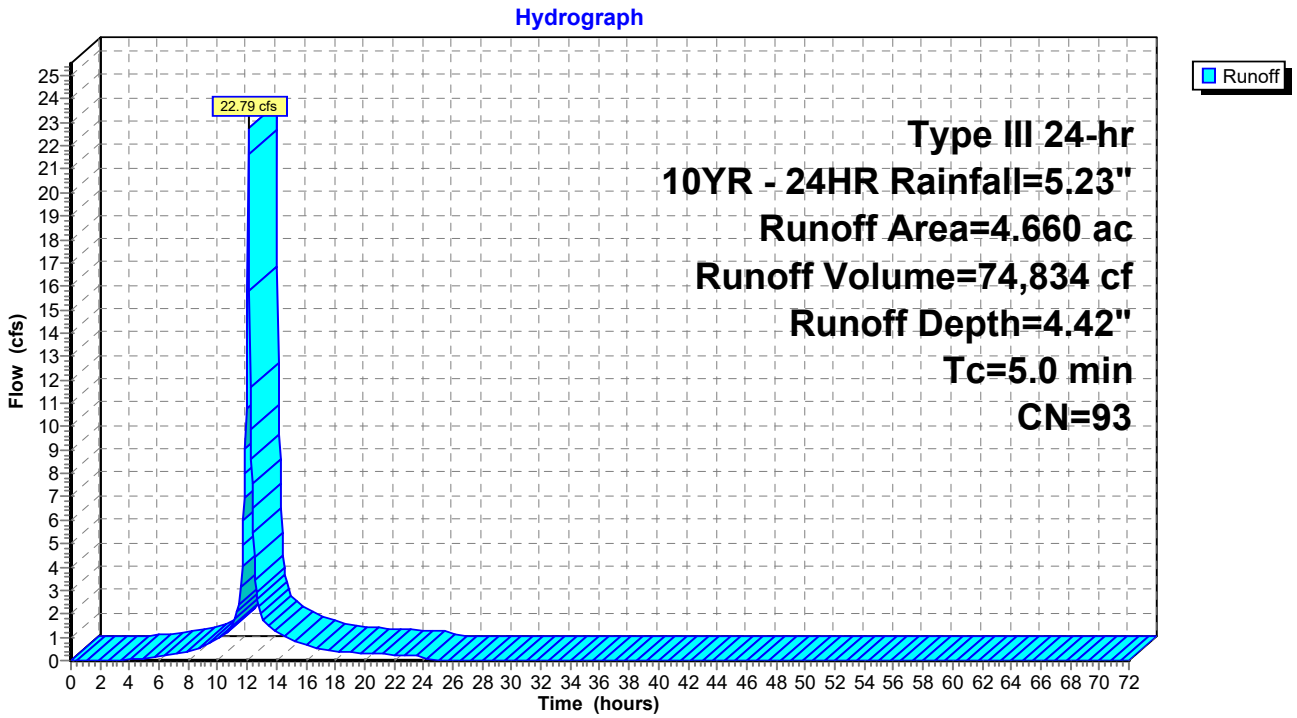
Runoff = 22.79 cfs @ 12.07 hrs, Volume= 74,834 cf, Depth= 4.42"
Routed to Pond SFA1 : SAND FILTER AREA A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
3.900	98	Paved parking, HSG A
0.760	68	<50% Grass cover, Poor, HSG A
4.660	93	Weighted Average
0.760		16.31% Pervious Area
3.900		83.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A1: Area A1



Summary for Subcatchment A2: Area A2

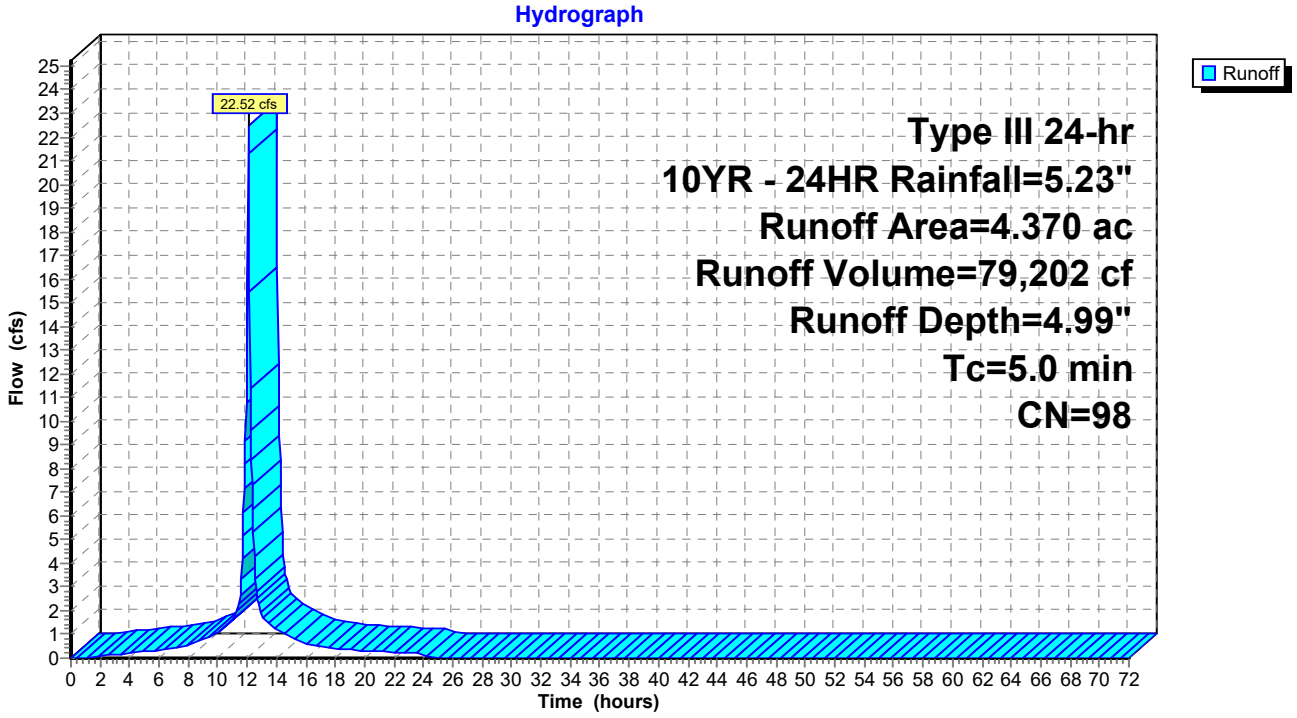
Runoff = 22.52 cfs @ 12.07 hrs, Volume= 79,202 cf, Depth= 4.99"
Routed to Pond SFA2 : SAND FILTER AREA A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
4.370	98	Paved parking, HSG A
0.000	68	<50% Grass cover, Poor, HSG A
4.370	98	Weighted Average
4.370		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A2: Area A2



Summary for Subcatchment A3: Area A3

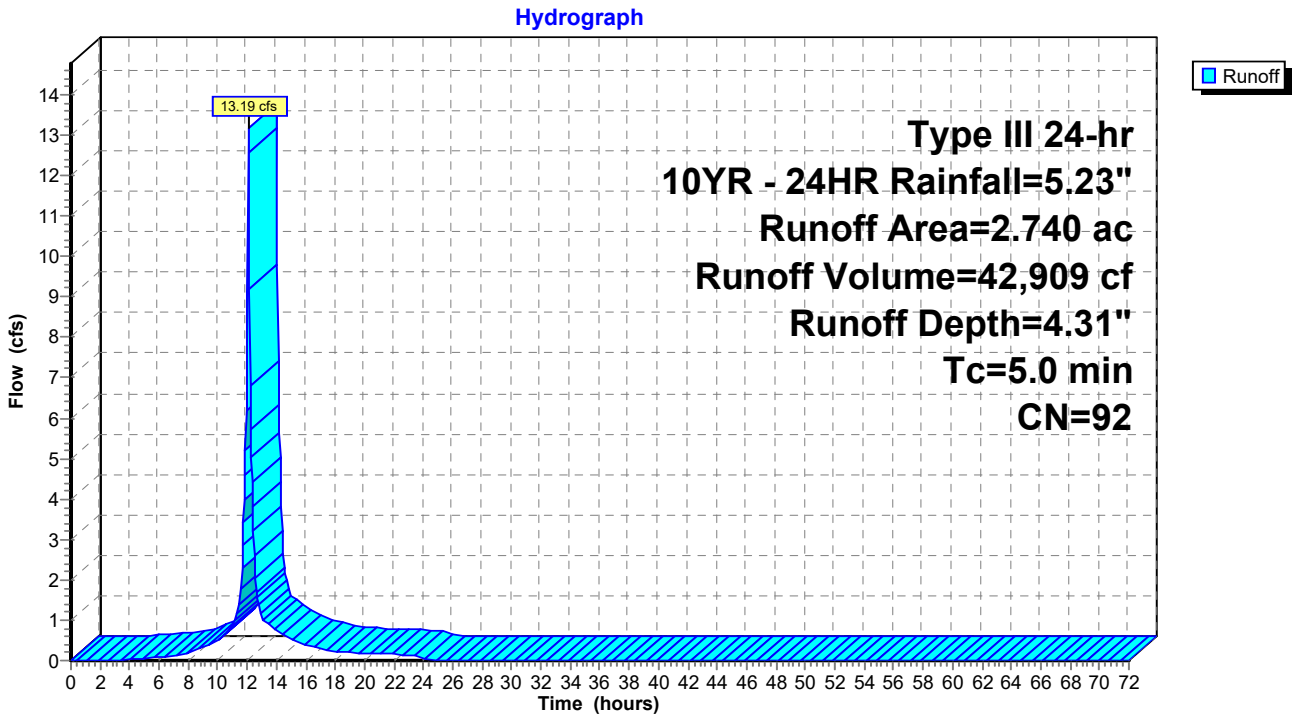
Runoff = 13.19 cfs @ 12.07 hrs, Volume= 42,909 cf, Depth= 4.31"
Routed to Link SS8 : SITESAVER 8 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (ac)	CN	Description
2.210	98	Paved parking, HSG A
0.530	68	<50% Grass cover, Poor, HSG A
2.740	92	Weighted Average
0.530		19.34% Pervious Area
2.210		80.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A3: Area A3



Summary for Subcatchment DS1: Ditch Segment 1

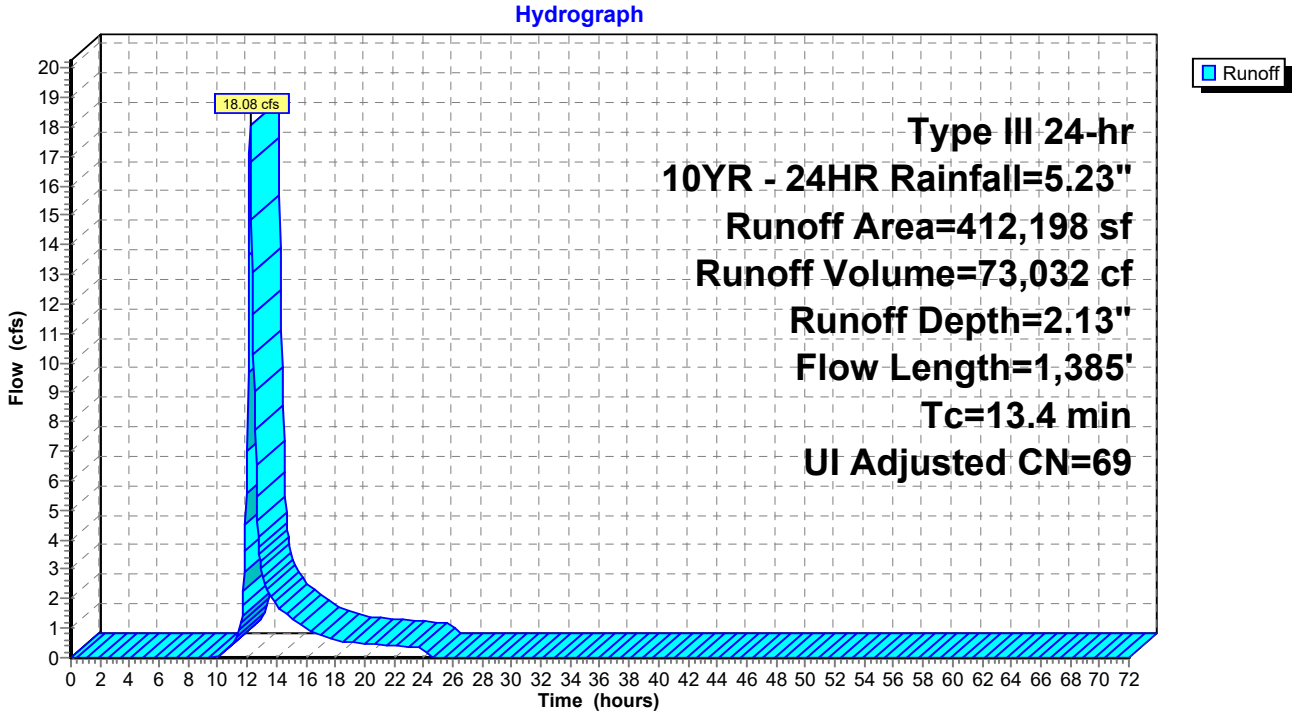
Runoff = 18.08 cfs @ 12.20 hrs, Volume= 73,032 cf, Depth= 2.13"
Routed to Reach 1R : WQS Segment 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	242,115	61		>75% Grass cover, Good, HSG B
	2,212	76		Gravel roads, HSG A
	0	98		Water Surface, 0% imp, HSG A
	0	98		Unconnected pavement, HSG A
	117,963	98		Unconnected pavement, HSG D
	20,768	55		Woods, Good, HSG B
*	29,140	98		Wetland/Water Surface, 0% imp, HSG A
	412,198	74	69	Weighted Average, UI Adjusted
	294,235			71.38% Pervious Area
	117,963			28.62% Impervious Area
	117,963			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	110	0.0200	1.42		**Sheet Flow, Pavement**
					Smooth surfaces n= 0.011 P2= 3.30"
0.8	65	0.0400	1.40		**Shallow Concentrated Flow, Grass**
					Short Grass Pasture Kv= 7.0 fps
11.3	1,210	0.0005	1.79	48.22	**Channel Flow, Ditch**
					Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
13.4	1,385	Total			

Subcatchment DS1: Ditch Segment 1



Summary for Subcatchment DS2: Ditch Segment 2

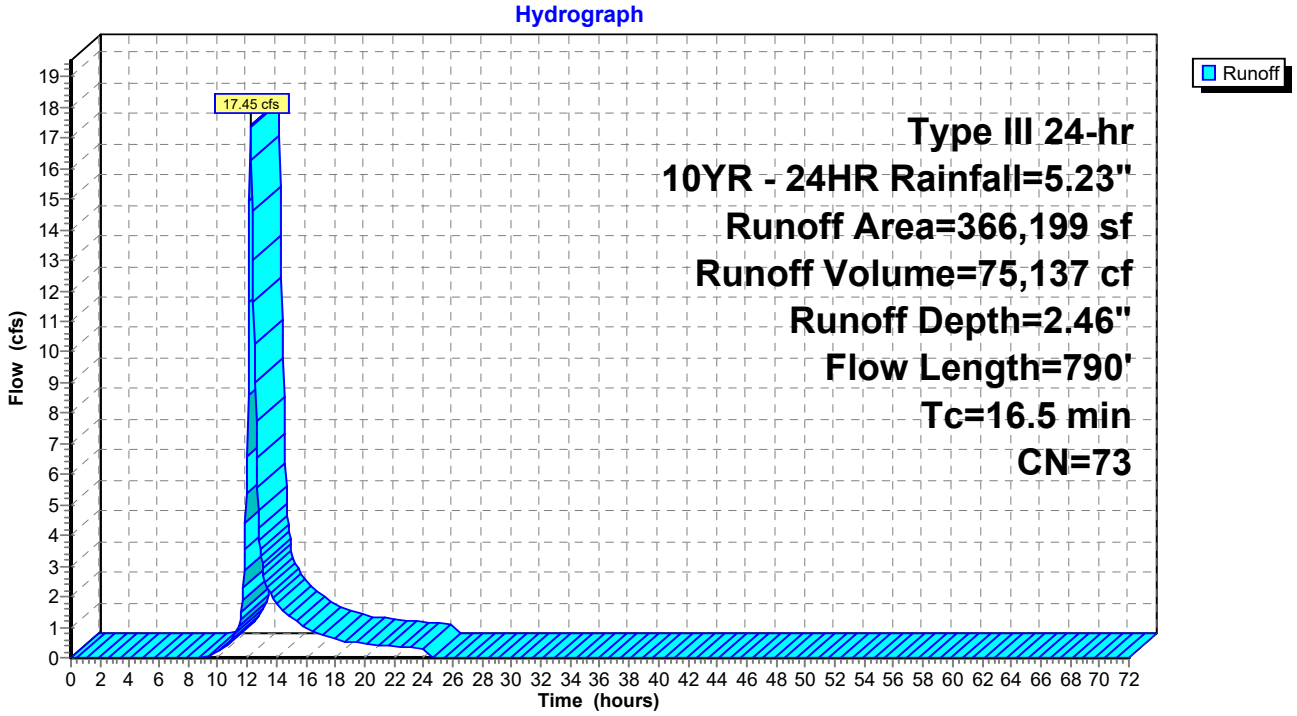
Runoff = 17.45 cfs @ 12.24 hrs, Volume= 75,137 cf, Depth= 2.46"
Routed to Reach 2R : WQS Segment 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
158,039	39	>75% Grass cover, Good, HSG A
9,172	98	Water Surface, 0% imp, HSG A
198,988	98	Unconnected pavement, HSG D
366,199	73	Weighted Average
167,211		45.66% Pervious Area
198,988		54.34% Impervious Area
198,988		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	140	0.0050	0.86		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
10.3	280	0.0005	0.45		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	370	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
16.5	790	Total			

Subcatchment DS2: Ditch Segment 2



Summary for Subcatchment DS3: Ditch Segment 3

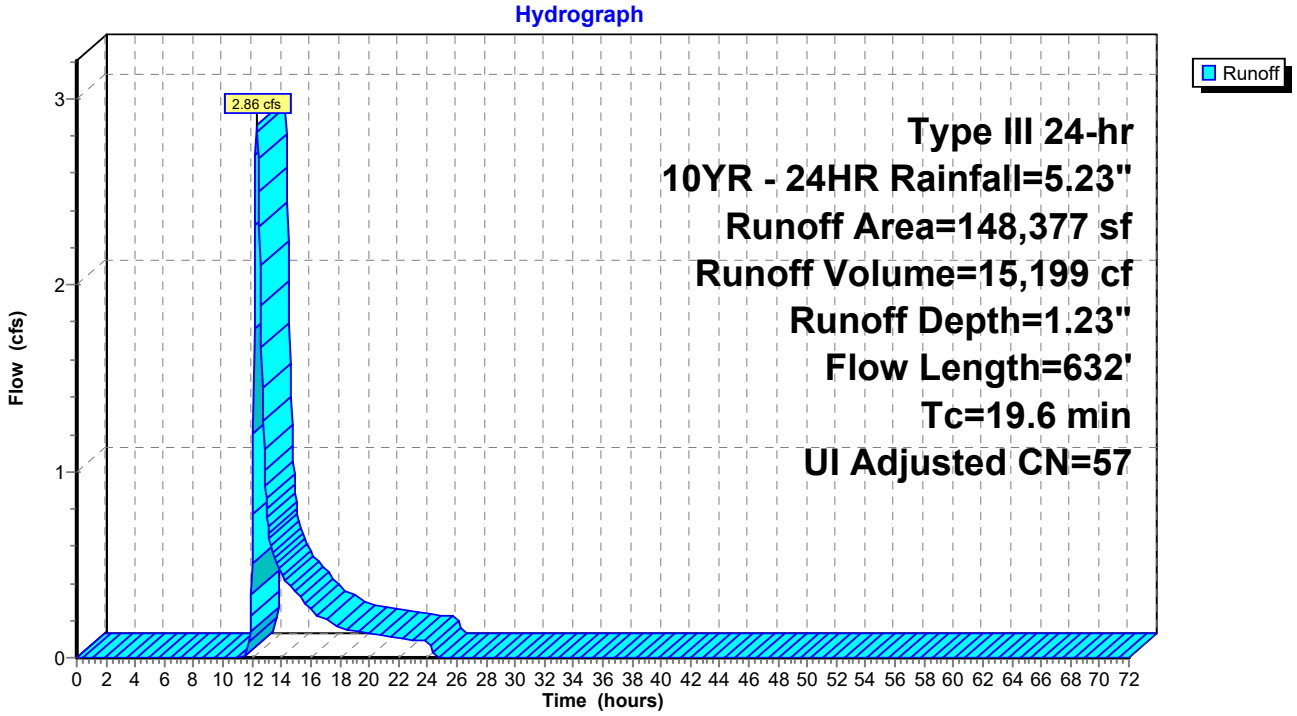
Runoff = 2.86 cfs @ 12.32 hrs, Volume= 15,199 cf, Depth= 1.23"
Routed to Reach 3R : WQS Segment 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	18,935	61		>75% Grass cover, Good, HSG B
	7,512	76		Gravel roads, HSG A
	9	98		Water Surface, 0% imp, HSG A
	6,613	98		Unconnected pavement, HSG D
	75,261	30		Woods, Good, HSG A
*	40,047	98		Wetland/Water Surface, 0% imp, HSG B
	148,377	58	57	Weighted Average, UI Adjusted
	141,764			95.54% Pervious Area
	6,613			4.46% Impervious Area
	6,613			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	42	0.0050	0.67		**Sheet Flow, Pavement A-B** Smooth surfaces n= 0.011 P2= 3.30"
16.3	345	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.3	245	0.0005	1.79	48.22	**Channel Flow,** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
19.6	632	Total			

Subcatchment DS3: Ditch Segment 3



Summary for Subcatchment N10: DA-N10

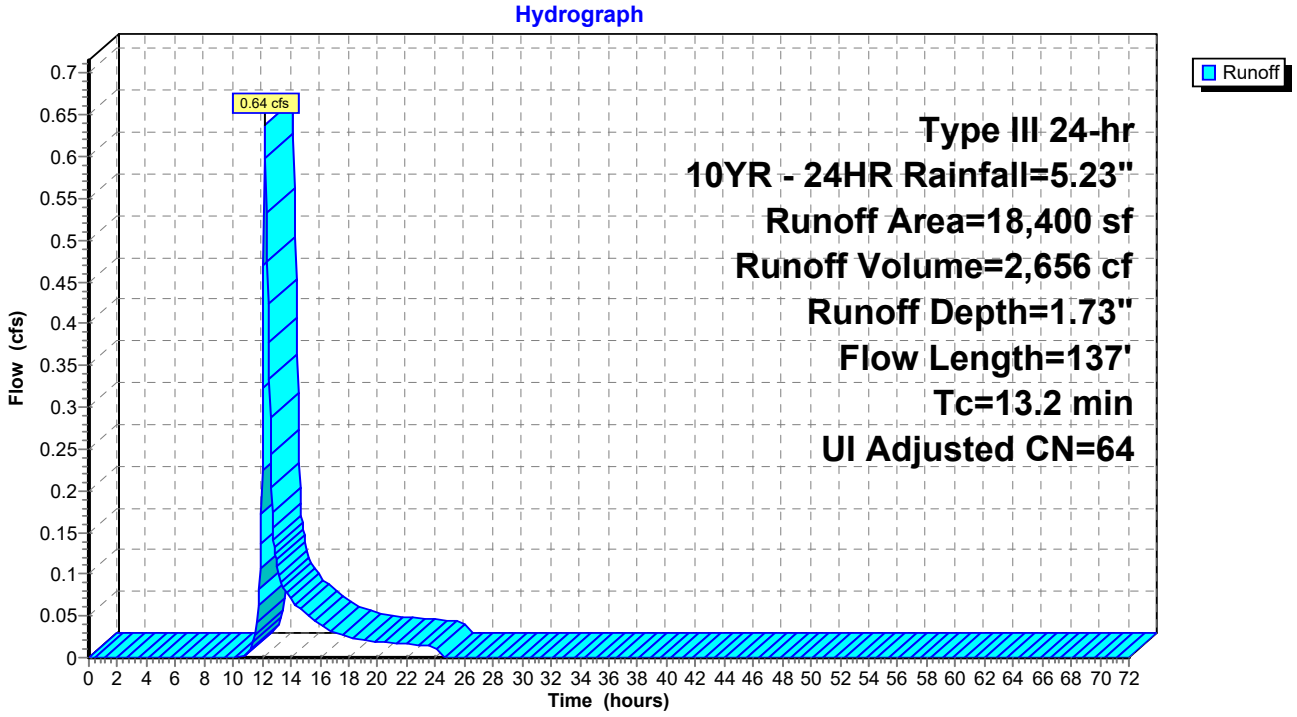
Runoff = 0.64 cfs @ 12.20 hrs, Volume= 2,656 cf, Depth= 1.73"
Routed to Pond P9 : Pond 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
13,317	58		Meadow, non-grazed, HSG B
3,878	98		Unconnected pavement, HSG A
1,205	98		Unconnected pavement, HSG D
18,400	69	64	Weighted Average, UI Adjusted
13,317			72.38% Pervious Area
5,083			27.62% Impervious Area
5,083			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	79	0.0709	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
8.4	58	0.0095	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
13.2	137	Total			

Subcatchment N10: DA-N10



Summary for Subcatchment N12: DA-N12

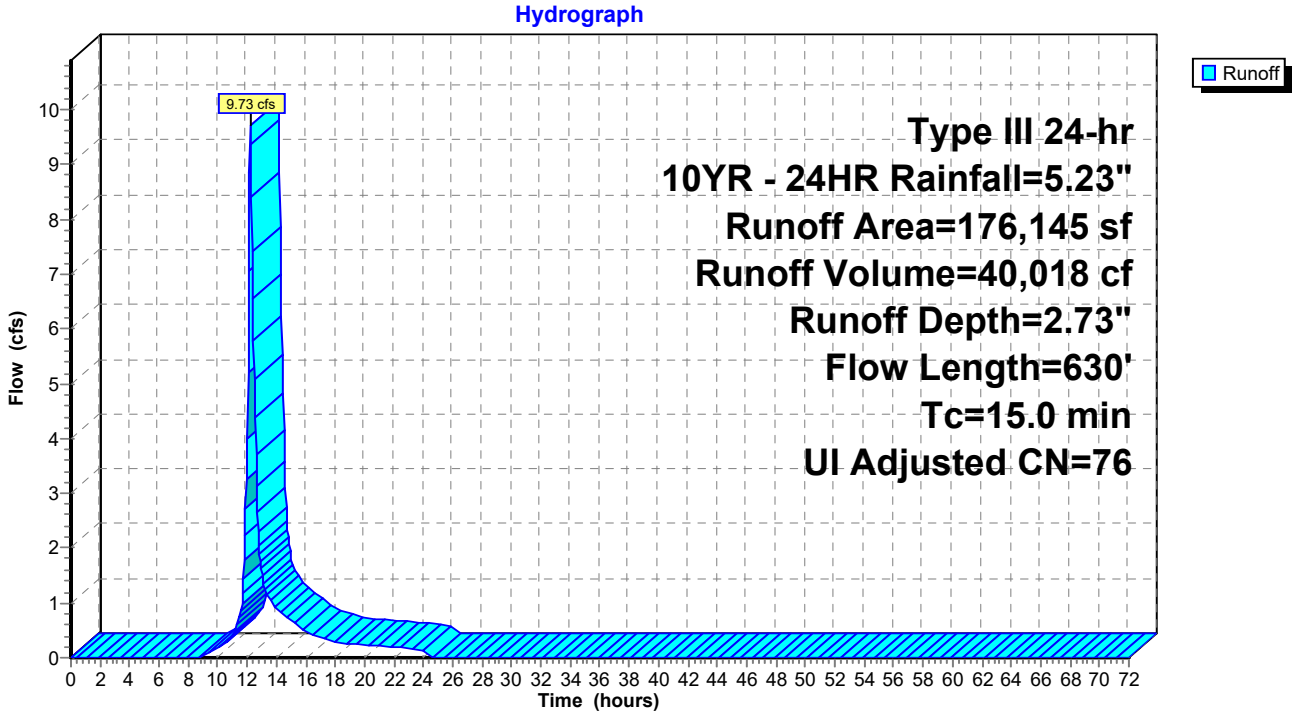
Runoff = 9.73 cfs @ 12.21 hrs, Volume= 40,018 cf, Depth= 2.73"
Routed to Pond P10 : Wetland Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

	Area (sf)	CN	Adj	Description
	31,420	61		>75% Grass cover, Good, HSG B
	13,488	98		Unconnected pavement, HSG A
	12,916	98		Unconnected pavement, HSG D
	54,749	55		Woods, Good, HSG B
*	63,572	98		Wetland/Water Surface, 0% imp, HSG D
	176,145	78	76	Weighted Average, UI Adjusted
	149,741			85.01% Pervious Area
	26,404			14.99% Impervious Area
	26,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	152	0.0105	1.17		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
8.1	251	0.0054	0.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	227	0.0029	0.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	630	Total			

Subcatchment N12: DA-N12



Summary for Subcatchment N13: DA-N13

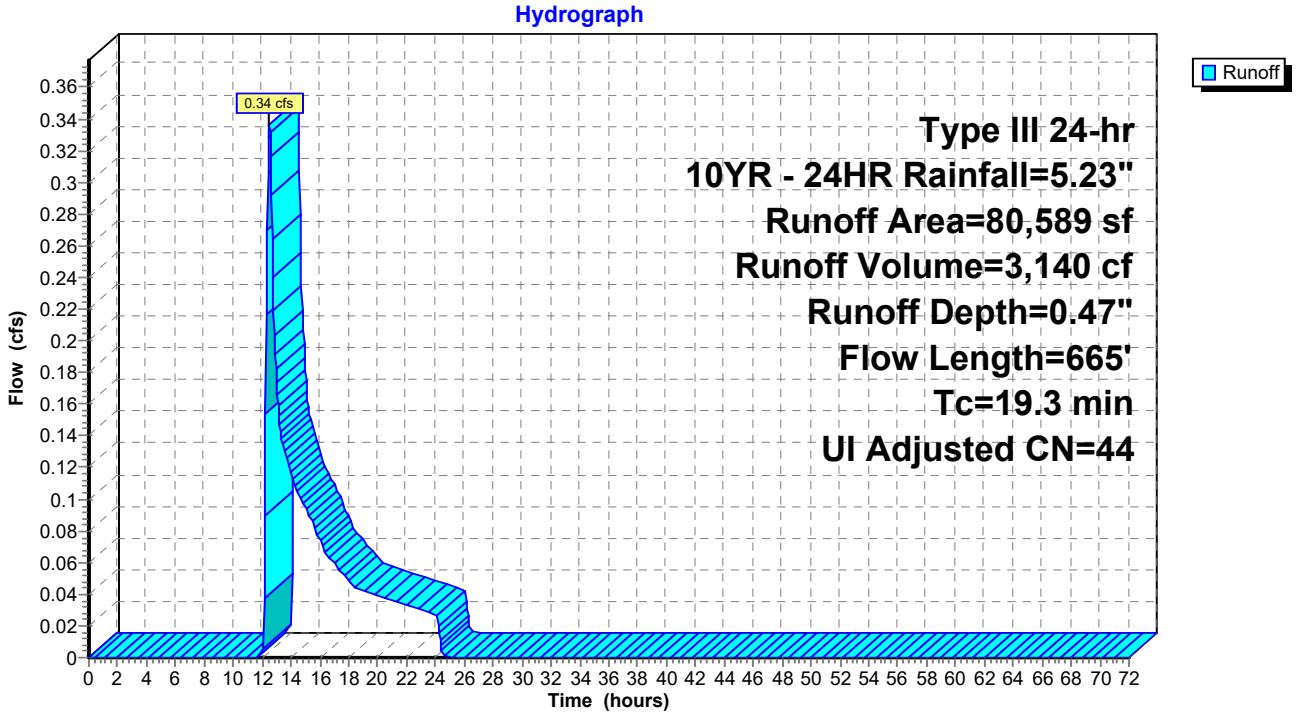
Runoff = 0.34 cfs @ 12.51 hrs, Volume= 3,140 cf, Depth= 0.47"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
12,512	98		Unconnected pavement, HSG A
48	98		Unconnected pavement, HSG D
68,029	39		>75% Grass cover, Good, HSG A
80,589	48	44	Weighted Average, UI Adjusted
68,029			84.41% Pervious Area
12,560			15.59% Impervious Area
12,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	115	0.0391	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
11.0	550	0.0141	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	665	Total			

Subcatchment N13: DA-N13



Summary for Subcatchment N14: DA-N14

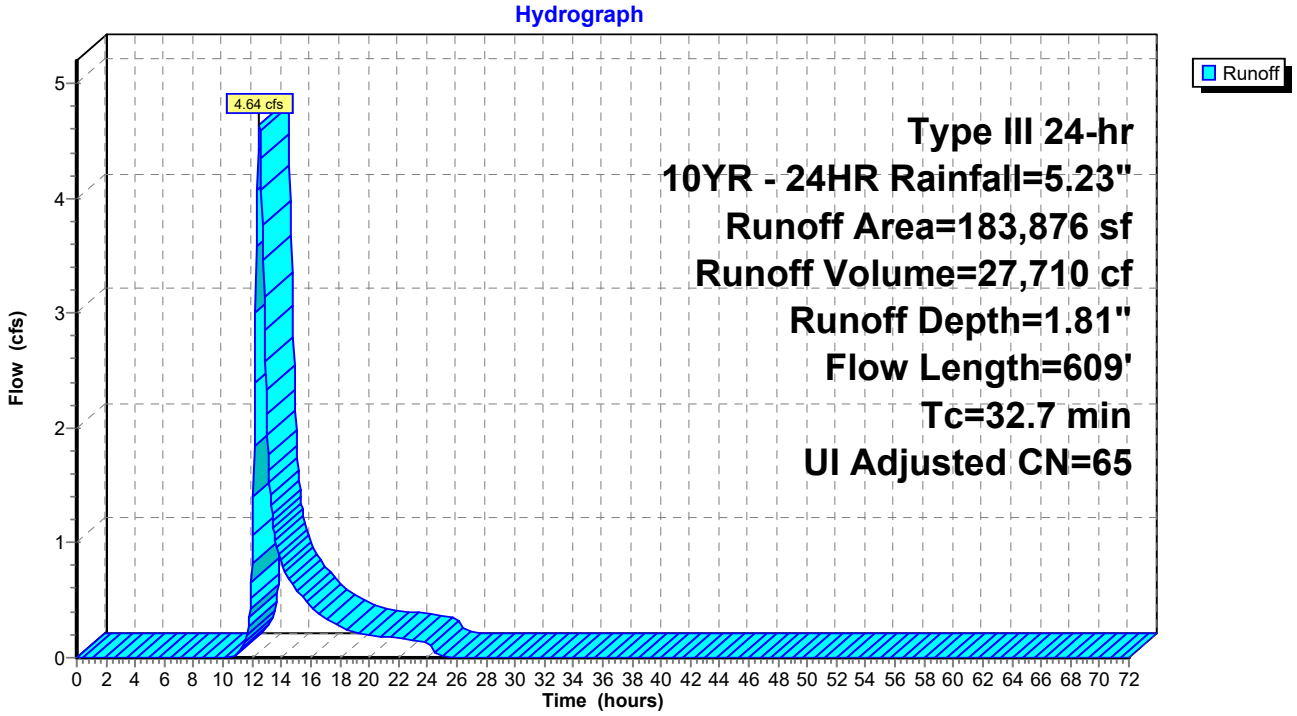
Runoff = 4.64 cfs @ 12.49 hrs, Volume= 27,710 cf, Depth= 1.81"
Routed to Pond P6 : Pond 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
140,023	61		>75% Grass cover, Good, HSG B
20,811	98		Unconnected pavement, HSG A
23,042	98		Unconnected pavement, HSG A
183,876	70	65	Weighted Average, UI Adjusted
140,023			76.15% Pervious Area
43,853			23.85% Impervious Area
43,853			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0122	1.08		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
13.2	122	0.0135	0.15		**Sheet Flow, Grasss** Grass: Short n= 0.150 P2= 3.30"
18.4	413	0.0036	0.37	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
32.7	609	Total			

Subcatchment N14: DA-N14



Summary for Subcatchment N15: DA-N15

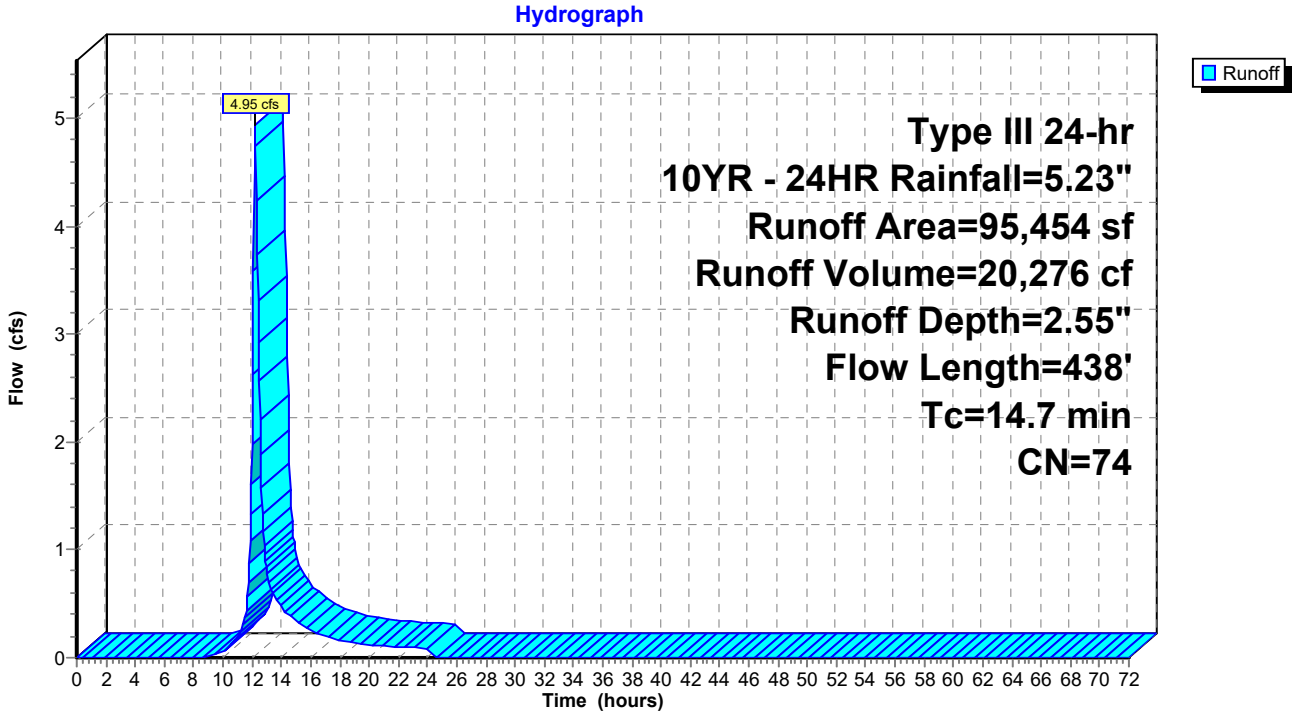
Runoff = 4.95 cfs @ 12.21 hrs, Volume= 20,276 cf, Depth= 2.55"
Routed to Pond P8 : Pond 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
61,700	61	>75% Grass cover, Good, HSG B
8,846	98	Unconnected pavement, HSG A
24,908	98	Unconnected pavement, HSG D
95,454	74	Weighted Average
61,700		64.64% Pervious Area
33,754		35.36% Impervious Area
33,754		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0783	0.27		**Sheet Flow, Grass**
					Grass: Short n= 0.150 P2= 3.30"
6.9	60	0.0166	0.14		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.30"
4.1	318	0.0075	1.30		**Shallow Concentrated Flow, Grass**
					Grassed Waterway Kv= 15.0 fps
14.7	438	Total			

Subcatchment N15: DA-N15



Summary for Subcatchment N2: DA-N2

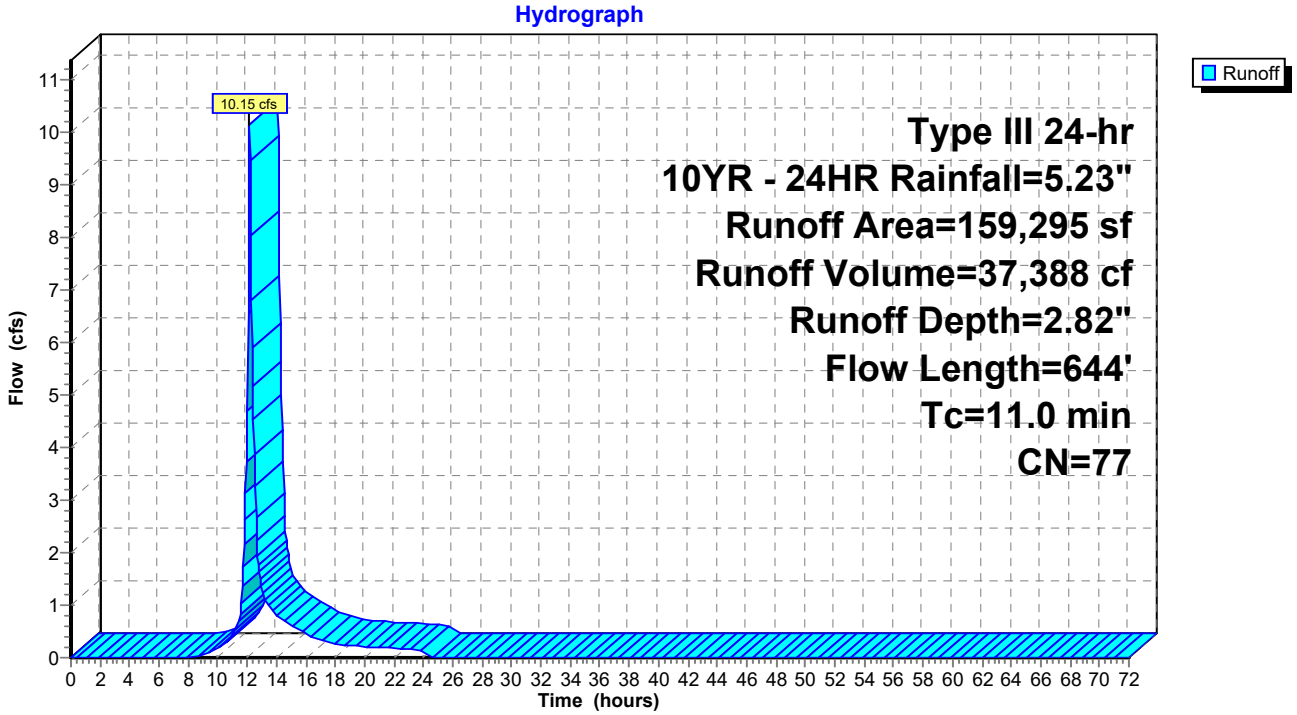
Runoff = 10.15 cfs @ 12.16 hrs, Volume= 37,388 cf, Depth= 2.82"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
76,508	98	Paved parking, HSG B
82,787	58	Meadow, non-grazed, HSG B
159,295	77	Weighted Average
82,787		51.97% Pervious Area
76,508		48.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	146	0.0137	1.30		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
9.1	498	0.0169	0.91		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.0	644	Total			

Subcatchment N2: DA-N2



Summary for Subcatchment N3: DA-N3

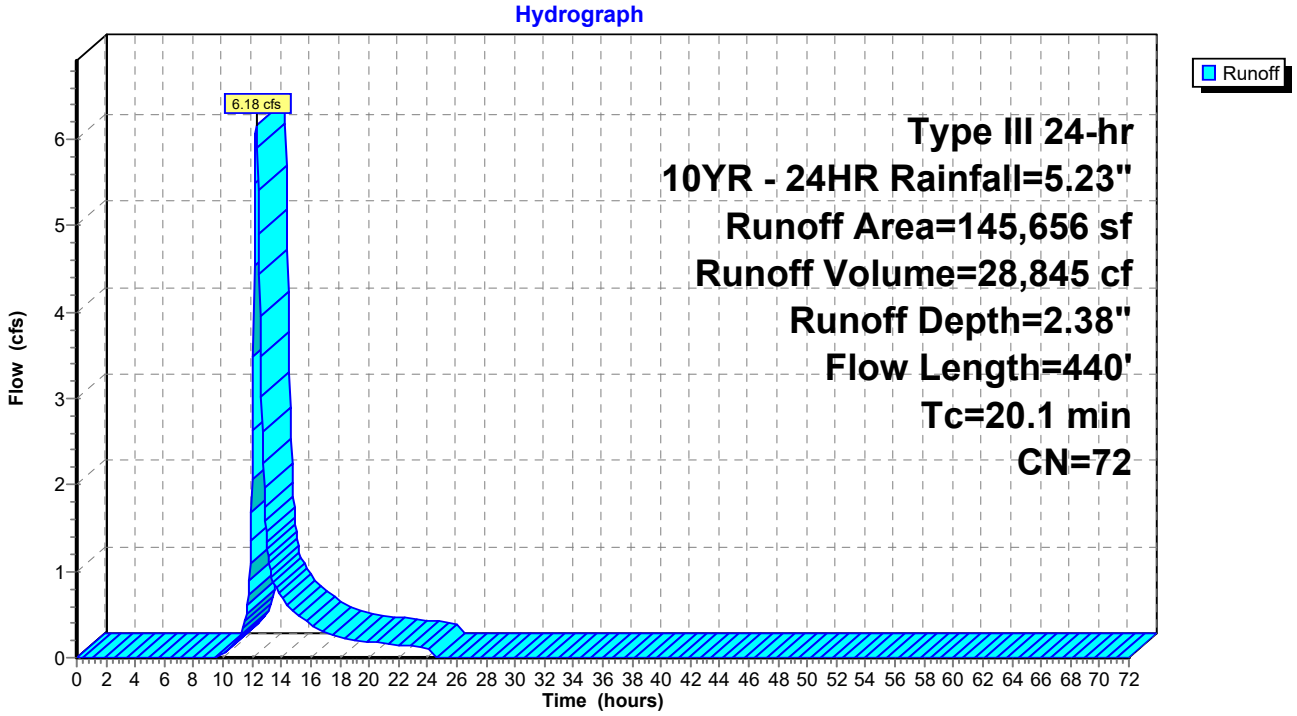
Runoff = 6.18 cfs @ 12.29 hrs, Volume= 28,845 cf, Depth= 2.38"
Routed to Pond P2 : Pond 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
95,136	58	Meadow, non-grazed, HSG B
716	85	Gravel roads, HSG B
39,197	98	Unconnected pavement, HSG A
10,607	98	Unconnected pavement, HSG D
145,656	72	Weighted Average
95,852		65.81% Pervious Area
49,804		34.19% Impervious Area
49,804		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	124	0.0127	1.22		**Sheet Flow, Taxiway A-B** Smooth surfaces n= 0.011 P2= 3.30"
12.3	140	0.0214	0.19		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
6.1	176	0.0059	0.48	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel C-D** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
20.1	440	Total			

Subcatchment N3: DA-N3



Summary for Subcatchment N4: DA-N4

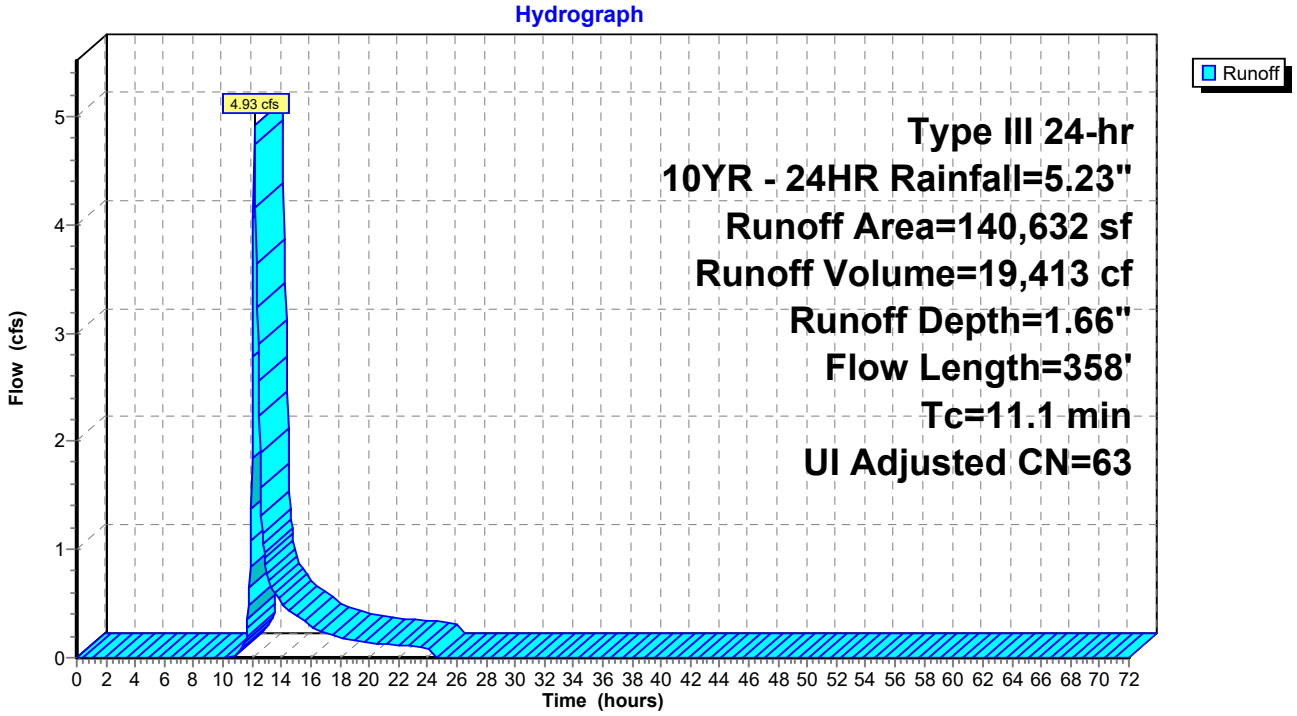
Runoff = 4.93 cfs @ 12.17 hrs, Volume= 19,413 cf, Depth= 1.66"
Routed to Pond P4 : Pond 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
103,196	58		Meadow, non-grazed, HSG B
28,491	98		Unconnected pavement, HSG A
8,945	98		Unconnected pavement, HSG D
140,632	69	63	Weighted Average, UI Adjusted
103,196			73.38% Pervious Area
37,436			26.62% Impervious Area
37,436			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	75	0.0100	1.00		**Sheet Flow, Runway A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.2	25	0.0100	0.10		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
4.1	200	0.0135	0.81		**Shallow Concentrated Flow, Grass C-D** Short Grass Pasture Kv= 7.0 fps
1.5	58	0.0103	0.63	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
11.1	358	Total			

Subcatchment N4: DA-N4



Summary for Subcatchment N6: DA-N6

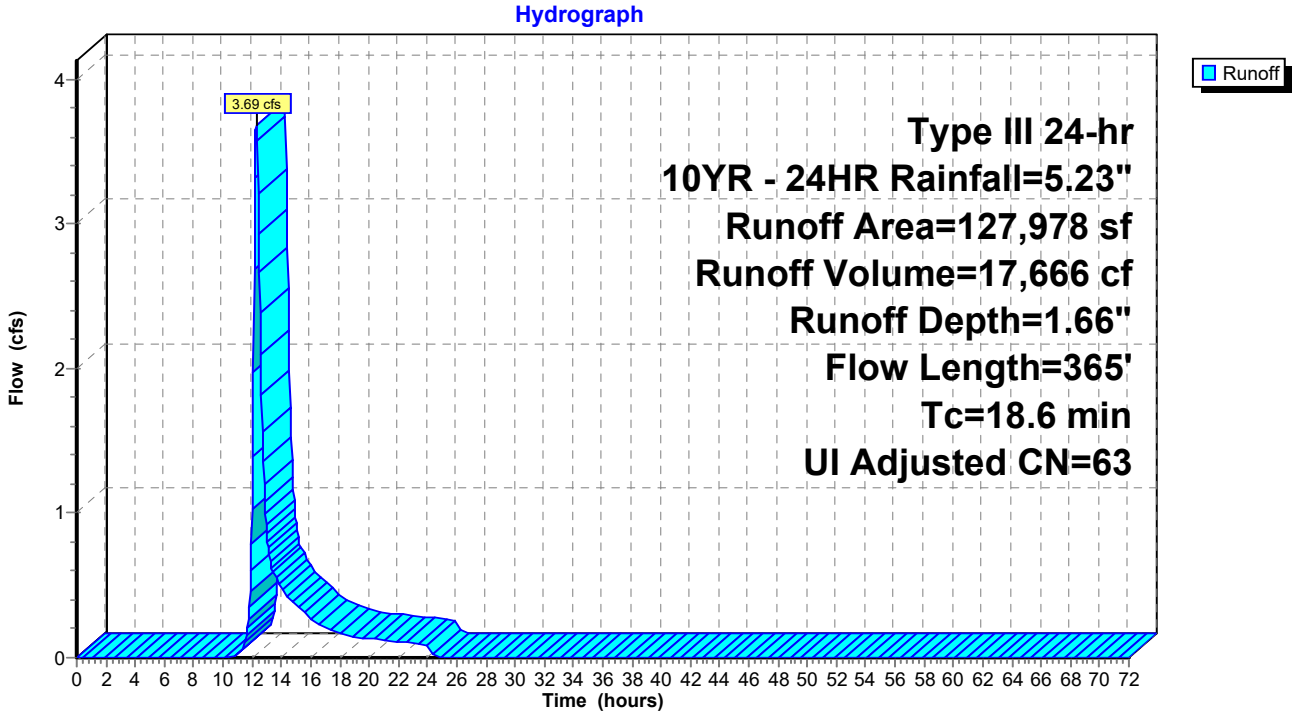
Runoff = 3.69 cfs @ 12.28 hrs, Volume= 17,666 cf, Depth= 1.66"
Routed to Pond P5 : Pond 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
93,344	58		Meadow, non-grazed, HSG B
709	76		Gravel roads, HSG A
25,067	98		Unconnected pavement, HSG A
8,858	98		Unconnected pavement, HSG D
127,978	69	63	Weighted Average, UI Adjusted
94,053			73.49% Pervious Area
33,925			26.51% Impervious Area
33,925			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	78	0.0102	0.13		**Sheet Flow, Runway A-B** Grass: Short n= 0.150 P2= 3.30"
2.7	22	0.0242	0.14		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
3.6	143	0.0088	0.66		**Shallow Concentrated Flow, Grass C-D** Short Grass Pasture Kv= 7.0 fps
0.4	55	0.0120	2.22		**Shallow Concentrated Flow, PCC Channel D-E** Paved Kv= 20.3 fps
1.5	67	0.0149	0.76	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
18.6	365	Total			

Subcatchment N6: DA-N6



Summary for Subcatchment N7: DA-N7

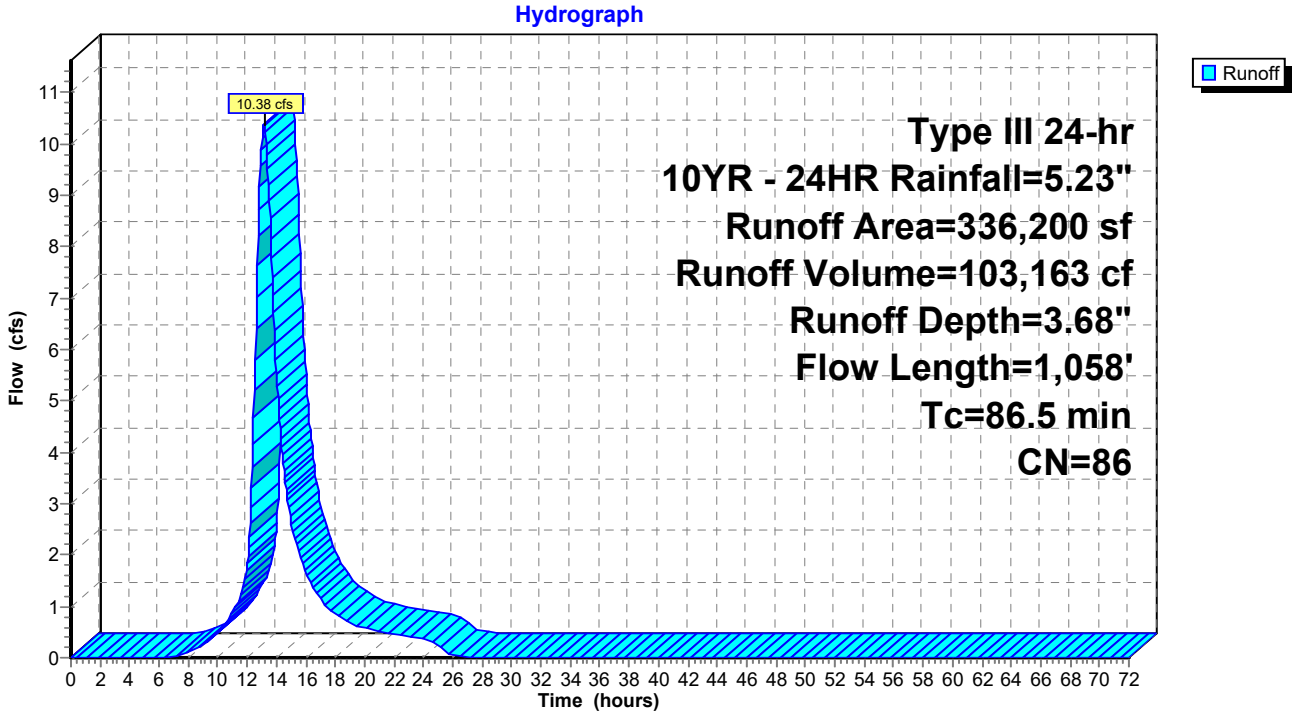
Runoff = 10.38 cfs @ 13.14 hrs, Volume= 103,163 cf, Depth= 3.68"
Routed to Pond P3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
104,683	58	Meadow, non-grazed, HSG B
2,298	98	Unconnected pavement, HSG A
229,219	98	Unconnected pavement, HSG D
336,200	86	Weighted Average
104,683		31.14% Pervious Area
231,517		68.86% Impervious Area
231,517		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	300	0.0043	0.94		**Sheet Flow, Apron** Smooth surfaces n= 0.011 P2= 3.30"
4.0	318	0.0043	1.33		**Shallow Concentrated Flow, Apron** Paved Kv= 20.3 fps
0.4	33	0.0424	1.44		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
76.8	407	0.0002	0.09	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
86.5	1,058	Total			

Subcatchment N7: DA-N7



Summary for Subcatchment N8: DA-N8

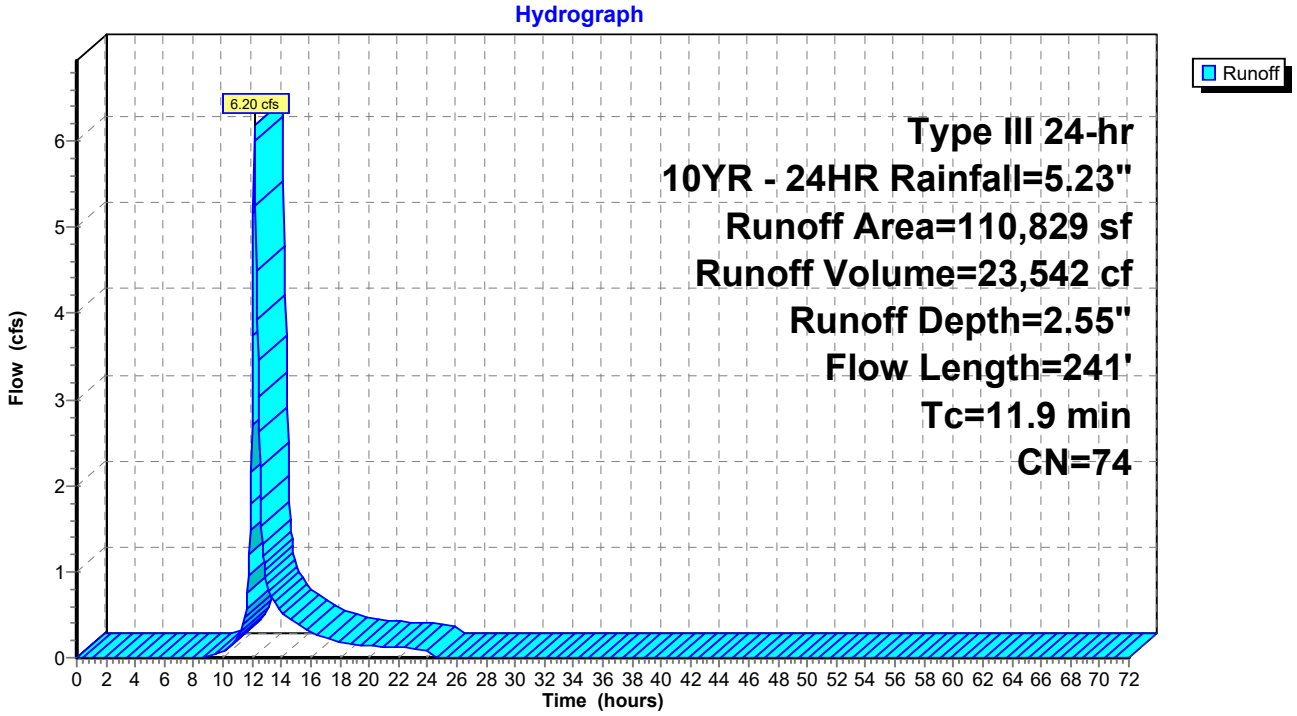
Runoff = 6.20 cfs @ 12.17 hrs, Volume= 23,542 cf, Depth= 2.55"
Routed to Pond P7 : Pond 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Description
66,418	58	Meadow, non-grazed, HSG B
36,227	98	Unconnected pavement, HSG A
8,184	98	Unconnected pavement, HSG D
110,829	74	Weighted Average
66,418		59.93% Pervious Area
44,411		40.07% Impervious Area
44,411		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	102	0.0107	1.09		**Sheet Flow, Pavement A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.6	105	0.0221	0.18		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
0.7	34	0.0174	0.82	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
11.9	241	Total			

Subcatchment N8: DA-N8



Summary for Subcatchment N9: DA-N9

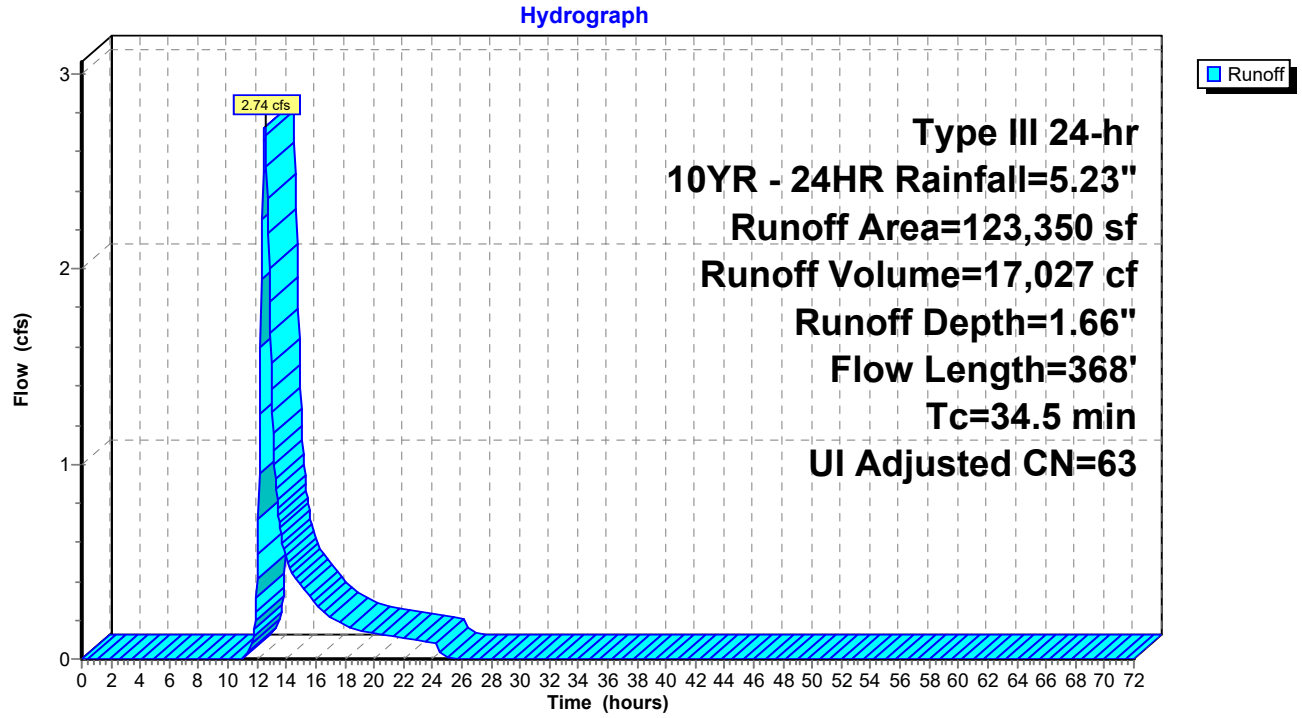
Runoff = 2.74 cfs @ 12.53 hrs, Volume= 17,027 cf, Depth= 1.66"
Routed to Pond P1 : Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 10YR - 24HR Rainfall=5.23"

Area (sf)	CN	Adj	Description
94,082	58		Meadow, non-grazed, HSG B
3,983	98		Unconnected pavement, HSG A
25,285	98		Unconnected pavement, HSG D
123,350	67	63	Weighted Average, UI Adjusted
94,082			76.27% Pervious Area
29,268			23.73% Impervious Area
29,268			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	214	0.0201	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
16.8	154	0.0006	0.15	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
34.5	368	Total			

Subcatchment N9: DA-N9



Summary for Reach 1R: WQS Segment 1

Inflow Area = 1,462,159 sf, 36.00% Impervious, Inflow Depth = 2.17" for 10YR - 24HR event
Inflow = 30.40 cfs @ 12.22 hrs, Volume= 264,390 cf
Outflow = 24.42 cfs @ 12.43 hrs, Volume= 264,390 cf, Atten= 20%, Lag= 12.3 min
Routed to Pond Cr-B : Robinson Driveway

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.51 fps, Min. Travel Time= 13.9 min
Avg. Velocity = 0.40 fps, Avg. Travel Time= 51.8 min

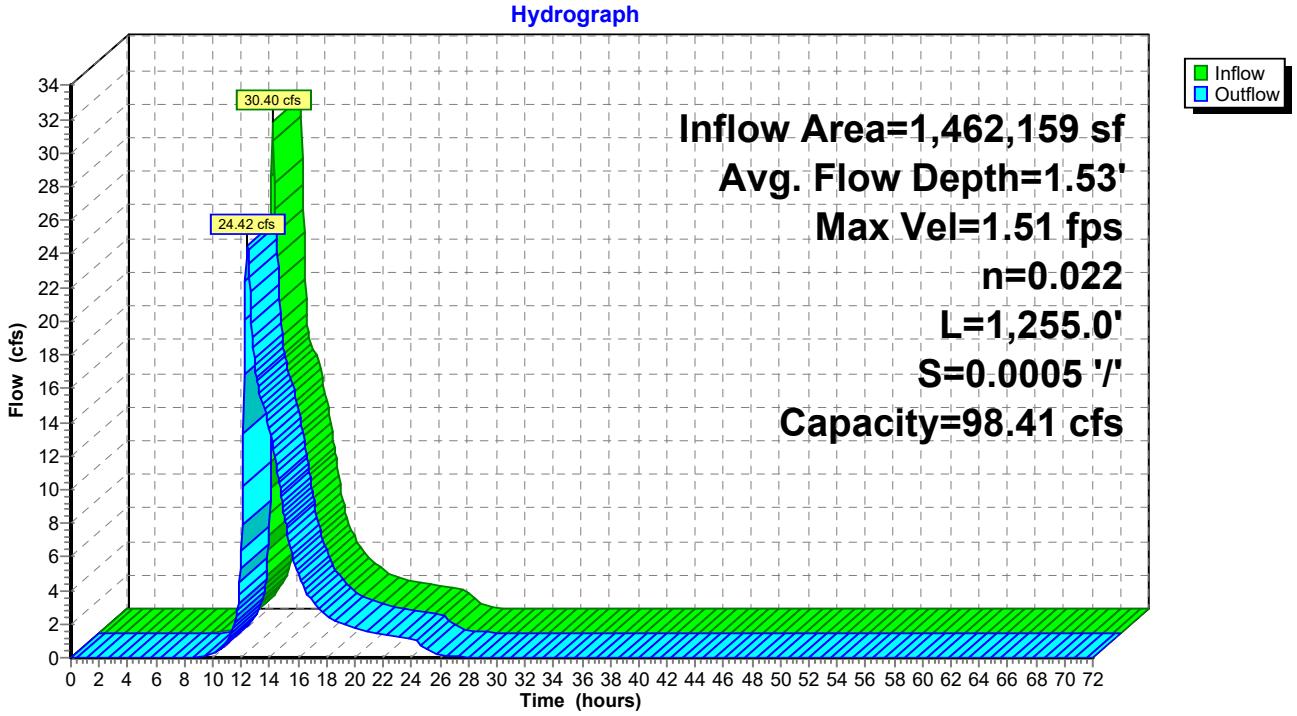
Peak Storage= 20,306 cf @ 12.43 hrs
Average Depth at Peak Storage= 1.53' , Surface Width= 15.17'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 239.23 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.41 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 1,255.0' Slope= 0.0005 '/'
Inlet Invert= 2.32', Outlet Invert= 1.72'



‡

Reach 1R: WQS Segment 1



Summary for Reach 2R: WQS Segment 2

Inflow Area = 1,828,358 sf, 39.67% Impervious, Inflow Depth = 2.23" for 10YR - 24HR event
Inflow = 38.74 cfs @ 12.31 hrs, Volume= 339,527 cf
Outflow = 36.40 cfs @ 12.44 hrs, Volume= 339,527 cf, Atten= 6%, Lag= 7.5 min
Routed to Pond Cr-CD : Utility Crossing

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.69 fps, Min. Travel Time= 7.5 min
Avg. Velocity = 0.42 fps, Avg. Travel Time= 30.1 min

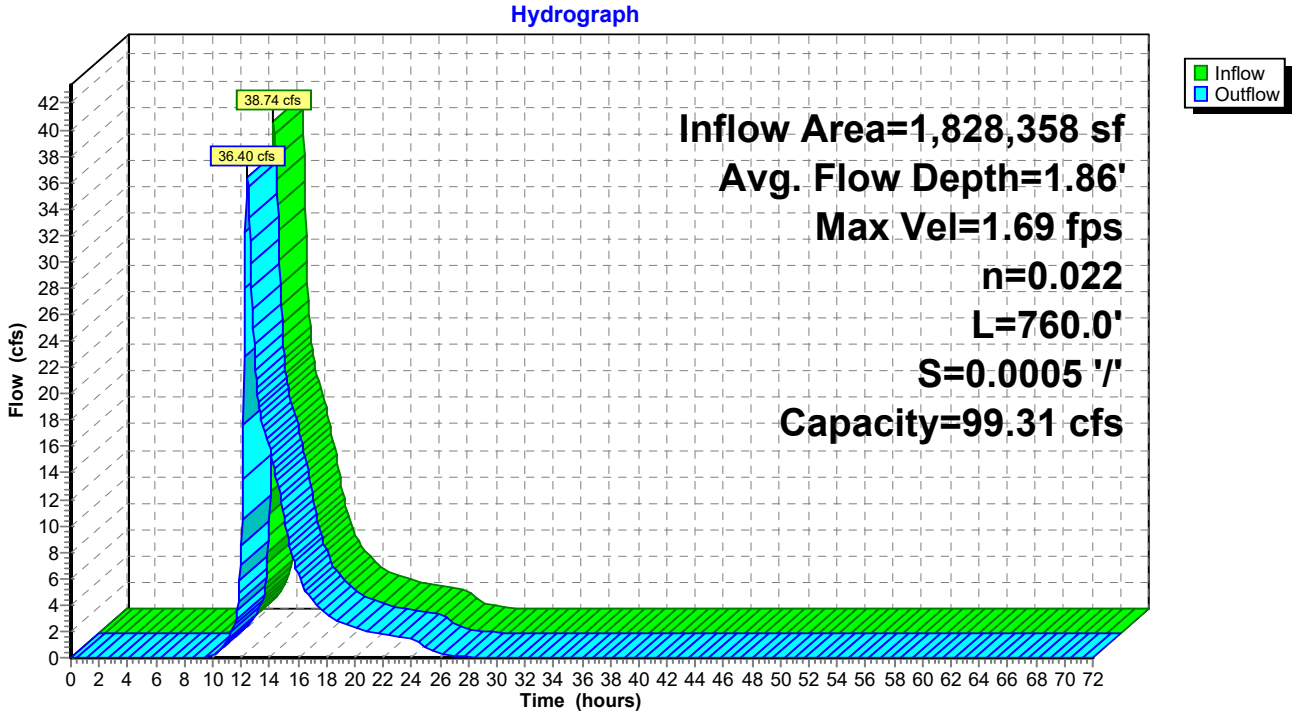
Peak Storage= 16,336 cf @ 12.44 hrs
Average Depth at Peak Storage= 1.86' , Surface Width= 17.14'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 241.41 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 99.31 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 760.0' Slope= 0.0005 '/'
Inlet Invert= 1.70', Outlet Invert= 1.33'



‡

Reach 2R: WQS Segment 2



Summary for Reach 3R: WQS Segment 3

Inflow Area = 2,385,294 sf, 36.01% Impervious, Inflow Depth = 2.15" for 10YR - 24HR event
Inflow = 51.80 cfs @ 12.40 hrs, Volume= 427,264 cf
Outflow = 46.55 cfs @ 12.52 hrs, Volume= 427,264 cf, Atten= 10%, Lag= 7.1 min
Routed to Pond CC1 : CC1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.79 fps, Min. Travel Time= 5.7 min
Avg. Velocity = 0.37 fps, Avg. Travel Time= 27.8 min

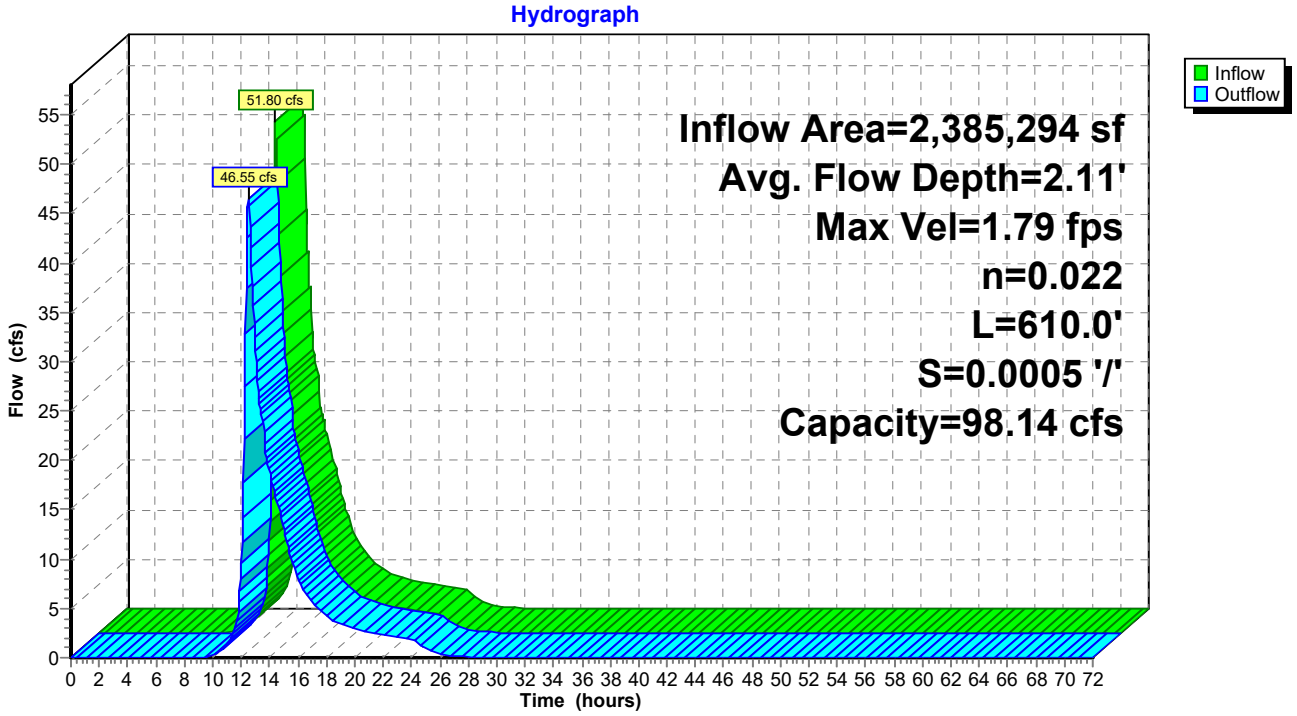
Peak Storage= 15,836 cf @ 12.52 hrs
Average Depth at Peak Storage= 2.11' , Surface Width= 18.64'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 238.55 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.14 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 610.0' Slope= 0.0005 '/'
Inlet Invert= 1.28', Outlet Invert= 0.99'



‡

Reach 3R: WQS Segment 3



Summary for Reach PT1: Overland Flow

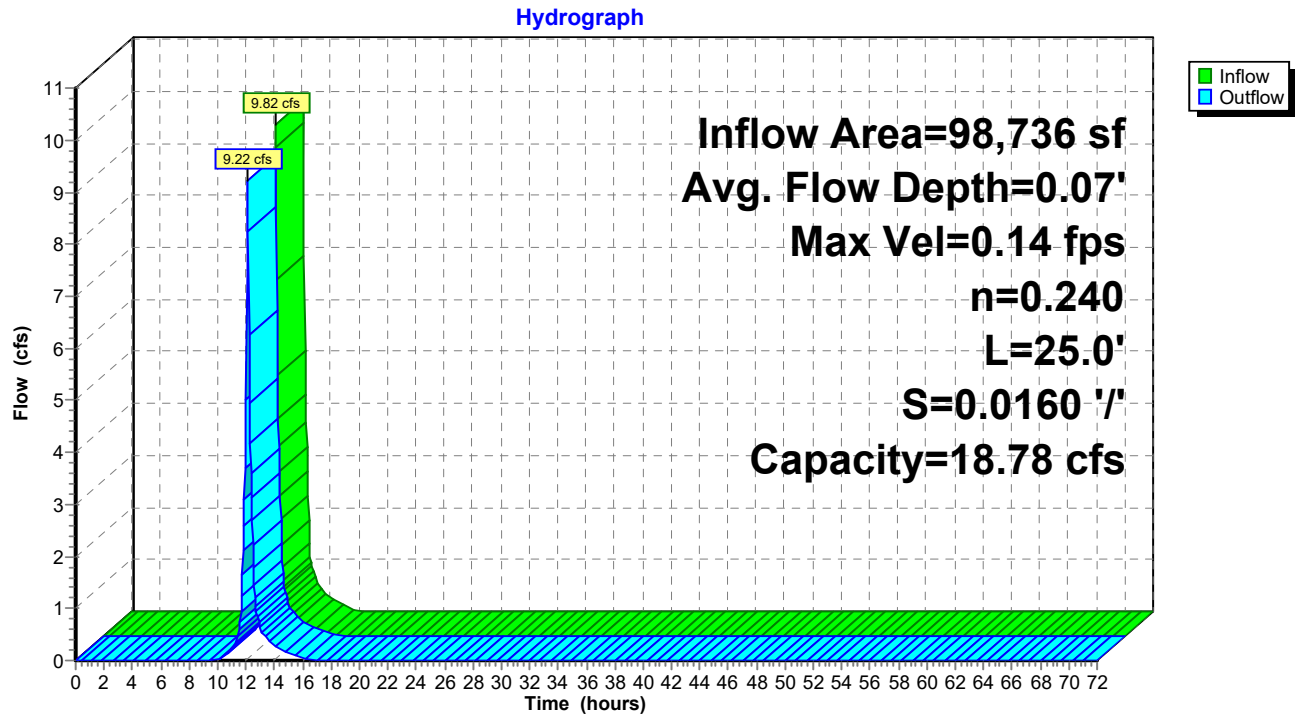
Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 2.29" for 10YR - 24HR event
Inflow = 9.82 cfs @ 12.07 hrs, Volume= 18,843 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 9.22 cfs @ 12.11 hrs, Volume= 18,843 cf, Atten= 6%, Lag= 2.0 min
Routed to Pond T1 : Sand Filter 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.14 fps, Min. Travel Time= 3.1 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 18.9 min

Peak Storage= 1,706 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.07' , Surface Width= 951.87'
Bank-Full Depth= 0.11' Flow Area= 104.6 sf, Capacity= 18.78 cfs

949.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 953.40'
Length= 25.0' Slope= 0.0160 '/'
Inlet Invert= 4.15', Outlet Invert= 3.75'





Summary for Reach PT2: Overland Flow

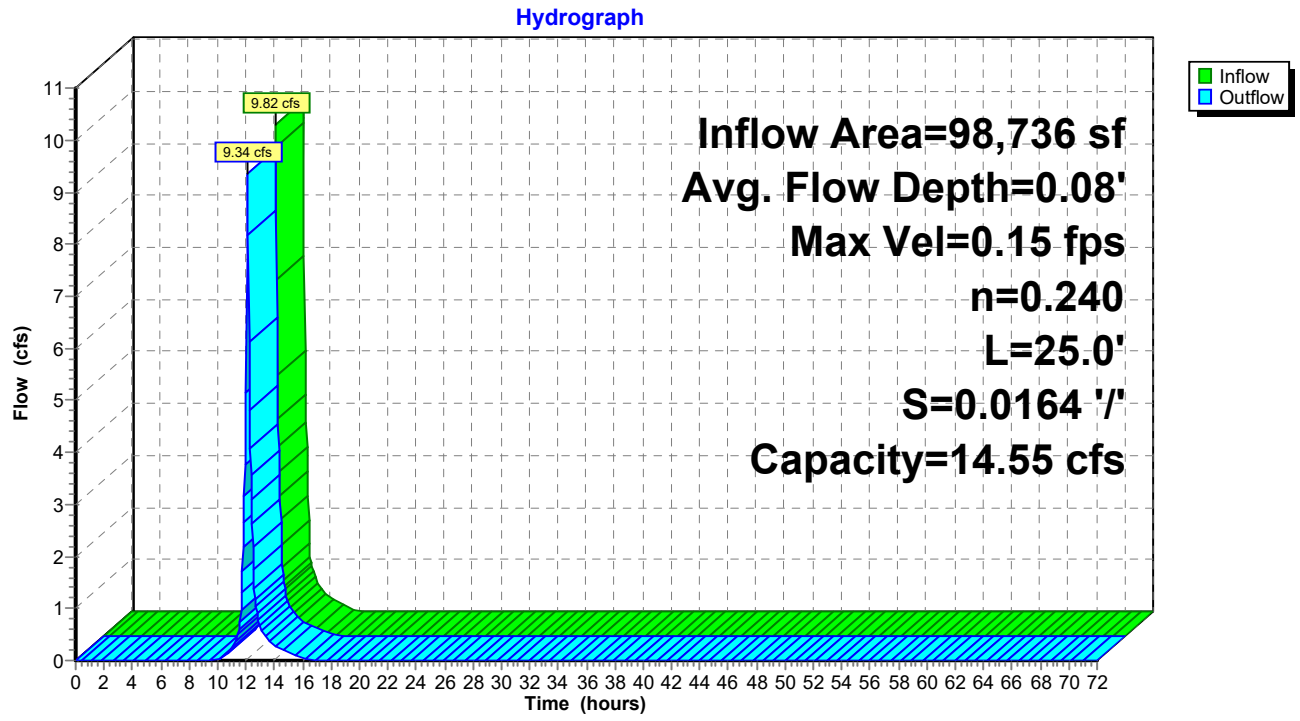
Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 2.29" for 10YR - 24HR event
Inflow = 9.82 cfs @ 12.07 hrs, Volume= 18,843 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 9.34 cfs @ 12.10 hrs, Volume= 18,843 cf, Atten= 5%, Lag= 1.9 min
Routed to Pond T2 : Sand Filter 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.15 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 17.0 min

Peak Storage= 1,534 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.08' , Surface Width= 729.37'
Bank-Full Depth= 0.11' Flow Area= 80.1 sf, Capacity= 14.55 cfs

726.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 730.40'
Length= 25.0' Slope= 0.0164 '/'
Inlet Invert= 4.15', Outlet Invert= 3.74'





Summary for Reach PT3: Overland Flow

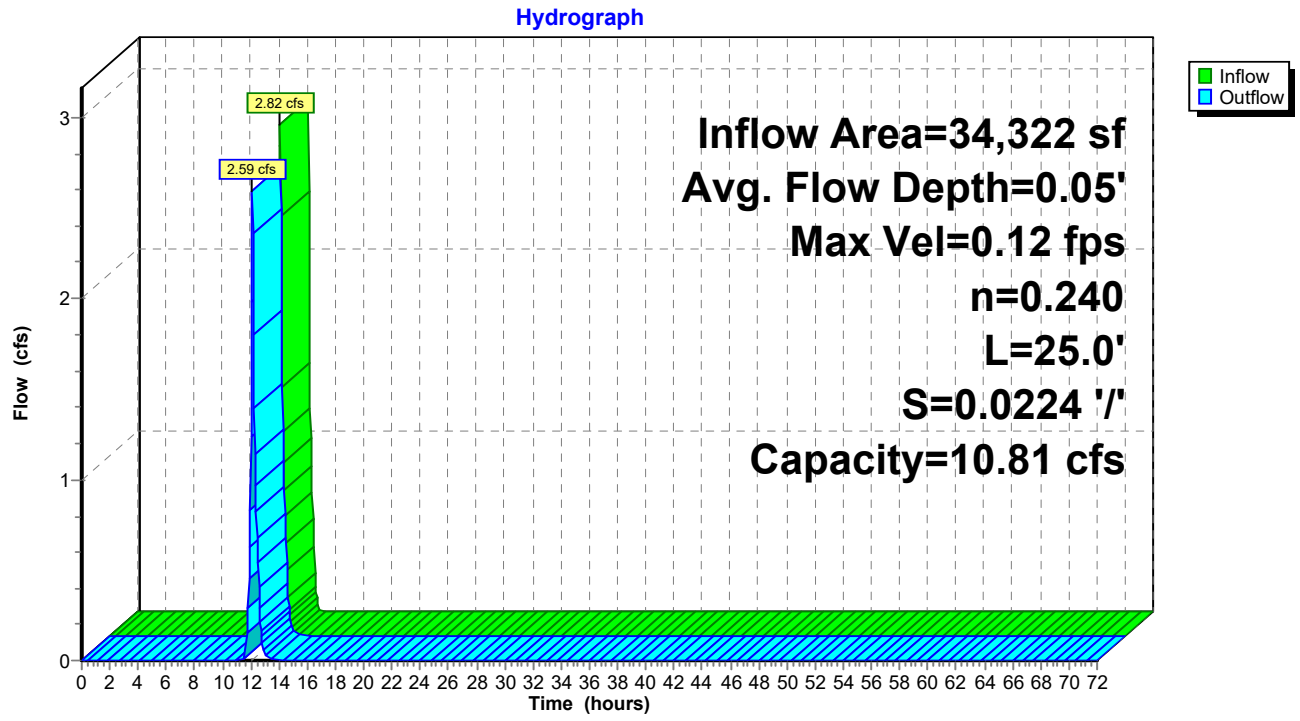
Inflow Area = 34,322 sf, 59.30% Impervious, Inflow Depth = 1.24" for 10YR - 24HR event
Inflow = 2.82 cfs @ 12.07 hrs, Volume= 3,551 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 2.59 cfs @ 12.11 hrs, Volume= 3,551 cf, Atten= 8%, Lag= 2.2 min
Routed to Pond T3 : Sand Filter 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 21.7 min

Peak Storage= 540 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.05' , Surface Width= 462.87'
Bank-Full Depth= 0.11' Flow Area= 51.0 sf, Capacity= 10.81 cfs

461.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 465.40'
Length= 25.0' Slope= 0.0224 '/'
Inlet Invert= 3.86', Outlet Invert= 3.30'





Summary for Reach PT4: Overland Flow

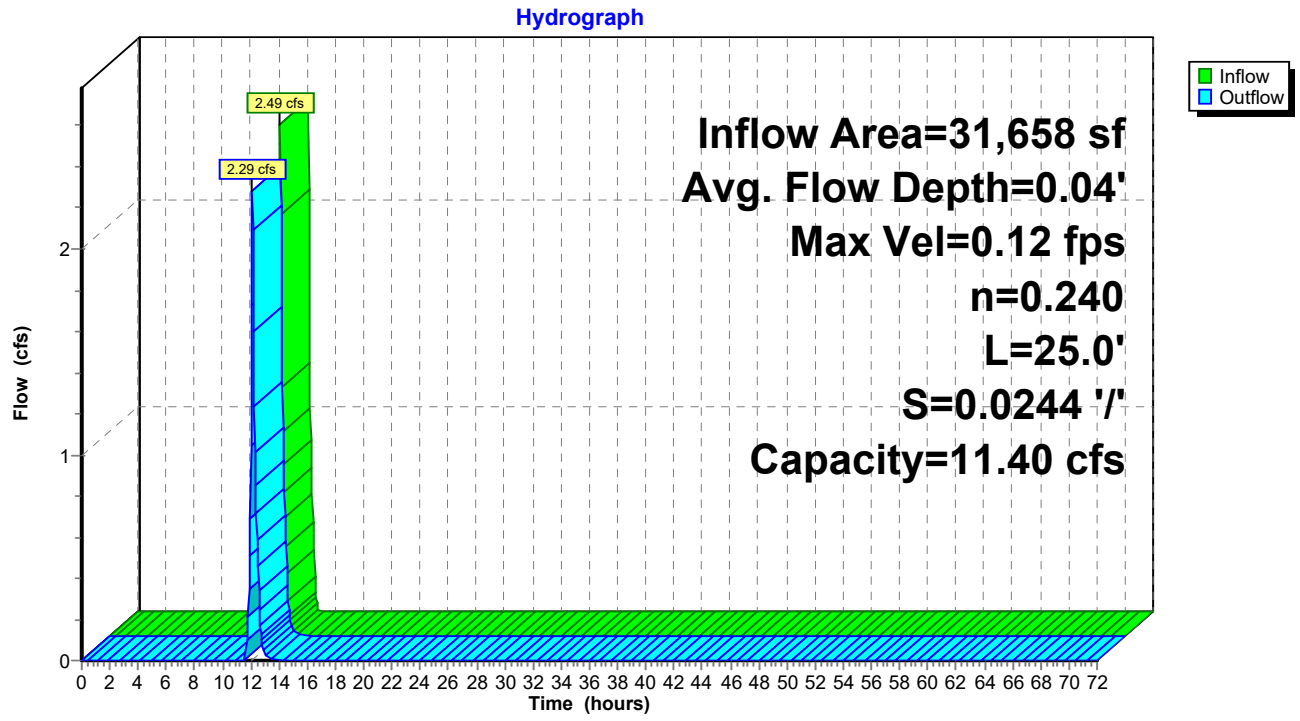
Inflow Area = 31,658 sf, 56.17% Impervious, Inflow Depth = 1.15" for 10YR - 24HR event
Inflow = 2.49 cfs @ 12.08 hrs, Volume= 3,041 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 2.29 cfs @ 12.11 hrs, Volume= 3,041 cf, Atten= 8%, Lag= 2.3 min
Routed to Pond T4 : Sand Filter 4

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.12 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 21.7 min

Peak Storage= 490 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.04' , Surface Width= 467.68'
Bank-Full Depth= 0.11' Flow Area= 51.5 sf, Capacity= 11.40 cfs

466.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 470.40'
Length= 25.0' Slope= 0.0244 '/'
Inlet Invert= 3.79', Outlet Invert= 3.18'





Summary for Pond 11P: (5) Culvert 6X3

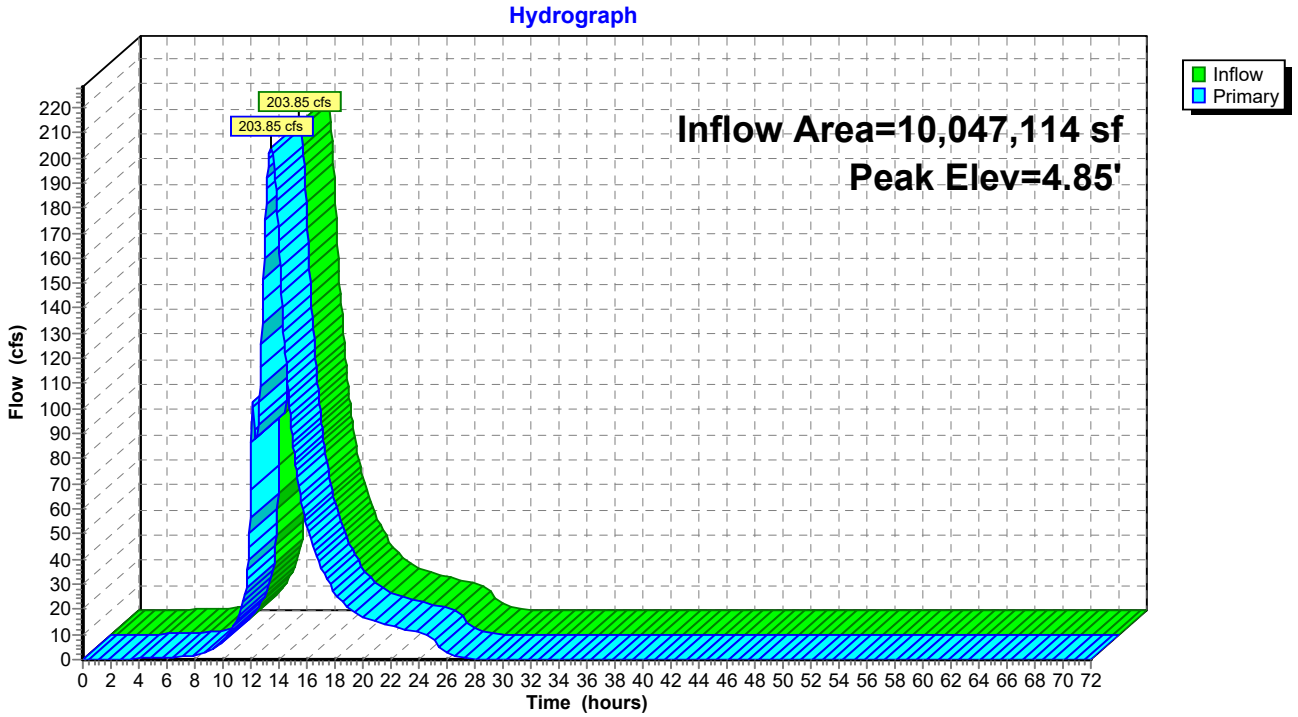
Inflow Area = 10,047,114 sf, 45.76% Impervious, Inflow Depth = 3.14" for 10YR - 24HR event
Inflow = 203.85 cfs @ 13.42 hrs, Volume= 2,626,162 cf
Outflow = 203.85 cfs @ 13.42 hrs, Volume= 2,626,162 cf, Atten= 0%, Lag= 0.0 min
Primary = 203.85 cfs @ 13.42 hrs, Volume= 2,626,162 cf
Routed to Link 3L : EAST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.85' @ 13.42 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	**72.0" W x 36.0" H Box Box 6x3, n=0.012 X 5.00** L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.80' S= 0.0033 '/' Cc= 0.900 n= 0.012, Flow Area= 18.00 sf
#2	Primary	5.51'	**1,000.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=203.59 cfs @ 13.42 hrs HW=4.85' (Free Discharge)
└─**1=Box 6x3, n=0.012** (Barrel Controls 203.59 cfs @ 4.90 fps)
└─**2=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 11P: (5) Culvert 6X3



Summary for Pond CB1: Exist CB

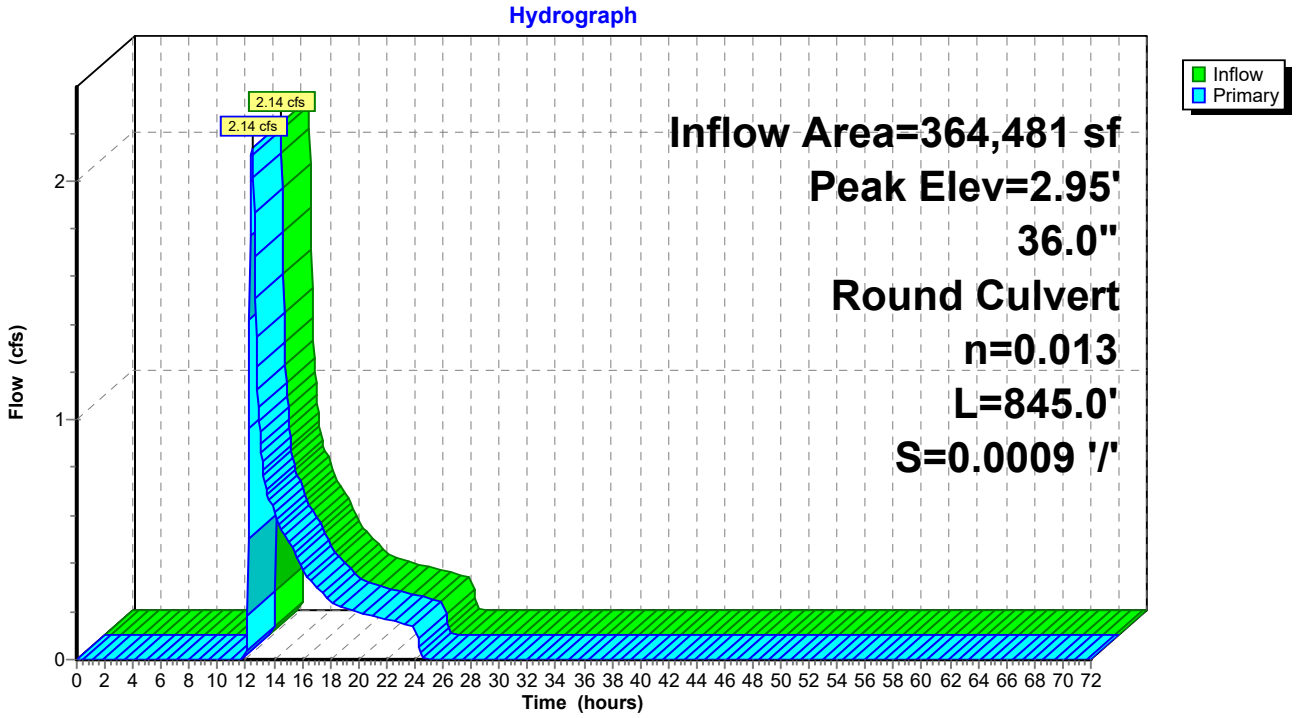
Inflow Area = 364,481 sf, 23.60% Impervious, Inflow Depth = 0.57" for 10YR - 24HR event
Inflow = 2.14 cfs @ 12.45 hrs, Volume= 17,256 cf
Outflow = 2.14 cfs @ 12.45 hrs, Volume= 17,256 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.14 cfs @ 12.45 hrs, Volume= 17,256 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.95' @ 12.45 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.10'	**36.0" Round Culvert** L= 845.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 2.10' / 1.32' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf

Primary OutFlow Max=2.14 cfs @ 12.45 hrs HW=2.95' (Free Discharge)
1=Culvert (Barrel Controls 2.14 cfs @ 1.96 fps)

Pond CB1: Exist CB



Summary for Pond CB10: Exist CB

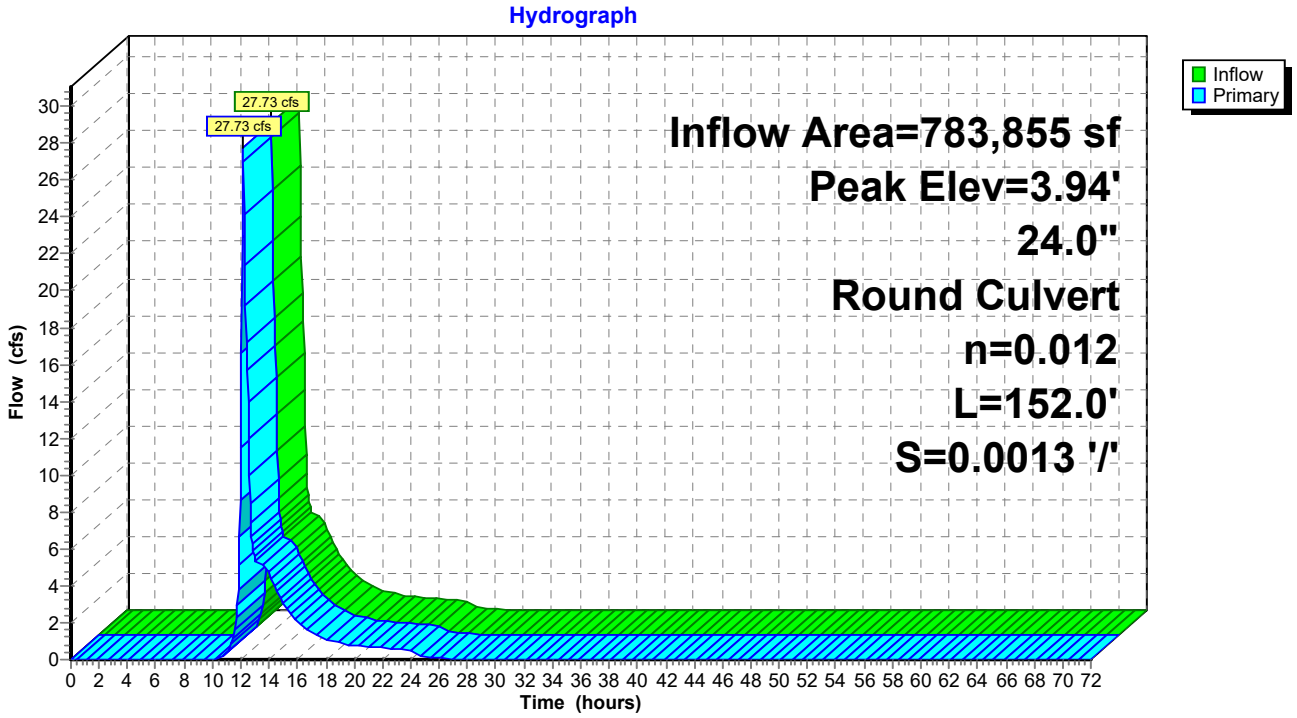
Inflow Area = 783,855 sf, 32.36% Impervious, Inflow Depth = 1.95" for 10YR - 24HR event
Inflow = 27.73 cfs @ 12.17 hrs, Volume= 127,687 cf
Outflow = 27.73 cfs @ 12.17 hrs, Volume= 127,687 cf, Atten= 0%, Lag= 0.0 min
Primary = 27.73 cfs @ 12.17 hrs, Volume= 127,687 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.94' @ 12.17 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.62'	**24.0" Round Culvert** L= 152.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -1.62' / -1.82' S= 0.0013 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=27.15 cfs @ 12.17 hrs HW=3.79' (Free Discharge)
1=Culvert (Barrel Controls 27.15 cfs @ 8.64 fps)

Pond CB10: Exist CB



Summary for Pond CB11: Exist CB

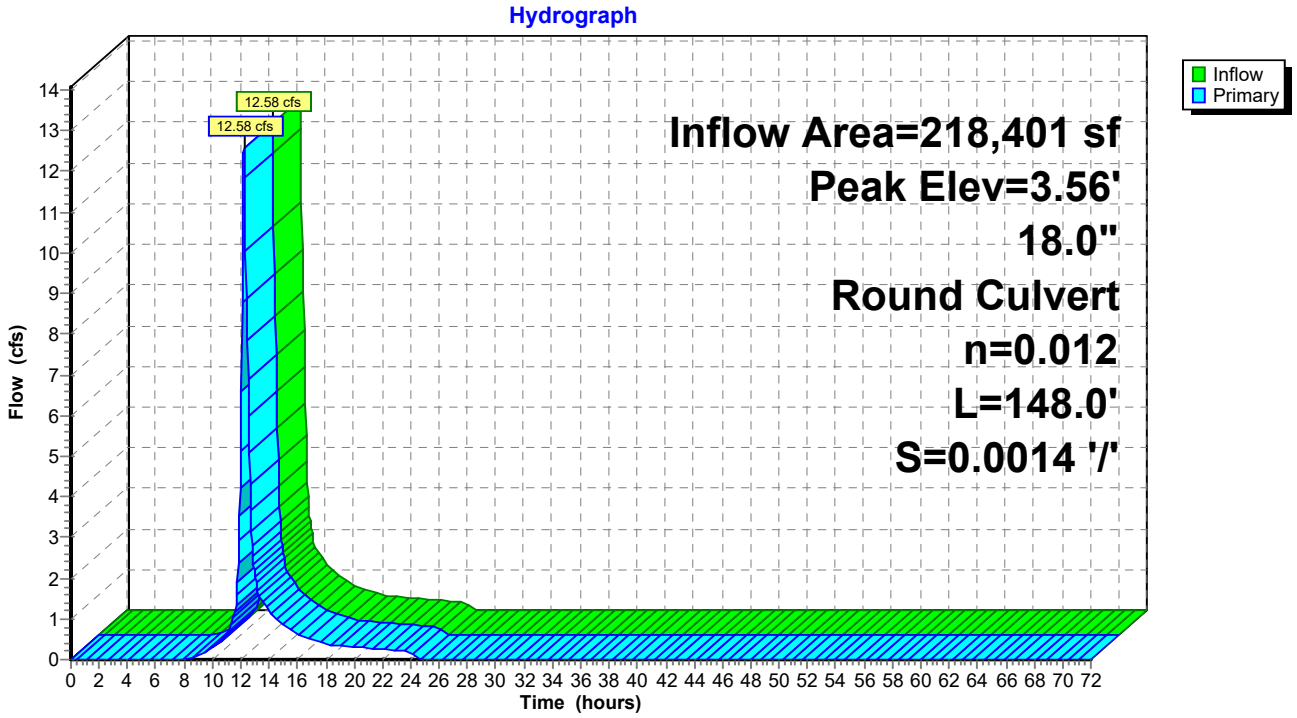
Inflow Area = 218,401 sf, 45.10% Impervious, Inflow Depth = 2.91" for 10YR - 24HR event
Inflow = 12.58 cfs @ 12.22 hrs, Volume= 52,926 cf
Outflow = 12.58 cfs @ 12.22 hrs, Volume= 52,926 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.58 cfs @ 12.22 hrs, Volume= 52,926 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.56' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.73'	**18.0" Round RCP_Round 18"** L= 148.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.73' / -0.93' S= 0.0014 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=12.40 cfs @ 12.22 hrs HW=3.48' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 12.40 cfs @ 7.02 fps)

Pond CB11: Exist CB



Summary for Pond CB2: Exist CB

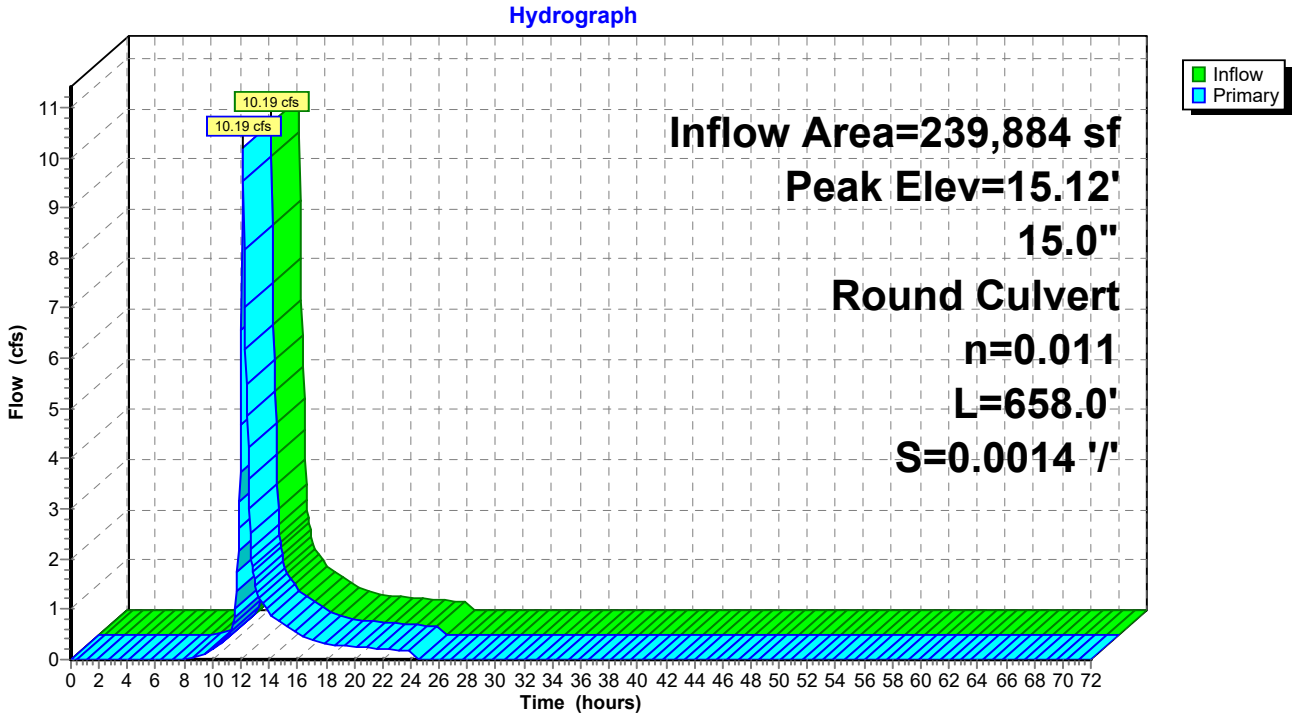
Inflow Area = 239,884 sf, 37.13% Impervious, Inflow Depth = 2.03" for 10YR - 24HR event
Inflow = 10.19 cfs @ 12.16 hrs, Volume= 40,529 cf
Outflow = 10.19 cfs @ 12.16 hrs, Volume= 40,529 cf, Atten= 0%, Lag= 0.0 min
Primary = 10.19 cfs @ 12.16 hrs, Volume= 40,529 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 15.12' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.40'	**15.0" Round Culvert** L= 658.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.40' / 0.50' S= 0.0014 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=10.07 cfs @ 12.16 hrs HW=14.81' (Free Discharge)
1=Culvert (Barrel Controls 10.07 cfs @ 8.21 fps)

Pond CB2: Exist CB



Summary for Pond CB3: Exist CB

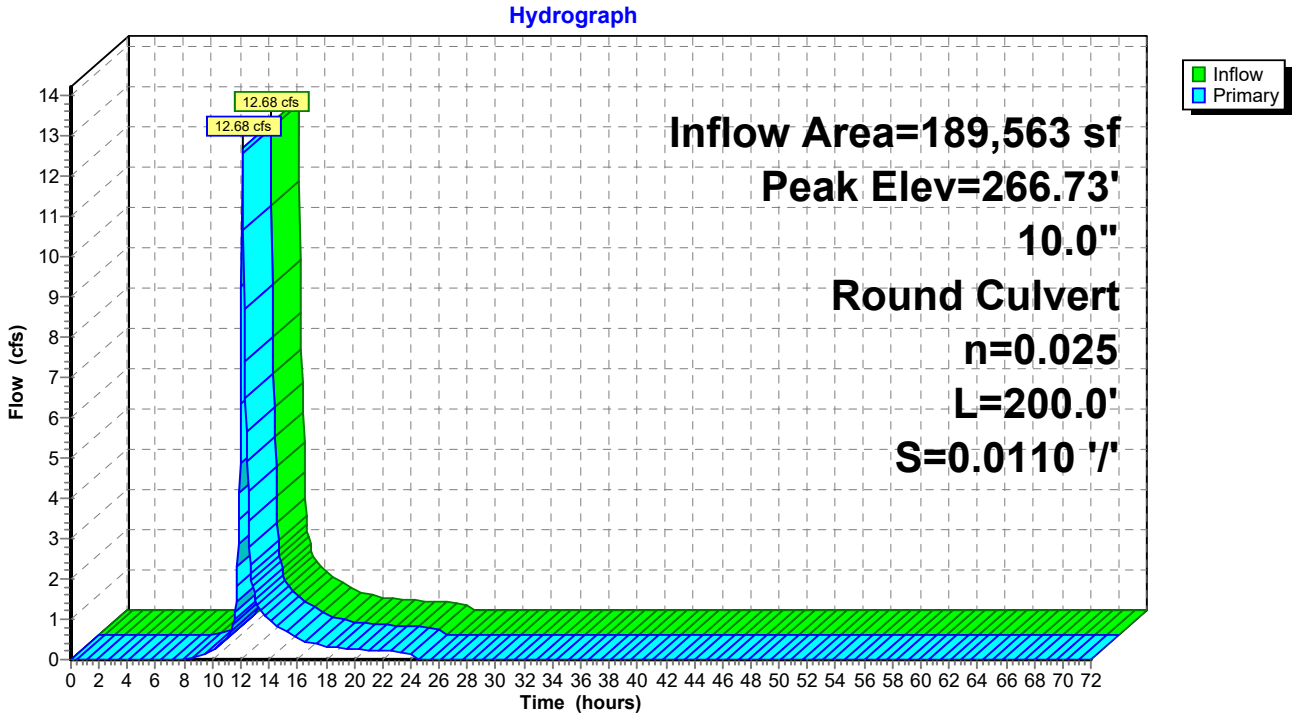
Inflow Area = 189,563 sf, 41.96% Impervious, Inflow Depth = 2.82" for 10YR - 24HR event
Inflow = 12.68 cfs @ 12.13 hrs, Volume= 44,493 cf
Outflow = 12.68 cfs @ 12.13 hrs, Volume= 44,493 cf, Atten= 0%, Lag= 0.0 min
Primary = 12.68 cfs @ 12.13 hrs, Volume= 44,493 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 266.73' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.14'	**10.0" Round CMP_Round 10"** L= 200.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 4.14' / 1.94' S= 0.0110 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.55 sf

Primary OutFlow Max=12.43 cfs @ 12.13 hrs HW=256.87' (Free Discharge)
1=CMP_Round 10" (Barrel Controls 12.43 cfs @ 22.79 fps)

Pond CB3: Exist CB



Summary for Pond CB4: Exist CB

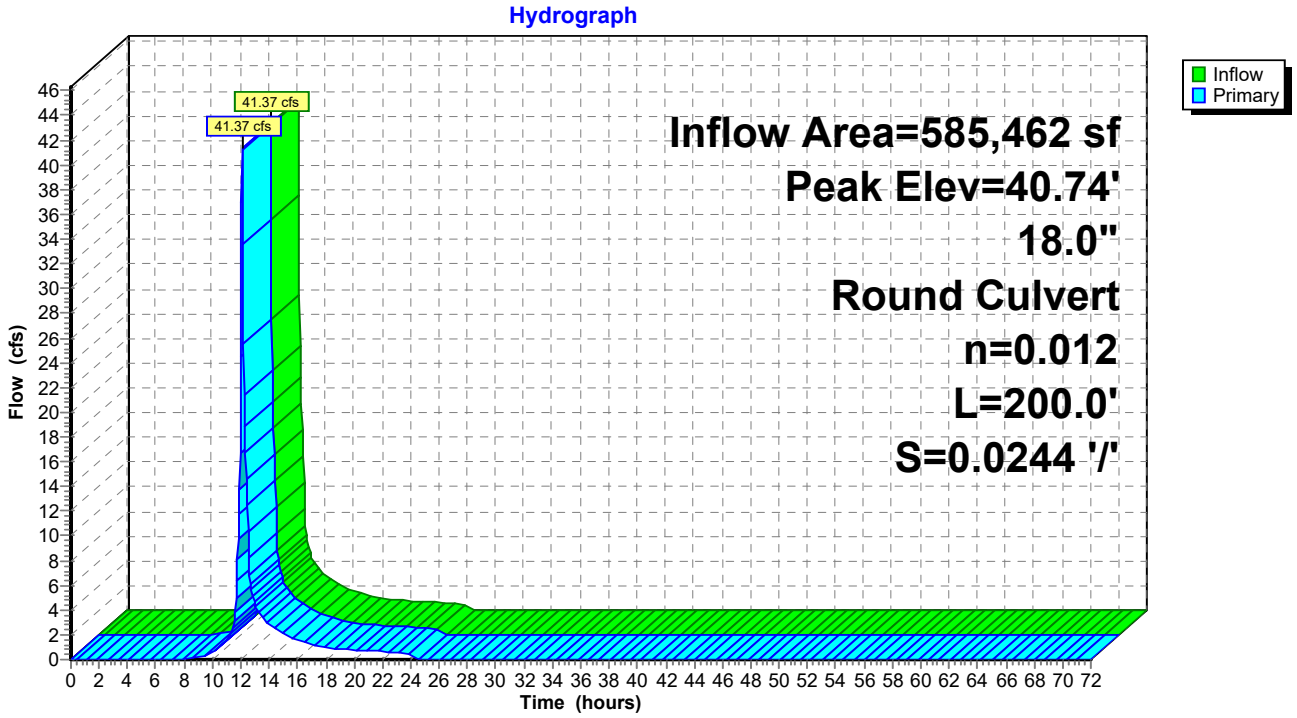
Inflow Area = 585,462 sf, 39.56% Impervious, Inflow Depth = 2.69" for 10YR - 24HR event
Inflow = 41.37 cfs @ 12.09 hrs, Volume= 131,142 cf
Outflow = 41.37 cfs @ 12.09 hrs, Volume= 131,142 cf, Atten= 0%, Lag= 0.0 min
Primary = 41.37 cfs @ 12.09 hrs, Volume= 131,142 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 40.74' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.89'	**18.0" Round RCP_Round 18"** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.89' / 0.00' S= 0.0244 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=40.67 cfs @ 12.09 hrs HW=39.47' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 40.67 cfs @ 23.01 fps)

Pond CB4: Exist CB



Summary for Pond CB5: New CB

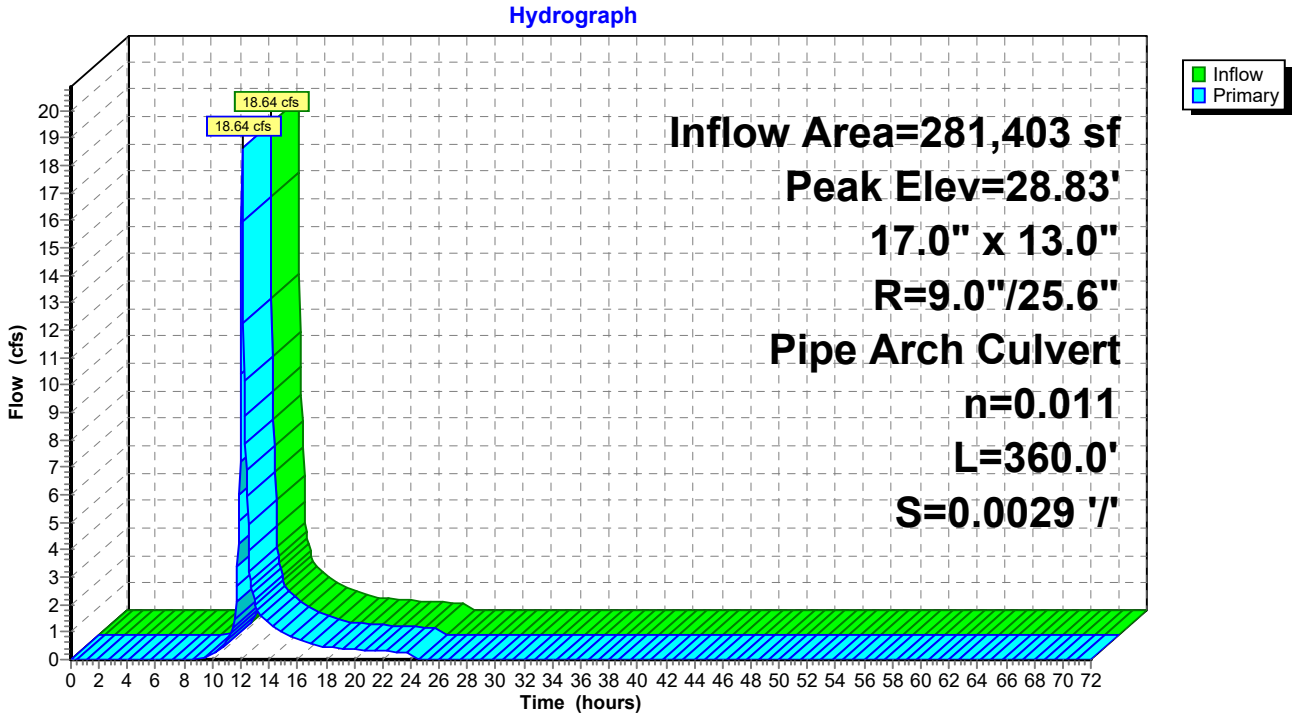
Inflow Area = 281,403 sf, 34.62% Impervious, Inflow Depth = 2.55" for 10YR - 24HR event
Inflow = 18.64 cfs @ 12.10 hrs, Volume= 59,776 cf
Outflow = 18.64 cfs @ 12.10 hrs, Volume= 59,776 cf, Atten= 0%, Lag= 0.0 min
Primary = 18.64 cfs @ 12.10 hrs, Volume= 59,776 cf
Routed to Pond CB4 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 28.83' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.55'	**17.0" W x 13.0" H, R=9.0"/25.6" Pipe Arch CMP_Arch_1/2 17x13** L= 360.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.55' / 0.50' S= 0.0029 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=18.62 cfs @ 12.10 hrs HW=28.79' (Free Discharge)
1=CMP_Arch_1/2 17x13 (Barrel Controls 18.62 cfs @ 15.15 fps)

Pond CB5: New CB



Summary for Pond CB6: New CB

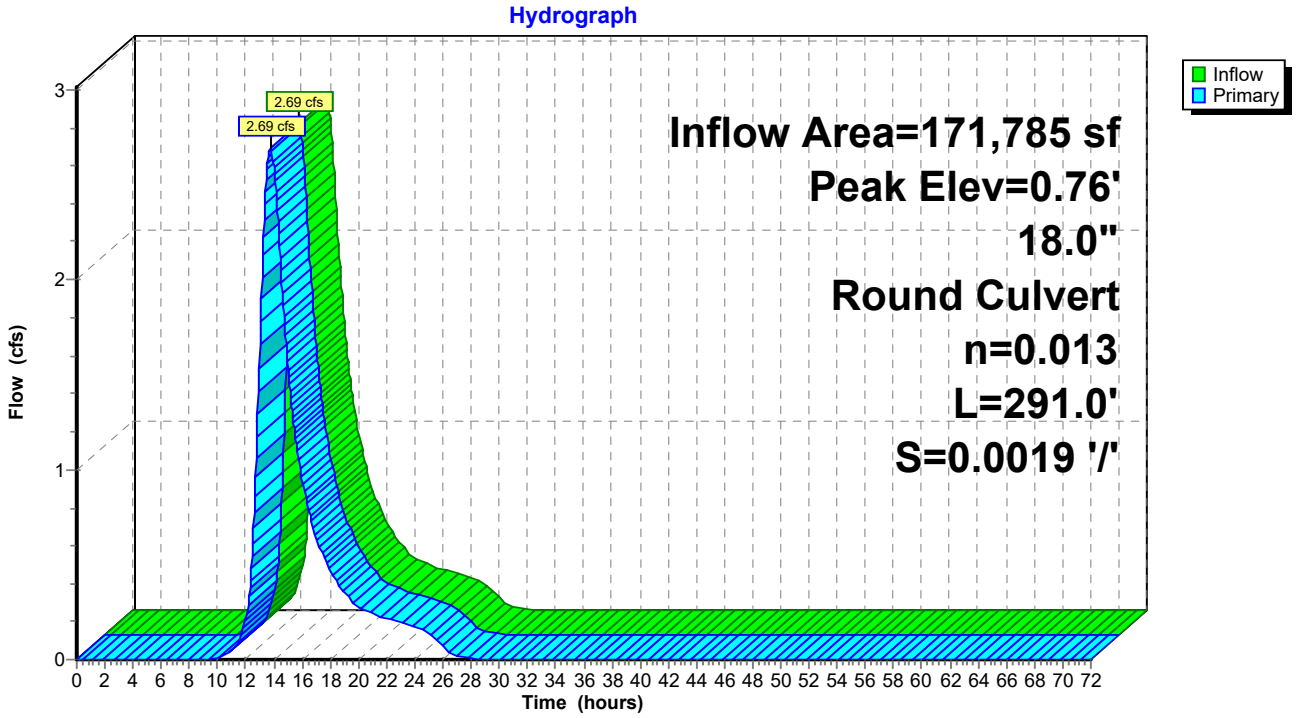
Inflow Area = 171,785 sf, 31.18% Impervious, Inflow Depth = 2.46" for 10YR - 24HR event
Inflow = 2.69 cfs @ 13.76 hrs, Volume= 35,247 cf
Outflow = 2.69 cfs @ 13.76 hrs, Volume= 35,247 cf, Atten= 0%, Lag= 0.0 min
Primary = 2.69 cfs @ 13.76 hrs, Volume= 35,247 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.76' @ 13.76 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.30'	**18.0" Round Culvert** L= 291.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.30' / -0.85' S= 0.0019 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=2.69 cfs @ 13.76 hrs HW=0.76' (Free Discharge)
1=Culvert (Barrel Controls 2.69 cfs @ 2.83 fps)

Pond CB6: New CB



Summary for Pond CB7: Exist CB

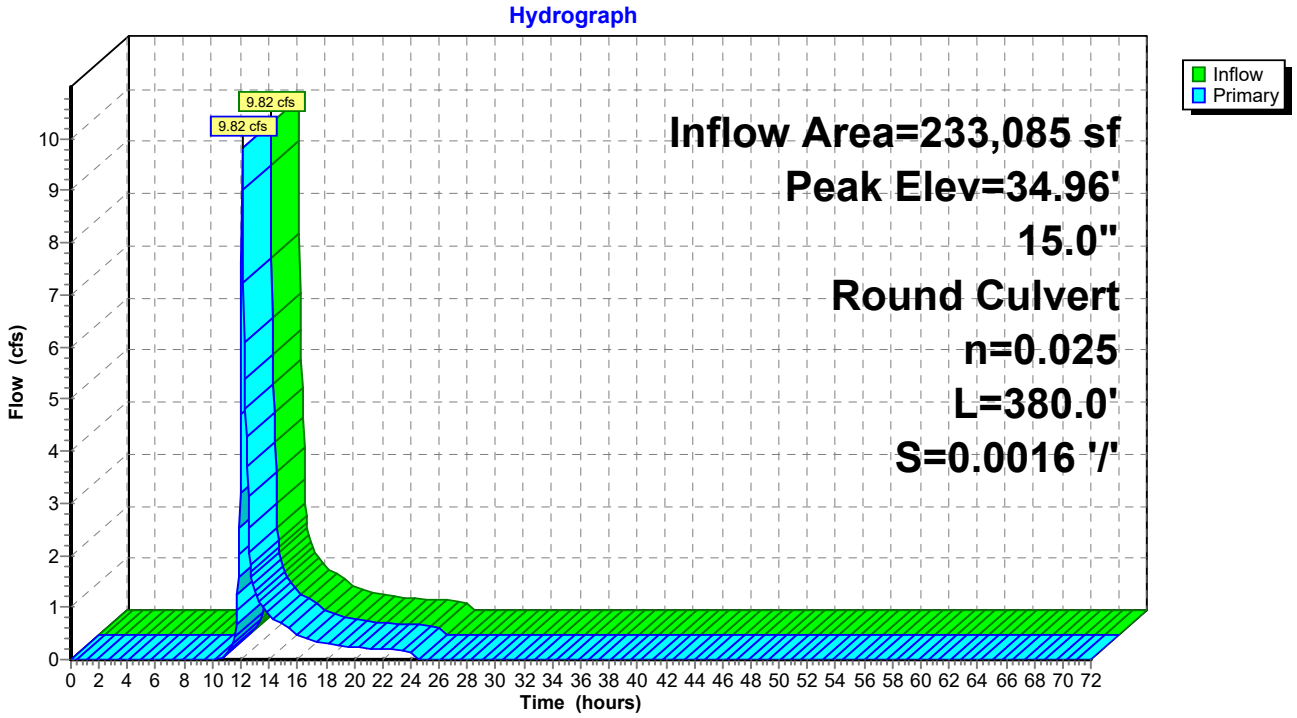
Inflow Area = 233,085 sf, 13.62% Impervious, Inflow Depth = 1.73" for 10YR - 24HR event
Inflow = 9.82 cfs @ 12.11 hrs, Volume= 33,639 cf
Outflow = 9.82 cfs @ 12.11 hrs, Volume= 33,639 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.82 cfs @ 12.11 hrs, Volume= 33,639 cf
Routed to Pond MH1 : MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 34.96' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**15.0" Round CMP_Round 15"** L= 380.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -0.62' S= 0.0016 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=9.56 cfs @ 12.11 hrs HW=33.28' (Free Discharge)
1=CMP_Round 15" (Barrel Controls 9.56 cfs @ 7.79 fps)

Pond CB7: Exist CB



Summary for Pond CB8: CB

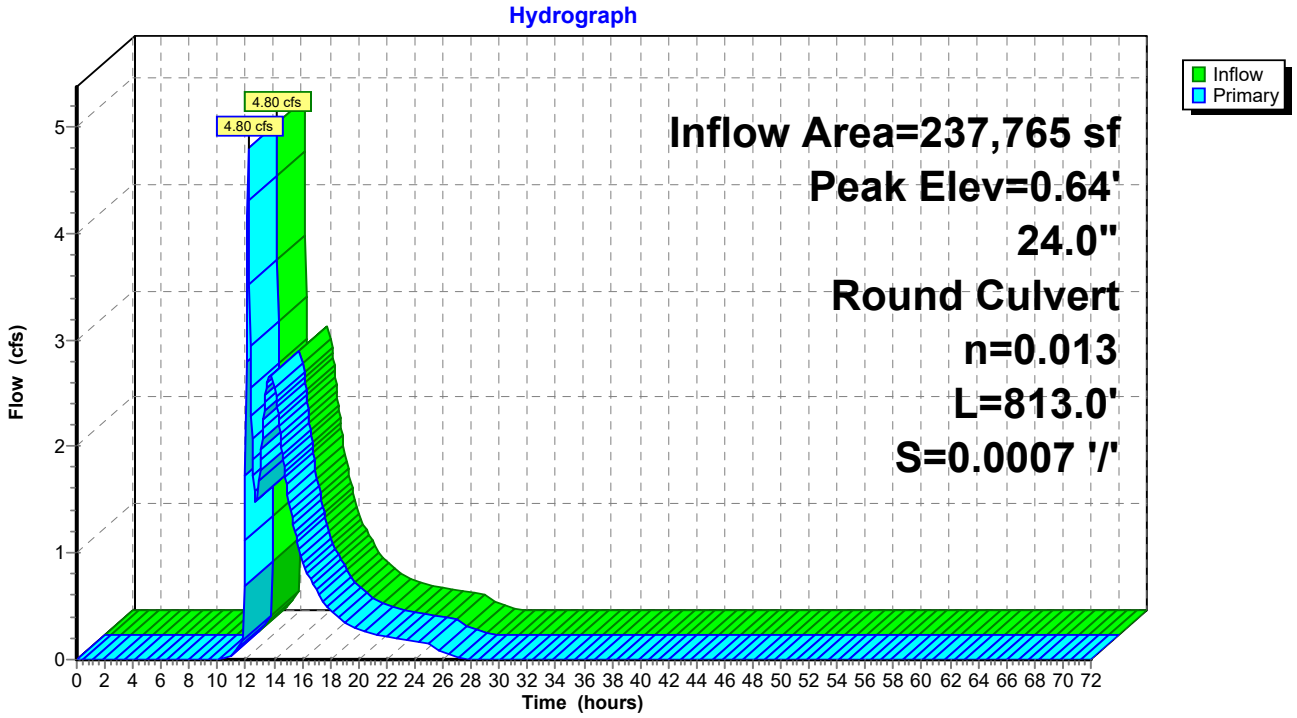
Inflow Area = 237,765 sf, 38.57% Impervious, Inflow Depth = 2.10" for 10YR - 24HR event
Inflow = 4.80 cfs @ 12.15 hrs, Volume= 41,654 cf
Outflow = 4.80 cfs @ 12.15 hrs, Volume= 41,654 cf, Atten= 0%, Lag= 0.0 min
Primary = 4.80 cfs @ 12.15 hrs, Volume= 41,654 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.64' @ 12.15 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.95'	**24.0" Round RCP_Round 24"** L= 813.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.95' / -1.52' S= 0.0007 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=4.77 cfs @ 12.15 hrs HW=0.64' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 4.77 cfs @ 2.45 fps)

Pond CB8: CB



Summary for Pond CC1: CC1

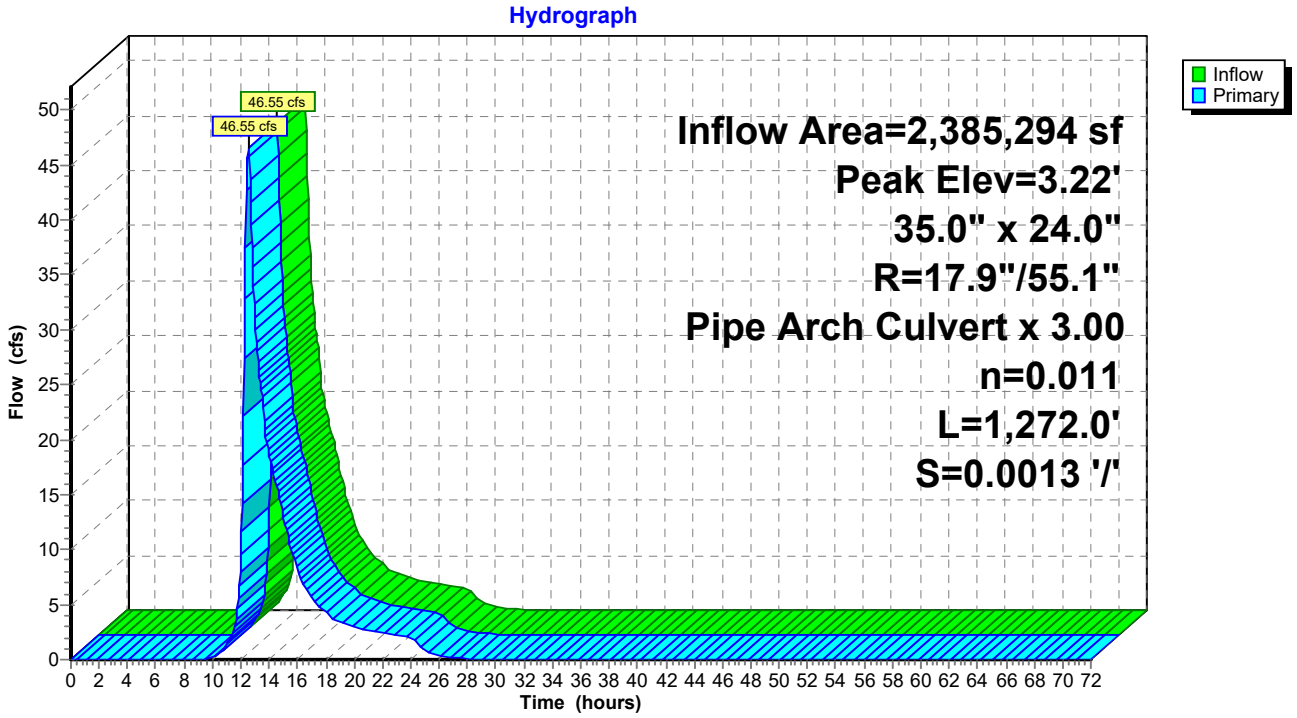
Inflow Area = 2,385,294 sf, 36.01% Impervious, Inflow Depth = 2.15" for 10YR - 24HR event
Inflow = 46.55 cfs @ 12.52 hrs, Volume= 427,264 cf
Outflow = 46.55 cfs @ 12.52 hrs, Volume= 427,264 cf, Atten= 0%, Lag= 0.0 min
Primary = 46.55 cfs @ 12.52 hrs, Volume= 427,264 cf
Routed to Link 4L : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.22' @ 12.52 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.20'	**35.0" W x 24.0" H, R=17.9"/55.1" Pipe Arch CMP_Arch_1/2 35x24 X 3.00** L= 1,272.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1.20' / -0.40' S= 0.0013 '/' Cc= 0.900 n= 0.011 Steel, smooth, Flow Area= 4.63 sf

Primary OutFlow Max=46.43 cfs @ 12.52 hrs HW=3.21' (Free Discharge)
1=CMP_Arch_1/2 35x24 (Barrel Controls 46.43 cfs @ 3.99 fps)

Pond CC1: CC1



Summary for Pond Cr-B: Robinson Driveway

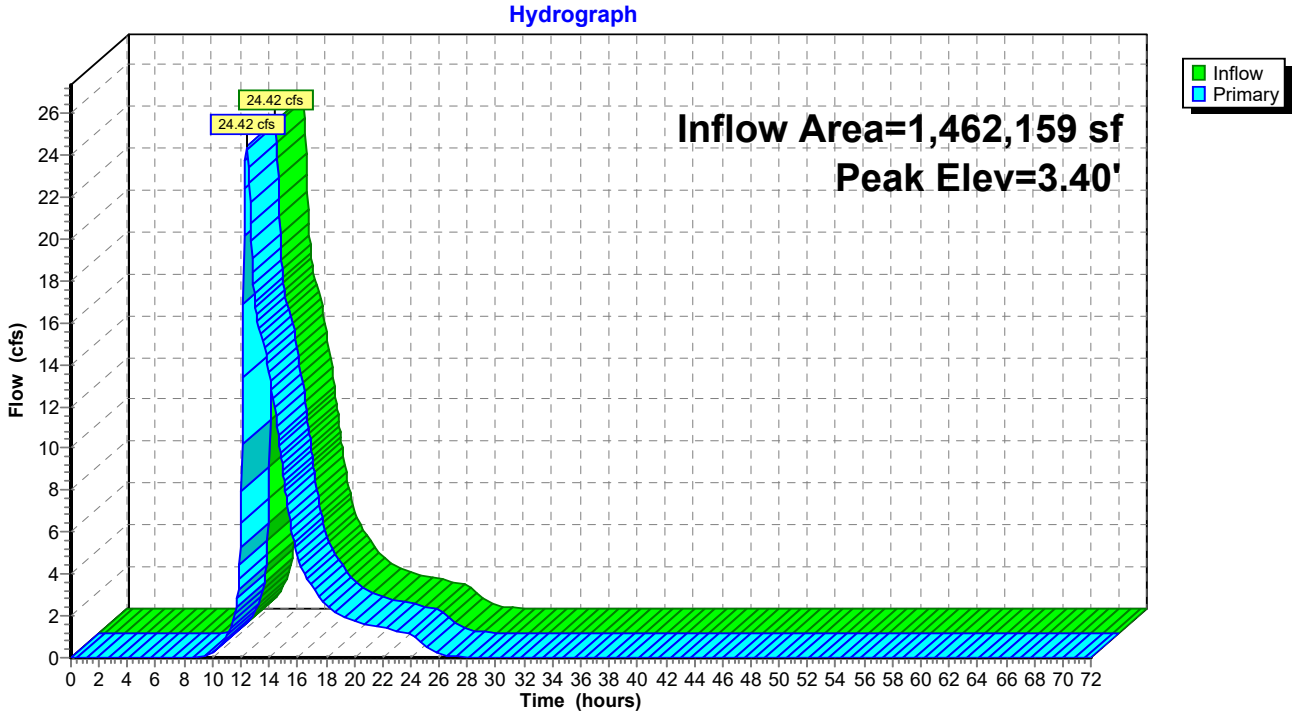
Inflow Area = 1,462,159 sf, 36.00% Impervious, Inflow Depth = 2.17" for 10YR - 24HR event
Inflow = 24.42 cfs @ 12.43 hrs, Volume= 264,390 cf
Outflow = 24.42 cfs @ 12.43 hrs, Volume= 264,390 cf, Atten= 0%, Lag= 0.0 min
Primary = 24.42 cfs @ 12.43 hrs, Volume= 264,390 cf
Routed to Reach 2R : WQS Segment 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.40' @ 12.43 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=24.37 cfs @ 12.43 hrs HW=3.40' (Free Discharge)
- **1=RCP_Round 24"** (Barrel Controls 8.12 cfs @ 3.90 fps)
- **2=RCP_Round 24"** (Barrel Controls 8.12 cfs @ 3.90 fps)
- **3=RCP_Round 24"** (Barrel Controls 8.12 cfs @ 3.90 fps)

Pond Cr-B: Robinson Driveway



Summary for Pond Cr-CD: Utility Crossing

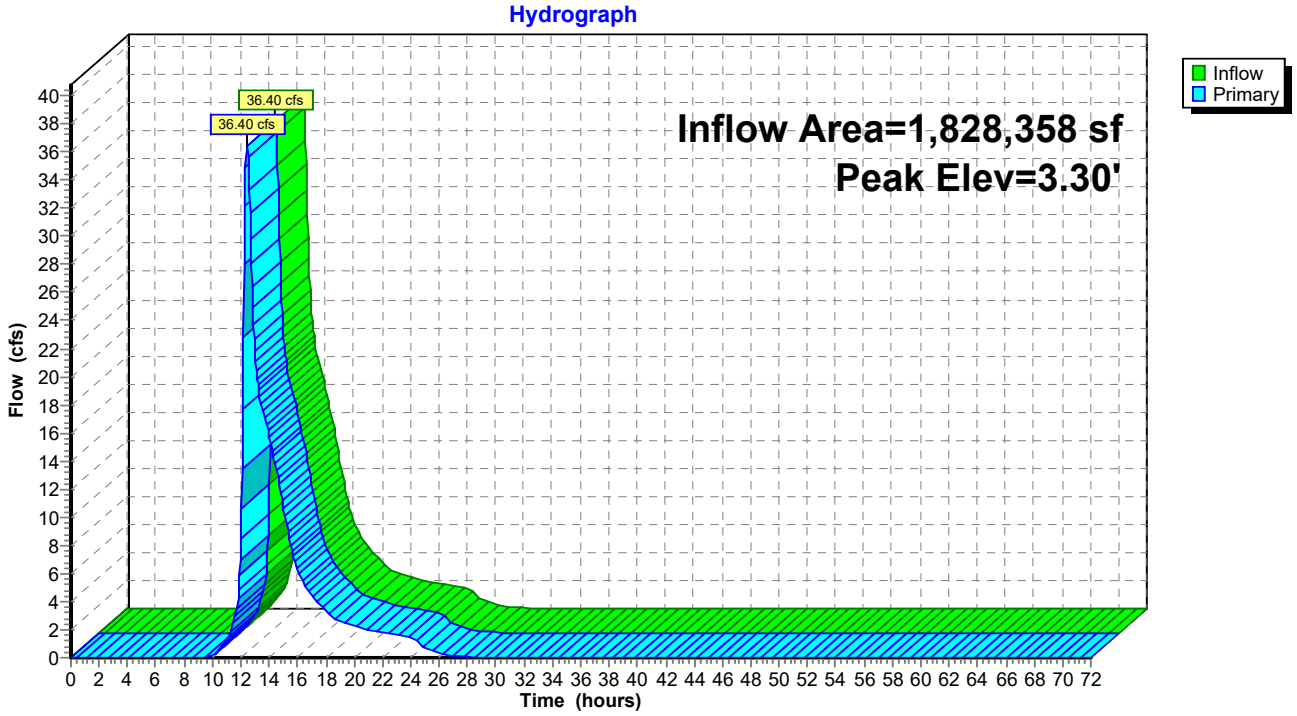
Inflow Area = 1,828,358 sf, 39.67% Impervious, Inflow Depth = 2.23" for 10YR - 24HR event
Inflow = 36.40 cfs @ 12.44 hrs, Volume= 339,527 cf
Outflow = 36.40 cfs @ 12.44 hrs, Volume= 339,527 cf, Atten= 0%, Lag= 0.0 min
Primary = 36.40 cfs @ 12.44 hrs, Volume= 339,527 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.30' @ 12.44 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#3	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=36.34 cfs @ 12.44 hrs HW=3.30' (Free Discharge)
- **1=RCP_Round 30"** (Barrel Controls 12.11 cfs @ 4.02 fps)
- **2=RCP_Round 30"** (Barrel Controls 12.11 cfs @ 4.02 fps)
- **3=RCP_Round 30"** (Barrel Controls 12.11 cfs @ 4.02 fps)

Pond Cr-CD: Utility Crossing



Summary for Pond MH1: MH

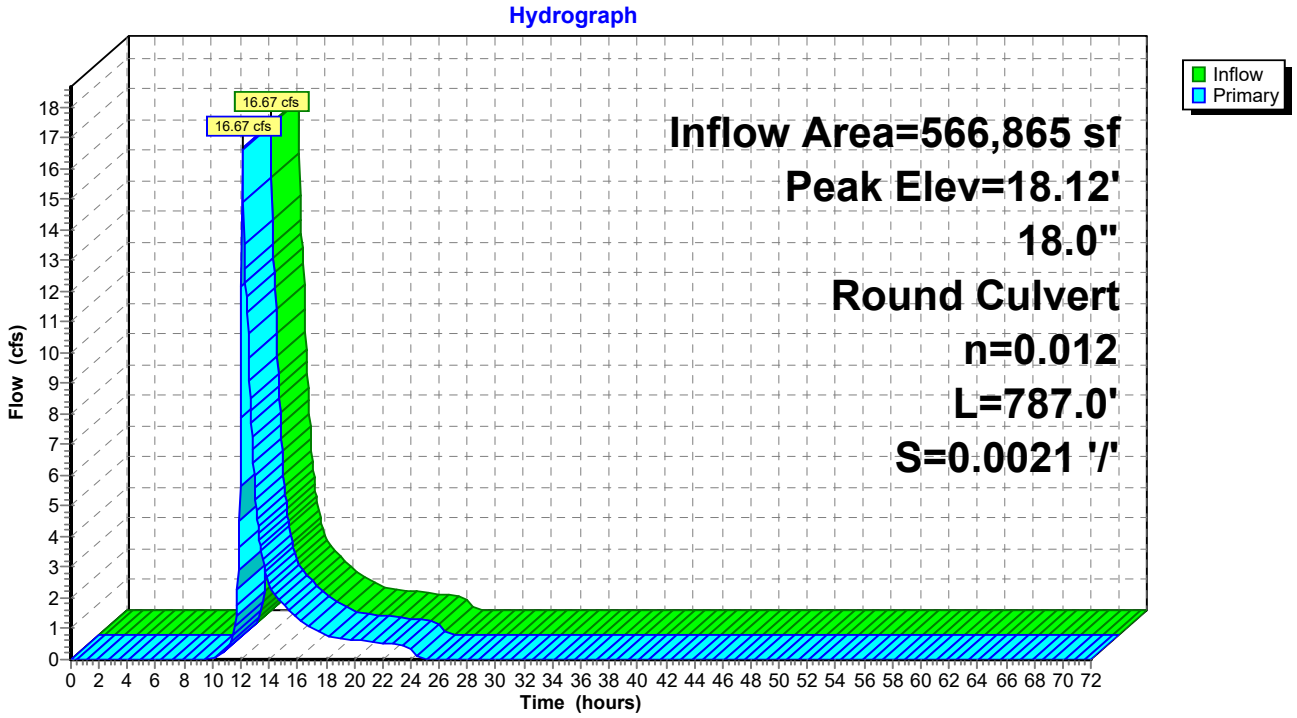
Inflow Area = 566,865 sf, 16.40% Impervious, Inflow Depth = 1.92" for 10YR - 24HR event
Inflow = 16.67 cfs @ 12.14 hrs, Volume= 90,742 cf
Outflow = 16.67 cfs @ 12.14 hrs, Volume= 90,742 cf, Atten= 0%, Lag= 0.0 min
Primary = 16.67 cfs @ 12.14 hrs, Volume= 90,742 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 18.12' @ 12.14 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.72'	**18.0" Round RCP_Round 18"** L= 787.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.72' / -2.37' S= 0.0021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=16.45 cfs @ 12.14 hrs HW=17.65' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 16.45 cfs @ 9.31 fps)

Pond MH1: MH



Summary for Pond P1: Pond 1

Inflow Area = 873,816 sf, 43.71% Impervious, Inflow Depth = 2.35" for 10YR - 24HR event
Inflow = 13.56 cfs @ 12.68 hrs, Volume= 170,894 cf
Outflow = 12.84 cfs @ 13.29 hrs, Volume= 170,894 cf, Atten= 5%, Lag= 36.6 min
Discarded = 1.18 cfs @ 13.29 hrs, Volume= 19,554 cf
Primary = 11.66 cfs @ 13.29 hrs, Volume= 151,340 cf
Routed to Pond P10 : Wetland Ditch

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.55' @ 13.29 hrs Surf.Area= 23,093 sf Storage= 12,176 cf

Plug-Flow detention time= 13.3 min calculated for 170,776 cf (100% of inflow)
Center-of-Mass det. time= 13.3 min (898.3 - 885.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2.40'	69,114 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

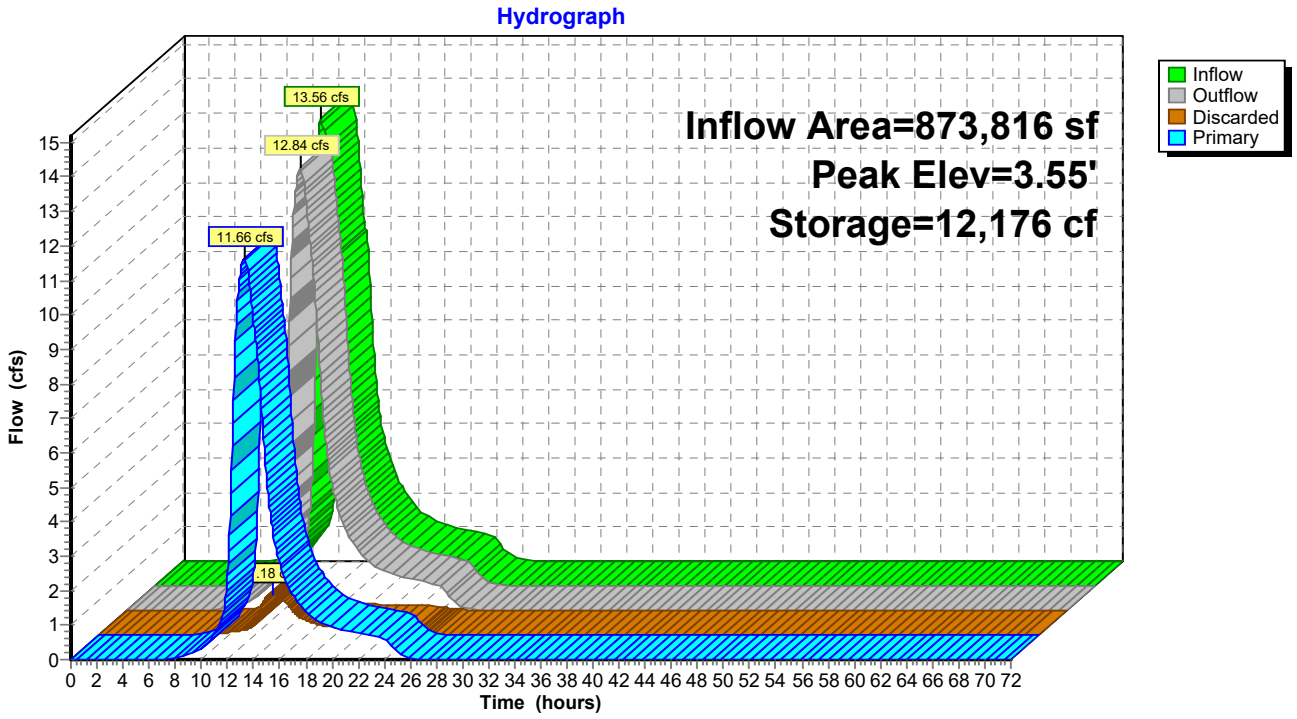
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.40	0	0.0	0	0	0
2.50	1,116	311.0	37	37	7,697
3.00	11,546	598.0	2,709	2,746	28,458
3.50	22,069	715.0	8,263	11,009	40,688
4.00	32,945	769.0	13,663	24,672	47,075
4.50	44,009	867.0	19,172	43,844	59,841
5.00	57,369	999.0	25,271	69,114	79,447

Device	Routing	Invert	Outlet Devices
#1	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#4	Discarded	2.40'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.30'

Discarded OutFlow Max=1.18 cfs @ 13.29 hrs HW=3.55' (Free Discharge)
└**4=Exfiltration** (Controls 1.18 cfs)

Primary OutFlow Max=11.65 cfs @ 13.29 hrs HW=3.55' (Free Discharge)
├**1=Culvert** (Barrel Controls 3.88 cfs @ 3.28 fps)
├**2=Culvert** (Barrel Controls 3.88 cfs @ 3.28 fps)
└**3=Culvert** (Barrel Controls 3.88 cfs @ 3.28 fps)

Pond P1: Pond 1



Summary for Pond P10: Wetland Ditch

Inflow Area = 1,049,961 sf, 38.89% Impervious, Inflow Depth = 2.19" for 10YR - 24HR event
Inflow = 14.17 cfs @ 12.25 hrs, Volume= 191,357 cf
Outflow = 13.75 cfs @ 12.33 hrs, Volume= 191,357 cf, Atten= 3%, Lag= 4.8 min
Primary = 13.75 cfs @ 12.33 hrs, Volume= 191,357 cf
Routed to Reach 1R : WQS Segment 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.60' @ 12.33 hrs Surf.Area= 4,047 sf Storage= 3,370 cf

Plug-Flow detention time= 5.3 min calculated for 191,225 cf (100% of inflow)
Center-of-Mass det. time= 5.3 min (888.6 - 883.3)

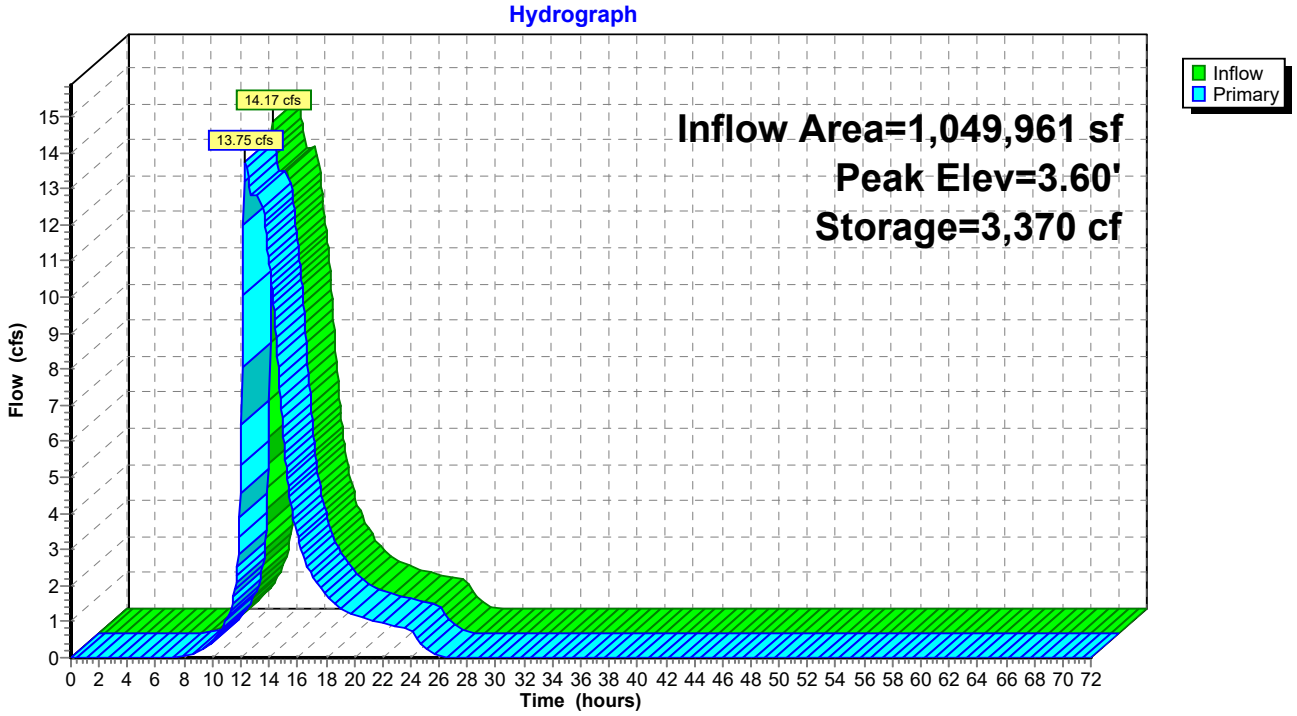
Volume	Invert	Avail.Storage	Storage Description
#1	2.33'	34,944 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.33	0	0.0	0	0	0
2.50	2,079	556.0	118	118	24,600
3.00	2,792	564.0	1,213	1,331	25,366
3.50	3,765	606.0	1,633	2,964	29,288
4.00	5,218	646.0	2,236	5,200	33,285
4.50	26,868	1,785.0	7,321	12,521	253,629
5.00	65,665	1,908.0	22,423	34,944	289,788

Device	Routing	Invert	Outlet Devices
#1	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf

Primary OutFlow Max=13.73 cfs @ 12.33 hrs HW=3.60' (Free Discharge)
- **1=RCP_Round 21"** (Barrel Controls 4.58 cfs @ 3.41 fps)
- **2=RCP_Round 21"** (Barrel Controls 4.58 cfs @ 3.41 fps)
- **3=RCP_Round 21"** (Barrel Controls 4.58 cfs @ 3.41 fps)

Pond P10: Wetland Ditch



Summary for Pond P2: Pond 2

Inflow Area = 145,656 sf, 34.19% Impervious, Inflow Depth = 2.38" for 10YR - 24HR event
Inflow = 6.18 cfs @ 12.29 hrs, Volume= 28,845 cf
Outflow = 3.31 cfs @ 12.62 hrs, Volume= 28,845 cf, Atten= 46%, Lag= 19.9 min
Discarded = 0.44 cfs @ 12.62 hrs, Volume= 2,112 cf
Primary = 2.87 cfs @ 12.62 hrs, Volume= 26,734 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.61' @ 12.62 hrs Surf.Area= 14,071 sf Storage= 4,662 cf

Plug-Flow detention time= 10.1 min calculated for 28,825 cf (100% of inflow)
Center-of-Mass det. time= 10.1 min (863.4 - 853.3)

Volume	Invert	Avail.Storage	Storage Description
#1	3.35'	13,689 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

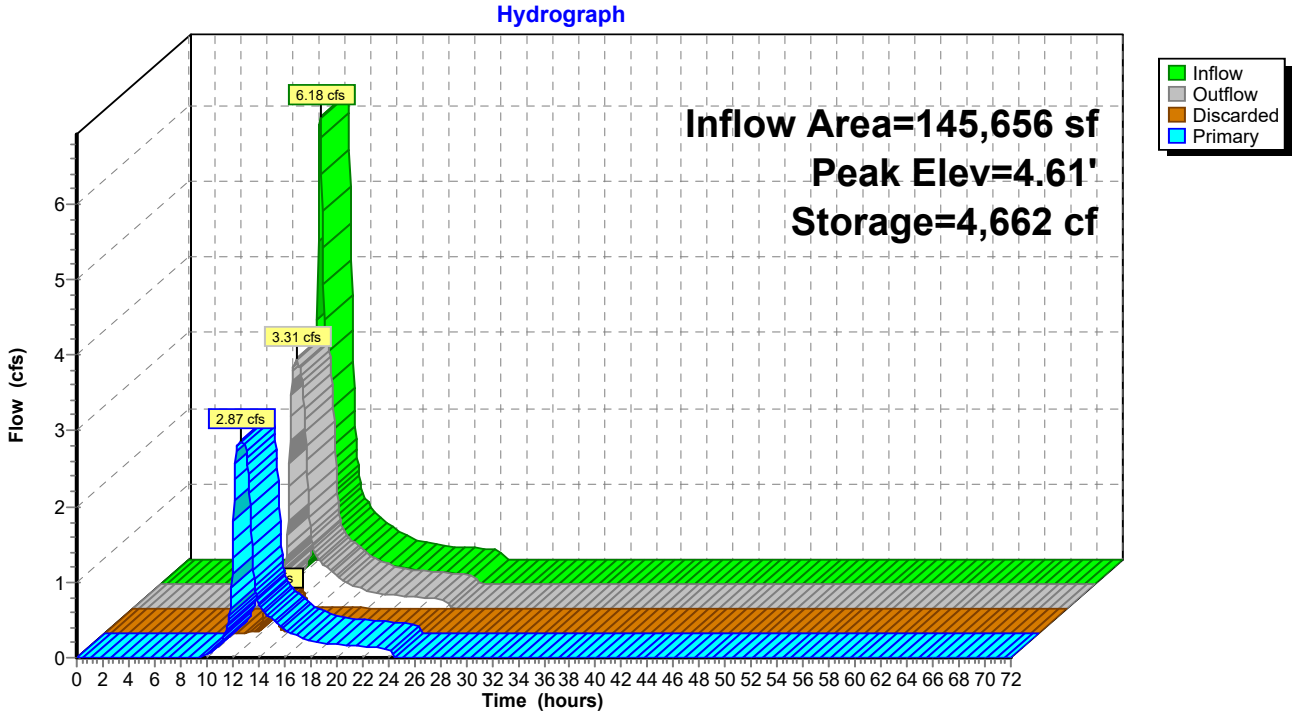
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.35	0	0.0	0	0	0
3.50	170	63.0	8	8	316
4.00	2,037	330.0	466	474	8,667
4.50	10,588	652.0	2,878	3,353	33,831
4.75	19,541	773.0	3,709	7,062	47,553
5.00	34,152	971.0	6,627	13,689	75,033

Device	Routing	Invert	Outlet Devices
#1	Primary	3.35'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 133.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.35' / 3.25' S= 0.0008 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.35'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.43 cfs @ 12.62 hrs HW=4.61' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.43 cfs)

Primary OutFlow Max=2.87 cfs @ 12.62 hrs HW=4.61' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.87 cfs @ 2.64 fps)

Pond P2: Pond 2



Summary for Pond P3: Pond 3

Inflow Area = 604,810 sf, 50.08% Impervious, Inflow Depth = 2.76" for 10YR - 24HR event
Inflow = 12.54 cfs @ 12.75 hrs, Volume= 139,269 cf
Outflow = 10.83 cfs @ 13.38 hrs, Volume= 139,269 cf, Atten= 14%, Lag= 38.1 min
Discarded = 1.03 cfs @ 13.38 hrs, Volume= 12,136 cf
Primary = 9.79 cfs @ 13.38 hrs, Volume= 127,133 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.04' @ 13.38 hrs Surf.Area= 20,141 sf Storage= 12,292 cf

Plug-Flow detention time= 11.4 min calculated for 139,173 cf (100% of inflow)
Center-of-Mass det. time= 11.4 min (888.6 - 877.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2.65'	46,661 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

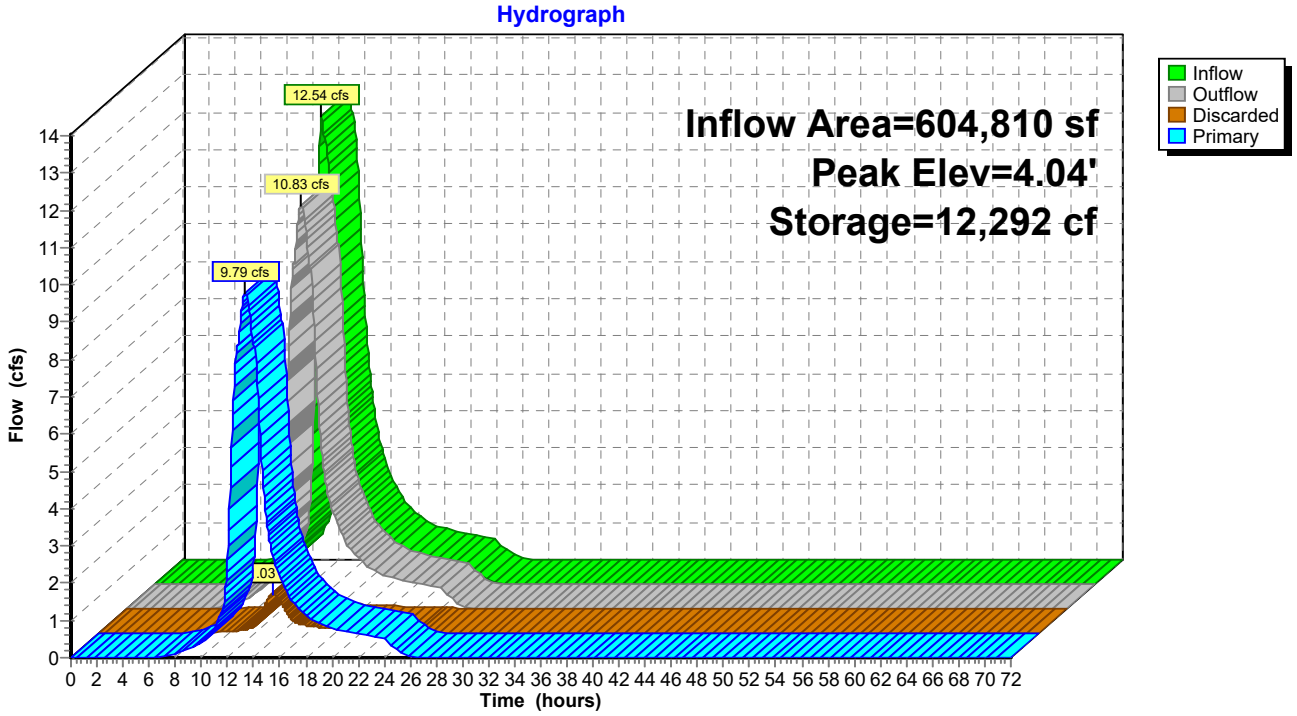
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.65	0	0.0	0	0	0
3.00	4,059	888.0	474	474	62,751
3.50	10,848	1,191.0	3,590	4,064	112,882
4.00	19,089	1,350.0	7,388	11,452	145,039
4.50	33,127	1,447.0	12,894	24,346	166,641
5.00	57,227	1,543.0	22,316	46,661	189,495

Device	Routing	Invert	Outlet Devices
#1	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#3	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#4	Discarded	2.65'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.55'

Discarded OutFlow Max=1.03 cfs @ 13.38 hrs HW=4.04' (Free Discharge)
└**4=Exfiltration** (Controls 1.03 cfs)

Primary OutFlow Max=9.79 cfs @ 13.38 hrs HW=4.04' (Free Discharge)
├**1=Culvert** (Barrel Controls 3.26 cfs @ 3.00 fps)
├**2=Culvert** (Barrel Controls 3.26 cfs @ 3.00 fps)
└**3=Culvert** (Barrel Controls 3.26 cfs @ 3.00 fps)

Pond P3: Pond 3



Summary for Pond P4: Pond 4

Inflow Area = 140,632 sf, 26.62% Impervious, Inflow Depth = 1.66" for 10YR - 24HR event
Inflow = 4.93 cfs @ 12.17 hrs, Volume= 19,413 cf
Outflow = 2.99 cfs @ 12.39 hrs, Volume= 19,413 cf, Atten= 39%, Lag= 13.1 min
Discarded = 0.21 cfs @ 12.39 hrs, Volume= 673 cf
Primary = 2.78 cfs @ 12.39 hrs, Volume= 18,740 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.33' @ 12.39 hrs Surf.Area= 6,773 sf Storage= 2,012 cf

Plug-Flow detention time= 4.1 min calculated for 19,399 cf (100% of inflow)
Center-of-Mass det. time= 4.1 min (872.4 - 868.2)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	12,438 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

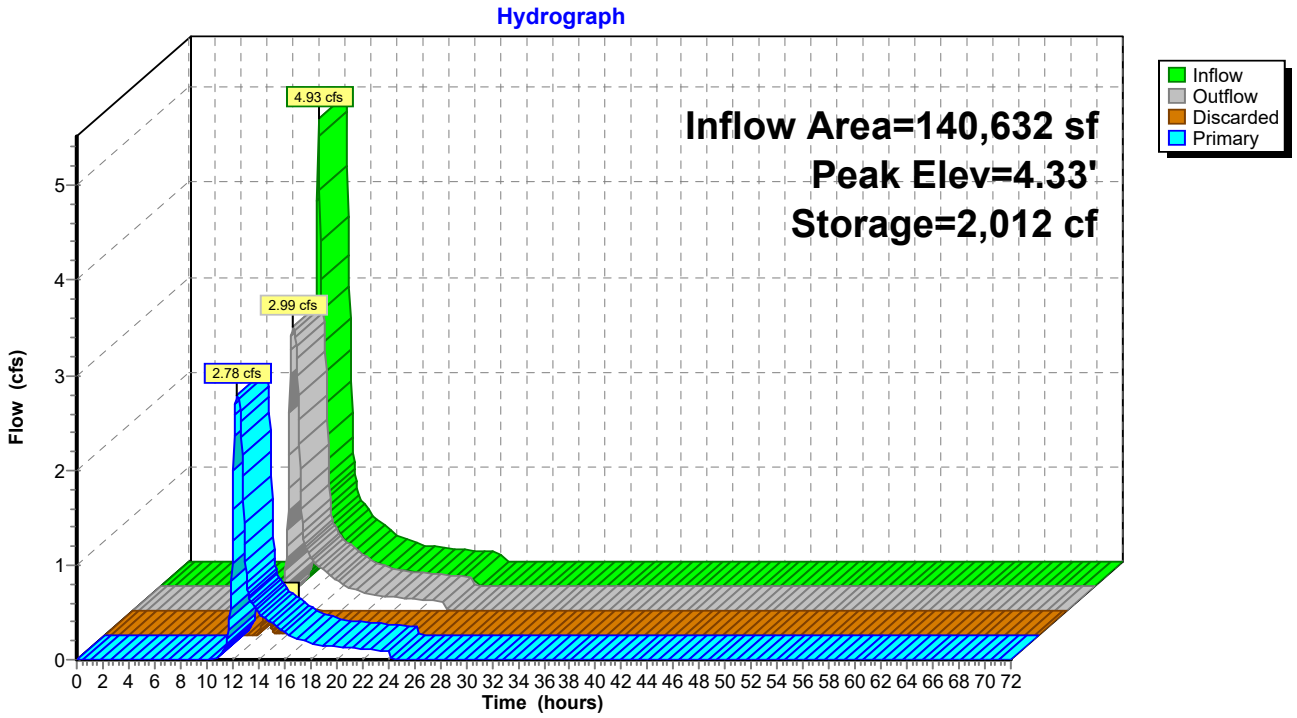
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.20	0	0.0	0	0	0
3.50	149	61.0	15	15	296
4.00	2,440	293.0	532	547	6,832
4.50	9,823	539.0	2,860	3,407	23,121
4.75	16,825	666.0	3,292	6,699	35,300
5.00	29,698	866.0	5,740	12,438	59,683

Device	Routing	Invert	Outlet Devices
#1	Primary	3.20'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 134.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.20' / 3.10' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.20'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.21 cfs @ 12.39 hrs HW=4.33' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.21 cfs)

Primary OutFlow Max=2.78 cfs @ 12.39 hrs HW=4.33' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.78 cfs @ 2.63 fps)

Pond P4: Pond 4



Summary for Pond P5: Pond 5

Inflow Area = 127,978 sf, 26.51% Impervious, Inflow Depth = 1.66" for 10YR - 24HR event
Inflow = 3.69 cfs @ 12.28 hrs, Volume= 17,666 cf
Outflow = 2.88 cfs @ 12.40 hrs, Volume= 17,666 cf, Atten= 22%, Lag= 7.2 min
Discarded = 0.10 cfs @ 12.40 hrs, Volume= 300 cf
Primary = 2.78 cfs @ 12.40 hrs, Volume= 17,366 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.05' @ 12.46 hrs Surf.Area= 3,371 sf Storage= 981 cf

Plug-Flow detention time= 1.9 min calculated for 17,654 cf (100% of inflow)
Center-of-Mass det. time= 1.9 min (877.1 - 875.2)

Volume	Invert	Avail.Storage	Storage Description
#1	2.85'	12,246 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

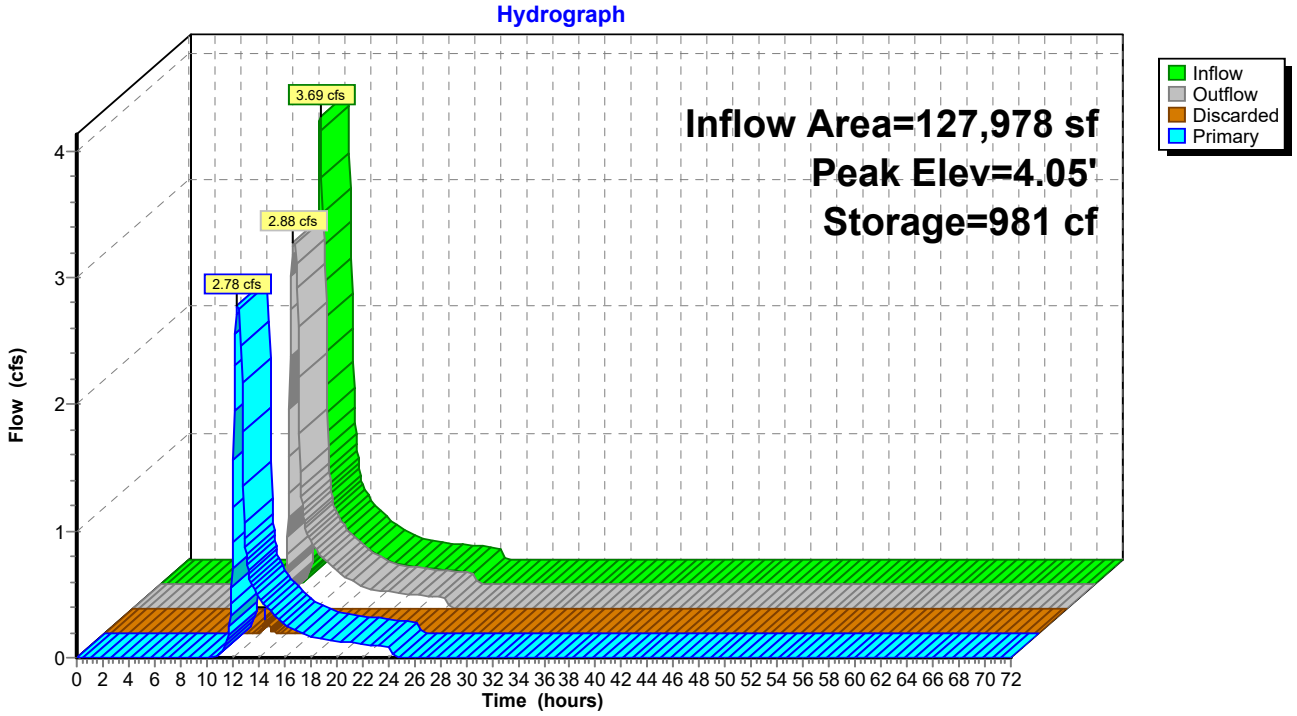
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.85	0	0.0	0	0	0
3.00	22	19.0	1	1	29
3.50	418	102.0	89	90	829
4.00	2,904	284.0	737	828	6,420
4.50	9,309	476.0	2,902	3,730	18,033
4.90	21,881	695.0	6,062	9,791	38,442
5.00	27,310	796.0	2,455	12,246	50,426

Device	Routing	Invert	Outlet Devices
#1	Primary	2.85'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 142.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.85' / 2.75' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.85'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.75'

Discarded OutFlow Max=0.11 cfs @ 12.40 hrs HW=4.04' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.11 cfs)

Primary OutFlow Max=2.78 cfs @ 12.40 hrs HW=4.04' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.78 cfs @ 2.57 fps)

Pond P5: Pond 5



Summary for Pond P6: Pond 6

Inflow Area = 294,705 sf, 29.95% Impervious, Inflow Depth = 2.05" for 10YR - 24HR event
Inflow = 7.79 cfs @ 12.48 hrs, Volume= 50,464 cf
Outflow = 6.25 cfs @ 12.73 hrs, Volume= 50,649 cf, Atten= 20%, Lag= 15.3 min
Discarded = 0.29 cfs @ 12.73 hrs, Volume= 656 cf
Primary = 5.96 cfs @ 12.73 hrs, Volume= 49,993 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.33' @ 12.73 hrs Surf.Area= 7,092 sf Storage= 2,306 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.9 min (869.2 - 867.3)

Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	48,739 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

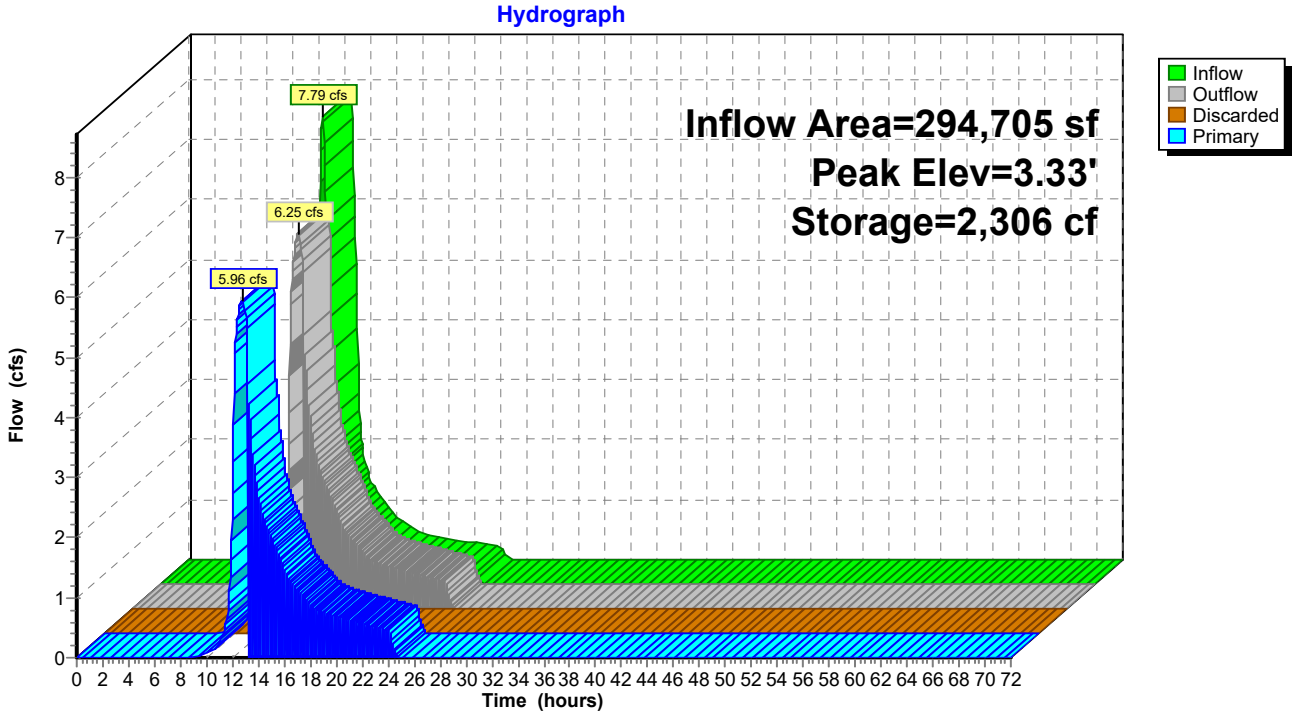
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
3.00	3,571	520.0	595	595	21,518
3.50	9,437	727.0	3,136	3,731	42,062
4.00	24,344	1,116.0	8,156	11,887	99,115
4.50	57,812	1,402.0	19,945	31,832	156,426
4.75	77,941	1,580.0	16,907	48,739	198,667

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**15.0" Round CMP_Round 15"** L= 265.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 0.50' / -0.40' S= 0.0034 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	2.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.40'

Discarded OutFlow Max=0.29 cfs @ 12.73 hrs HW=3.33' (Free Discharge)
↑**2=Exfiltration** (Controls 0.29 cfs)

Primary OutFlow Max=5.96 cfs @ 12.73 hrs HW=3.33' (Free Discharge)
↑**1=CMP_Round 15"** (Barrel Controls 5.96 cfs @ 4.85 fps)

Pond P6: Pond 6



Summary for Pond P7: Pond 7

Inflow Area = 110,829 sf, 40.07% Impervious, Inflow Depth = 2.55" for 10YR - 24HR event
Inflow = 6.20 cfs @ 12.17 hrs, Volume= 23,542 cf
Outflow = 3.44 cfs @ 12.40 hrs, Volume= 23,542 cf, Atten= 45%, Lag= 14.1 min
Discarded = 0.27 cfs @ 12.40 hrs, Volume= 789 cf
Primary = 3.17 cfs @ 12.40 hrs, Volume= 22,754 cf
Routed to Pond P6 : Pond 6

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.22' @ 12.40 hrs Surf.Area= 8,078 sf Storage= 2,965 cf

Plug-Flow detention time= 5.1 min calculated for 23,526 cf (100% of inflow)
Center-of-Mass det. time= 5.1 min (845.8 - 840.7)

Volume	Invert	Avail.Storage	Storage Description
#1	2.75'	16,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

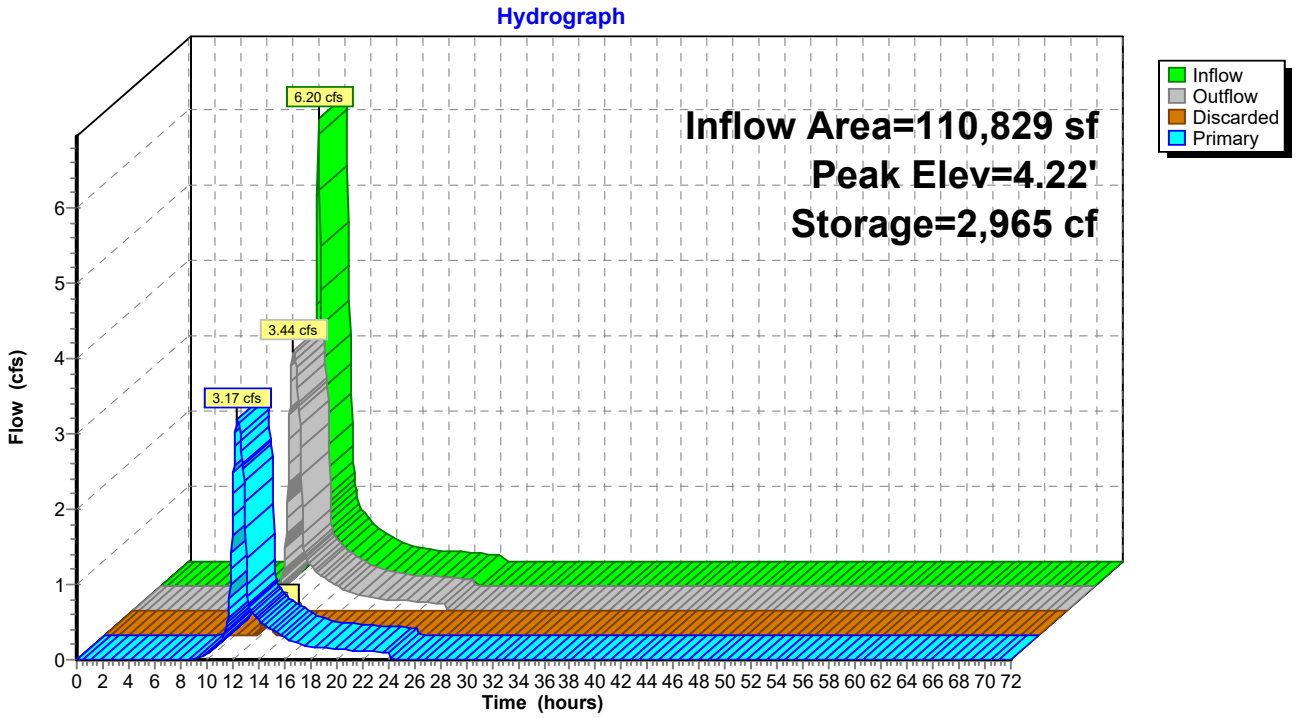
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.75	0	0.0	0	0	0
3.00	47	29.0	4	4	67
3.50	992	154.0	209	213	1,888
4.00	4,809	305.0	1,331	1,544	7,405
4.50	13,313	480.0	4,354	5,898	18,338
4.90	25,536	679.0	7,638	13,536	36,694
5.00	29,518	743.0	2,750	16,286	43,936

Device	Routing	Invert	Outlet Devices
#1	Primary	2.75'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 180.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.75' / 2.65' S= 0.0006 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.75'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.65'

Discarded OutFlow Max=0.26 cfs @ 12.40 hrs HW=4.22' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.26 cfs)

Primary OutFlow Max=3.17 cfs @ 12.40 hrs HW=4.22' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 3.17 cfs @ 2.91 fps)

Pond P7: Pond 7



Summary for Pond P8: Pond 8

Inflow Area = 408,559 sf, 31.11% Impervious, Inflow Depth = 2.13" for 10YR - 24HR event
Inflow = 10.90 cfs @ 12.25 hrs, Volume= 72,517 cf
Outflow = 12.96 cfs @ 12.40 hrs, Volume= 72,537 cf, Atten= 0%, Lag= 9.1 min
Primary = 12.96 cfs @ 12.40 hrs, Volume= 72,537 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 14.74' @ 12.40 hrs Surf.Area= 21,292 sf Storage= 4,397 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 4.4 min (869.8 - 865.4)

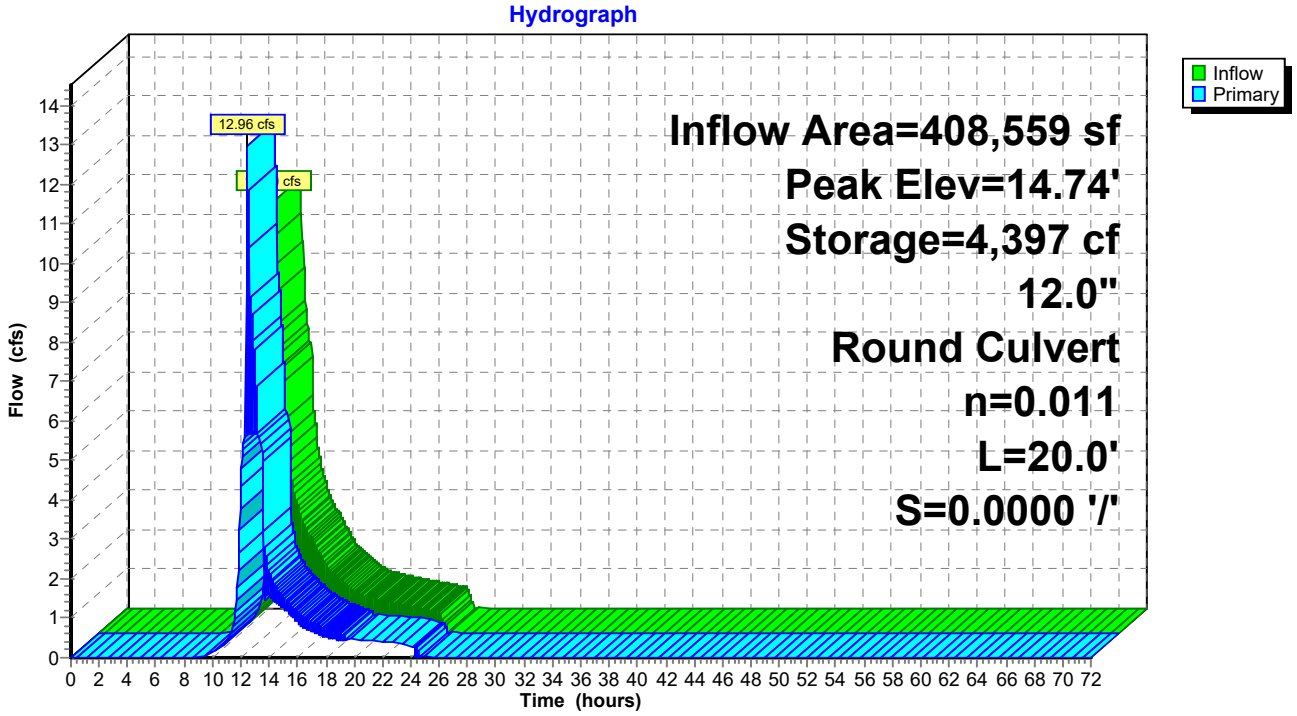
Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	4,397 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
4.00	44	40.0	22	22	131
4.50	348	192.0	86	108	2,938
5.00	5,358	771.0	1,179	1,287	47,309
5.25	21,292	781.0	3,111	4,397	48,559

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 2.50' / 2.50' S= 0.0000 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=12.96 cfs @ 12.40 hrs HW=14.74' (Free Discharge)
1=Culvert (Inlet Controls 12.96 cfs @ 16.50 fps)

Pond P8: Pond 8



Summary for Pond P9: Pond 9

Inflow Area = 18,400 sf, 27.62% Impervious, Inflow Depth = 1.73" for 10YR - 24HR event
Inflow = 0.64 cfs @ 12.20 hrs, Volume= 2,656 cf
Outflow = 0.91 cfs @ 12.25 hrs, Volume= 2,247 cf, Atten= 0%, Lag= 3.2 min
Primary = 0.91 cfs @ 12.25 hrs, Volume= 2,247 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.08' @ 12.26 hrs Surf.Area= 2,618 sf Storage= 532 cf

Plug-Flow detention time= 148.7 min calculated for 2,247 cf (85% of inflow)
Center-of-Mass det. time= 80.5 min (948.0 - 867.5)

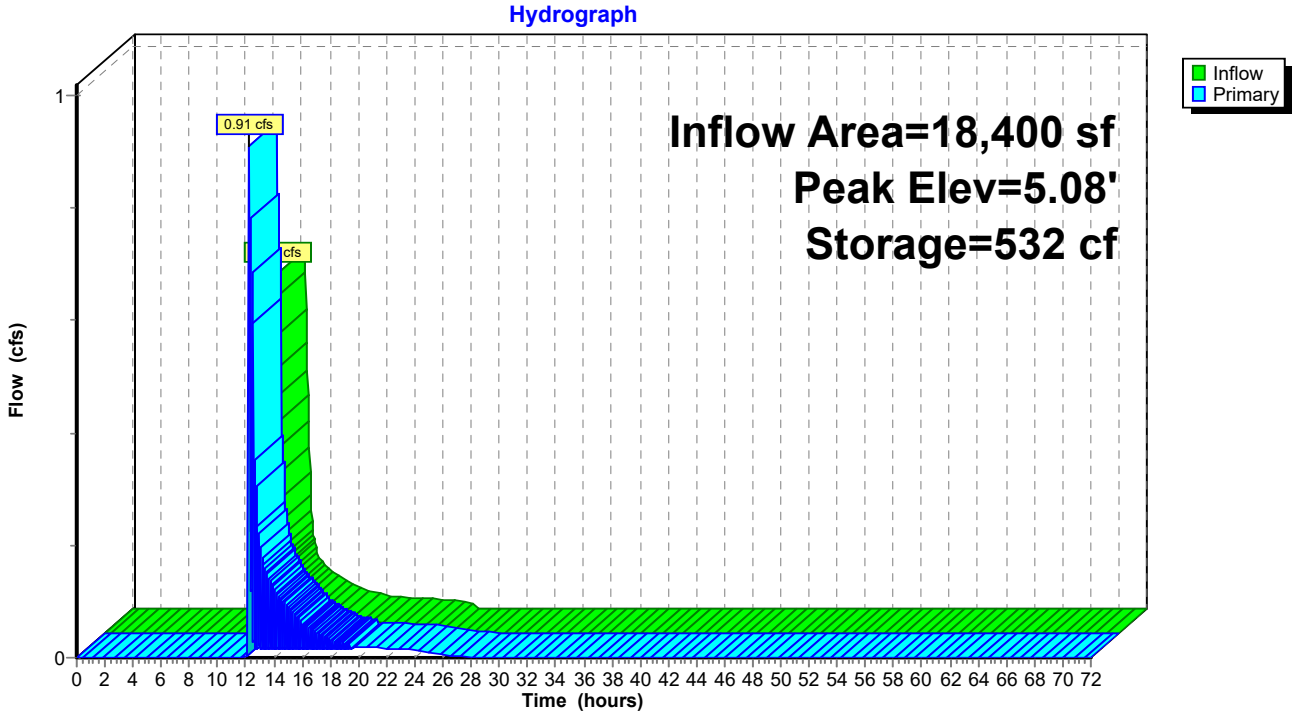
Volume	Invert	Avail.Storage	Storage Description
#1	1.60'	532 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1.60	12	12.0	0	0	12
4.45	12	12.0	34	34	46
4.50	1,258	168.0	23	57	2,281
4.75	2,618	234.0	474	532	4,393

Device	Routing	Invert	Outlet Devices
#1	Primary	4.70'	**12.0" Round Culvert** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	4.70'	**12.0" Round RCP_Round 12"** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=0.85 cfs @ 12.25 hrs HW=5.06' (Free Discharge)
1=Culvert (Barrel Controls 0.42 cfs @ 2.47 fps)
2=RCP_Round 12" (Barrel Controls 0.42 cfs @ 2.47 fps)

Pond P9: Pond 9



Summary for Pond SF2: Sand Filter Area 2

Inflow Area = 168,577 sf, 97.16% Impervious, Inflow Depth = 4.88" for 10YR - 24HR event
Inflow = 19.81 cfs @ 12.07 hrs, Volume= 68,503 cf
Outflow = 16.82 cfs @ 12.12 hrs, Volume= 68,503 cf, Atten= 15%, Lag= 3.2 min
Primary = 16.82 cfs @ 12.12 hrs, Volume= 68,503 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.50' @ 12.12 hrs Surf.Area= 0.220 ac Storage= 0.145 af

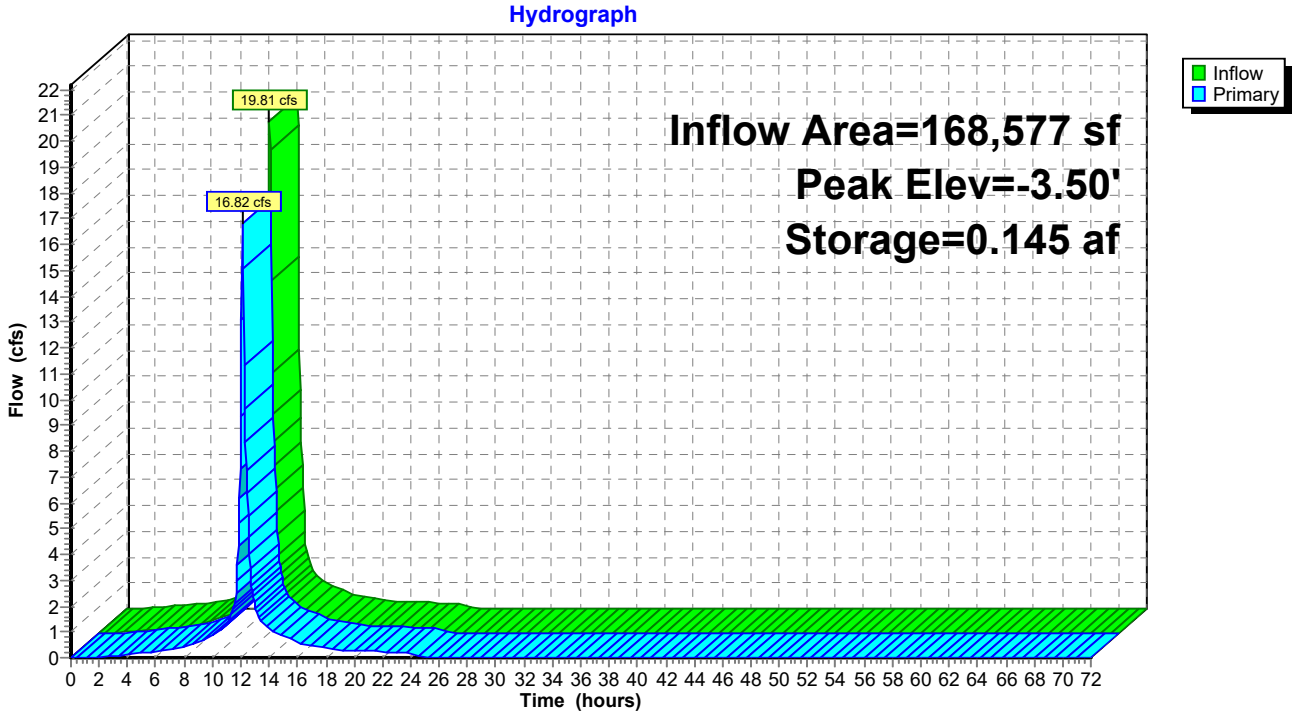
Plug-Flow detention time= 15.1 min calculated for 68,456 cf (100% of inflow)
Center-of-Mass det. time= 15.1 min (769.1 - 753.9)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.582 af	**StormTrap SingleTrap 4-0** x 54 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 54 Chambers in 8 Rows 67.83' x 107.77' Core + 6.66' Border = 81.15' x 121.08' System 0.979 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=16.39 cfs @ 12.12 hrs HW=-3.52' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 16.39 cfs @ 3.34 fps)

Pond SF2: Sand Filter Area 2



Summary for Pond SF3: Sand Filter Area 3

Inflow Area = 182,081 sf, 91.63% Impervious, Inflow Depth = 4.65" for 10YR - 24HR event
Inflow = 20.99 cfs @ 12.07 hrs, Volume= 70,517 cf
Outflow = 16.36 cfs @ 12.14 hrs, Volume= 70,517 cf, Atten= 22%, Lag= 4.2 min
Primary = 16.36 cfs @ 12.14 hrs, Volume= 70,517 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.52' @ 12.14 hrs Surf.Area= 0.305 ac Storage= 0.200 af

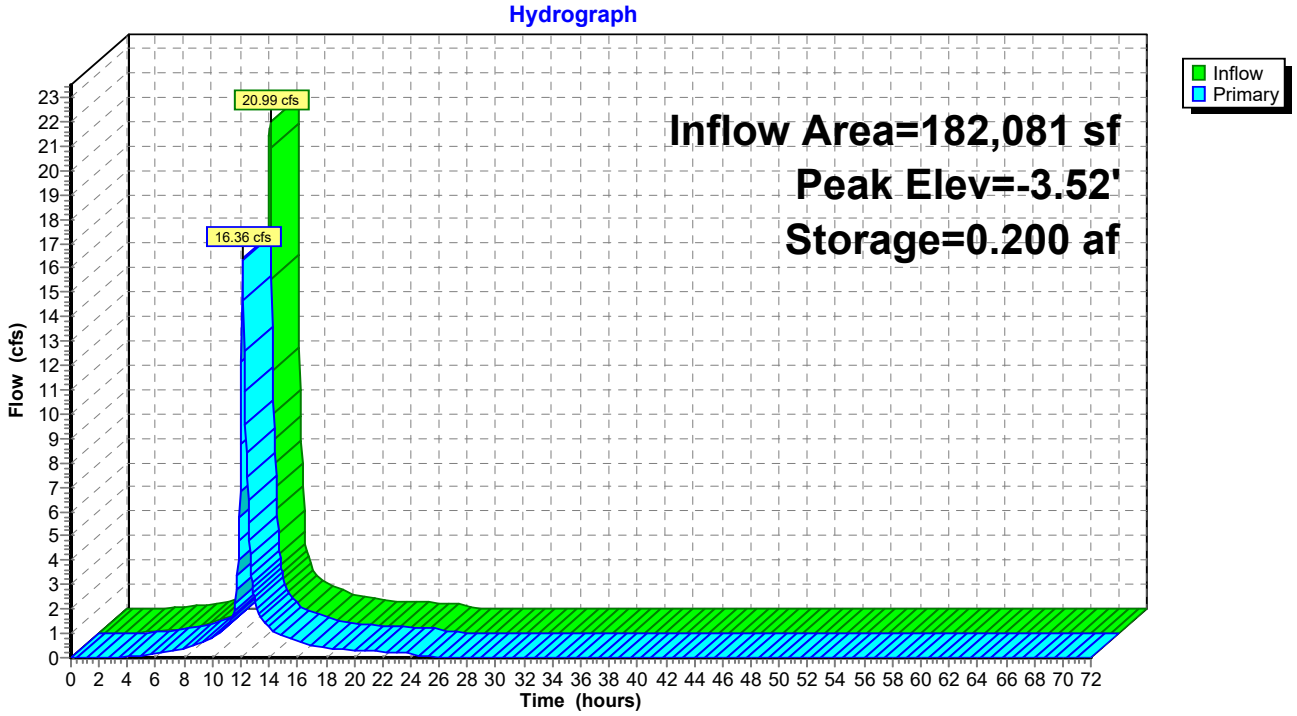
Plug-Flow detention time= 20.6 min calculated for 70,469 cf (100% of inflow)
Center-of-Mass det. time= 20.7 min (786.8 - 766.1)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.815 af	**StormTrap SingleTrap 4-0** x 77 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 77 Chambers in 7 Rows 59.35' x 169.35' Core + 6.66' Border = 72.67' x 182.67' System 1.371 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=16.18 cfs @ 12.14 hrs HW=-3.53' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 16.18 cfs @ 3.32 fps)

Pond SF3: Sand Filter Area 3



Summary for Pond SF5: SAND FILTER AREA 5

Inflow Area = 109,336 sf, 91.63% Impervious, Inflow Depth = 4.65" for 10YR - 24HR event
Inflow = 12.60 cfs @ 12.07 hrs, Volume= 42,344 cf
Outflow = 10.28 cfs @ 12.13 hrs, Volume= 42,344 cf, Atten= 18%, Lag= 3.6 min
Primary = 10.28 cfs @ 12.13 hrs, Volume= 42,344 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.75' @ 12.13 hrs Surf.Area= 0.205 ac Storage= 0.101 af

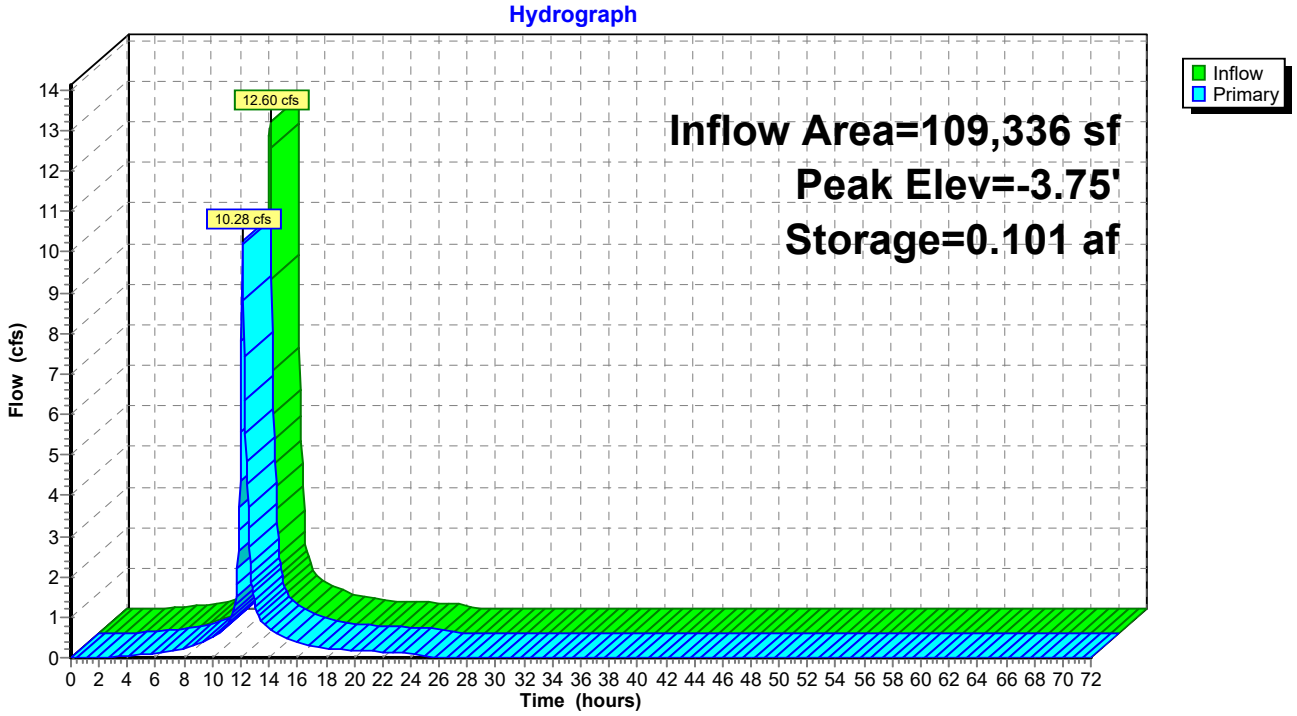
Plug-Flow detention time= 16.0 min calculated for 42,315 cf (100% of inflow)
Center-of-Mass det. time= 16.1 min (782.2 - 766.1)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.538 af	**StormTrap SingleTrap 4-0** x 50 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 50 Chambers in 9 Rows 76.31' x 92.38' Core + 6.66' Border = 89.63' x 105.69' System 0.906 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=10.09 cfs @ 12.13 hrs HW=-3.76' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 10.09 cfs @ 2.72 fps)

Pond SF5: SAND FILTER AREA 5



Summary for Pond SF6: SAND FILTER AREA 6

Inflow Area = 171,191 sf, 92.11% Impervious, Inflow Depth = 4.76" for 10YR - 24HR event
Inflow = 19.94 cfs @ 12.07 hrs, Volume= 67,923 cf
Outflow = 15.63 cfs @ 12.14 hrs, Volume= 67,923 cf, Atten= 22%, Lag= 4.1 min
Primary = 15.63 cfs @ 12.14 hrs, Volume= 67,923 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.54' @ 12.14 hrs Surf.Area= 0.296 ac Storage= 0.187 af

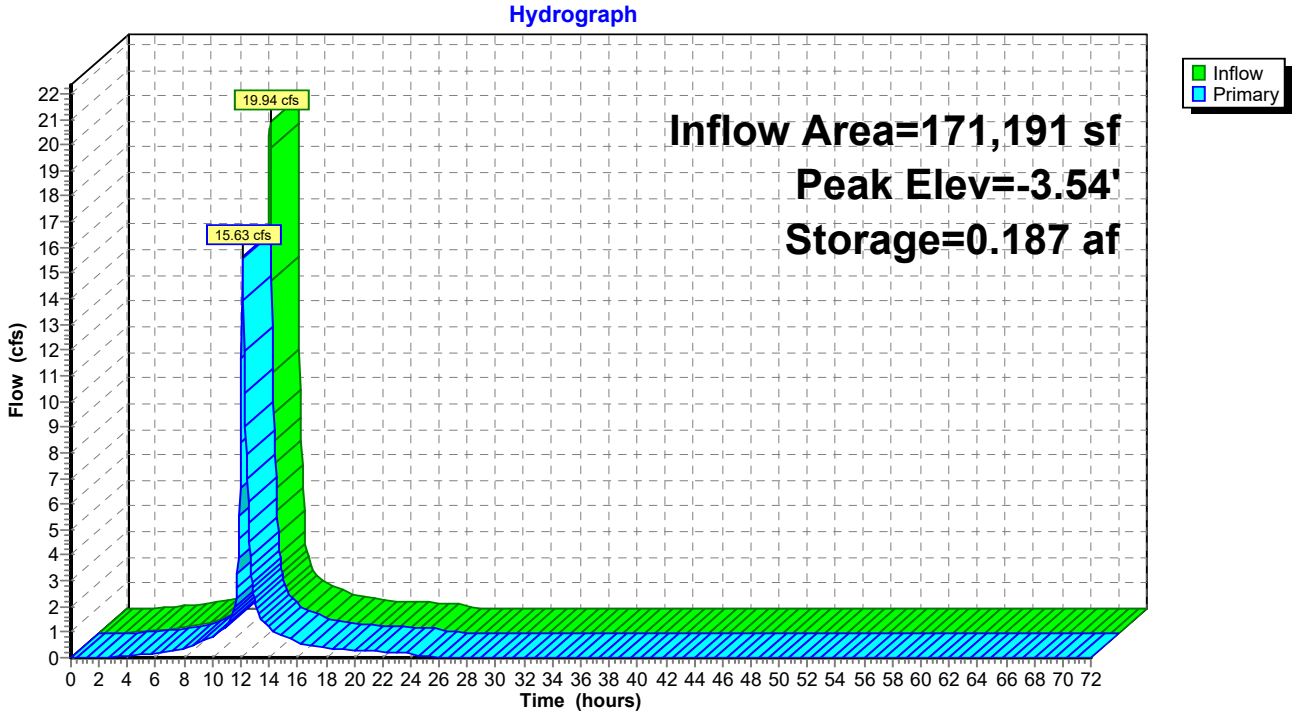
Plug-Flow detention time= 20.2 min calculated for 67,876 cf (100% of inflow)
Center-of-Mass det. time= 20.3 min (780.7 - 760.4)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.784 af	**StormTrap SingleTrap 4-0** x 74 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 74 Chambers in 7 Rows 59.35' x 169.35' Core + 6.66' Border = 72.67' x 182.67' System 1.318 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=15.43 cfs @ 12.14 hrs HW=-3.55' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 15.43 cfs @ 3.25 fps)

Pond SF6: SAND FILTER AREA 6



Summary for Pond SF7: SAND FILTER AREA 7

Inflow Area = 67,954 sf, 92.31% Impervious, Inflow Depth = 4.76" for 10YR - 24HR event
Inflow = 7.92 cfs @ 12.07 hrs, Volume= 26,962 cf
Outflow = 6.81 cfs @ 12.12 hrs, Volume= 26,962 cf, Atten= 14%, Lag= 3.0 min
Primary = 6.81 cfs @ 12.12 hrs, Volume= 26,962 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.91' @ 12.12 hrs Surf.Area= 0.131 ac Storage= 0.052 af

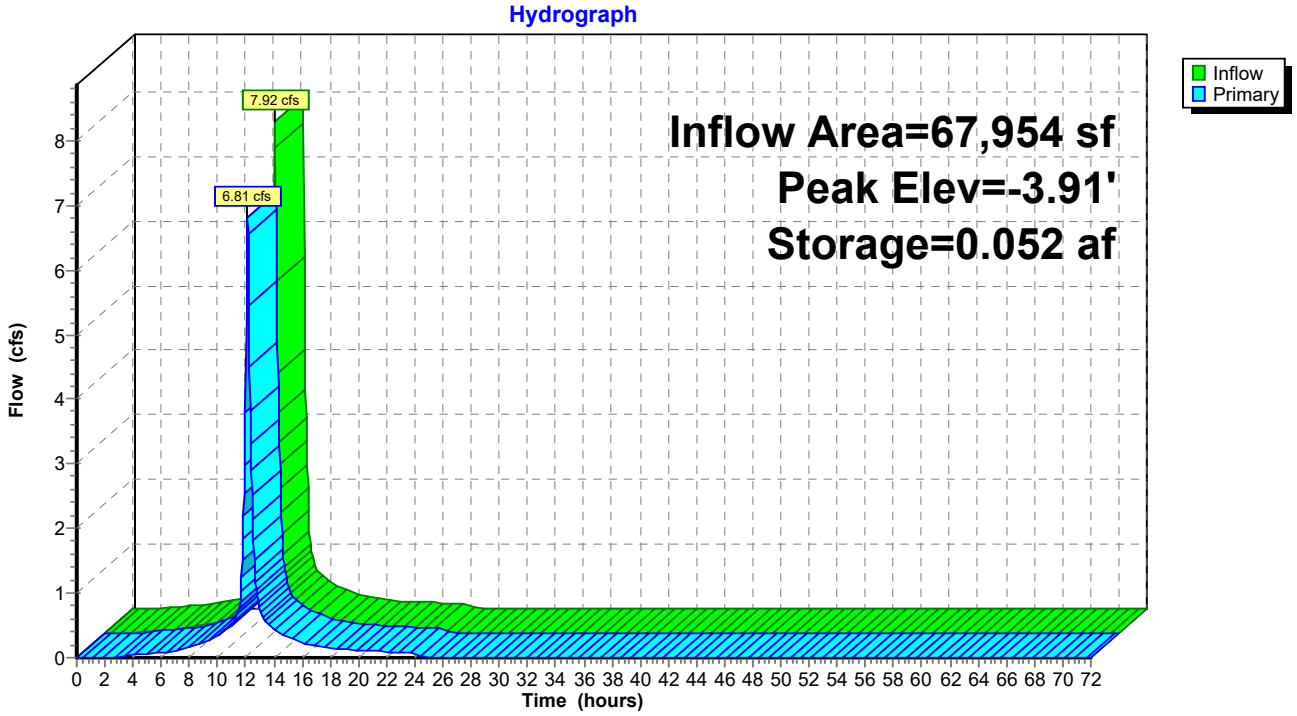
Plug-Flow detention time= 12.1 min calculated for 26,962 cf (100% of inflow)
Center-of-Mass det. time= 12.0 min (772.4 - 760.4)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.350 af	**StormTrap SingleTrap 4-0** x 28 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 28 Chambers in 4 Rows 33.92' x 107.77' Core + 6.66' Border = 47.23' x 121.08' System 0.591 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=6.63 cfs @ 12.12 hrs HW=-3.92' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 6.63 cfs @ 2.29 fps)

Pond SF7: SAND FILTER AREA 7



Summary for Pond SF8: SAND FILTER AREA 8

Inflow Area = 53,579 sf, 90.24% Impervious, Inflow Depth = 4.65" for 10YR - 24HR event
Inflow = 6.18 cfs @ 12.07 hrs, Volume= 20,750 cf
Outflow = 5.10 cfs @ 12.13 hrs, Volume= 20,750 cf, Atten= 17%, Lag= 3.4 min
Primary = 5.10 cfs @ 12.13 hrs, Volume= 20,750 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -4.00' @ 12.13 hrs Surf.Area= 0.131 ac Storage= 0.043 af

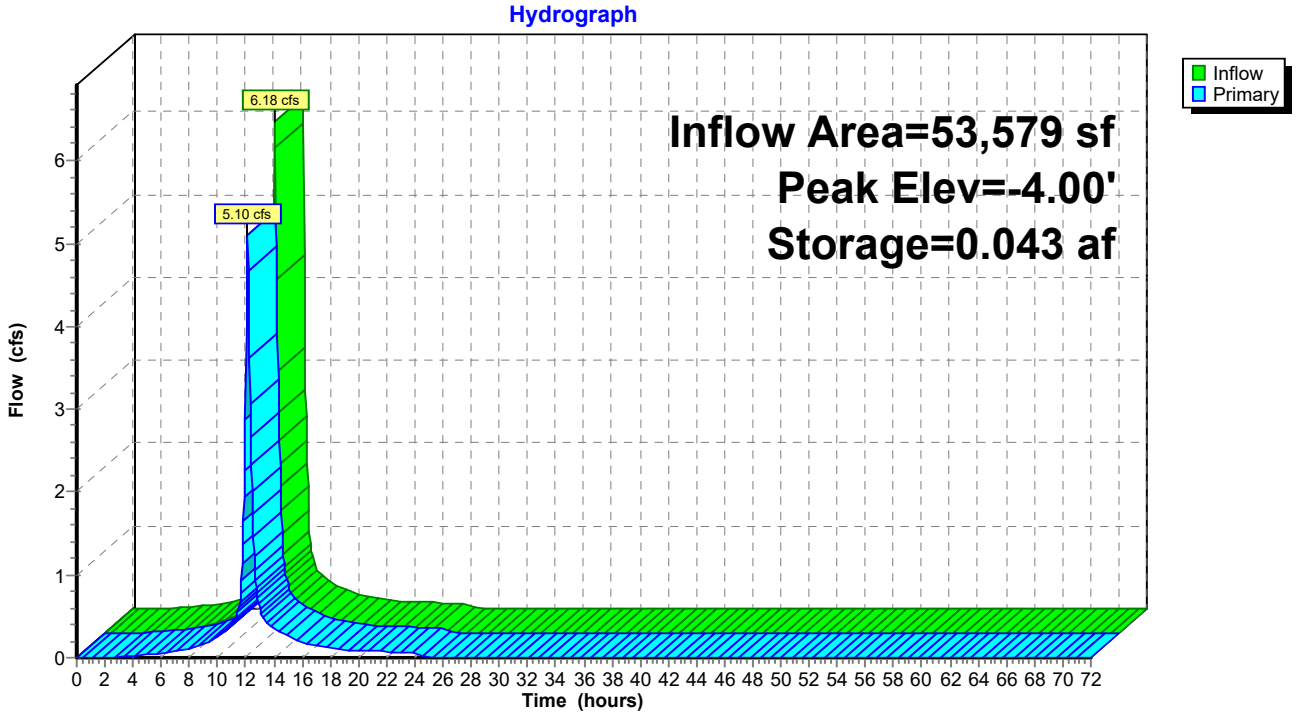
Plug-Flow detention time= 12.7 min calculated for 20,736 cf (100% of inflow)
Center-of-Mass det. time= 12.7 min (778.9 - 766.1)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.350 af	**StormTrap SingleTrap 4-0** x 28 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 28 Chambers in 4 Rows 33.92' x 107.77' Core + 6.66' Border = 47.23' x 121.08' System 0.591 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=5.01 cfs @ 12.13 hrs HW=-4.01' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 5.01 cfs @ 2.04 fps)

Pond SF8: SAND FILTER AREA 8



Summary for Pond SFA1: SAND FILTER AREA A1

Inflow Area = 202,990 sf, 83.69% Impervious, Inflow Depth = 4.42" for 10YR - 24HR event
Inflow = 22.79 cfs @ 12.07 hrs, Volume= 74,834 cf
Outflow = 18.82 cfs @ 12.13 hrs, Volume= 74,834 cf, Atten= 17%, Lag= 3.4 min
Primary = 18.82 cfs @ 12.13 hrs, Volume= 74,834 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.43' @ 12.13 hrs Surf.Area= 0.248 ac Storage= 0.176 af

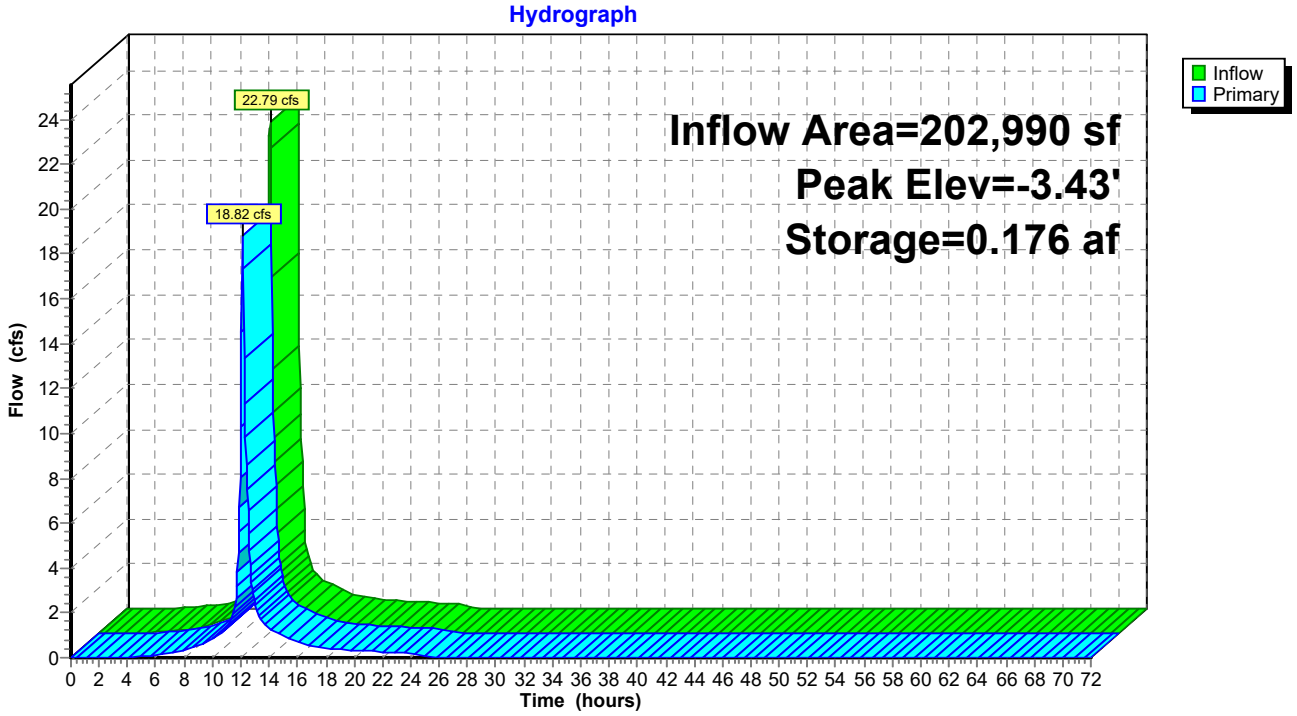
Plug-Flow detention time= 16.0 min calculated for 74,782 cf (100% of inflow)
Center-of-Mass det. time= 16.1 min (792.1 - 776.0)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.659 af	**StormTrap SingleTrap 4-0** x 62 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 62 Chambers in 8 Rows 67.83' x 123.17' Core + 6.66' Border = 81.15' x 136.48' System 1.108 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=18.49 cfs @ 12.13 hrs HW=-3.44' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 18.49 cfs @ 3.50 fps)

Pond SFA1: SAND FILTER AREA A1



Summary for Pond SFA2: SAND FILTER AREA A2

Inflow Area = 190,357 sf,100.00% Impervious, Inflow Depth = 4.99" for 10YR - 24HR event
Inflow = 22.52 cfs @ 12.07 hrs, Volume= 79,202 cf
Outflow = 16.52 cfs @ 12.15 hrs, Volume= 79,202 cf, Atten= 27%, Lag= 4.8 min
Primary = 16.52 cfs @ 12.15 hrs, Volume= 79,202 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.51' @ 12.15 hrs Surf.Area= 0.382 ac Storage= 0.253 af

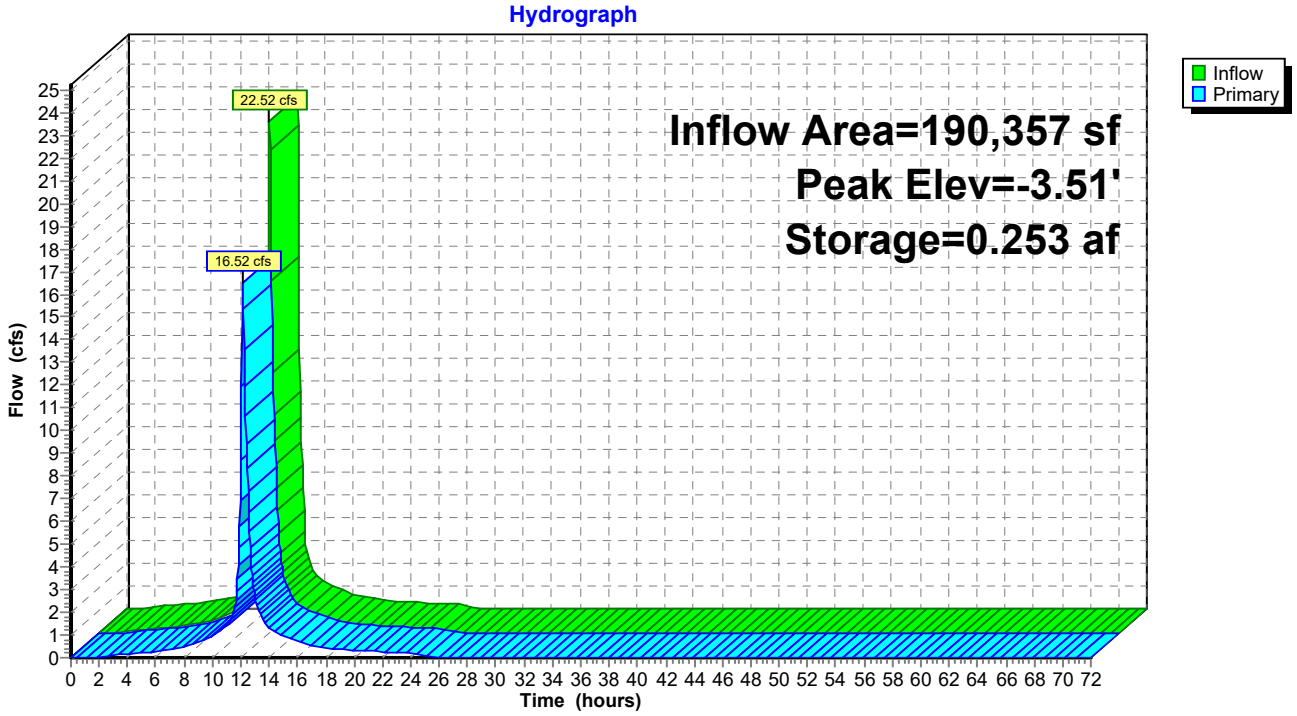
Plug-Flow detention time= 25.9 min calculated for 79,147 cf (100% of inflow)
Center-of-Mass det. time= 26.0 min (772.3 - 746.4)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	1.027 af	**StormTrap SingleTrap 4-0** x 101 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 101 Chambers in 9 Rows 76.31' x 169.35' Core + 6.66' Border = 89.63' x 182.67' System 1.725 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=16.52 cfs @ 12.15 hrs HW=-3.51' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 16.52 cfs @ 3.35 fps)

Pond SFA2: SAND FILTER AREA A2



Summary for Pond T1: Sand Filter 1

Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 2.29" for 10YR - 24HR event
Inflow = 9.22 cfs @ 12.11 hrs, Volume= 18,843 cf
Outflow = 5.81 cfs @ 12.22 hrs, Volume= 18,590 cf, Atten= 37%, Lag= 6.8 min
Primary = 5.81 cfs @ 12.22 hrs, Volume= 18,590 cf
Routed to Link 2L : TUTTLE BROOK
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.33' @ 12.22 hrs Surf.Area= 4,723 sf Storage= 5,079 cf

Plug-Flow detention time= 28.7 min calculated for 18,577 cf (99% of inflow)
Center-of-Mass det. time= 27.4 min (771.0 - 743.6)

Volume	Invert	Avail.Storage	Storage Description
#1	0.04'	5,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,428 cf Overall - 749 cf Embedded = 16,679 cf x 30.0% Voids
#2	0.21'	648 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 928.0' S= 0.0014 '/' 749 cf Overall - 0.3" Wall Thickness = 648 cf
		5,652 cf	Total Available Storage

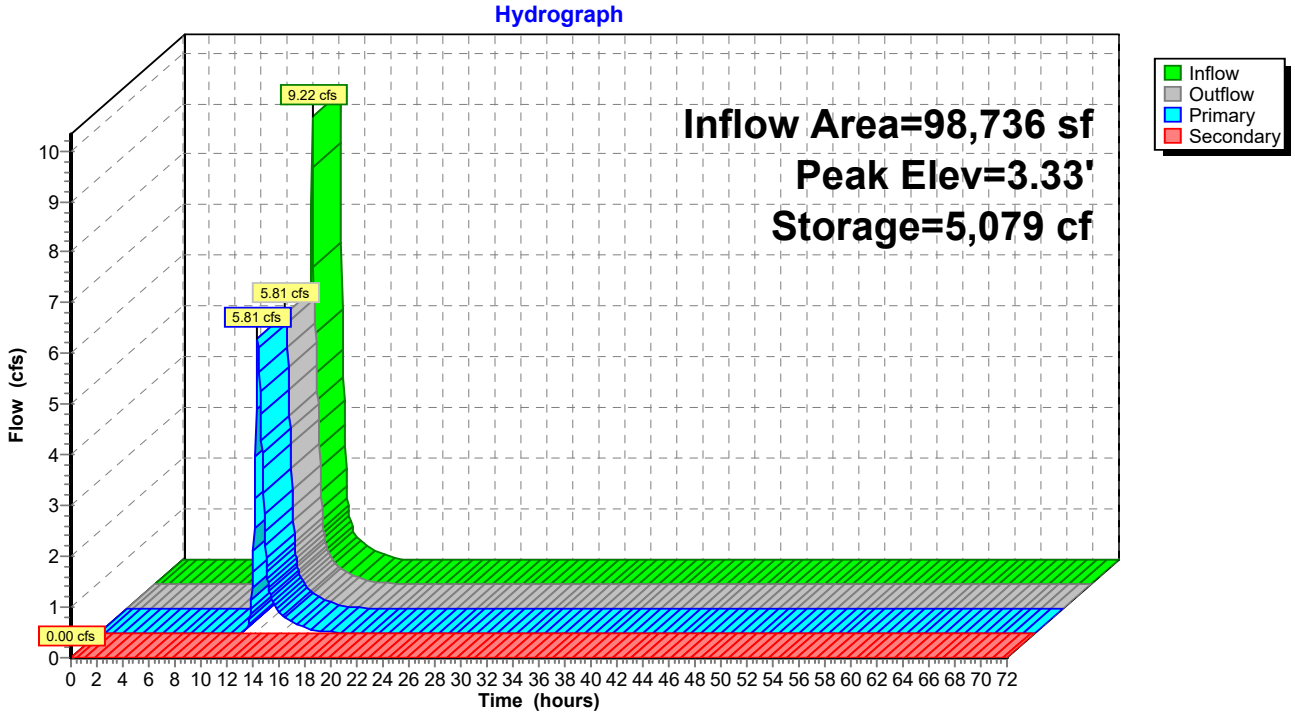
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.04	4,723	0	0
1.50	4,723	6,896	6,896
3.50	4,723	9,446	16,342
3.73	4,723	1,086	17,428

Device	Routing	Invert	Outlet Devices
#1	Primary	0.21'	**18.0" Round Culvert** L= 202.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 0.21' / 0.11' S= 0.0005 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Secondary	3.73'	**928.0' long overflow** 2 End Contraction(s)
#3	Device 1	0.21'	**0.5" Vert. perf pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.76 cfs @ 12.22 hrs HW=3.30' (Free Discharge)
└**1=Culvert** (Barrel Controls 5.76 cfs @ 3.26 fps)
└**3=perf pipe holes** (Passes 5.76 cfs of 11.49 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=0.04' (Free Discharge)
└**2=overflow** (Controls 0.00 cfs)

Pond T1: Sand Filter 1



Summary for Pond T2: Sand Filter 2

Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 2.29" for 10YR - 24HR event
Inflow = 9.34 cfs @ 12.10 hrs, Volume= 18,843 cf
Outflow = 5.96 cfs @ 12.21 hrs, Volume= 18,616 cf, Atten= 36%, Lag= 6.5 min
Primary = 5.96 cfs @ 12.21 hrs, Volume= 18,616 cf
Routed to Pond CB10 : Exist CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.53' @ 12.21 hrs Surf.Area= 4,723 sf Storage= 4,248 cf

Plug-Flow detention time= 18.0 min calculated for 18,616 cf (99% of inflow)
Center-of-Mass det. time= 15.1 min (758.0 - 742.9)

Volume	Invert	Avail.Storage	Storage Description
#1	-1.26'	6,880 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 23,521 cf Overall - 586 cf Embedded = 22,935 cf x 30.0% Voids
#2	-1.10'	507 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 726.0' S= 0.0035 '/' 586 cf Overall - 0.3" Wall Thickness = 507 cf
		7,387 cf	Total Available Storage

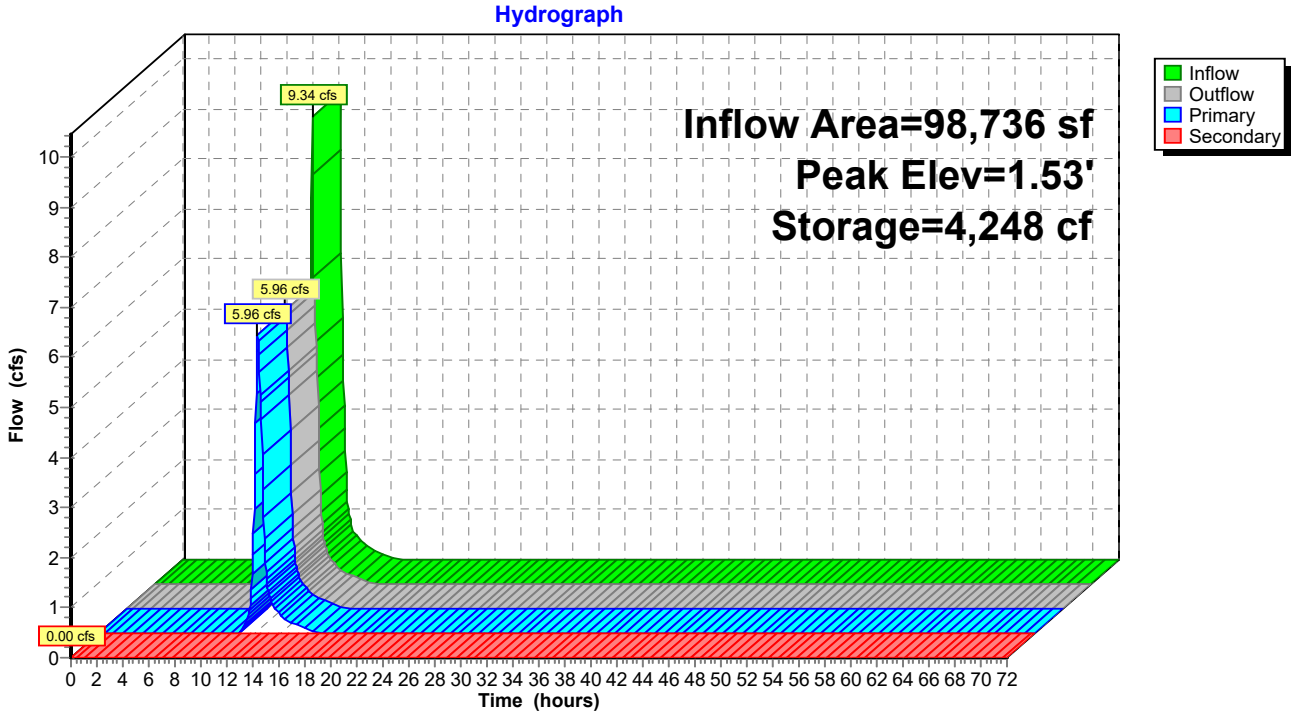
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-1.26	4,723	0	0
1.50	4,723	13,035	13,035
3.49	4,723	9,399	22,434
3.72	4,723	1,086	23,521

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.20'	**18.0" Round Culvert** L= 177.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= -1.20' / -1.59' S= 0.0022 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Secondary	3.72'	**726.0' long overflow** 2 End Contraction(s)
#3	Device 1	-1.10'	**0.5" Vert. Perf Pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.92 cfs @ 12.21 hrs HW=1.51' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 5.92 cfs @ 3.35 fps)
↑—**3=Perf Pipe holes** (Passes 5.92 cfs of 10.55 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-1.26' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T2: Sand Filter 2



Summary for Pond T3: Sand Filter 3

Inflow Area = 34,322 sf, 59.30% Impervious, Inflow Depth = 1.24" for 10YR - 24HR event
Inflow = 2.59 cfs @ 12.11 hrs, Volume= 3,551 cf
Outflow = 2.42 cfs @ 12.15 hrs, Volume= 3,459 cf, Atten= 7%, Lag= 2.3 min
Primary = 2.42 cfs @ 12.15 hrs, Volume= 3,459 cf
Routed to Pond CB8 : CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -0.11' @ 12.15 hrs Surf.Area= 1,808 sf Storage= 468 cf

Plug-Flow detention time= 5.0 min calculated for 3,456 cf (97% of inflow)
Center-of-Mass det. time= 3.6 min (736.1 - 732.5)

Volume	Invert	Avail.Storage	Storage Description
#1	-0.92'	2,103 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,377 cf Overall - 365 cf Embedded = 7,011 cf x 30.0% Voids
#2	-0.75'	316 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 453.0' S= 0.0050 '/' 365 cf Overall - 0.3" Wall Thickness = 316 cf
		2,420 cf	Total Available Storage

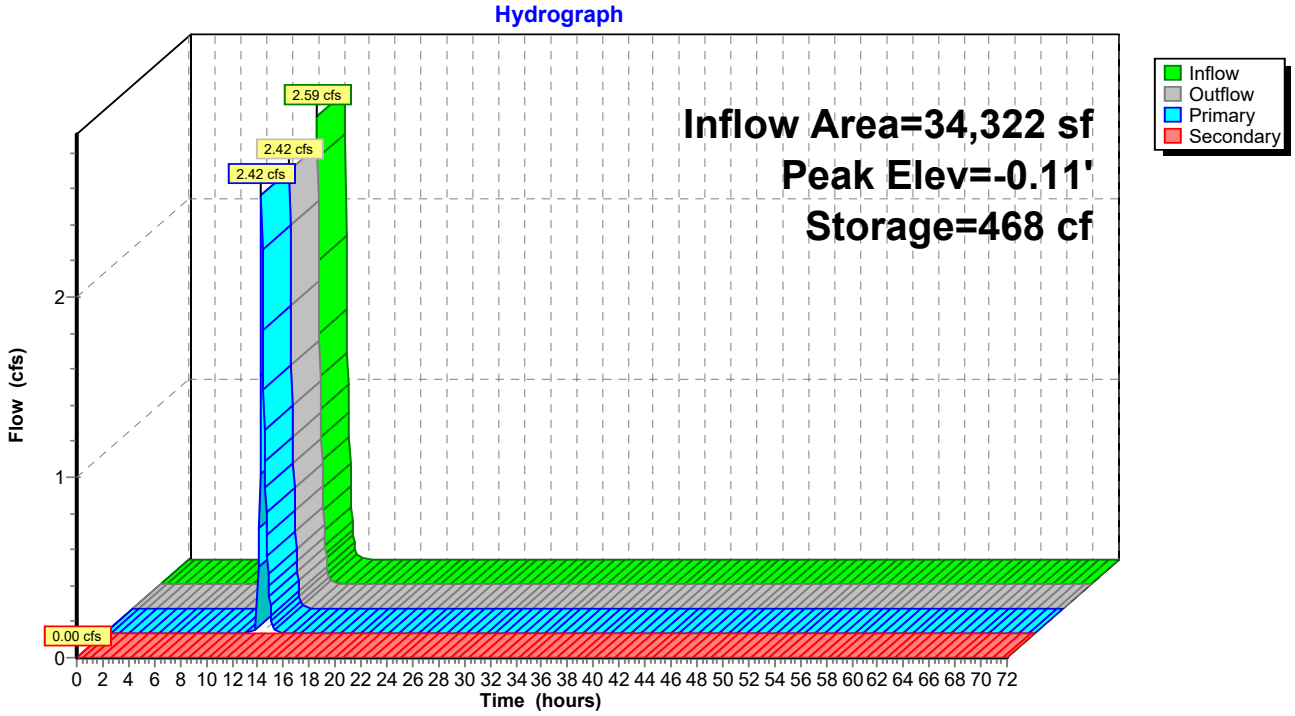
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-0.92	1,808	0	0
0.08	1,808	1,808	1,808
1.66	1,808	2,857	4,665
3.16	1,808	2,712	7,377

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.95'	**24.0" Round Culvert** L= 38.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= -0.95' / -1.01' S= 0.0016 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Secondary	3.16'	**453.0' long overflow** 2 End Contraction(s)
#3	Device 1	-0.75'	**0.5" Vert. Perf Pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.42 cfs @ 12.15 hrs HW=-0.11' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.42 cfs @ 2.85 fps)
↑—**3=Perf Pipe holes** (Passes 2.42 cfs of 5.16 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-0.92' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T3: Sand Filter 3



Summary for Pond T4: Sand Filter 4

Inflow Area = 31,658 sf, 56.17% Impervious, Inflow Depth = 1.15" for 10YR - 24HR event
Inflow = 2.29 cfs @ 12.11 hrs, Volume= 3,041 cf
Outflow = 2.11 cfs @ 12.16 hrs, Volume= 2,948 cf, Atten= 8%, Lag= 2.5 min
Primary = 2.11 cfs @ 12.16 hrs, Volume= 2,948 cf
Routed to Pond CB8 : CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.18' @ 12.16 hrs Surf.Area= 1,808 sf Storage= 524 cf

Plug-Flow detention time= 6.9 min calculated for 2,946 cf (97% of inflow)
Center-of-Mass det. time= 5.4 min (737.8 - 732.4)

Volume	Invert	Avail.Storage	Storage Description
#1	-0.72'	1,946 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 6,852 cf Overall - 365 cf Embedded = 6,487 cf x 30.0% Voids
#2	-0.55'	316 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 453.0' S= 0.0050 '/' 365 cf Overall - 0.3" Wall Thickness = 316 cf
		2,262 cf	Total Available Storage

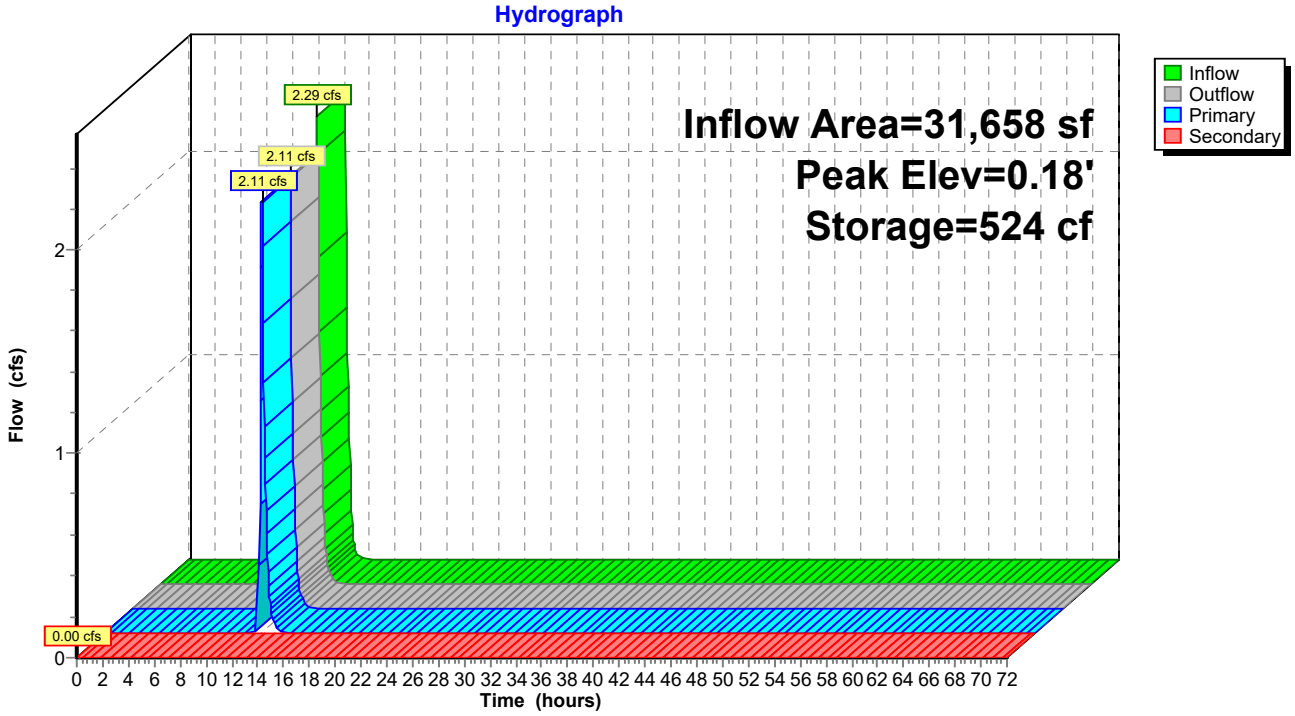
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-0.72	1,808	0	0
1.50	1,808	4,014	4,014
2.93	1,808	2,585	6,599
3.07	1,808	253	6,852

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.65'	**24.0" Round Culvert** L= 131.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= -0.65' / -0.85' S= 0.0015 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Secondary	3.07'	**453.0' long overflow** 2 End Contraction(s)
#3	Device 1	-0.55'	**0.5" Vert. Perf pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.08 cfs @ 12.16 hrs HW=0.18' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 2.08 cfs @ 2.52 fps)
↑—**3=Perf pipe holes** (Passes 2.08 cfs of 5.50 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-0.72' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T4: Sand Filter 4

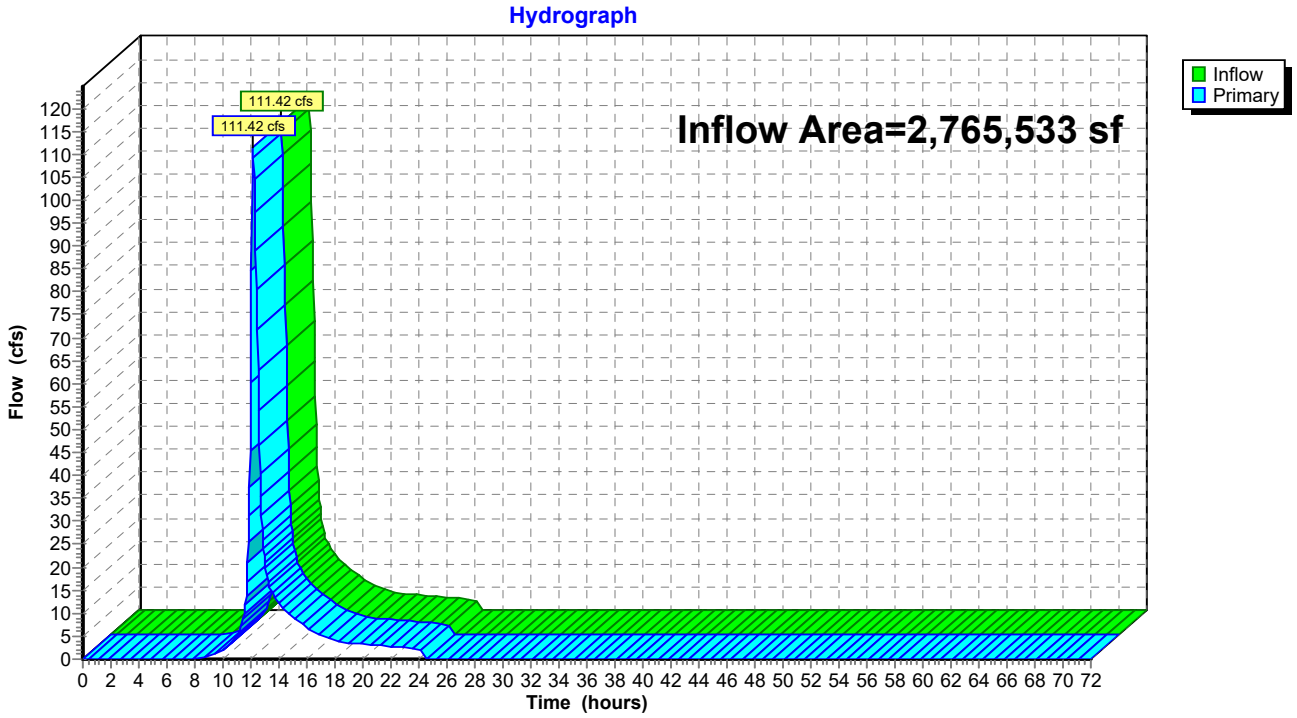


Summary for Link 1L: WEST WETL

Inflow Area = 2,765,533 sf, 39.83% Impervious, Inflow Depth = 2.30" for 10YR - 24HR event
Inflow = 111.42 cfs @ 12.16 hrs, Volume= 528,974 cf
Primary = 111.42 cfs @ 12.16 hrs, Volume= 528,974 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : TUTTLE BROOK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 1L: WEST WETL

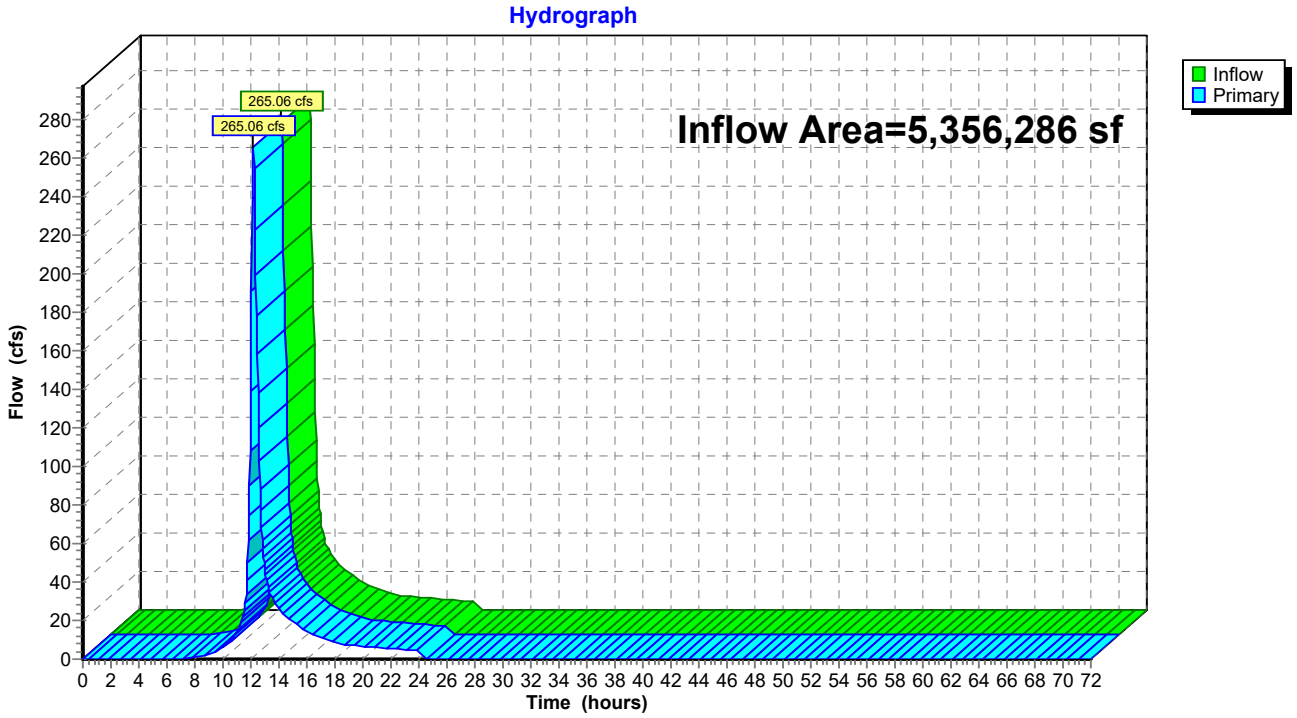


Summary for Link 2L: TUTTLE BROOK

Inflow Area = 5,356,286 sf, 27.31% Impervious, Inflow Depth = 2.67" for 10YR - 24HR event
Inflow = 265.06 cfs @ 12.17 hrs, Volume= 1,193,126 cf
Primary = 265.06 cfs @ 12.17 hrs, Volume= 1,193,126 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 2L: TUTTLE BROOK

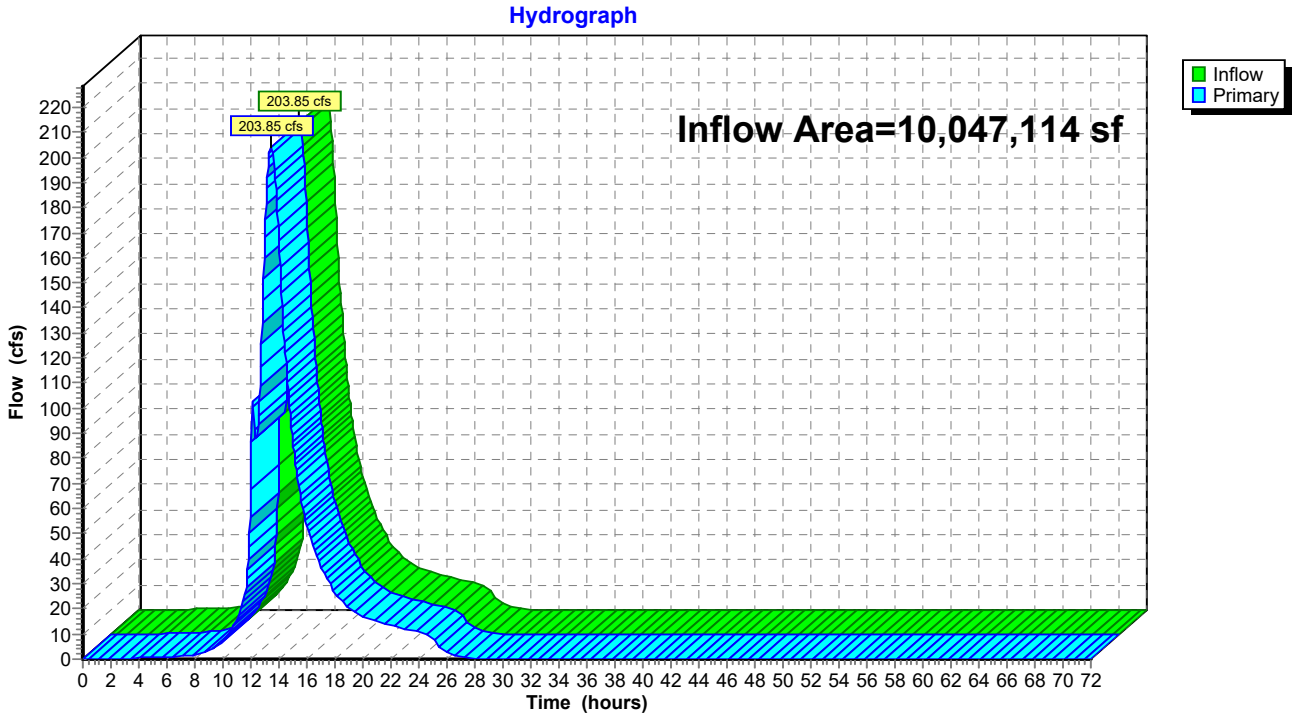


Summary for Link 3L: EAST WETL

Inflow Area = 10,047,114 sf, 45.76% Impervious, Inflow Depth = 3.14" for 10YR - 24HR event
Inflow = 203.85 cfs @ 13.42 hrs, Volume= 2,626,162 cf
Primary = 203.85 cfs @ 13.42 hrs, Volume= 2,626,162 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: EAST WETL

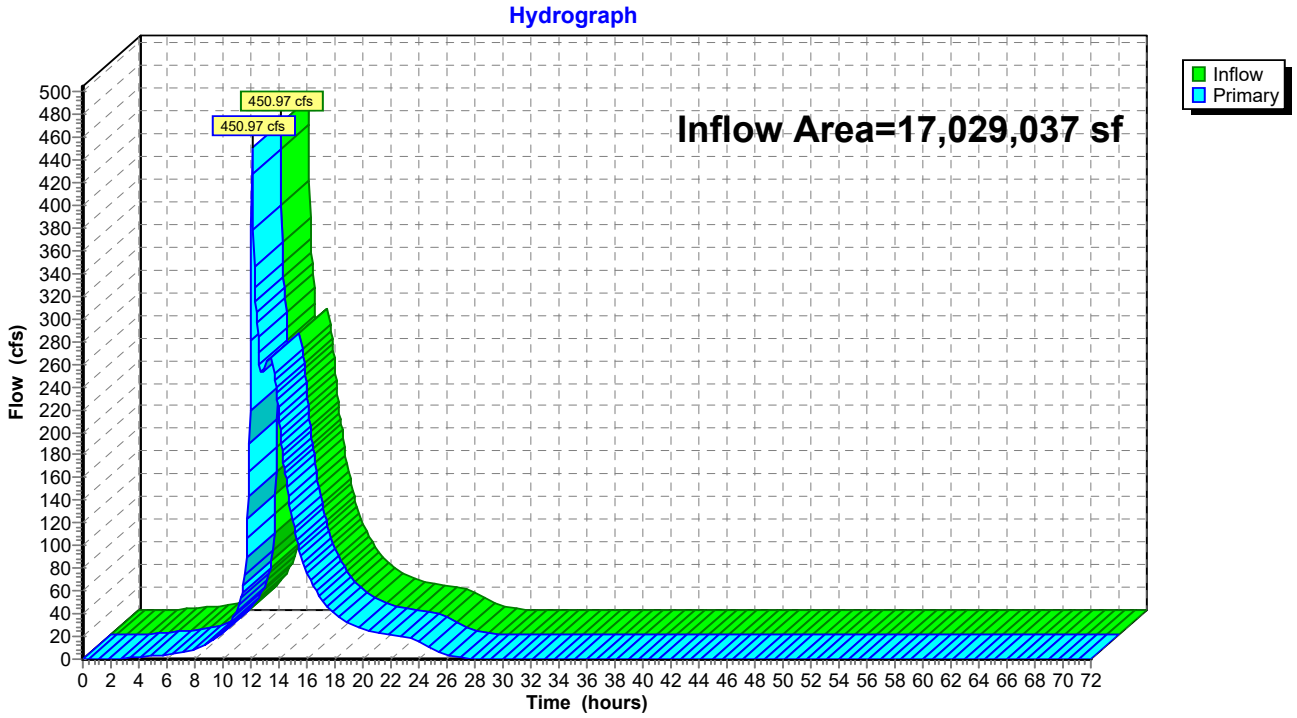


Summary for Link 4L: MORRIS CREEK

Inflow Area = 17,029,037 sf, 42.77% Impervious, Inflow Depth = 3.23" for 10YR - 24HR event
Inflow = 450.97 cfs @ 12.11 hrs, Volume= 4,579,010 cf
Primary = 450.97 cfs @ 12.11 hrs, Volume= 4,579,010 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: MORRIS CREEK



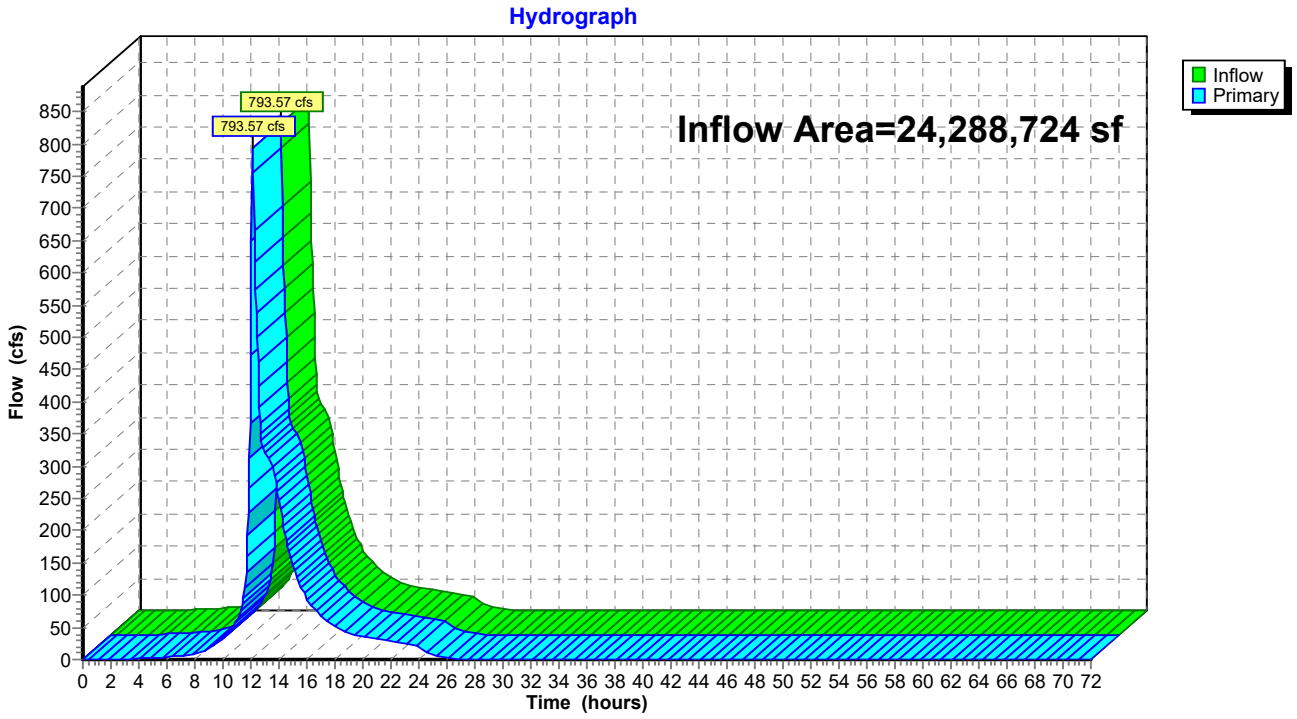
Summary for Link AP1: TIDE GATE

Inflow Area = 24,288,724 sf, 36.95% Impervious, Inflow Depth = 3.05" for 10YR - 24HR event
Inflow = 793.57 cfs @ 12.13 hrs, Volume= 6,164,664 cf
Primary = 793.57 cfs @ 12.13 hrs, Volume= 6,164,664 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 2.50'

Link AP1: TIDE GATE

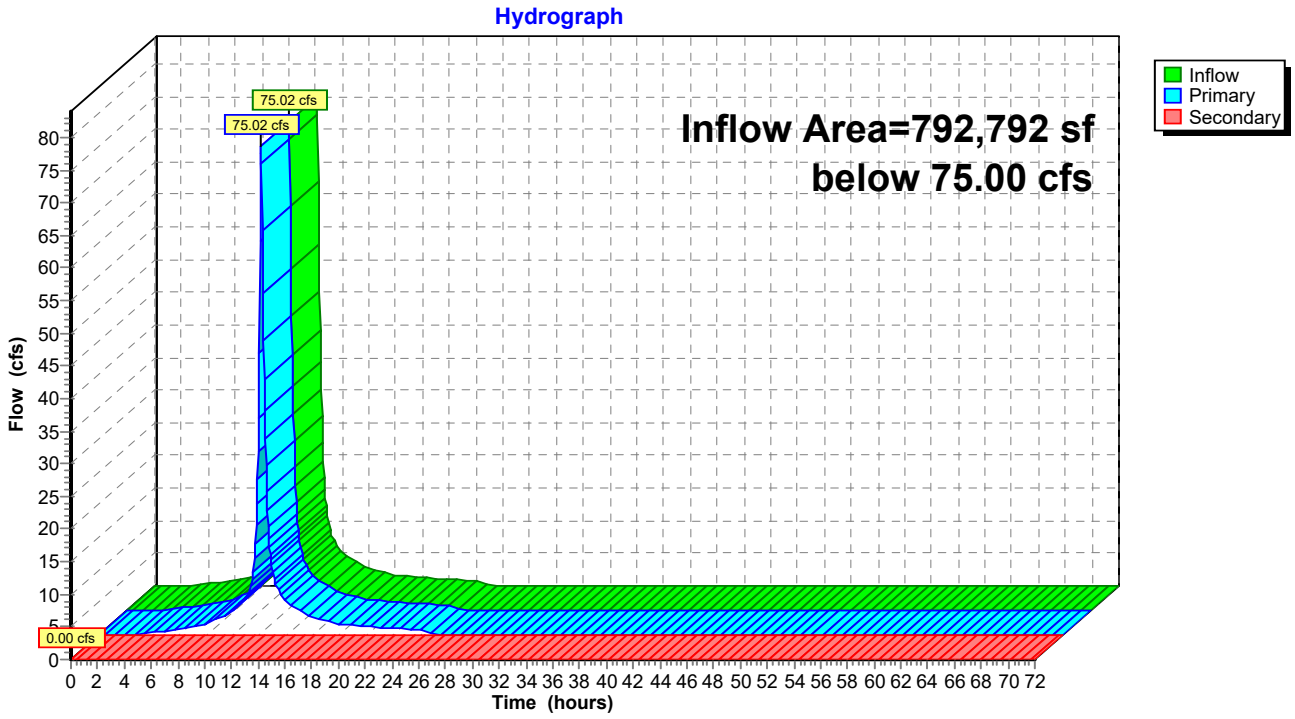


Summary for Link PS1: Pump Station 1

Inflow Area = 792,792 sf, 92.69% Impervious, Inflow Depth = 4.72" for 10YR - 24HR event
Inflow = 75.02 cfs @ 12.12 hrs, Volume= 312,080 cf
Primary = 75.02 cfs @ 12.12 hrs, Volume= 312,080 cf, Atten= 0%, Lag= 0.0 min
Routed to Link W1 : EAST WETL
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 75.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PS1: Pump Station 1

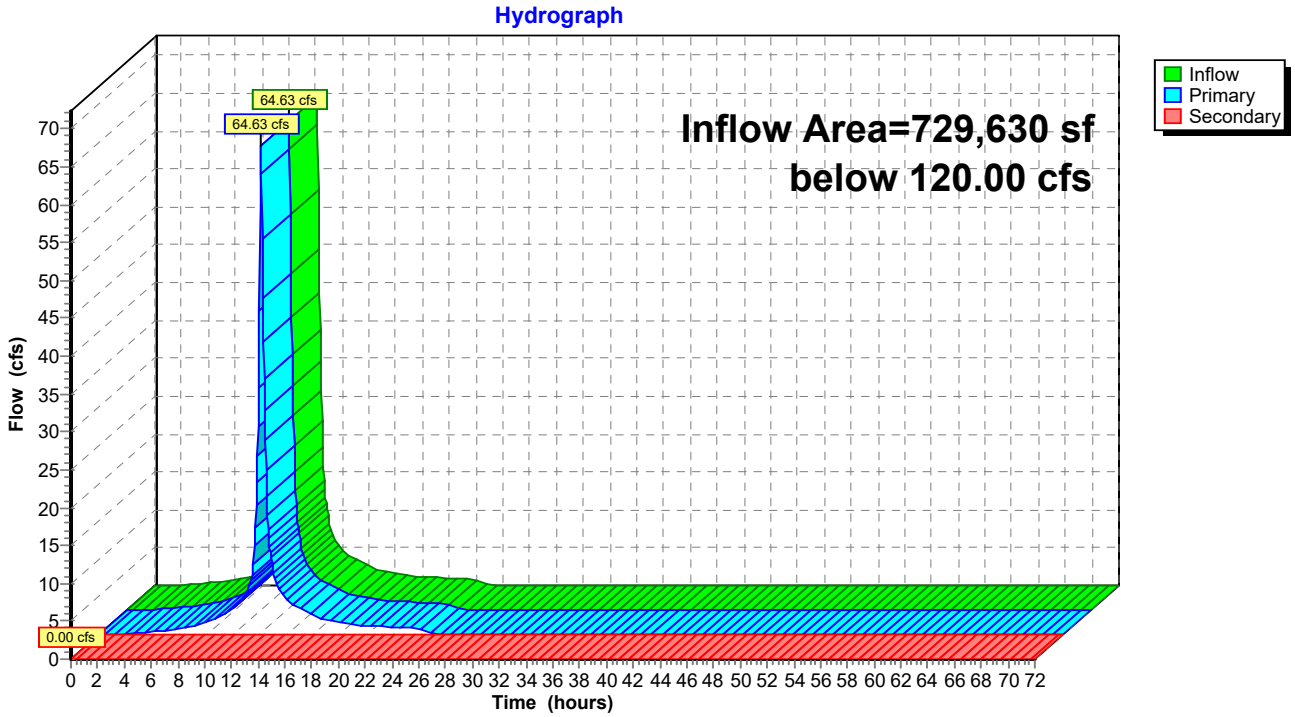


Summary for Link PS2: Pump Station 2

Inflow Area = 729,630 sf, 90.33% Impervious, Inflow Depth = 4.62" for 10YR - 24HR event
Inflow = 64.63 cfs @ 12.11 hrs, Volume= 280,790 cf
Primary = 64.63 cfs @ 12.11 hrs, Volume= 280,790 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow below 120.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PS2: Pump Station 2

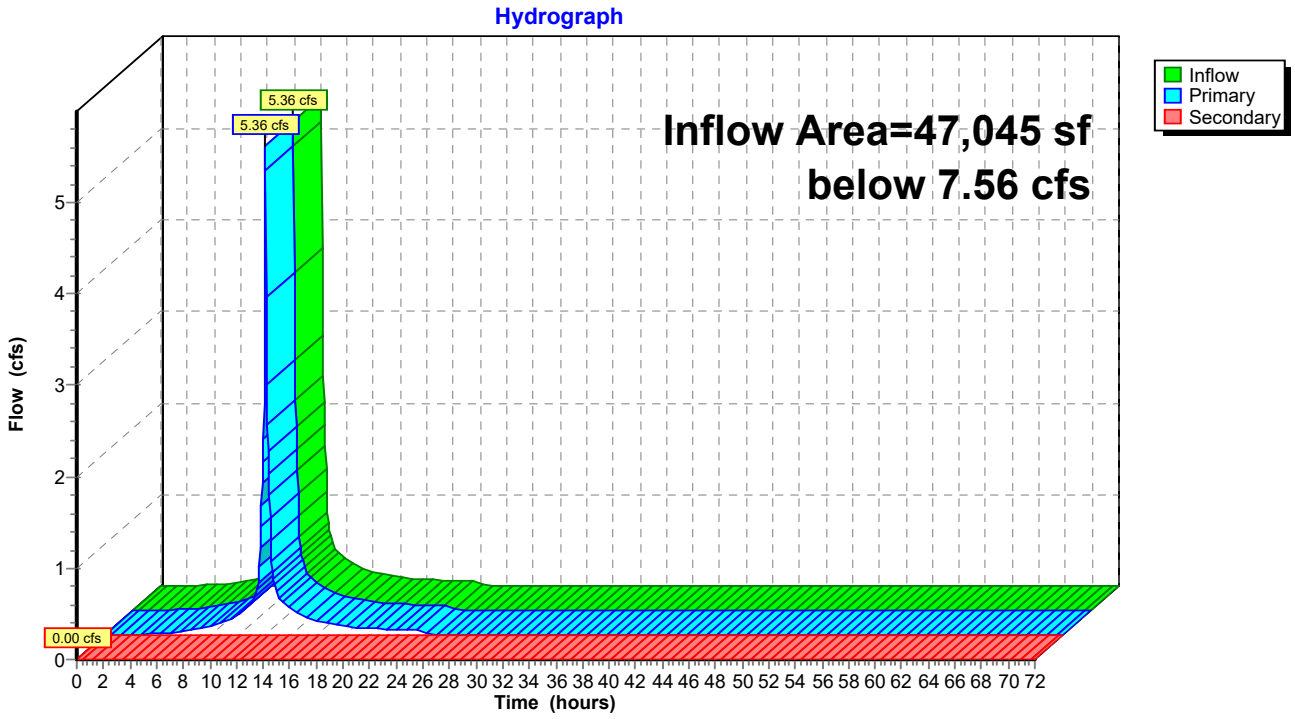


Summary for Link SS1: SITESAVER 1 - STSS-7

Inflow Area = 47,045 sf, 87.04% Impervious, Inflow Depth = 4.54" for 10YR - 24HR event
Inflow = 5.36 cfs @ 12.07 hrs, Volume= 17,779 cf
Primary = 5.36 cfs @ 12.07 hrs, Volume= 17,779 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS1 : Pump Station 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS1: SITESAVER 1 - STSS-7

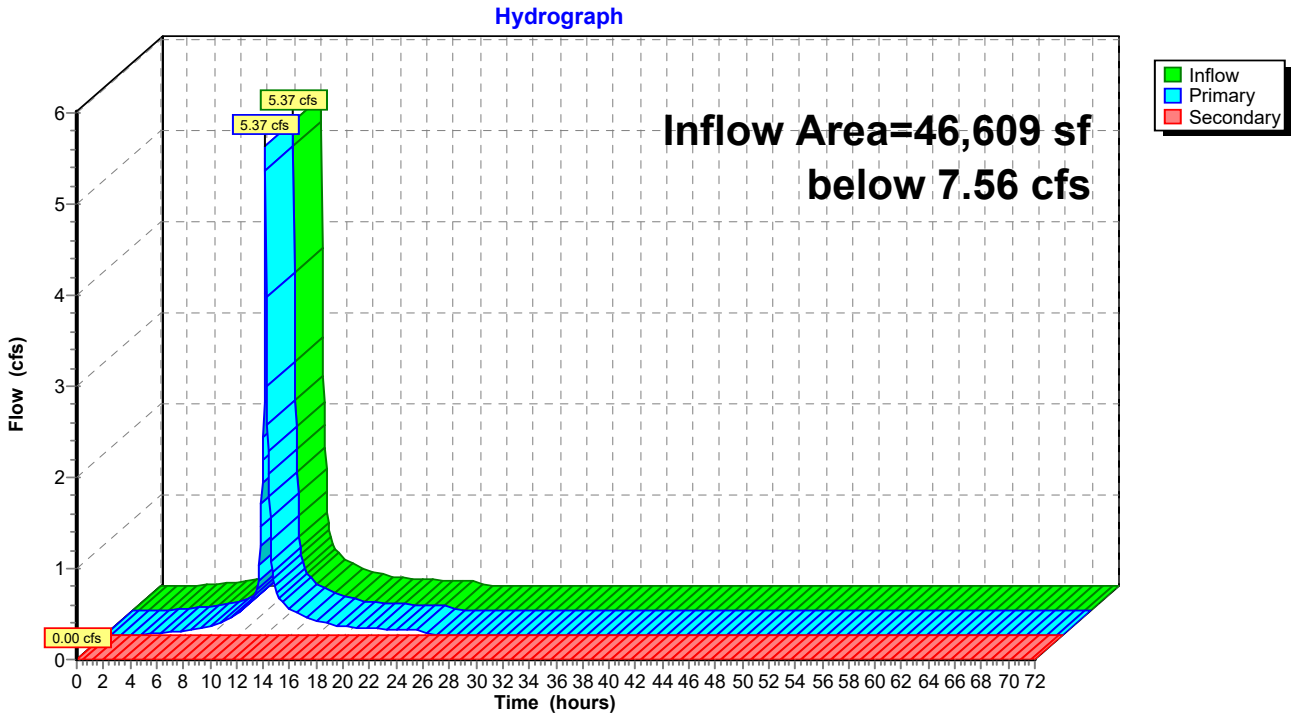


Summary for Link SS2: SITESAVER 2 - STSS-7

Inflow Area = 46,609 sf, 91.59% Impervious, Inflow Depth = 4.65" for 10YR - 24HR event
Inflow = 5.37 cfs @ 12.07 hrs, Volume= 18,051 cf
Primary = 5.37 cfs @ 12.07 hrs, Volume= 18,051 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS1 : Pump Station 1
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS2: SITESAVER 2 - STSS-7

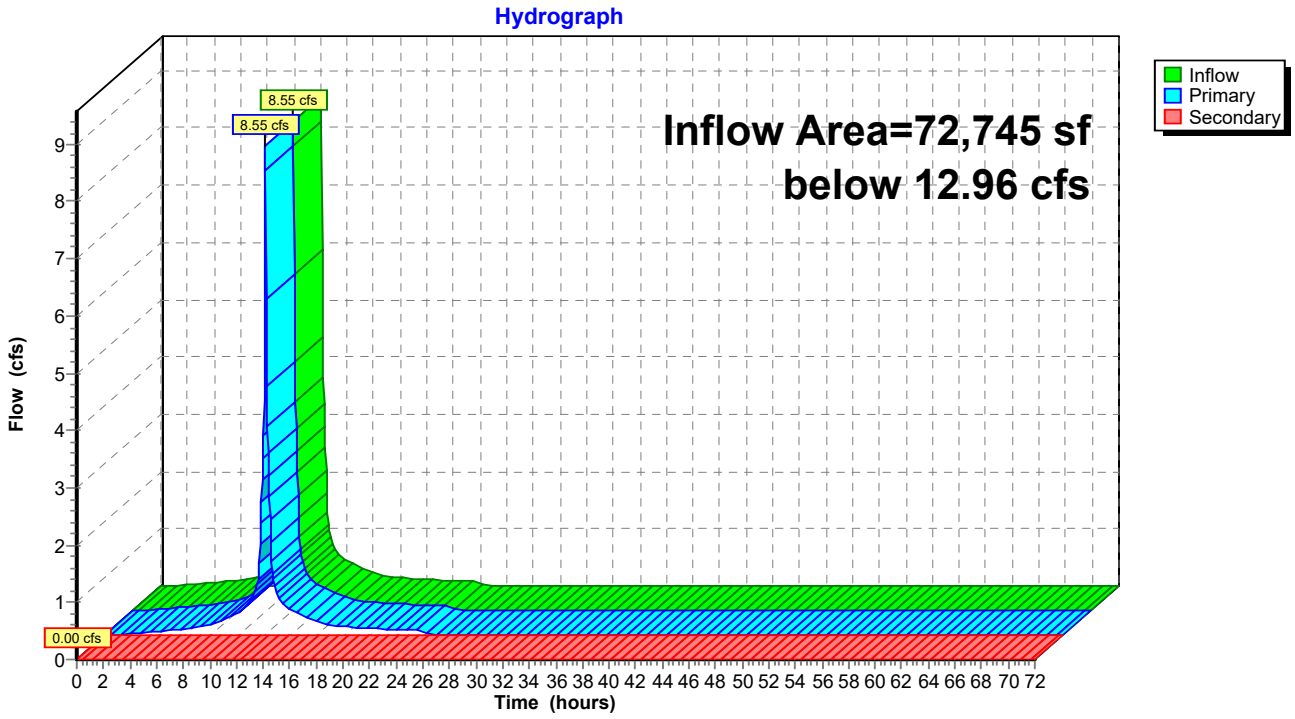


Summary for Link SS3: SITESAVER 3 - STSS-12

Inflow Area = 72,745 sf, 95.21% Impervious, Inflow Depth = 4.88" for 10YR - 24HR event
Inflow = 8.55 cfs @ 12.07 hrs, Volume= 29,561 cf
Primary = 8.55 cfs @ 12.07 hrs, Volume= 29,561 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 12.96 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS3: SITESAVER 3 - STSS-12

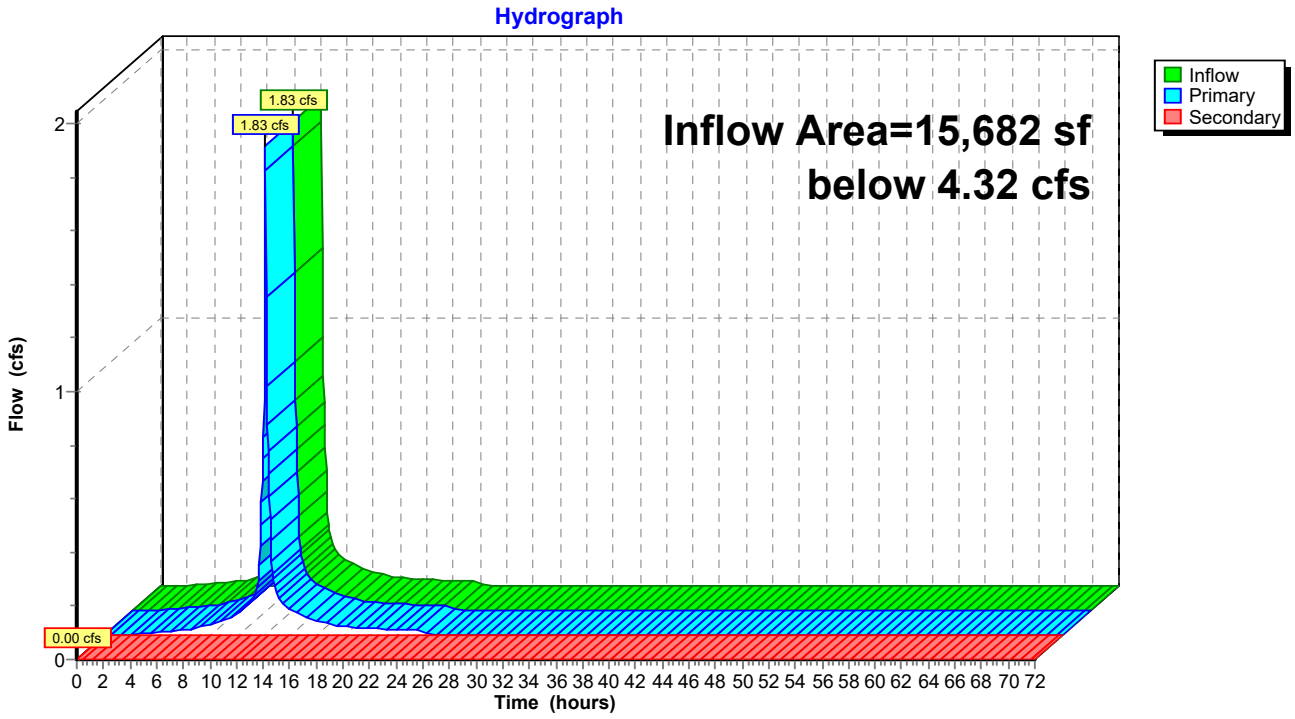


Summary for Link SS4: SITESAVER 4 - STSS-4

Inflow Area = 15,682 sf, 91.67% Impervious, Inflow Depth = 4.76" for 10YR - 24HR event
Inflow = 1.83 cfs @ 12.07 hrs, Volume= 6,222 cf
Primary = 1.83 cfs @ 12.07 hrs, Volume= 6,222 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS4: SITESAVER 4 - STSS-4

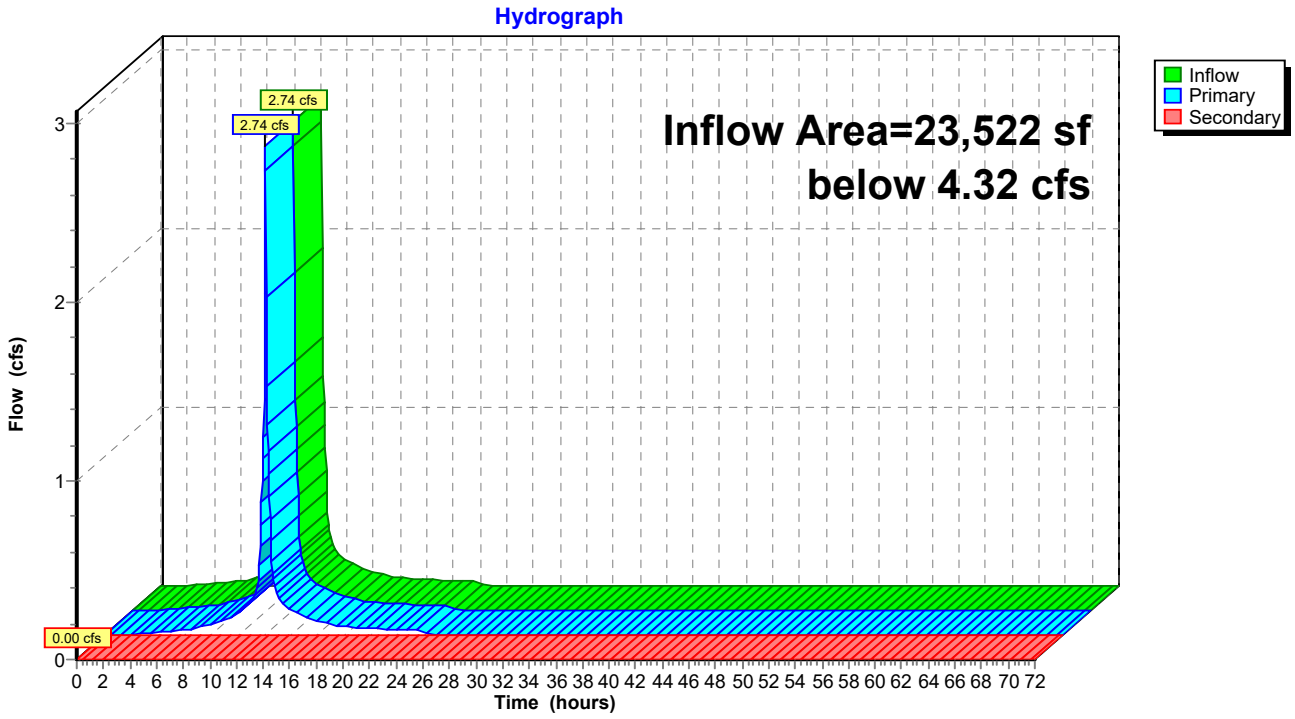


Summary for Link SS5: SITESAVER 5 - STSS-4

Inflow Area = 23,522 sf, 94.44% Impervious, Inflow Depth = 4.76" for 10YR - 24HR event
Inflow = 2.74 cfs @ 12.07 hrs, Volume= 9,333 cf
Primary = 2.74 cfs @ 12.07 hrs, Volume= 9,333 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS5: SITESAVER 5 - STSS-4

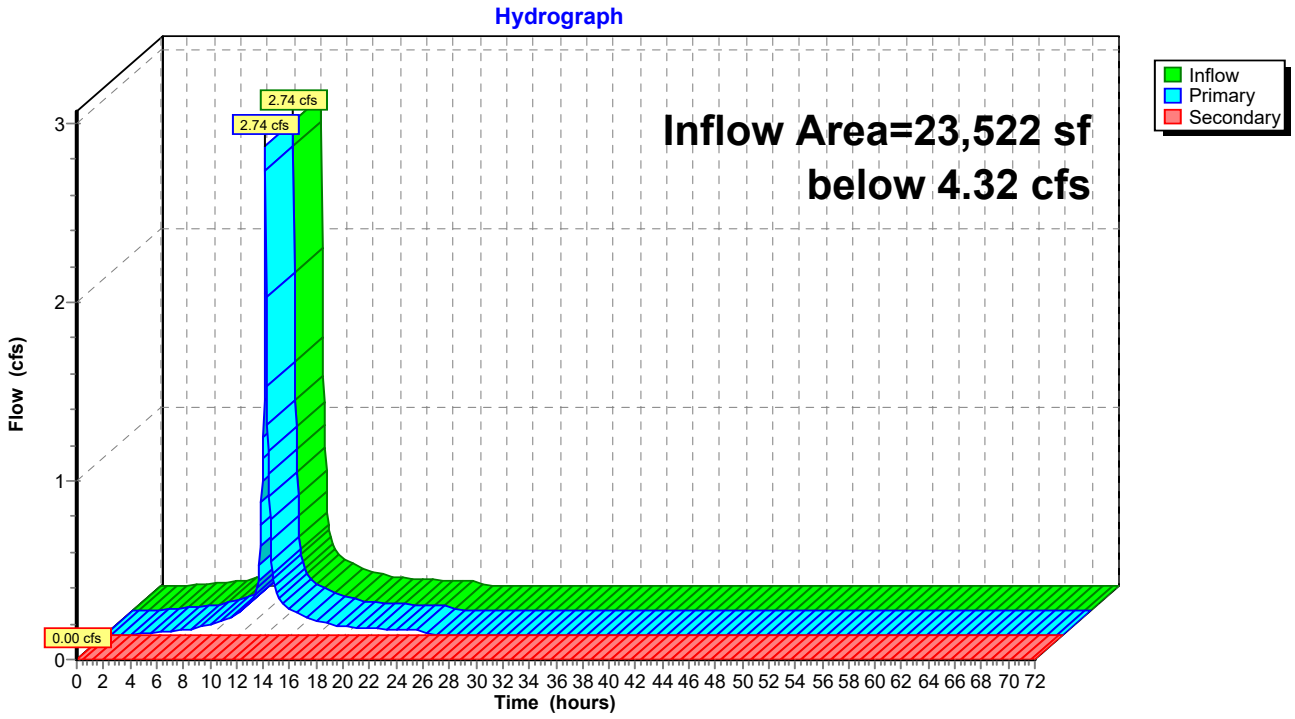


Summary for Link SS6: SITESAVER 6 - STSS-4

Inflow Area = 23,522 sf, 94.44% Impervious, Inflow Depth = 4.76" for 10YR - 24HR event
Inflow = 2.74 cfs @ 12.07 hrs, Volume= 9,333 cf
Primary = 2.74 cfs @ 12.07 hrs, Volume= 9,333 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS6: SITESAVER 6 - STSS-4

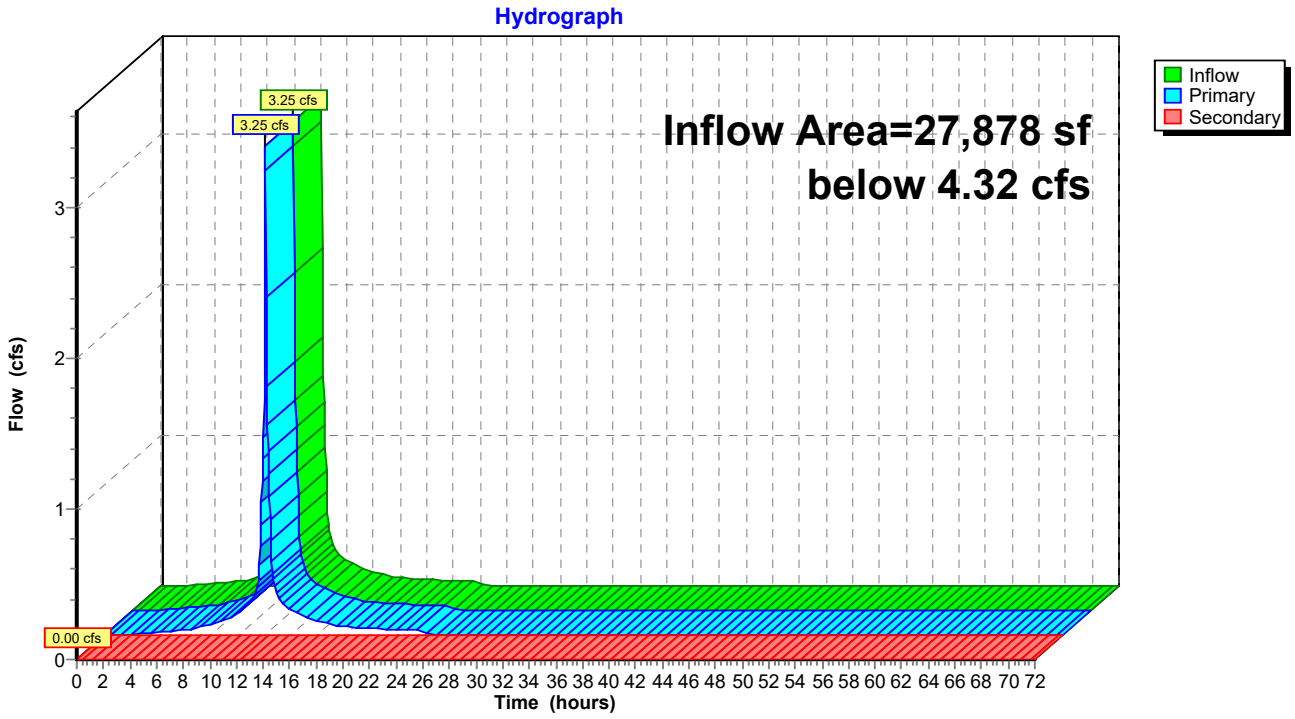


Summary for Link SS7: SITESAVER 7 - STSS-4

Inflow Area = 27,878 sf, 93.75% Impervious, Inflow Depth = 4.76" for 10YR - 24HR event
Inflow = 3.25 cfs @ 12.07 hrs, Volume= 11,061 cf
Primary = 3.25 cfs @ 12.07 hrs, Volume= 11,061 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS7: SITESAVER 7 - STSS-4

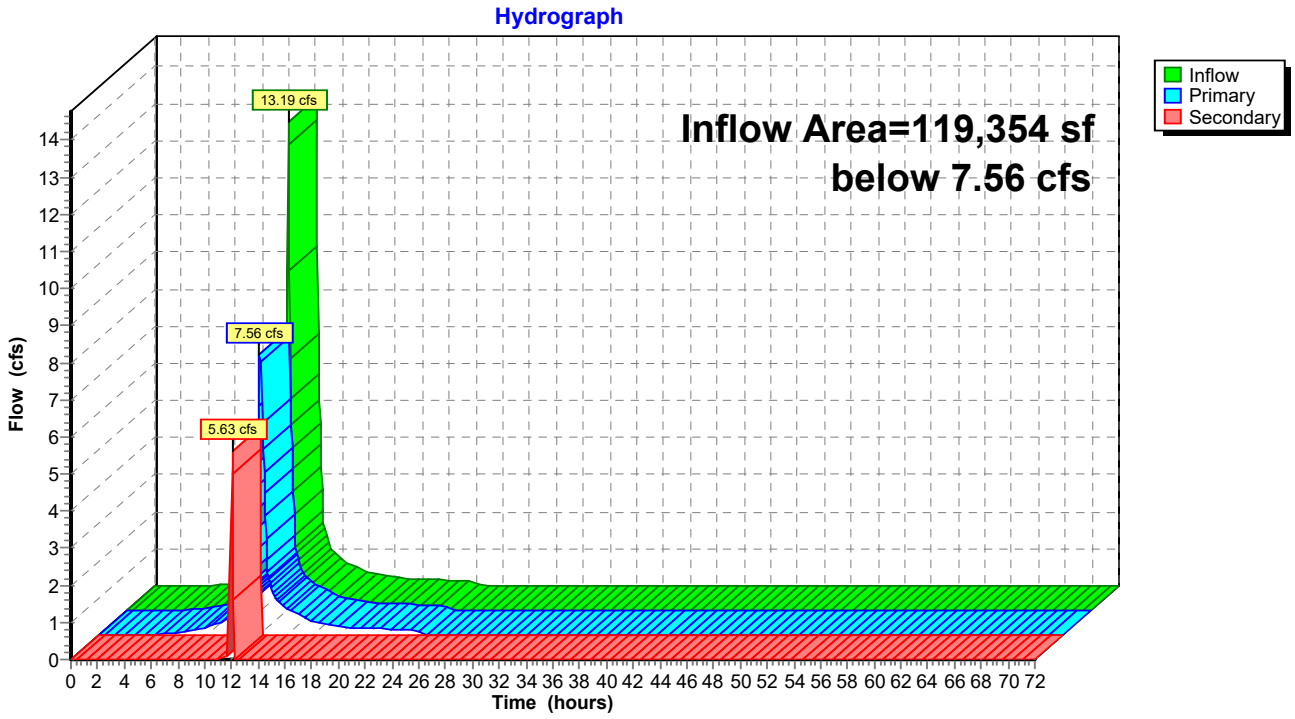


Summary for Link SS8: SITESAVER 8 - STSS-7

Inflow Area = 119,354 sf, 80.66% Impervious, Inflow Depth = 4.31" for 10YR - 24HR event
Inflow = 13.19 cfs @ 12.07 hrs, Volume= 42,909 cf
Primary = 7.56 cfs @ 12.00 hrs, Volume= 40,494 cf, Atten= 43%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 5.63 cfs @ 12.07 hrs, Volume= 2,415 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS8: SITESAVER 8 - STSS-7

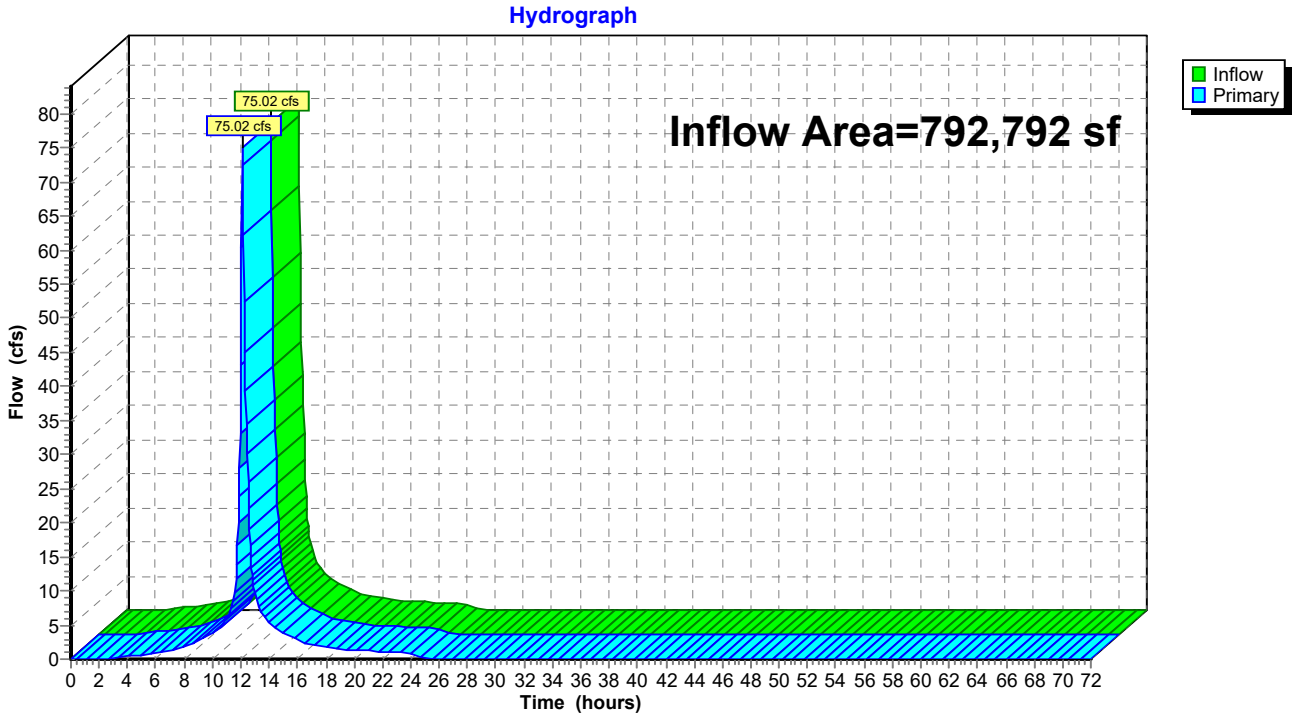


Summary for Link W1: EAST WETL

Inflow Area = 792,792 sf, 92.69% Impervious, Inflow Depth = 4.72" for 10YR - 24HR event
Inflow = 75.02 cfs @ 12.12 hrs, Volume= 312,080 cf
Primary = 75.02 cfs @ 12.12 hrs, Volume= 312,080 cf, Atten= 0%, Lag= 0.0 min
Routed to Pond 11P : (5) Culvert 6X3

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link W1: EAST WETL



Time span=0.00-72.00 hrs, dt=0.05 hrs, 1441 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment1: Area 1 Runoff Area=1.080 ac 87.04% Impervious Runoff Depth=7.51"
Tc=5.0 min CN=94 Runoff=8.63 cfs 29,445 cf

Subcatchment1S: SC 1 Runoff Area=1,993,439 sf 2.18% Impervious Runoff Depth=7.39"
Flow Length=161' Tc=6.9 min CN=93 Runoff=345.11 cfs 1,227,779 cf

Subcatchment2: Area 2 Runoff Area=3.870 ac 97.16% Impervious Runoff Depth=7.87"
Tc=5.0 min CN=97 Runoff=31.39 cfs 110,561 cf

Subcatchment2S: SC 2 Runoff Area=218,401 sf 45.10% Impervious Runoff Depth=5.60"
Flow Length=568' Tc=16.0 min CN=78 Runoff=24.04 cfs 101,994 cf

Subcatchment3: Area 3 Runoff Area=4.180 ac 91.63% Impervious Runoff Depth=7.63"
Tc=5.0 min CN=95 Runoff=33.61 cfs 115,780 cf

Subcatchment3A: SC 3A Runoff Area=34,322 sf 59.30% Impervious Runoff Depth=6.20"
Flow Length=143' Tc=5.0 min CN=83 Runoff=5.59 cfs 17,725 cf

Subcatchment3B: SC 3B Runoff Area=98,736 sf 72.12% Impervious Runoff Depth=6.79"
Flow Length=100' Tc=5.0 min CN=88 Runoff=17.18 cfs 55,894 cf

Subcatchment3S: SC 3 Runoff Area=447,354 sf 20.28% Impervious Runoff Depth=4.08"
Flow Length=413' Tc=11.6 min UI Adjusted CN=65 Runoff=40.46 cfs 152,138 cf

Subcatchment4: Area 4 Runoff Area=1.070 ac 91.59% Impervious Runoff Depth=7.63"
Tc=5.0 min CN=95 Runoff=8.60 cfs 29,637 cf

Subcatchment4S: SC 4 (Reduced) Runoff Area=871,304 sf 88.65% Impervious Runoff Depth=7.51"
Tc=36.8 min CN=94 Runoff=82.62 cfs 545,339 cf

Subcatchment5: Area 5 Runoff Area=2.510 ac 91.63% Impervious Runoff Depth=7.63"
Tc=5.0 min CN=95 Runoff=20.18 cfs 69,523 cf

Subcatchment6: Area 6 Runoff Area=3.930 ac 92.11% Impervious Runoff Depth=7.75"
Tc=5.0 min CN=96 Runoff=31.75 cfs 110,565 cf

Subcatchment7: Area 7 Runoff Area=1.560 ac 92.31% Impervious Runoff Depth=7.75"
Tc=5.0 min CN=96 Runoff=12.60 cfs 43,888 cf

Subcatchment7A: SC 7A Runoff Area=31,658 sf 56.17% Impervious Runoff Depth=6.08"
Flow Length=105' Tc=5.0 min CN=82 Runoff=5.08 cfs 16,036 cf

Subcatchment7B: SC 7 Runoff Area=171,281 sf 3.53% Impervious Runoff Depth=3.74"
Flow Length=162' Tc=10.5 min CN=62 Runoff=14.55 cfs 53,318 cf

Subcatchment7S: SC 7 Runoff Area=171,785 sf 31.18% Impervious Runoff Depth=5.01"
Flow Length=772' Tc=127.8 min CN=73 Runoff=5.56 cfs 71,781 cf

Subcatchment8: Area 8 Runoff Area=1.230 ac 90.24% Impervious Runoff Depth=7.63"
Tc=5.0 min CN=95 Runoff=9.89 cfs 34,069 cf

Subcatchment8A: SC 8A Runoff Area=233,085 sf 13.62% Impervious Runoff Depth=3.97"
Flow Length=304' Tc=7.1 min UI Adjusted CN=64 Runoff=23.56 cfs 77,025 cf

Subcatchment8S: SC 8 Runoff Area=162,499 sf 33.95% Impervious Runoff Depth=5.13"
Flow Length=721' Tc=43.3 min CN=74 Runoff=10.57 cfs 69,494 cf

Subcatchment9A: Area 9A Runoff Area=1.670 ac 95.21% Impervious Runoff Depth=7.87"
Tc=5.0 min CN=97 Runoff=13.54 cfs 47,710 cf

Subcatchment9b: Area 9b Runoff Area=0.360 ac 91.67% Impervious Runoff Depth=7.75"
Tc=5.0 min CN=96 Runoff=2.91 cfs 10,128 cf

Subcatchment9c: Area 9c Runoff Area=0.540 ac 94.44% Impervious Runoff Depth=7.75"
Tc=5.0 min CN=96 Runoff=4.36 cfs 15,192 cf

Subcatchment9d: Area 9d Runoff Area=0.540 ac 94.44% Impervious Runoff Depth=7.75"
Tc=5.0 min CN=96 Runoff=4.36 cfs 15,192 cf

Subcatchment9e: Area 9e Runoff Area=0.640 ac 93.75% Impervious Runoff Depth=7.75"
Tc=5.0 min CN=96 Runoff=5.17 cfs 18,005 cf

Subcatchment9S: SC Culvert Runoff Area=212.450 ac 41.73% Impervious Runoff Depth=5.72"
Tc=110.6 min CN=79 Runoff=375.74 cfs 4,413,089 cf

Subcatchment14S: SC 14 Runoff Area=364,481 sf 23.60% Impervious Runoff Depth=1.96"
Flow Length=594' Tc=18.6 min UI Adjusted CN=46 Runoff=11.50 cfs 59,639 cf

Subcatchment15S: SC 15 Runoff Area=974,157 sf 40.31% Impervious Runoff Depth=4.78"
Flow Length=592' Tc=15.7 min CN=71 Runoff=92.84 cfs 388,007 cf

Subcatchment16A: SC 16A Runoff Area=281,403 sf 34.62% Impervious Runoff Depth=5.13"
Flow Length=629' Tc=6.5 min CN=74 Runoff=37.47 cfs 120,344 cf

Subcatchment16B: SC 16B Runoff Area=304,059 sf 44.14% Impervious Runoff Depth=5.49"
Flow Length=370' Tc=5.5 min CN=77 Runoff=43.99 cfs 138,999 cf

Subcatchment16S: SC 16 Runoff Area=189,563 sf 41.96% Impervious Runoff Depth=5.49"
Flow Length=466' Tc=9.1 min CN=77 Runoff=24.49 cfs 86,658 cf

Subcatchment17S: SC 17 Runoff Area=411,986 sf 54.00% Impervious Runoff Depth=5.96"
Flow Length=444' Tc=22.6 min CN=81 Runoff=41.58 cfs 204,606 cf

Subcatchment18S: SC 18 Runoff Area=1,697,838 sf 11.60% Impervious Runoff Depth=6.32"
Flow Length=519' Tc=14.3 min UI Adjusted CN=84 Runoff=214.83 cfs 893,665 cf

Subcatchment19A: SC 19A Runoff Area=98,736 sf 72.12% Impervious Runoff Depth=6.79"
Flow Length=98' Tc=5.0 min CN=88 Runoff=17.18 cfs 55,894 cf

Subcatchment19S: SC 19 Runoff Area=227,314 sf 0.00% Impervious Runoff Depth=6.08"
Flow Length=165' Tc=5.0 min CN=82 Runoff=36.49 cfs 115,142 cf

Subcatchment20S: SC 20 Runoff Area=404,240 sf 16.91% Impervious Runoff Depth=5.01"
Flow Length=414' Tc=7.6 min UI Adjusted CN=73 Runoff=50.90 cfs 168,914 cf

Subcatchment21S: SC 21 Runoff Area=222,583 sf 10.63% Impervious Runoff Depth=5.13"
Flow Length=472' Tc=8.8 min UI Adjusted CN=74 Runoff=27.45 cfs 95,189 cf

Subcatchment22S: SC 22 Runoff Area=253,526 sf 11.67% Impervious Runoff Depth=5.01"
Flow Length=356' Tc=14.1 min UI Adjusted CN=73 Runoff=26.31 cfs 105,937 cf

Subcatchment23S: SC 23 Runoff Area=436,850 sf 7.67% Impervious Runoff Depth=5.49"
Flow Length=384' Tc=6.1 min UI Adjusted CN=77 Runoff=62.42 cfs 199,704 cf

Subcatchment24S: SC 24 Runoff Area=325,253 sf 1.55% Impervious Runoff Depth=5.01"
Flow Length=365' Tc=11.8 min CN=73 Runoff=36.02 cfs 135,909 cf

Subcatchment27S: SC 27 Runoff Area=260,949 sf 26.73% Impervious Runoff Depth=4.20"
Flow Length=266' Tc=26.7 min UI Adjusted CN=66 Runoff=17.48 cfs 91,263 cf

SubcatchmentA1: Area A1 Runoff Area=4.660 ac 83.69% Impervious Runoff Depth=7.39"
Tc=5.0 min CN=93 Runoff=37.00 cfs 125,023 cf

SubcatchmentA2: Area A2 Runoff Area=4.370 ac 100.00% Impervious Runoff Depth=7.99"
Tc=5.0 min CN=98 Runoff=35.54 cfs 126,747 cf

SubcatchmentA3: Area A3 Runoff Area=2.740 ac 80.66% Impervious Runoff Depth=7.27"
Tc=5.0 min CN=92 Runoff=21.59 cfs 72,321 cf

SubcatchmentDS1: Ditch Segment 1 Runoff Area=412,198 sf 28.62% Impervious Runoff Depth=4.55"
Flow Length=1,385' Tc=13.4 min UI Adjusted CN=69 Runoff=39.47 cfs 156,147 cf

SubcatchmentDS2: Ditch Segment 2 Runoff Area=366,199 sf 54.34% Impervious Runoff Depth=5.01"
Flow Length=790' Tc=16.5 min CN=73 Runoff=35.76 cfs 153,018 cf

SubcatchmentDS3: Ditch Segment 3 Runoff Area=148,377 sf 4.46% Impervious Runoff Depth=3.17"
Flow Length=632' Tc=19.6 min UI Adjusted CN=57 Runoff=8.30 cfs 39,157 cf

SubcatchmentN10: DA-N10 Runoff Area=18,400 sf 27.62% Impervious Runoff Depth=3.97"
Flow Length=137' Tc=13.2 min UI Adjusted CN=64 Runoff=1.54 cfs 6,080 cf

SubcatchmentN12: DA-N12 Runoff Area=176,145 sf 14.99% Impervious Runoff Depth=5.37"
Flow Length=630' Tc=15.0 min UI Adjusted CN=76 Runoff=19.09 cfs 78,790 cf

SubcatchmentN13: DA-N13 Runoff Area=80,589 sf 15.59% Impervious Runoff Depth=1.76"
Flow Length=665' Tc=19.3 min UI Adjusted CN=44 Runoff=2.15 cfs 11,787 cf

SubcatchmentN14: DA-N14 Runoff Area=183,876 sf 23.85% Impervious Runoff Depth=4.08"
Flow Length=609' Tc=32.7 min UI Adjusted CN=65 Runoff=10.92 cfs 62,533 cf

SubcatchmentN15: DA-N15 Runoff Area=95,454 sf 35.36% Impervious Runoff Depth=5.13"
Flow Length=438' Tc=14.7 min CN=74 Runoff=9.99 cfs 40,822 cf

SubcatchmentN2: DA-N2 Runoff Area=159,295 sf 48.03% Impervious Runoff Depth=5.49"
Flow Length=644' Tc=11.0 min CN=77 Runoff=19.62 cfs 72,821 cf

SubcatchmentN3: DA-N3 Runoff Area=145,656 sf 34.19% Impervious Runoff Depth=4.90"
Flow Length=440' Tc=20.1 min CN=72 Runoff=12.86 cfs 59,438 cf

SubcatchmentN4: DA-N4 Runoff Area=140,632 sf 26.62% Impervious Runoff Depth=3.85"
Flow Length=358' Tc=11.1 min UI Adjusted CN=63 Runoff=12.13 cfs 45,123 cf

SubcatchmentN6: DA-N6 Runoff Area=127,978 sf 26.51% Impervious Runoff Depth=3.85"
Flow Length=365' Tc=18.6 min UI Adjusted CN=63 Runoff=9.11 cfs 41,063 cf

SubcatchmentN7: DA-N7 Runoff Area=336,200 sf 68.86% Impervious Runoff Depth=6.55"
Flow Length=1,058' Tc=86.5 min CN=86 Runoff=18.12 cfs 183,636 cf

SubcatchmentN8: DA-N8 Runoff Area=110,829 sf 40.07% Impervious Runoff Depth=5.13"
Flow Length=241' Tc=11.9 min CN=74 Runoff=12.51 cfs 47,397 cf

SubcatchmentN9: DA-N9 Runoff Area=123,350 sf 23.73% Impervious Runoff Depth=3.85"
Flow Length=368' Tc=34.5 min UI Adjusted CN=63 Runoff=6.71 cfs 39,578 cf

Reach 1R: WQS Segment 1 Avg. Flow Depth=2.23' Max Vel=1.85 fps Inflow=62.88 cfs 530,358 cf
n=0.022 L=1,255.0' S=0.0005 '/' Capacity=98.41 cfs Outflow=52.32 cfs 530,358 cf

Reach 2R: WQS Segment 2 Avg. Flow Depth=2.71' Max Vel=2.08 fps Inflow=84.17 cfs 683,377 cf
n=0.022 L=760.0' S=0.0005 '/' Capacity=99.31 cfs Outflow=79.86 cfs 683,377 cf

Reach 3R: WQS Segment 3 Avg. Flow Depth=3.02' Max Vel=2.19 fps Inflow=110.44 cfs 869,453 cf
n=0.022 L=610.0' S=0.0005 '/' Capacity=98.14 cfs Outflow=99.69 cfs 869,453 cf

Reach PT1: Overland Flow Avg. Flow Depth=0.10' Max Vel=0.17 fps Inflow=16.88 cfs 38,545 cf
n=0.240 L=25.0' S=0.0160 '/' Capacity=18.78 cfs Outflow=16.20 cfs 38,545 cf

Reach PT2: Overland Flow Avg. Flow Depth=0.12' Max Vel=0.19 fps Inflow=16.88 cfs 38,545 cf
n=0.240 L=25.0' S=0.0164 '/' Capacity=14.55 cfs Outflow=16.31 cfs 38,545 cf

Reach PT3: Overland Flow Avg. Flow Depth=0.07' Max Vel=0.16 fps Inflow=5.29 cfs 8,173 cf
n=0.240 L=25.0' S=0.0224 '/' Capacity=10.81 cfs Outflow=5.04 cfs 8,173 cf

Reach PT4: Overland Flow Avg. Flow Depth=0.06' Max Vel=0.15 fps Inflow=4.78 cfs 7,122 cf
n=0.240 L=25.0' S=0.0244 '/' Capacity=11.40 cfs Outflow=4.54 cfs 7,122 cf

Pond 11P: (5) Culvert 6X3 Peak Elev=5.58' Inflow=386.31 cfs 4,895,555 cf
Outflow=386.31 cfs 4,895,555 cf

Pond CB1: Exist CB Peak Elev=4.09' Inflow=11.50 cfs 59,639 cf
36.0" Round Culvert n=0.013 L=845.0' S=0.0009 '/' Outflow=11.50 cfs 59,639 cf

Pond CB10: Exist CB Peak Elev=18.49' Inflow=61.26 cfs 277,348 cf
24.0" Round Culvert n=0.012 L=152.0' S=0.0013 '/' Outflow=61.26 cfs 277,348 cf

Pond CB11: Exist CB Peak Elev=11.50' Inflow=24.04 cfs 101,994 cf
18.0" Round Culvert n=0.012 L=148.0' S=0.0014 '/' Outflow=24.04 cfs 101,994 cf

Pond CB2: Exist CB Peak Elev=58.23' Inflow=20.95 cfs 84,608 cf
15.0" Round Culvert n=0.011 L=658.0' S=0.0014 '/' Outflow=20.95 cfs 84,608 cf

Pond CB3: Exist CB Peak Elev=985.91' Inflow=24.49 cfs 86,658 cf
10.0" Round Culvert n=0.025 L=200.0' S=0.0110 '/' Outflow=24.49 cfs 86,658 cf

Pond CB4: Exist CB Peak Elev=152.68' Inflow=81.24 cfs 259,343 cf
18.0" Round Culvert n=0.012 L=200.0' S=0.0244 '/' Outflow=81.24 cfs 259,343 cf

Pond CB5: New CB Peak Elev=111.68' Inflow=37.47 cfs 120,344 cf
17.0" x 13.0", R=9.0"/25.6" Pipe Arch Culvert n=0.011 L=360.0' S=0.0029 '/' Outflow=37.47 cfs 120,344 cf

Pond CB6: New CB Peak Elev=1.47' Inflow=5.56 cfs 71,781 cf
18.0" Round Culvert n=0.013 L=291.0' S=0.0019 '/' Outflow=5.56 cfs 71,781 cf

Pond CB7: Exist CB Peak Elev=198.82' Inflow=23.56 cfs 77,025 cf
15.0" Round Culvert n=0.025 L=380.0' S=0.0016 '/' Outflow=23.56 cfs 77,025 cf

Pond CB8: CB Peak Elev=2.30' Inflow=9.88 cfs 86,892 cf
24.0" Round Culvert n=0.013 L=813.0' S=0.0007 '/' Outflow=9.88 cfs 86,892 cf

Pond CC1: CC1 Peak Elev=10.12' Inflow=99.69 cfs 869,453 cf
35.0" x 24.0", R=17.9"/55.1" Pipe Arch Culvert x 3.00 n=0.011 L=1,272.0' S=0.0013 '/' Outflow=99.69 cfs 869,453 cf

Pond Cr-B: Robinson Driveway Peak Elev=4.62' Inflow=52.32 cfs 530,358 cf
Outflow=52.32 cfs 530,358 cf

Pond Cr-CD: Utility Crossing Peak Elev=4.81' Inflow=79.86 cfs 683,377 cf
Outflow=79.86 cfs 683,377 cf

Pond MH1: MH Peak Elev=112.85' Inflow=40.88 cfs 199,837 cf
18.0" Round Culvert n=0.012 L=787.0' S=0.0021 '/' Outflow=40.88 cfs 199,837 cf

Pond P1: Pond 1 Peak Elev=3.90' Storage=21,462 cf Inflow=23.14 cfs 329,018 cf
Discarded=1.70 cfs 33,597 cf Primary=18.46 cfs 295,421 cf Outflow=20.16 cfs 329,018 cf

Pond P10: Wetland Ditch Peak Elev=4.18' Storage=6,629 cf Inflow=27.68 cfs 374,212 cf
Outflow=25.48 cfs 374,212 cf

Pond P2: Pond 2 Peak Elev=6.13' Storage=13,689 cf Inflow=12.86 cfs 59,438 cf
Discarded=1.65 cfs 6,926 cf Primary=6.07 cfs 52,512 cf Outflow=7.72 cfs 59,438 cf

Pond P3: Pond 3 Peak Elev=4.89' Storage=40,581 cf Inflow=25.25 cfs 264,717 cf
Discarded=2.48 cfs 27,789 cf Primary=15.38 cfs 236,928 cf Outflow=17.86 cfs 264,717 cf

Pond P4: Pond 4 Peak Elev=4.88' Storage=9,264 cf Inflow=12.13 cfs 45,123 cf
Discarded=0.73 cfs 3,318 cf Primary=4.01 cfs 41,806 cf Outflow=4.74 cfs 45,123 cf

Pond P5: Pond 5 Peak Elev=4.72' Storage=6,378 cf Inflow=9.11 cfs 41,063 cf
Discarded=0.49 cfs 1,788 cf Primary=4.35 cfs 39,275 cf Outflow=4.84 cfs 41,063 cf

Pond P6: Pond 6 Peak Elev=4.14' Storage=15,871 cf Inflow=15.14 cfs 107,009 cf
Discarded=1.27 cfs 6,859 cf Primary=6.87 cfs 100,394 cf Outflow=8.13 cfs 107,253 cf

Pond P7: Pond 7 Peak Elev=4.73' Storage=9,709 cf Inflow=12.51 cfs 47,397 cf
Discarded=0.66 cfs 2,922 cf Primary=4.23 cfs 44,475 cf Outflow=4.88 cfs 47,397 cf

Pond P8: Pond 8 Peak Elev=47.56' Storage=4,397 cf Inflow=17.64 cfs 146,887 cf
12.0" Round Culvert n=0.011 L=20.0' S=0.0000 '/' Outflow=25.25 cfs 146,920 cf

Pond P9: Pond 9 Peak Elev=5.26' Storage=532 cf Inflow=1.54 cfs 6,080 cf
Outflow=1.85 cfs 5,672 cf

Pond SF2: Sand Filter Area 2 Peak Elev=-3.16' Storage=0.195 af Inflow=31.39 cfs 110,561 cf
Outflow=27.48 cfs 110,561 cf

Pond SF3: Sand Filter Area 3 Peak Elev=-3.16' Storage=0.273 af Inflow=33.61 cfs 115,780 cf
Outflow=27.35 cfs 115,780 cf

Pond SF5: SAND FILTER AREA 5 Peak Elev=-3.48' Storage=0.137 af Inflow=20.18 cfs 69,523 cf
Outflow=17.43 cfs 69,523 cf

Pond SF6: SAND FILTER AREA 6 Peak Elev=-3.20' Storage=0.254 af Inflow=31.75 cfs 110,565 cf
Outflow=25.95 cfs 110,565 cf

Pond SF7: SAND FILTER AREA 7 Peak Elev=-3.70' Storage=0.069 af Inflow=12.60 cfs 43,888 cf
Outflow=11.34 cfs 43,888 cf

Pond SF8: SAND FILTER AREA 8 Peak Elev=-3.82' Storage=0.060 af Inflow=9.89 cfs 34,069 cf
Outflow=8.71 cfs 34,069 cf

Pond SFA1: SAND FILTER AREA A1 Peak Elev=-3.03' Storage=0.243 af Inflow=37.00 cfs 125,023 cf
Outflow=32.01 cfs 125,023 cf

Pond SFA2: SAND FILTER AREA A2 Peak Elev=-3.16' Storage=0.345 af Inflow=35.54 cfs 126,747 cf
Outflow=27.44 cfs 126,747 cf

Pond T1: Sand Filter 1 Peak Elev=3.76' Storage=5,652 cf Inflow=16.20 cfs 38,545 cf
Primary=6.49 cfs 33,487 cf Secondary=15.47 cfs 4,804 cf Outflow=21.96 cfs 38,291 cf

Pond T2: Sand Filter 2 Peak Elev=3.74' Storage=7,387 cf Inflow=16.31 cfs 38,545 cf
Primary=9.17 cfs 37,564 cf Secondary=4.19 cfs 754 cf Outflow=13.34 cfs 38,318 cf

Pond T3: Sand Filter 3 Peak Elev=0.26' Storage=699 cf Inflow=5.04 cfs 8,173 cf
Primary=4.77 cfs 8,081 cf Secondary=0.00 cfs 0 cf Outflow=4.77 cfs 8,081 cf

Pond T4: Sand Filter 4 Peak Elev=0.55' Storage=758 cf Inflow=4.54 cfs 7,122 cf
Primary=4.28 cfs 7,030 cf Secondary=0.00 cfs 0 cf Outflow=4.28 cfs 7,030 cf

Link 1L: WEST WETL Inflow=231.56 cfs 1,082,862 cf
Primary=231.56 cfs 1,082,862 cf

Link 2L: TUTTLE BROOK Inflow=516.39 cfs 2,329,796 cf
Primary=516.39 cfs 2,329,796 cf

Link 3L: EAST WETL Inflow=386.31 cfs 4,895,555 cf
Primary=386.31 cfs 4,895,555 cf

Link 4L: MORRIS CREEK Inflow=739.04 cfs 8,372,412 cf
Primary=739.04 cfs 8,372,412 cf

Link AP1: TIDE GATE Inflow=1,446.46 cfs 11,499,125 cf
Primary=1,446.46 cfs 11,499,125 cf

Link PS1: Pump Station 1 below 75.00 cfs Inflow=123.89 cfs 508,880 cf
Primary=75.00 cfs 482,466 cf Secondary=48.89 cfs 26,414 cf

Link PS2: Pump Station 2 below 120.00 cfs Inflow=102.13 cfs 454,945 cf
Primary=102.13 cfs 454,945 cf Secondary=0.00 cfs 0 cf

Link SS1: SITESAVER1 - STSS-7 below 7.56 cfs Inflow=8.63 cfs 29,445 cf
Primary=7.75 cfs 29,180 cf Secondary=0.90 cfs 265 cf

Link SS2: SITESAVER2 - STSS-7 below 7.56 cfs Inflow=8.60 cfs 29,637 cf
Primary=7.75 cfs 29,383 cf Secondary=0.86 cfs 254 cf

Link SS3: SITESAVER3 - STSS-12 below 12.96 cfs Inflow=13.54 cfs 47,710 cf
Primary=13.34 cfs 47,665 cf Secondary=0.25 cfs 44 cf

Link SS4: SITESAVER4 - STSS-4 below 4.32 cfs Inflow=2.91 cfs 10,128 cf
Primary=2.91 cfs 10,128 cf Secondary=0.00 cfs 0 cf

Link SS5: SITESAVER5 - STSS-4 below 4.32 cfs Inflow=4.36 cfs 15,192 cf
Primary=4.36 cfs 15,192 cf Secondary=0.00 cfs 0 cf

Link SS6: SITESAVER6 - STSS-4 below 4.32 cfs Inflow=4.36 cfs 15,192 cf
Primary=4.36 cfs 15,192 cf Secondary=0.00 cfs 0 cf

Link SS7: SITESAVER7 - STSS-4 below 4.32 cfs Inflow=5.17 cfs 18,005 cf
Primary=4.41 cfs 17,772 cf Secondary=0.77 cfs 233 cf

Link SS8: SITESAVER8 - STSS-7 below 7.56 cfs Inflow=21.59 cfs 72,321 cf
Primary=7.56 cfs 63,156 cf Secondary=14.03 cfs 9,166 cf

Link W1: EAST WETL Inflow=75.00 cfs 482,466 cf
Primary=75.00 cfs 482,466 cf

Total Runoff Area = 24,288,724 sf Runoff Volume = 11,672,660 cf Average Runoff Depth = 5.77"
63.05% Pervious = 15,313,137 sf 36.95% Impervious = 8,975,587 sf

Summary for Subcatchment 1: Area 1

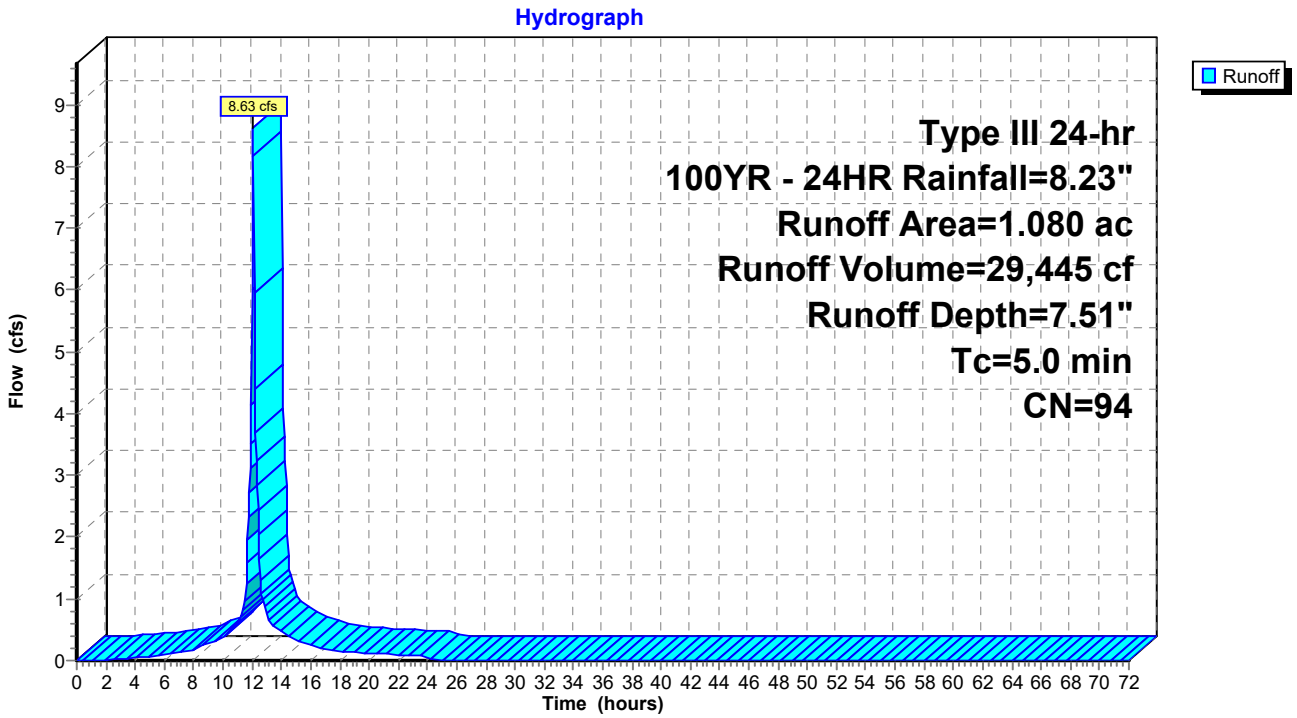
Runoff = 8.63 cfs @ 12.07 hrs, Volume= 29,445 cf, Depth= 7.51"
Routed to Link SS1 : SITESAVER 1 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
0.940	98	Paved parking, HSG A
0.140	68	<50% Grass cover, Poor, HSG A
1.080	94	Weighted Average
0.140		12.96% Pervious Area
0.940		87.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1: Area 1



Summary for Subcatchment 1S: SC 1

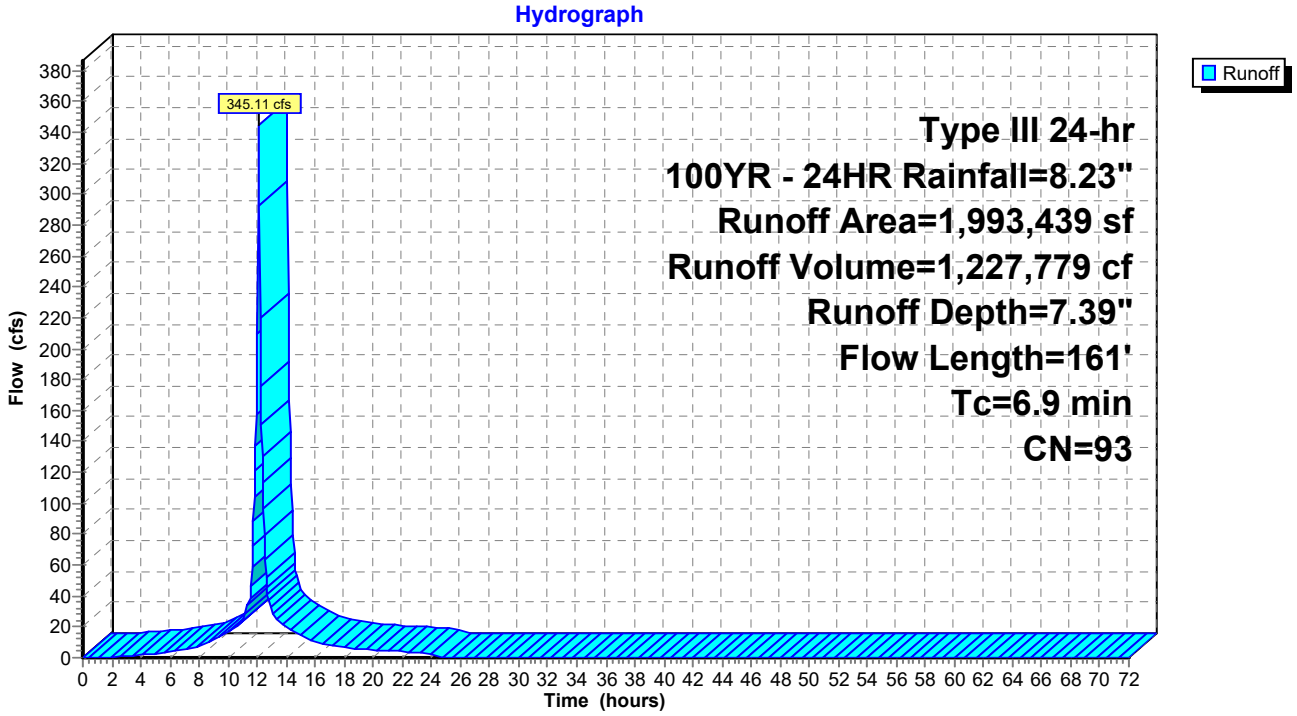
Runoff = 345.11 cfs @ 12.10 hrs, Volume= 1,227,779 cf, Depth= 7.39"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	210,509	80	>75% Grass cover, Good, HSG D
	40,323	96	Gravel surface, HSG D
	176,389	98	Water Surface, 0% imp, HSG D
	10,474	98	Unconnected pavement, HSG A
	32,944	98	Unconnected pavement, HSG D
	248,525	77	Woods, Good, HSG D
*	1,274,275	98	Wetland/Water Surface, 0% imp, HSG D
	1,993,439	93	Weighted Average
	1,950,021		97.82% Pervious Area
	43,418		2.18% Impervious Area
	43,418		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.2	23	0.1335	2.22		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
6.7	138	0.0024	0.34		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
6.9	161	Total			

Subcatchment 1S: SC 1



Summary for Subcatchment 2: Area 2

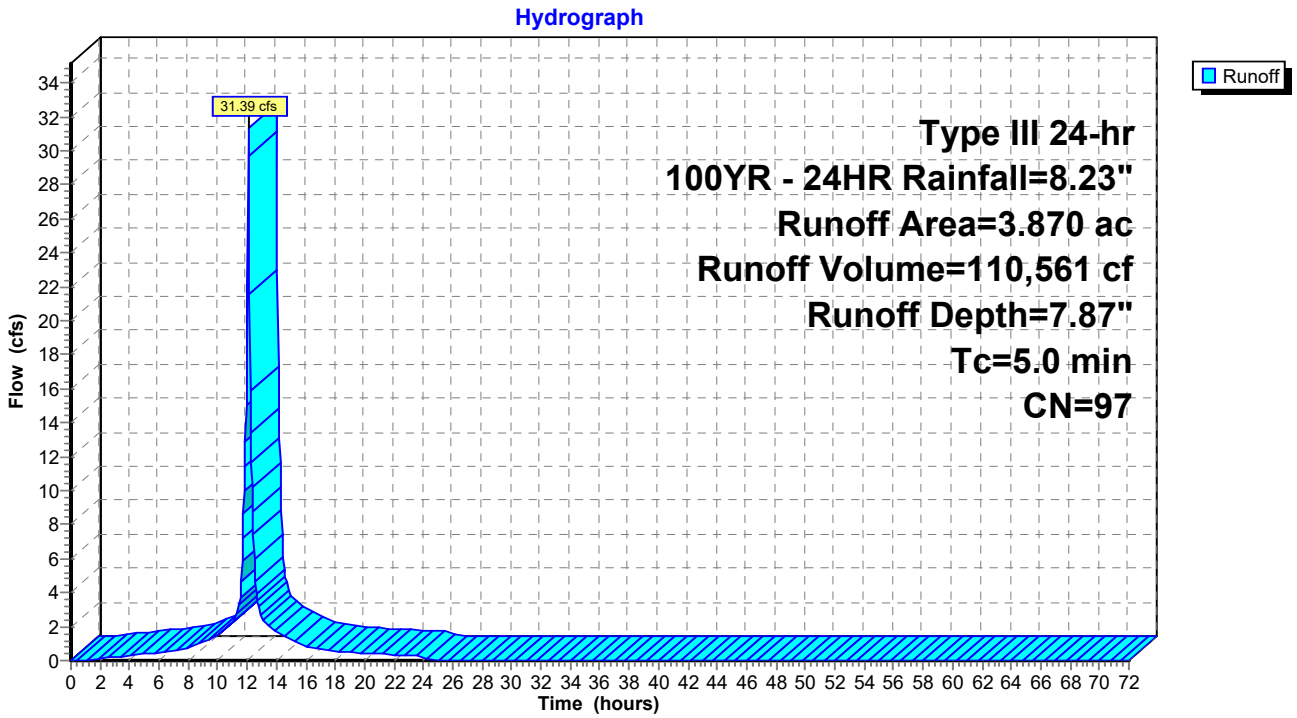
Runoff = 31.39 cfs @ 12.07 hrs, Volume= 110,561 cf, Depth= 7.87"
Routed to Pond SF2 : Sand Filter Area 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
3.760	98	Paved parking, HSG A
0.110	68	<50% Grass cover, Poor, HSG A
3.870	97	Weighted Average
0.110		2.84% Pervious Area
3.760		97.16% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 2: Area 2



Summary for Subcatchment 2S: SC 2

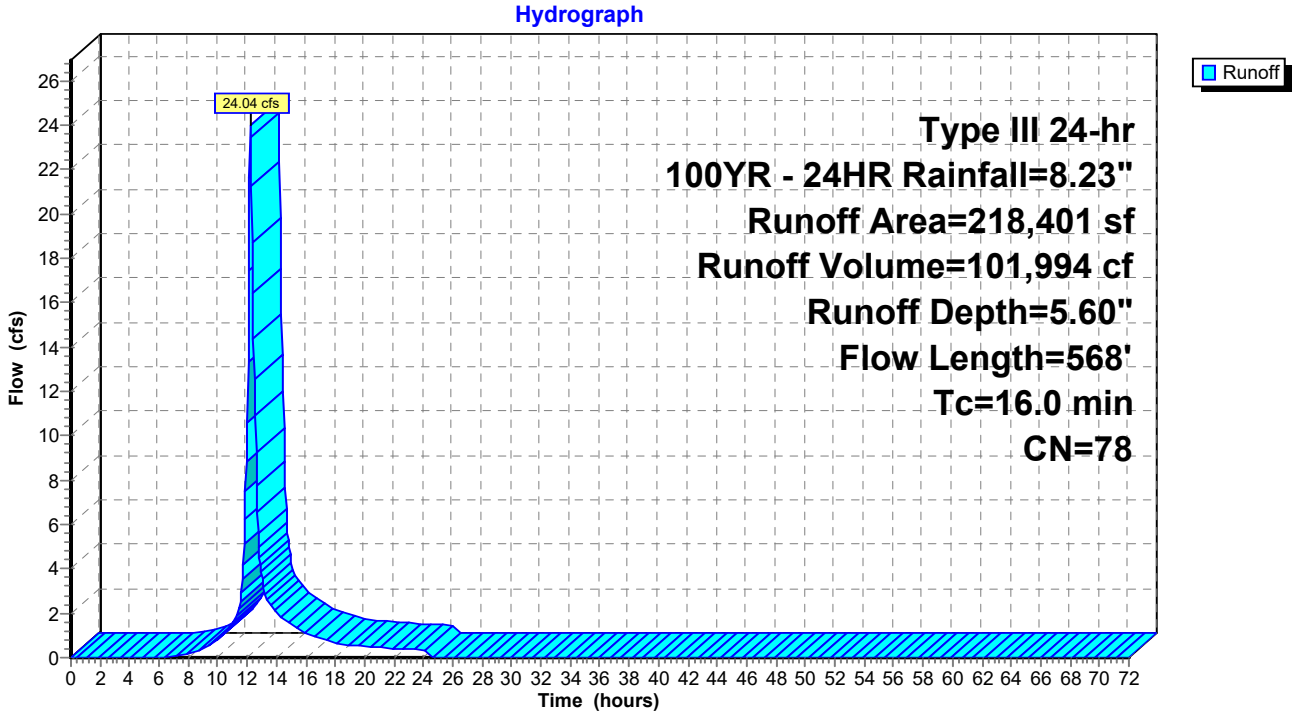
Runoff = 24.04 cfs @ 12.22 hrs, Volume= 101,994 cf, Depth= 5.60"
Routed to Pond CB11 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
119,910	61	>75% Grass cover, Good, HSG B
84,094	98	Unconnected pavement, HSG A
14,397	98	Unconnected pavement, HSG D
218,401	78	Weighted Average
119,910		54.90% Pervious Area
98,491		45.10% Impervious Area
98,491		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	81	0.0114	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
14.7	487	0.0062	0.55		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
16.0	568	Total			

Subcatchment 2S: SC 2



Summary for Subcatchment 3: Area 3

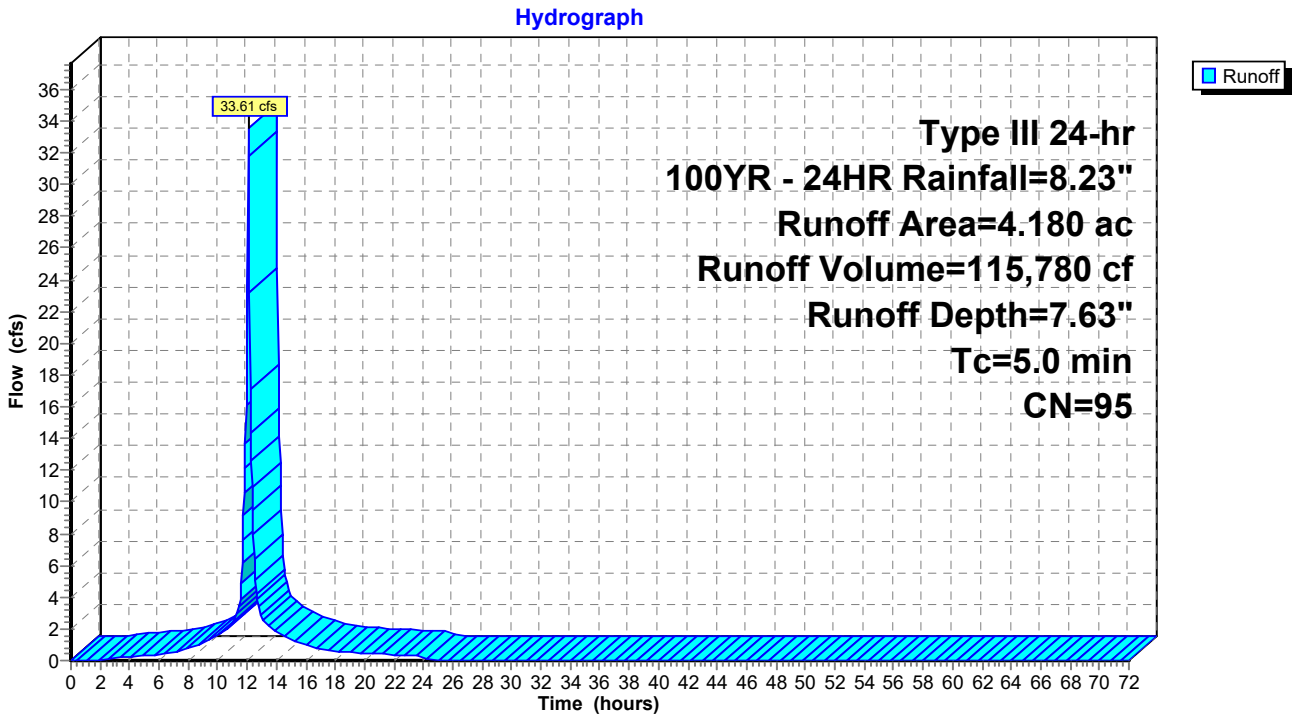
Runoff = 33.61 cfs @ 12.07 hrs, Volume= 115,780 cf, Depth= 7.63"
Routed to Pond SF3 : Sand Filter Area 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
3.830	98	Paved parking, HSG A
0.350	68	<50% Grass cover, Poor, HSG A
4.180	95	Weighted Average
0.350		8.37% Pervious Area
3.830		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 3: Area 3



Summary for Subcatchment 3A: SC 3A

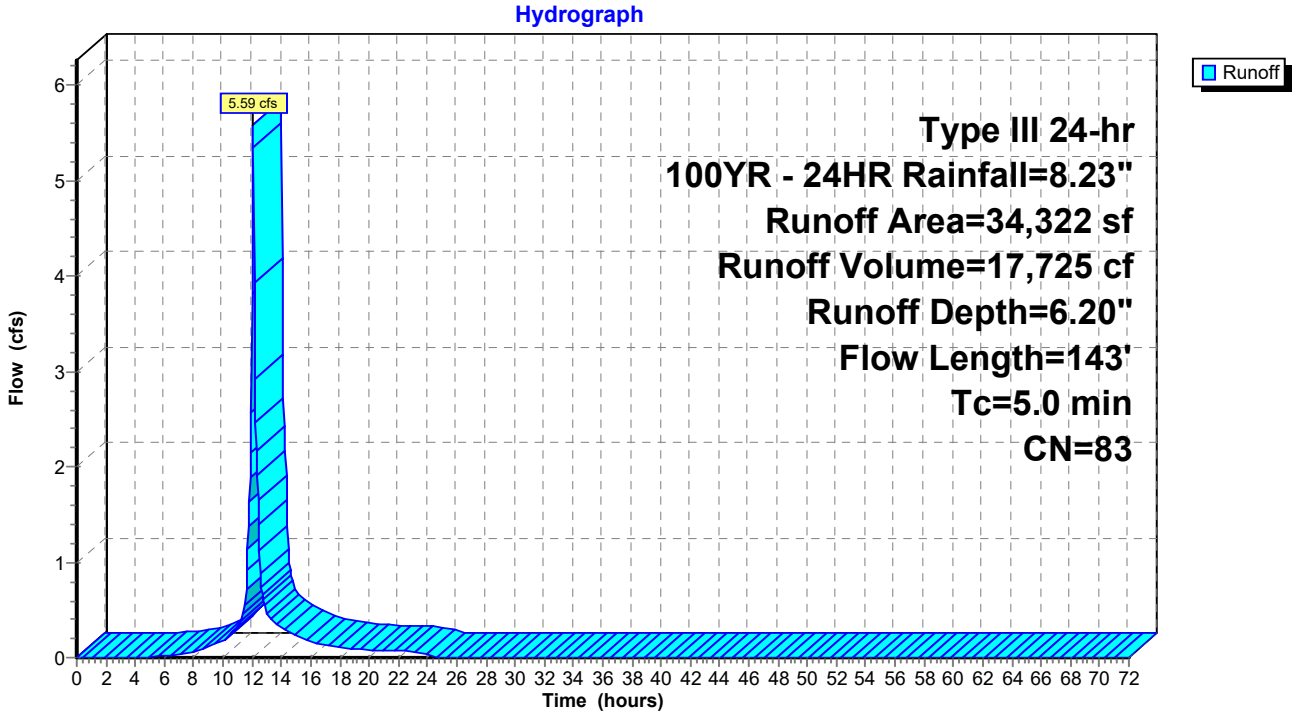
Runoff = 5.59 cfs @ 12.07 hrs, Volume= 17,725 cf, Depth= 6.20"
Routed to Reach PT3 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
13,969	61	>75% Grass cover, Good, HSG B
20,353	98	Unconnected pavement, HSG A
34,322	83	Weighted Average
13,969		40.70% Pervious Area
20,353		59.30% Impervious Area
20,353		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	84	0.0055	0.80		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
1.2	59	0.0145	0.84		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.1					**Direct Entry, minimum 5 min**
5.0	143	Total			

Subcatchment 3A: SC 3A



Summary for Subcatchment 3B: SC 3B

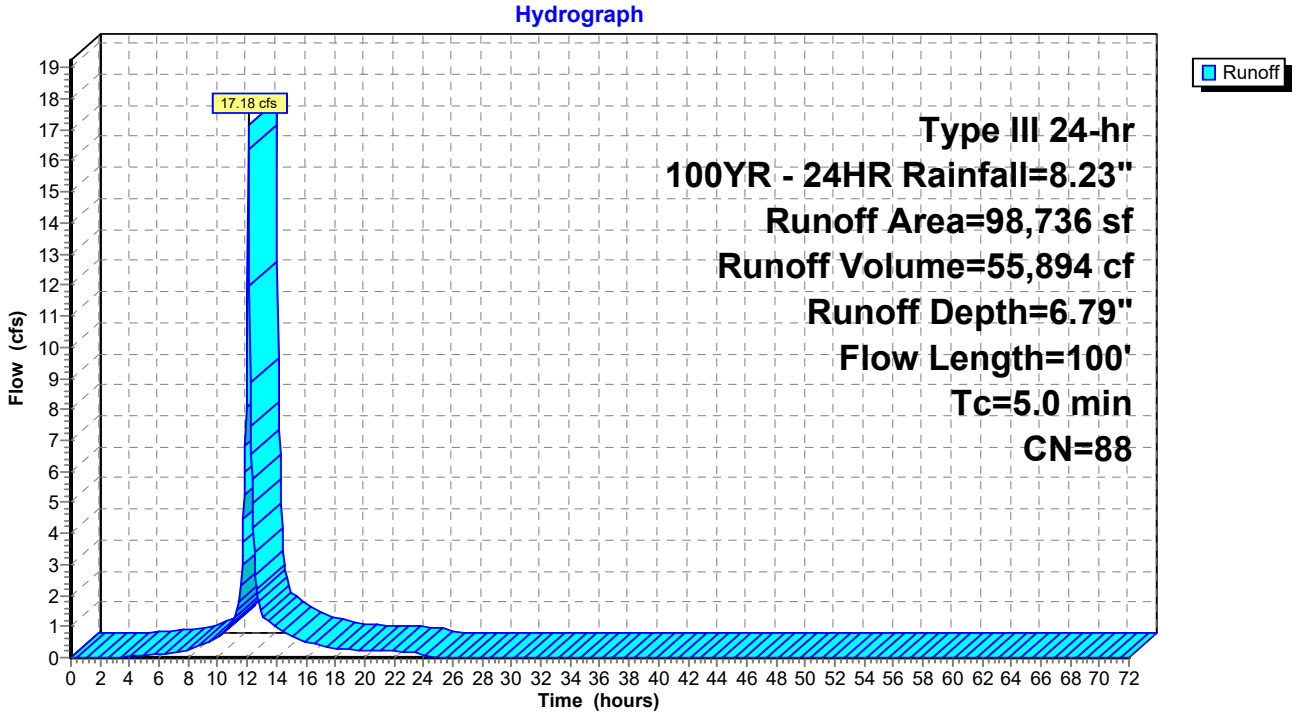
Runoff = 17.18 cfs @ 12.07 hrs, Volume= 55,894 cf, Depth= 6.79"
Routed to Reach PT2 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
27,532	61	>75% Grass cover, Good, HSG B
71,204	98	Unconnected pavement, HSG A
98,736	88	Weighted Average
27,532		27.88% Pervious Area
71,204		72.12% Impervious Area
71,204		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	71	0.0100	0.99		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	29	0.0169	0.91		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.3					**Direct Entry, minimum 5 min**
5.0	100	Total			

Subcatchment 3B: SC 3B



Summary for Subcatchment 3S: SC 3

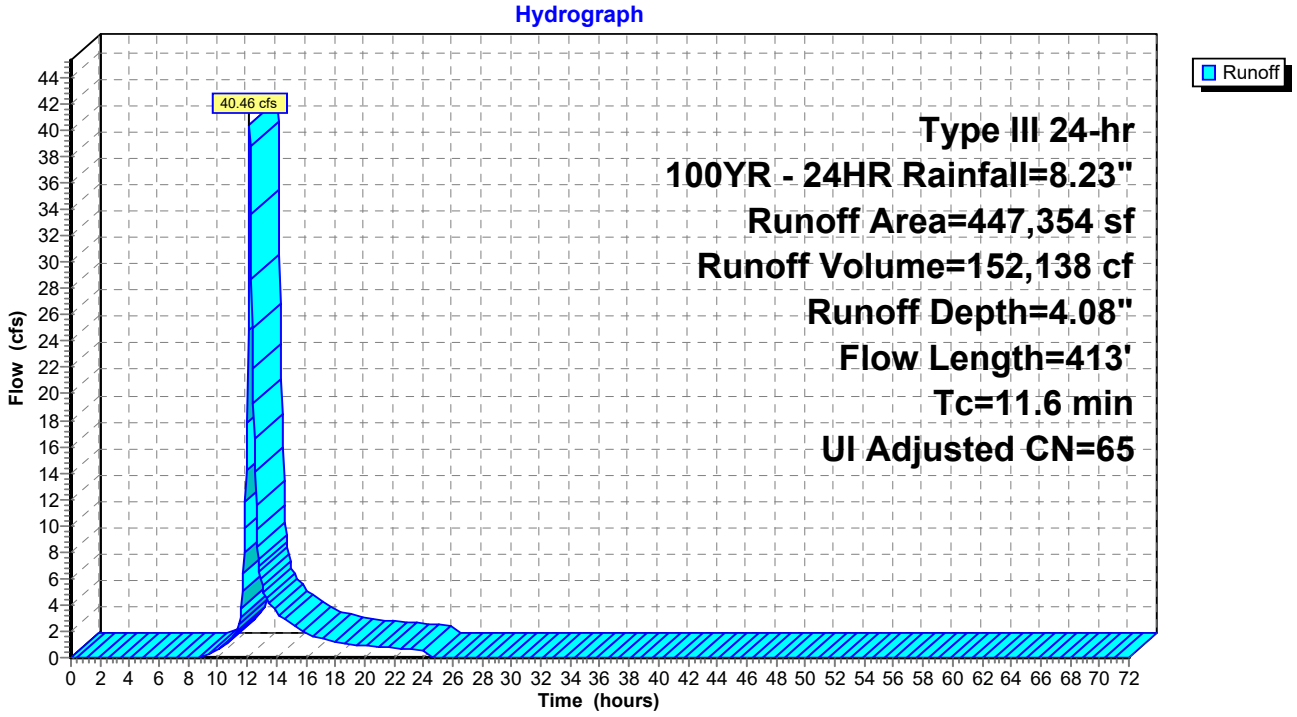
Runoff = 40.46 cfs @ 12.17 hrs, Volume= 152,138 cf, Depth= 4.08"
Routed to Pond CB10 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
356,645	61		>75% Grass cover, Good, HSG B
62,664	98		Unconnected pavement, HSG A
28,045	98		Unconnected pavement, HSG D
447,354	69	65	Weighted Average, UI Adjusted
356,645			79.72% Pervious Area
90,709			20.28% Impervious Area
90,709			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	88	0.0117	1.10		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
10.3	325	0.0056	0.52		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
11.6	413	Total			

Subcatchment 3S: SC 3



Summary for Subcatchment 4: Area 4

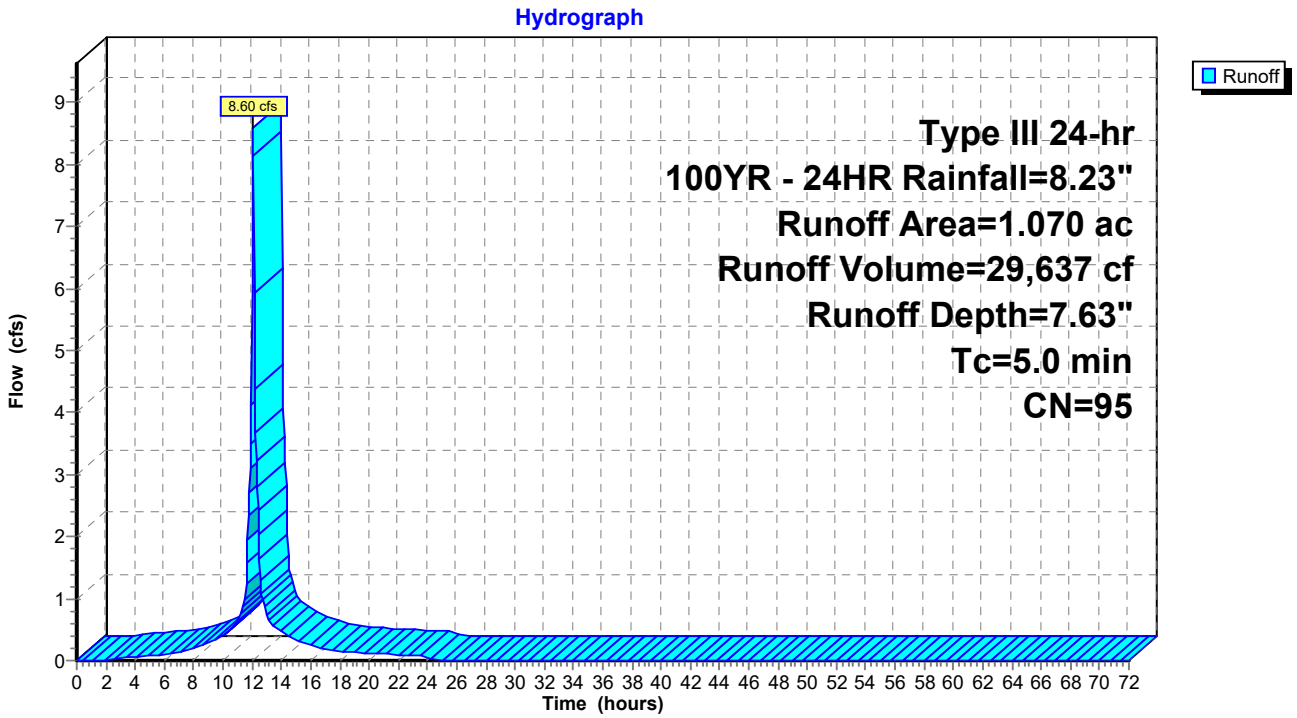
Runoff = 8.60 cfs @ 12.07 hrs, Volume= 29,637 cf, Depth= 7.63"
Routed to Link SS2 : SITESAVER 2 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
0.980	98	Paved parking, HSG A
0.090	68	<50% Grass cover, Poor, HSG A
1.070	95	Weighted Average
0.090		8.41% Pervious Area
0.980		91.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 4: Area 4



Summary for Subcatchment 4S: SC 4 (Reduced)

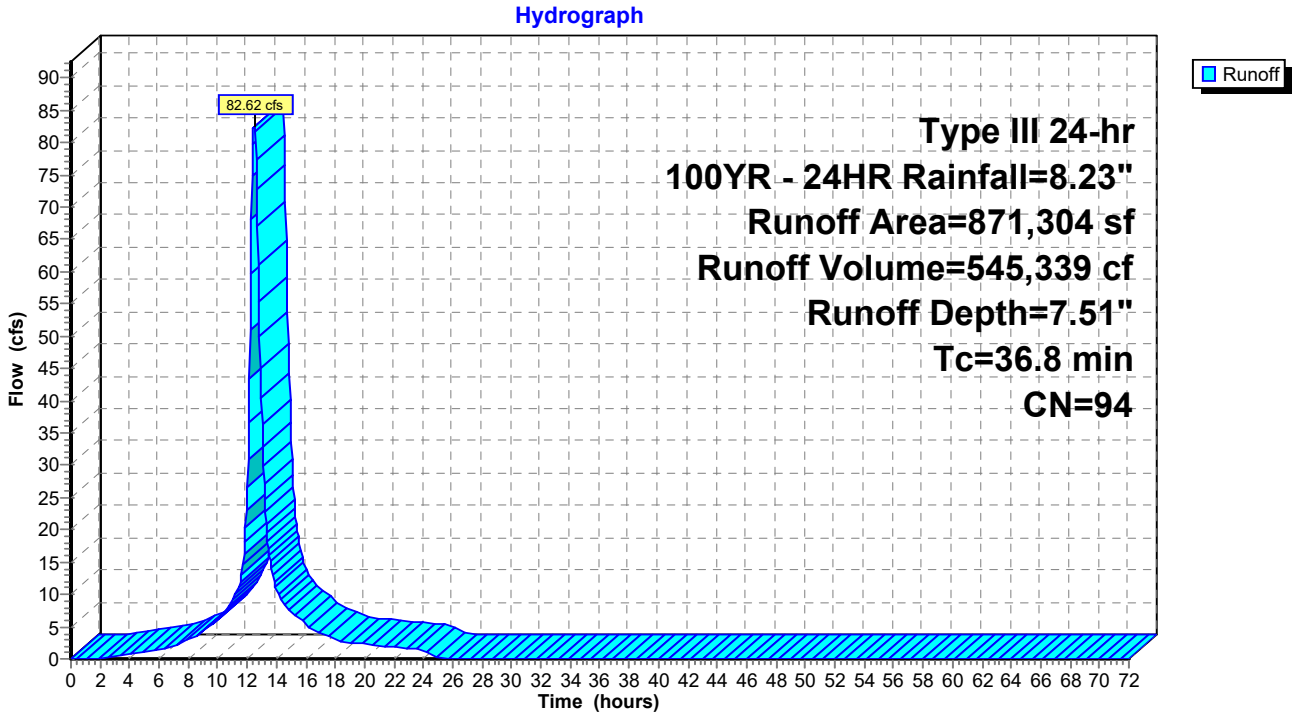
Runoff = 82.62 cfs @ 12.48 hrs, Volume= 545,339 cf, Depth= 7.51"
Routed to Link 4L : MORRIS CREEK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	98,881	61	>75% Grass cover, Good, HSG B
	18,295	98	Unconnected pavement, HSG B
*	273,992	98	Wetland/Water Surface, HSG B
*	480,136	98	Wetland/Water Surface. HSG D
	871,304	94	Weighted Average
	98,881		11.35% Pervious Area
	772,423		88.65% Impervious Area
	18,295		2.37% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
36.8					**Direct Entry, See Calculation Sheet**

Subcatchment 4S: SC 4 (Reduced)



Summary for Subcatchment 5: Area 5

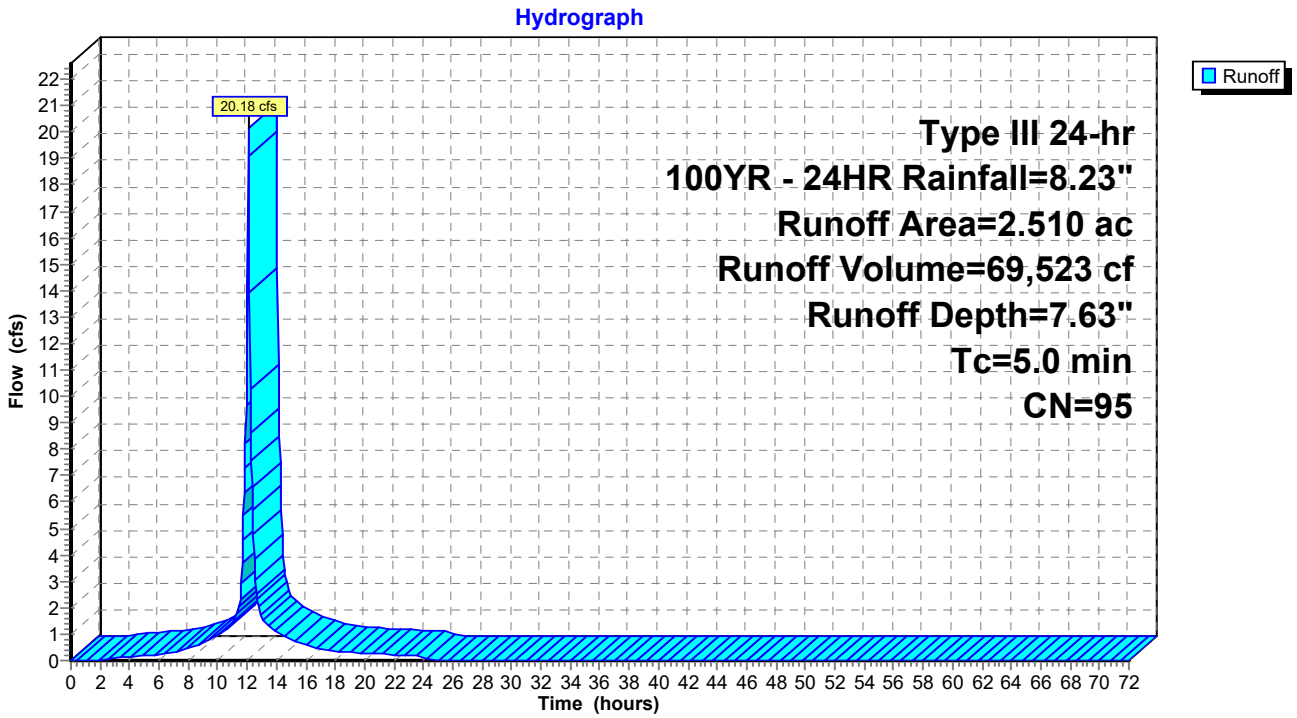
Runoff = 20.18 cfs @ 12.07 hrs, Volume= 69,523 cf, Depth= 7.63"
Routed to Pond SF5 : SAND FILTER AREA 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
2.300	98	Paved parking, HSG A
0.210	68	<50% Grass cover, Poor, HSG A
2.510	95	Weighted Average
0.210		8.37% Pervious Area
2.300		91.63% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 5: Area 5



Summary for Subcatchment 6: Area 6

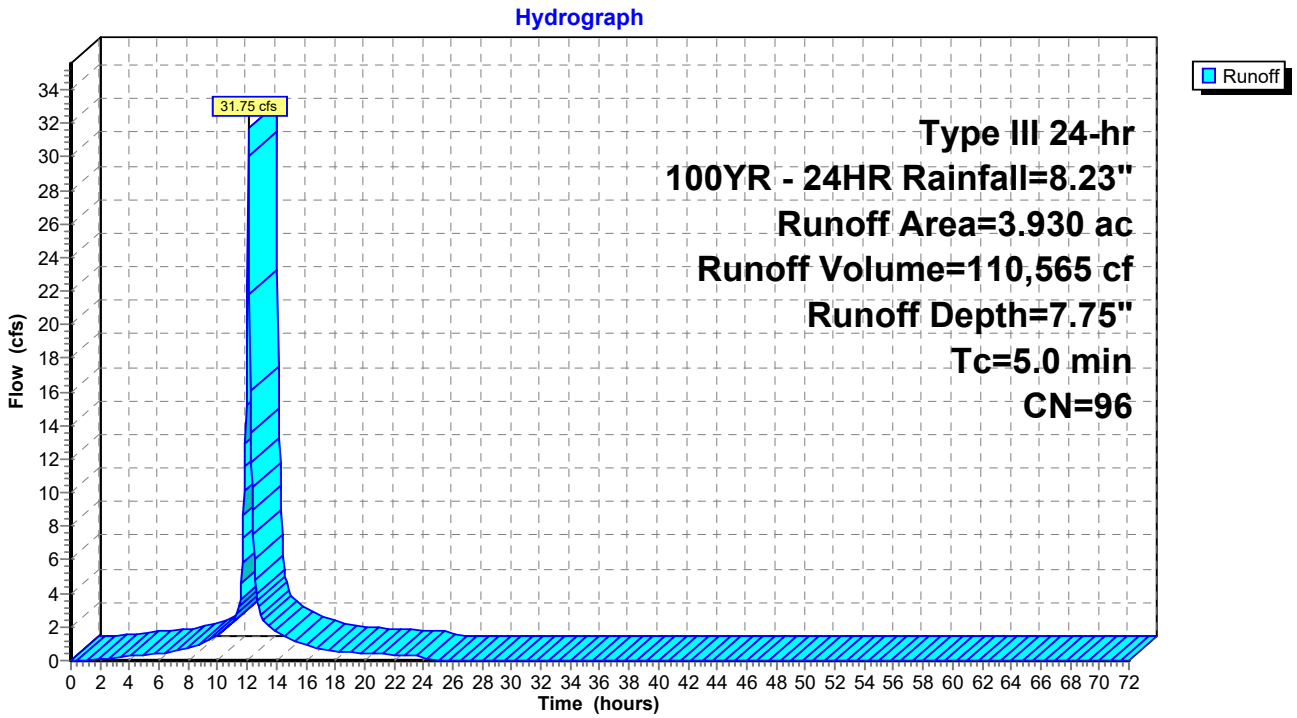
Runoff = 31.75 cfs @ 12.07 hrs, Volume= 110,565 cf, Depth= 7.75"
Routed to Pond SF6 : SAND FILTER AREA 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
3.620	98	Paved parking, HSG A
0.310	68	<50% Grass cover, Poor, HSG A
3.930	96	Weighted Average
0.310		7.89% Pervious Area
3.620		92.11% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 6: Area 6



Summary for Subcatchment 7: Area 7

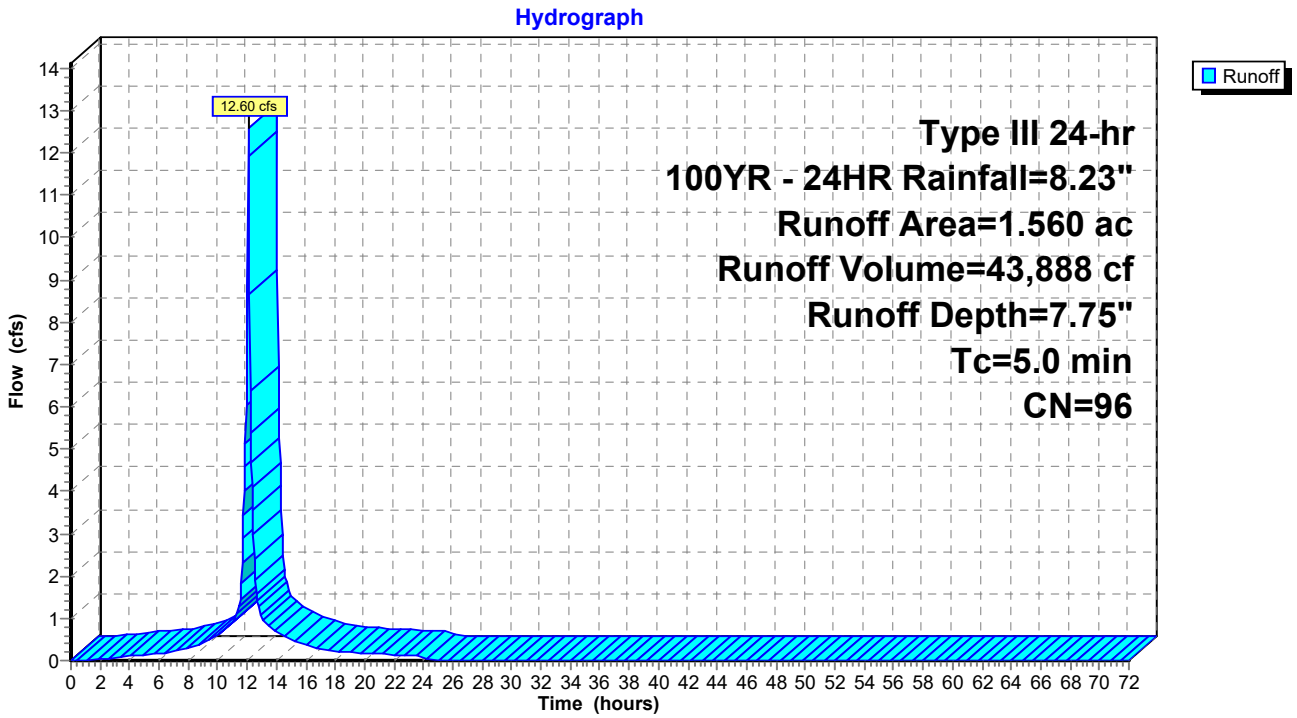
Runoff = 12.60 cfs @ 12.07 hrs, Volume= 43,888 cf, Depth= 7.75"
Routed to Pond SF7 : SAND FILTER AREA 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
1.440	98	Paved parking, HSG A
0.120	68	<50% Grass cover, Poor, HSG A
1.560	96	Weighted Average
0.120		7.69% Pervious Area
1.440		92.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 7: Area 7



Summary for Subcatchment 7A: SC 7A

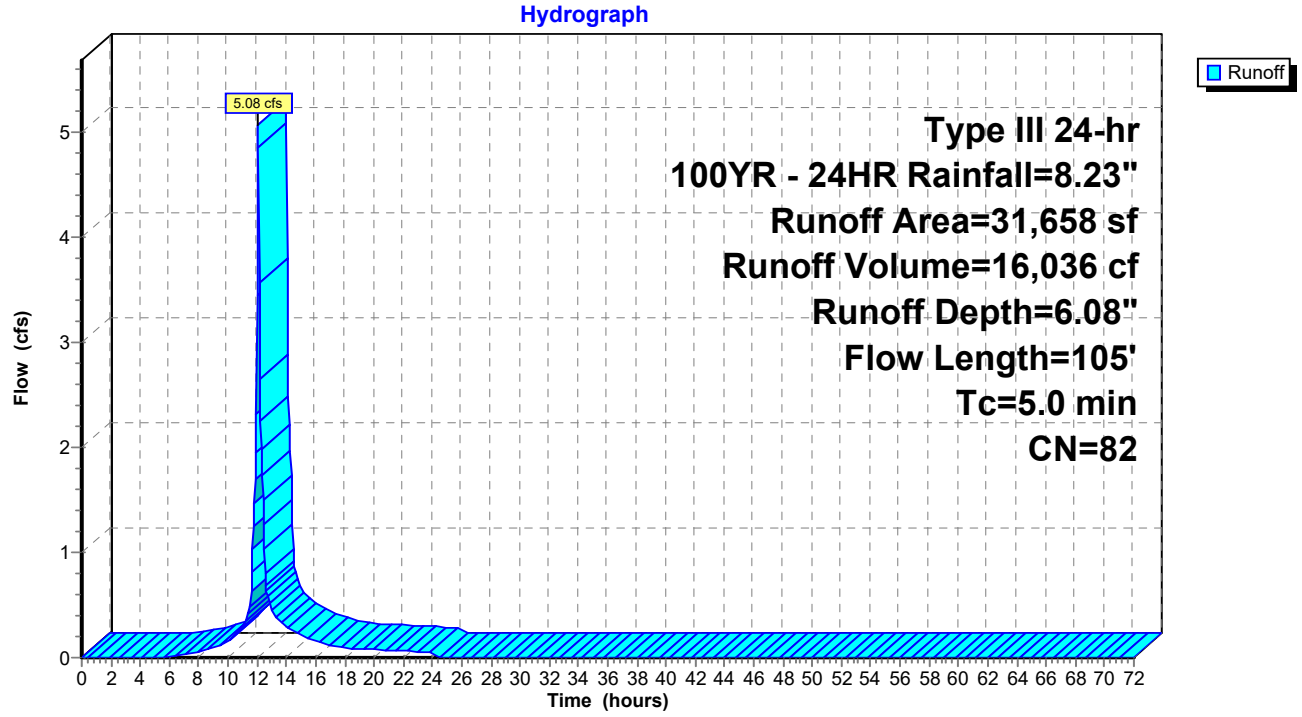
Runoff = 5.08 cfs @ 12.07 hrs, Volume= 16,036 cf, Depth= 6.08"
Routed to Reach PT4 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
13,875	61	>75% Grass cover, Good, HSG B
17,783	98	Unconnected pavement, HSG A
31,658	82	Weighted Average
13,875		43.83% Pervious Area
17,783		56.17% Impervious Area
17,783		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	72	0.0123	1.08		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	33	0.0254	1.12		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.4					**Direct Entry, minimum 5 min**
5.0	105	Total			

Subcatchment 7A: SC 7A



Summary for Subcatchment 7B: SC 7

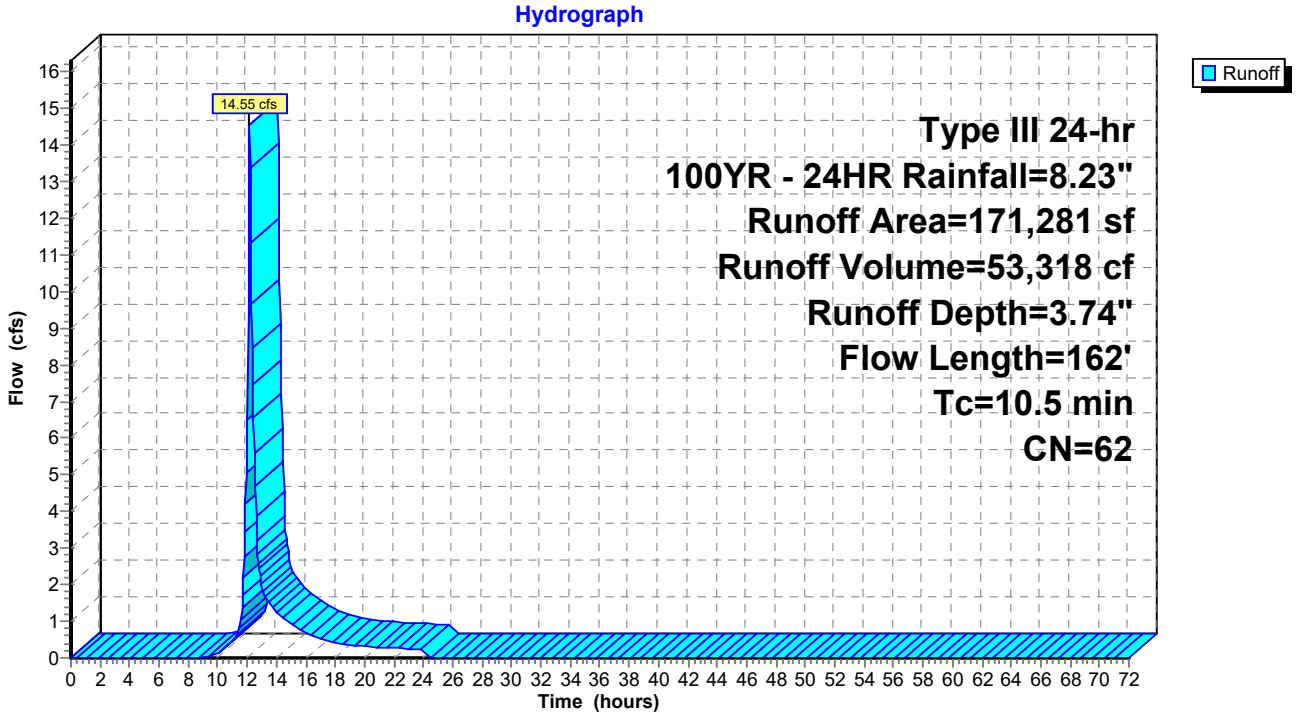
Runoff = 14.55 cfs @ 12.15 hrs, Volume= 53,318 cf, Depth= 3.74"
Routed to Pond MH1 : MH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
165,238	61	>75% Grass cover, Good, HSG B
6,043	98	Unconnected pavement, HSG D
171,281	62	Weighted Average
165,238		96.47% Pervious Area
6,043		3.53% Impervious Area
6,043		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.7	38	0.0097	0.86		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.8	124	0.0009	0.21		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
10.5	162	Total			

Subcatchment 7B: SC 7



Summary for Subcatchment 7S: SC 7

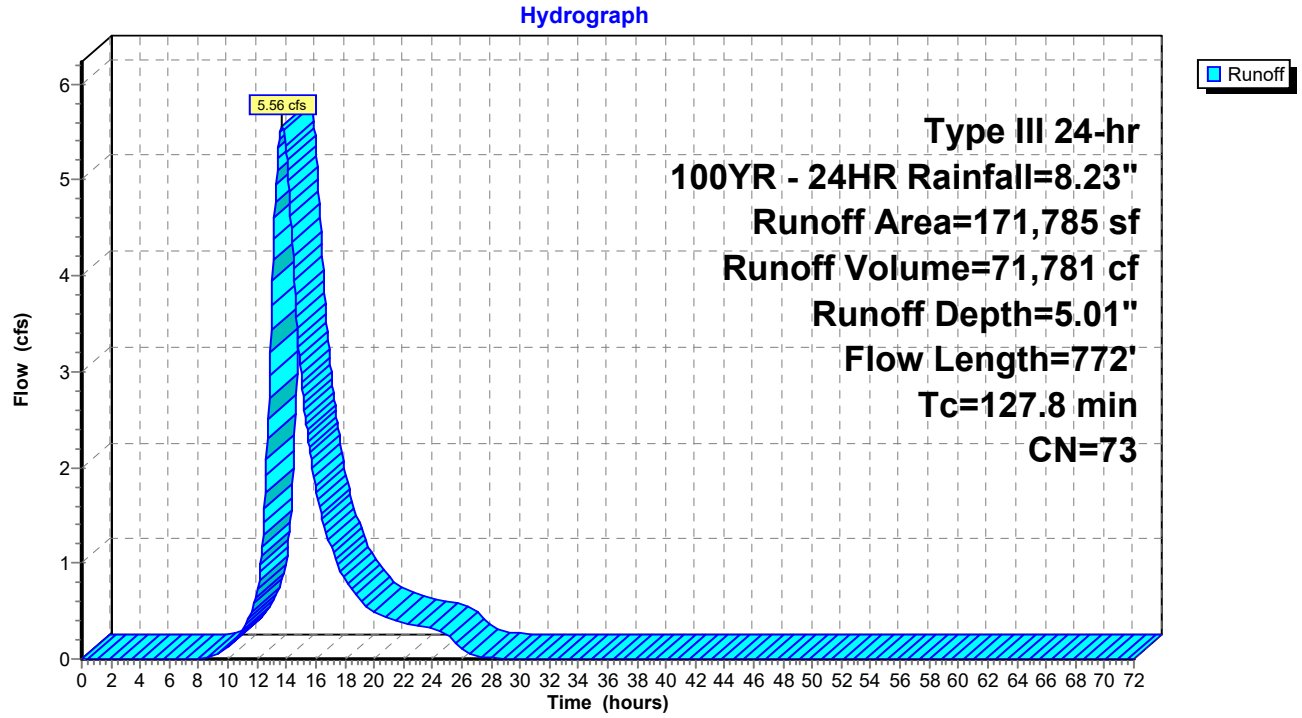
Runoff = 5.56 cfs @ 13.74 hrs, Volume= 71,781 cf, Depth= 5.01"
Routed to Pond CB6 : New CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
118,215	61	>75% Grass cover, Good, HSG B
53,570	98	Unconnected pavement, HSG A
171,785	73	Weighted Average
118,215		68.82% Pervious Area
53,570		31.18% Impervious Area
53,570		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	76	0.0118	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.5	179	0.0152	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
123.1	517	0.0001	0.07		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
127.8	772	Total			

Subcatchment 7S: SC 7



Summary for Subcatchment 8: Area 8

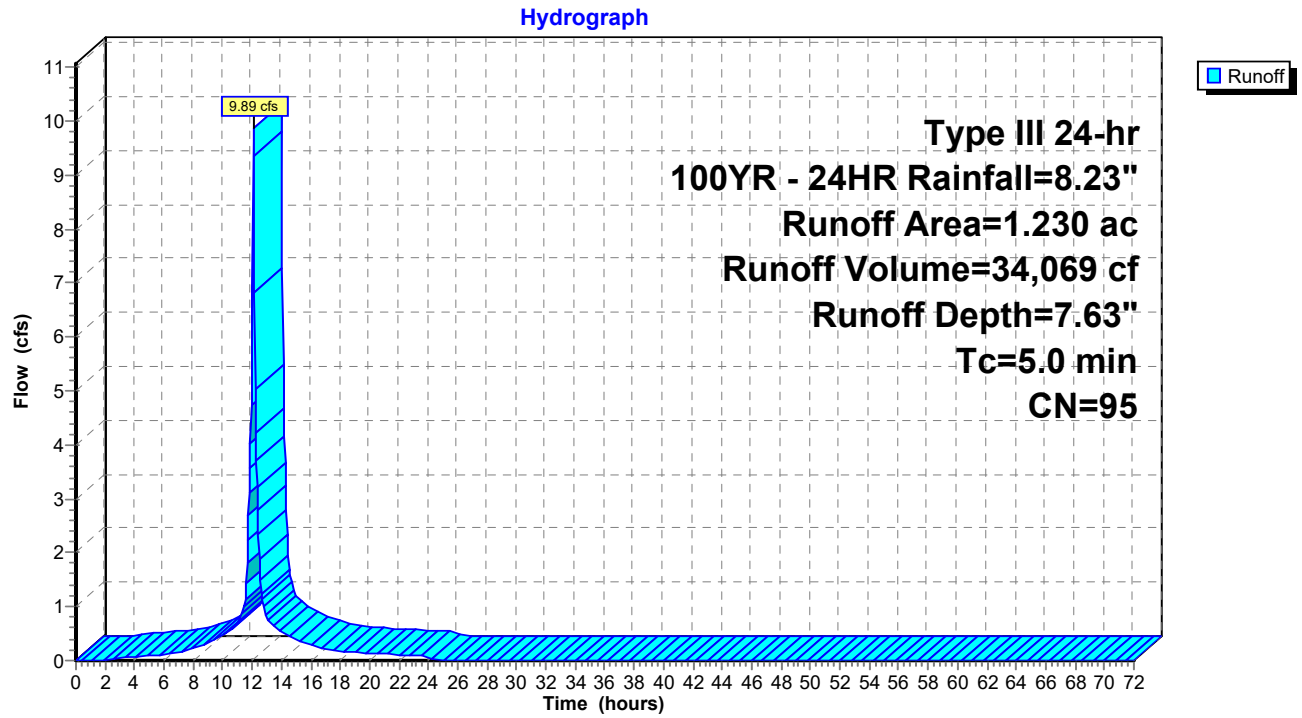
Runoff = 9.89 cfs @ 12.07 hrs, Volume= 34,069 cf, Depth= 7.63"
Routed to Pond SF8 : SAND FILTER AREA 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
1.110	98	Paved parking, HSG A
0.120	68	<50% Grass cover, Poor, HSG A
1.230	95	Weighted Average
0.120		9.76% Pervious Area
1.110		90.24% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 8: Area 8



Summary for Subcatchment 8A: SC 8A

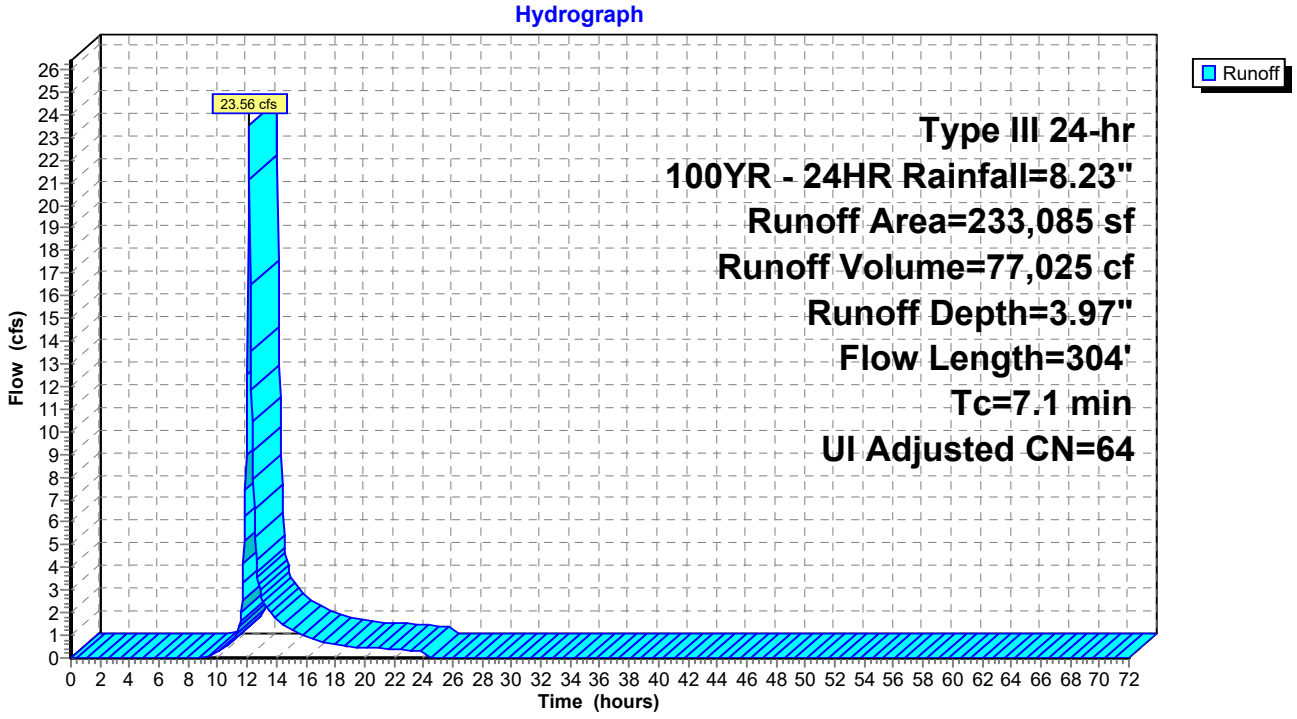
Runoff = 23.56 cfs @ 12.11 hrs, Volume= 77,025 cf, Depth= 3.97"
Routed to Pond CB7 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
201,343	61		>75% Grass cover, Good, HSG B
31,742	98		Unconnected pavement, HSG A
233,085	66	64	Weighted Average, UI Adjusted
201,343			86.38% Pervious Area
31,742			13.62% Impervious Area
31,742			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.4	115	0.0010	0.43		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
2.7	189	0.0274	1.16		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
7.1	304	Total			

Subcatchment 8A: SC 8A



Summary for Subcatchment 8S: SC 8

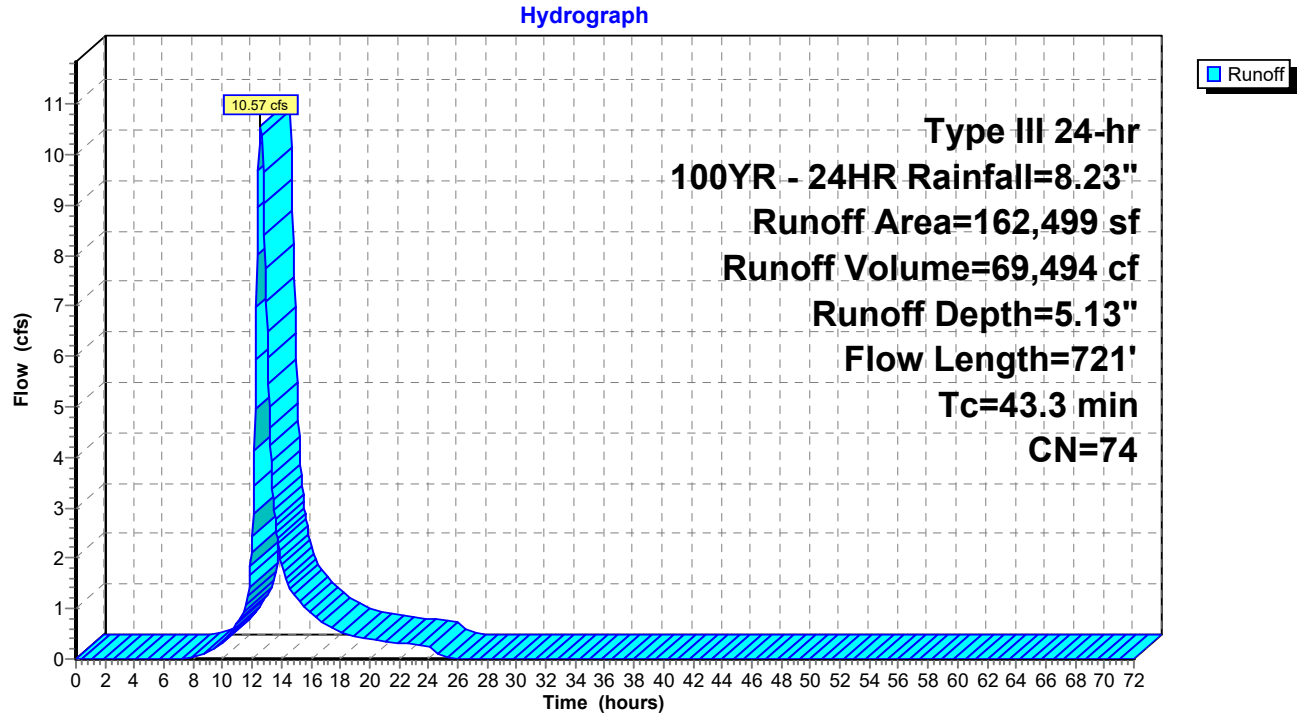
Runoff = 10.57 cfs @ 12.59 hrs, Volume= 69,494 cf, Depth= 5.13"
Routed to Pond MH1 : MH

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
107,335	61	>75% Grass cover, Good, HSG B
55,164	98	Unconnected pavement, HSG A
162,499	74	Weighted Average
107,335		66.05% Pervious Area
55,164		33.95% Impervious Area
55,164		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	106	0.0093	1.04		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
5.7	246	0.0106	0.72		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
35.9	369	0.0006	0.17		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
43.3	721	Total			

Subcatchment 8S: SC 8



Summary for Subcatchment 9A: Area 9A

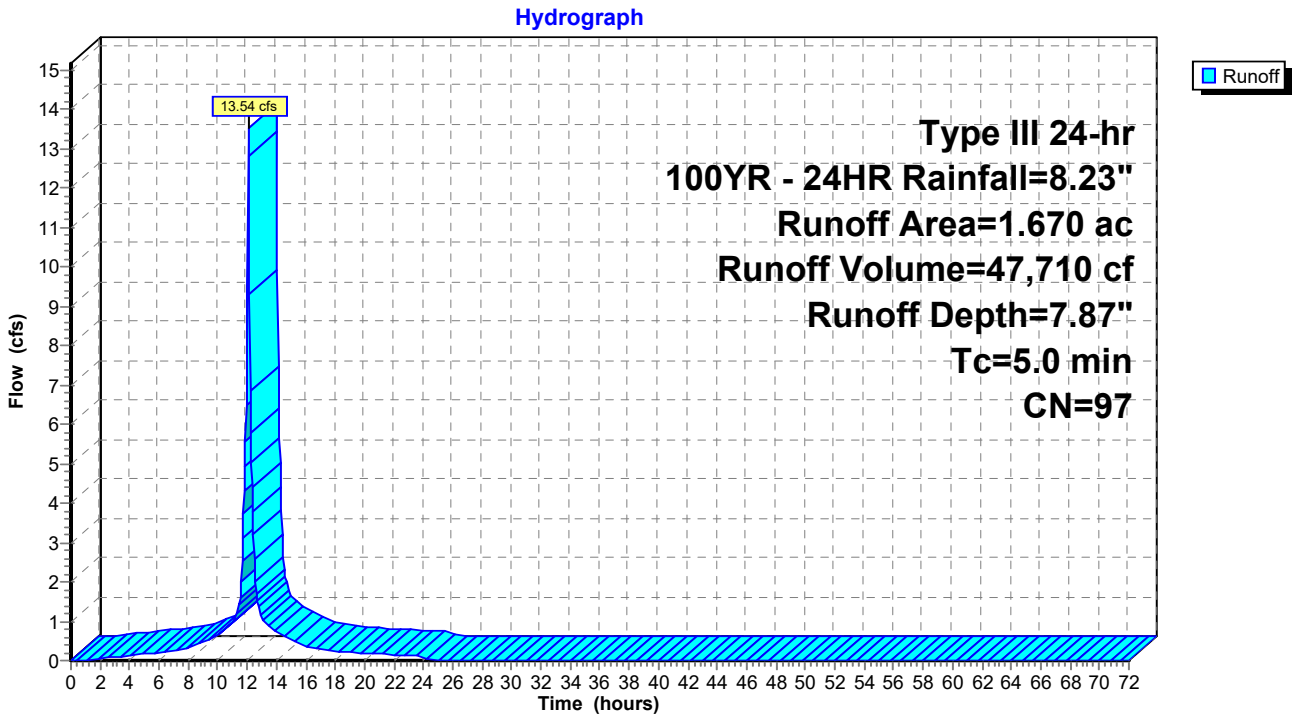
Runoff = 13.54 cfs @ 12.07 hrs, Volume= 47,710 cf, Depth= 7.87"
Routed to Link SS3 : SITESAVER 3 - STSS-12

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
1.590	98	Paved parking, HSG A
0.080	68	<50% Grass cover, Poor, HSG A
1.670	97	Weighted Average
0.080		4.79% Pervious Area
1.590		95.21% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9A: Area 9A



Summary for Subcatchment 9b: Area 9b

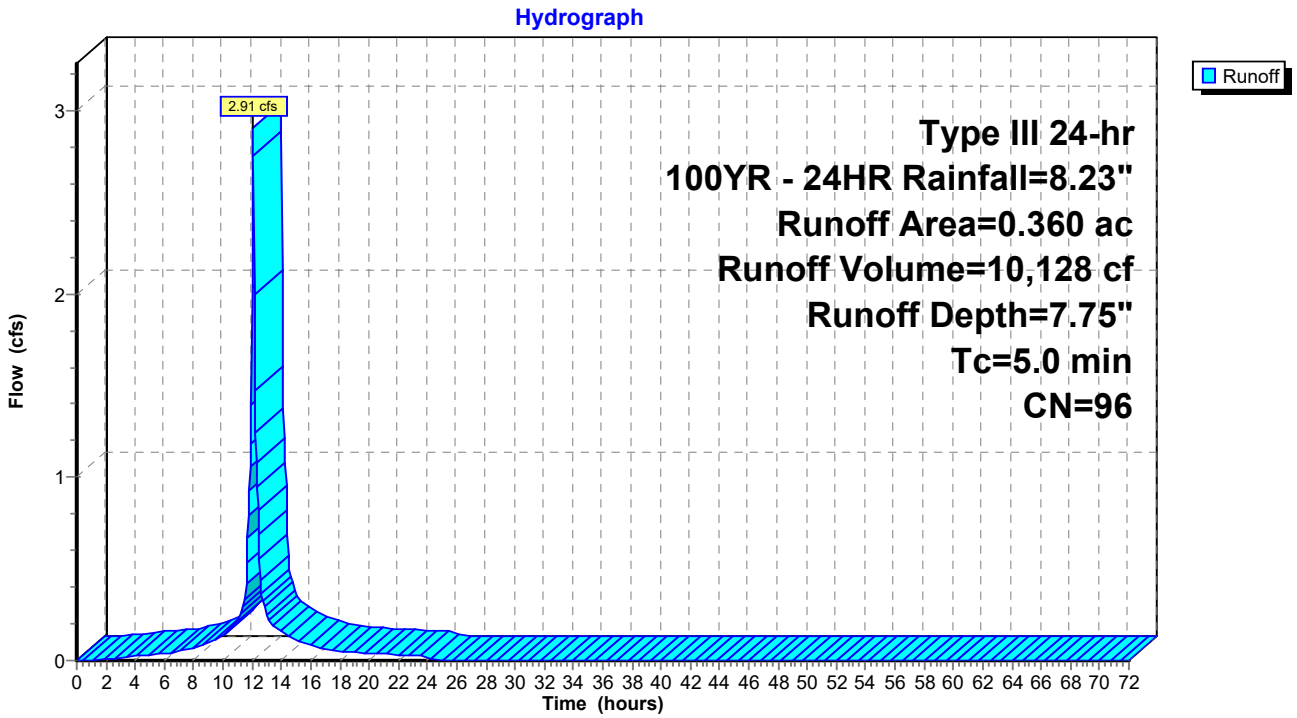
Runoff = 2.91 cfs @ 12.07 hrs, Volume= 10,128 cf, Depth= 7.75"
Routed to Link SS4 : SITESAVER 4 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
0.330	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.360	96	Weighted Average
0.030		8.33% Pervious Area
0.330		91.67% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9b: Area 9b



Summary for Subcatchment 9c: Area 9c

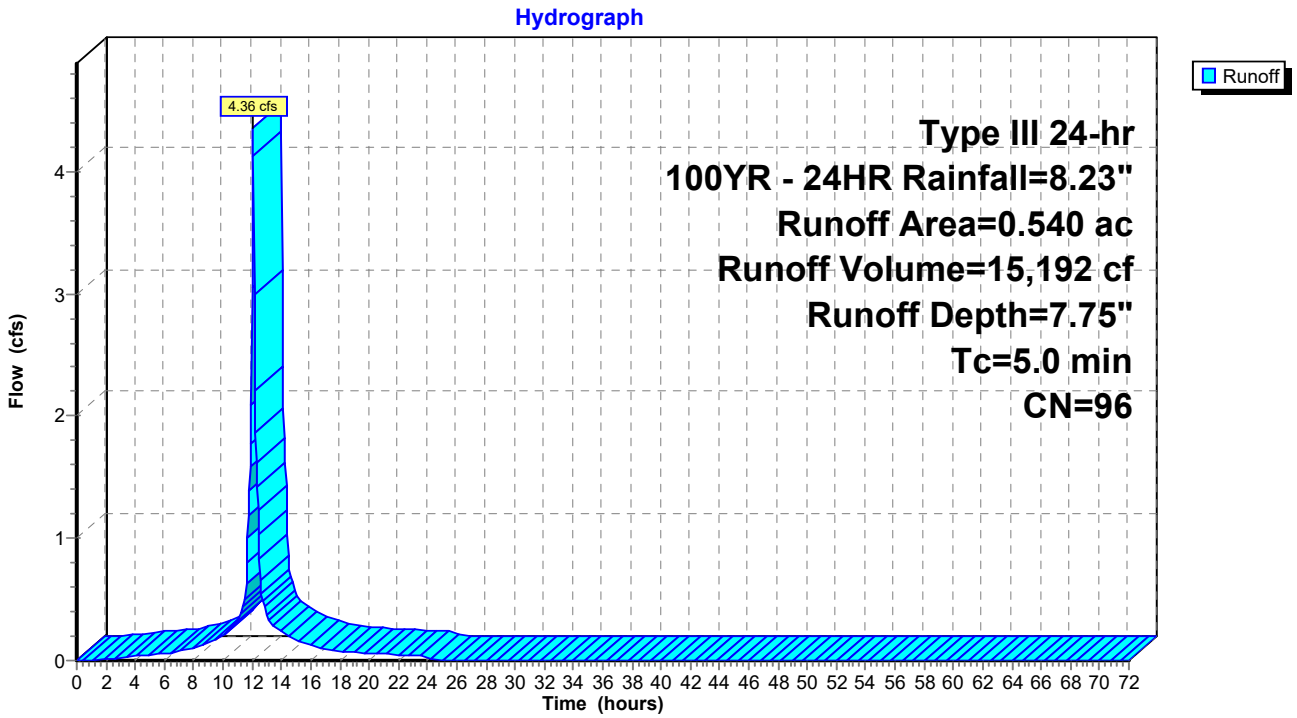
Runoff = 4.36 cfs @ 12.07 hrs, Volume= 15,192 cf, Depth= 7.75"
Routed to Link SS5 : SITESAVER 5 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.540	96	Weighted Average
0.030		5.56% Pervious Area
0.510		94.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9c: Area 9c



Summary for Subcatchment 9d: Area 9d

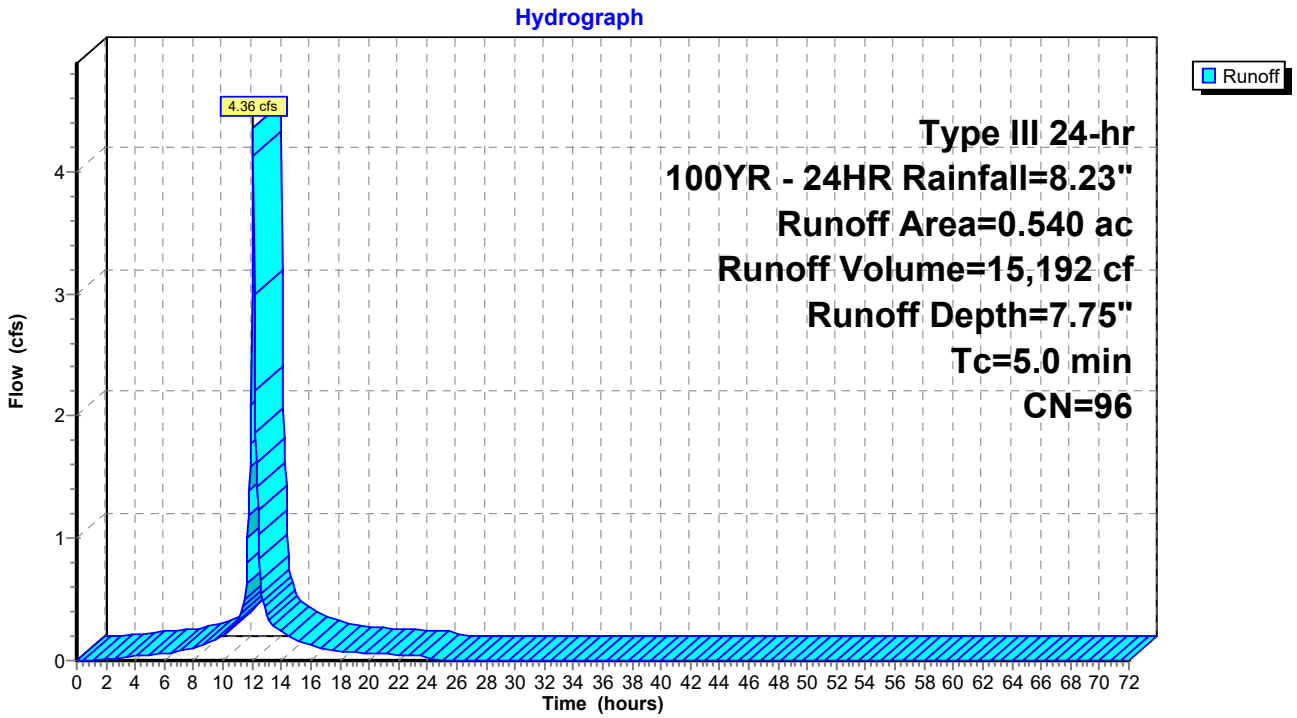
Runoff = 4.36 cfs @ 12.07 hrs, Volume= 15,192 cf, Depth= 7.75"
Routed to Link SS6 : SITESAVER 6 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
0.510	98	Paved parking, HSG A
0.030	68	<50% Grass cover, Poor, HSG A
0.540	96	Weighted Average
0.030		5.56% Pervious Area
0.510		94.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9d: Area 9d



Summary for Subcatchment 9e: Area 9e

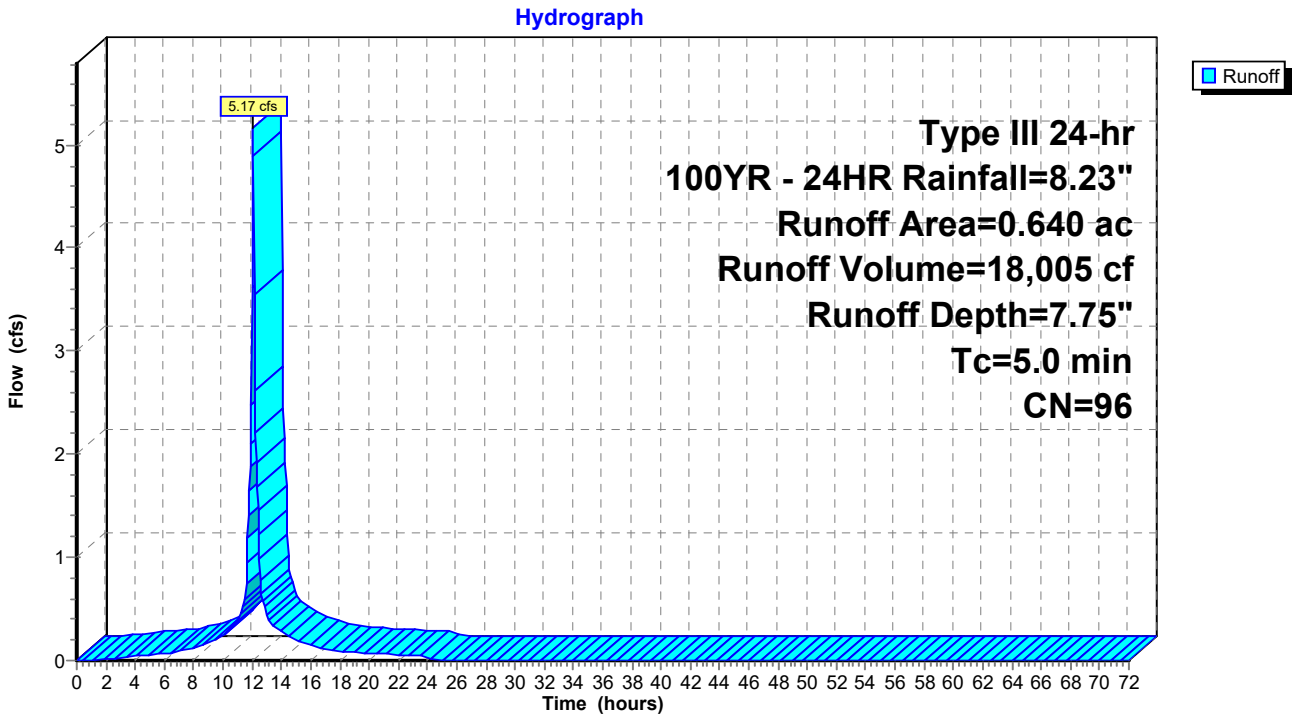
Runoff = 5.17 cfs @ 12.07 hrs, Volume= 18,005 cf, Depth= 7.75"
Routed to Link SS7 : SITESAVER 7 - STSS-4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
0.600	98	Paved parking, HSG A
0.040	68	<50% Grass cover, Poor, HSG A
0.640	96	Weighted Average
0.040		6.25% Pervious Area
0.600		93.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 9e: Area 9e



Summary for Subcatchment 9S: SC Culvert

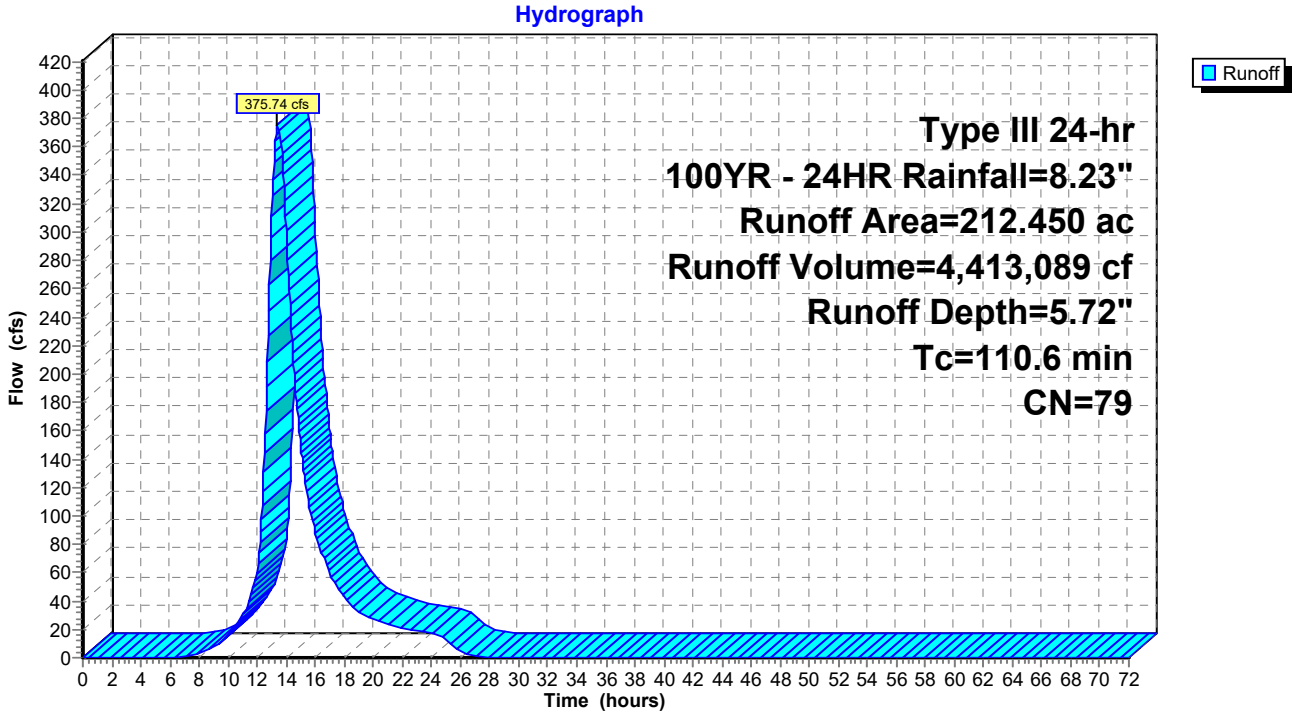
Runoff = 375.74 cfs @ 13.41 hrs, Volume= 4,413,089 cf, Depth= 5.72"
Routed to Pond 11P : (5) Culvert 6X3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (ac)	CN	Description
	8.600	54	1/2 acre lots, 25% imp, HSG A
	2.340	85	1/2 acre lots, 25% imp, HSG D
	12.290	61	1/4 acre lots, 38% imp, HSG A
	0.360	75	1/4 acre lots, 38% imp, HSG B
	0.010	87	1/4 acre lots, 38% imp, HSG D
	55.170	77	1/8 acre lots, 65% imp, HSG A
	0.490	85	1/8 acre lots, 65% imp, HSG B
	0.010	92	1/8 acre lots, 65% imp, HSG D
	2.210	67	Brush, Poor, HSG B
	0.740	83	Brush, Poor, HSG D
	2.880	89	Urban commercial, 85% imp, HSG A
	11.260	92	Urban commercial, 85% imp, HSG B
	21.000	95	Urban commercial, 85% imp, HSG D
	2.430	39	>75% Grass cover, Good, HSG A
	10.380	61	>75% Grass cover, Good, HSG B
	1.240	80	>75% Grass cover, Good, HSG D
	0.180	81	Urban industrial, 72% imp, HSG A
	0.520	93	Urban industrial, 72% imp, HSG D
	10.260	98	Paved roads w/curbs & sewers, HSG A
	2.890	98	Paved roads w/curbs & sewers, HSG B
	1.410	98	Paved roads w/curbs & sewers, HSG D
*	0.010	98	Wetland/Water Surface, 0% imp, HSG A
*	9.990	98	Wetland/Water Surface, 0% imp, HSG B
*	28.580	98	Wetland/Water Surface, 0% imp, HSG D
	5.120	30	Woods, Good, HSG A
	16.980	55	Woods, Good, HSG B
	5.100	77	Woods, Good, HSG D
	212.450	79	Weighted Average
	123.786		58.27% Pervious Area
	88.664		41.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
110.6					**Direct Entry, See Calculation Sheet**

Subcatchment 9S: SC Culvert



Summary for Subcatchment 14S: SC 14

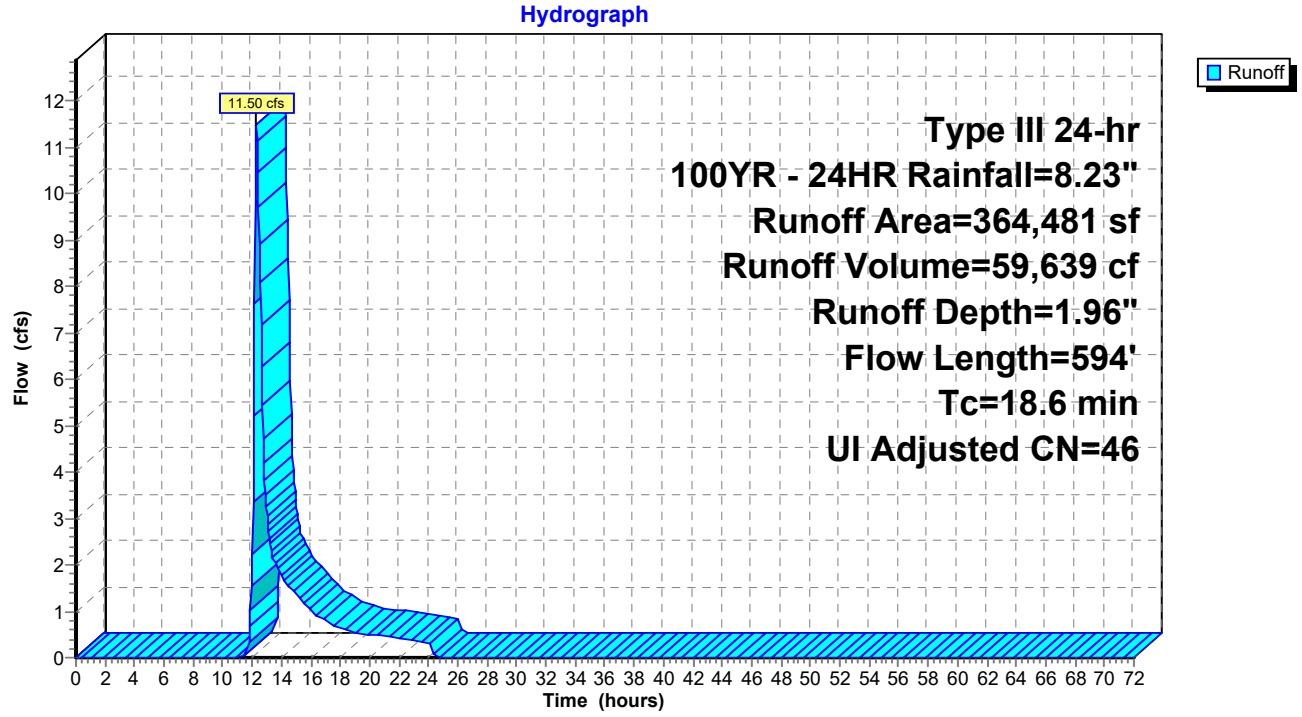
Runoff = 11.50 cfs @ 12.30 hrs, Volume= 59,639 cf, Depth= 1.96"
Routed to Pond CB1 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
278,288	39		>75% Grass cover, Good, HSG A
170	96		Gravel surface, HSG A
86,023	98		Unconnected pavement, HSG A
364,481	53	46	Weighted Average, UI Adjusted
278,458			76.40% Pervious Area
86,023			23.60% Impervious Area
86,023			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	100	0.0425	0.16		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
8.2	494	0.0204	1.00		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
18.6	594	Total			

Subcatchment 14S: SC 14



Summary for Subcatchment 15S: SC 15

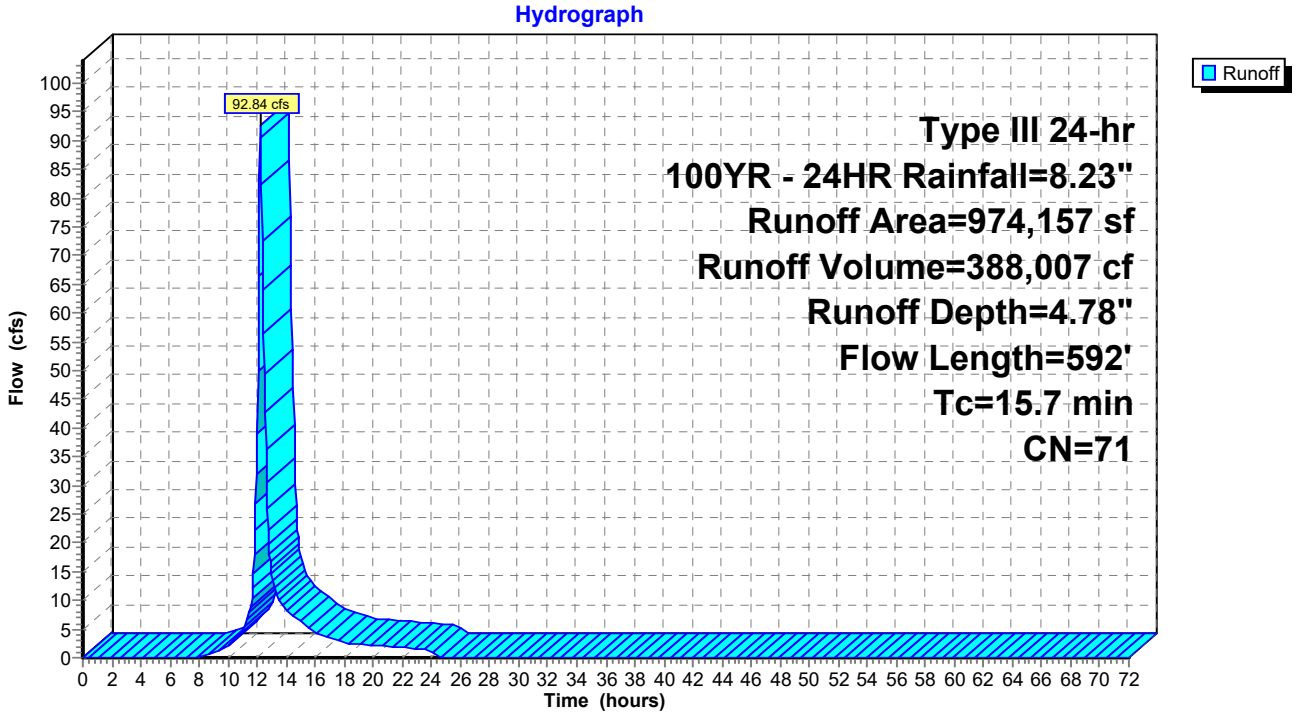
Runoff = 92.84 cfs @ 12.22 hrs, Volume= 388,007 cf, Depth= 4.78"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	428,677	39	>75% Grass cover, Good, HSG A
	1,164	76	Gravel roads, HSG A
	32,761	98	Water Surface, 0% imp, HSG A
	83,054	98	Unconnected pavement, HSG A
	309,611	98	Unconnected pavement, HSG D
	11,248	30	Woods, Good, HSG A
*	107,642	98	Wetland/water Surface, 0% imp, HSG A
	974,157	71	Weighted Average
	581,492		59.69% Pervious Area
	392,665		40.31% Impervious Area
	392,665		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.9	100	0.0630	0.19		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
6.1	423	0.0276	1.16		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.1	19	0.0175	2.69		**Shallow Concentrated Flow, C-D** Paved Kv= 20.3 fps
0.6	50	0.0394	1.39		**Shallow Concentrated Flow, D-E** Short Grass Pasture Kv= 7.0 fps
15.7	592	Total			

Subcatchment 15S: SC 15



Summary for Subcatchment 16A: SC 16A

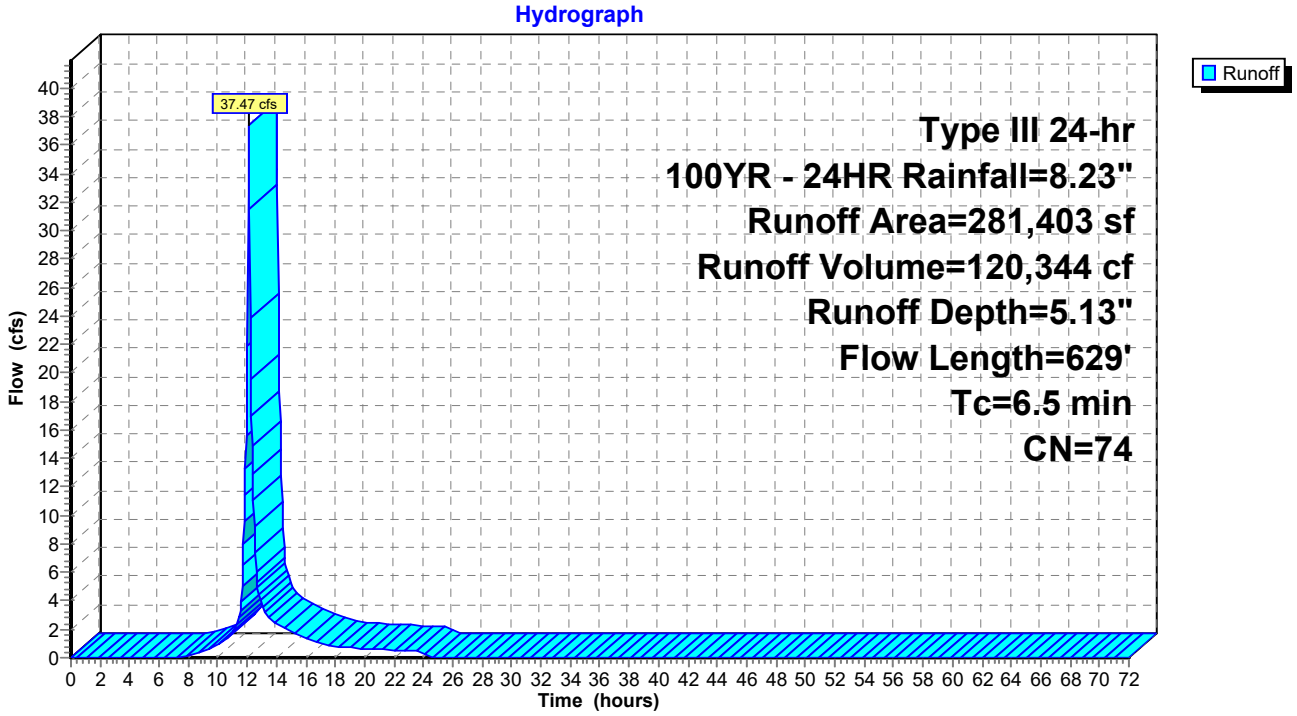
Runoff = 37.47 cfs @ 12.10 hrs, Volume= 120,344 cf, Depth= 5.13"
Routed to Pond CB5 : New CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
183,990	61	>75% Grass cover, Good, HSG B
97,294	98	Unconnected pavement, HSG A
119	98	Unconnected pavement, HSG D
281,403	74	Weighted Average
183,990		65.38% Pervious Area
97,413		34.62% Impervious Area
97,413		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	100	0.0107	1.09		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.0	157	0.0160	0.89		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
2.0	372	0.0030	3.09	110.88	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
6.5	629	Total			

Subcatchment 16A: SC 16A



Summary for Subcatchment 16B: SC 16B

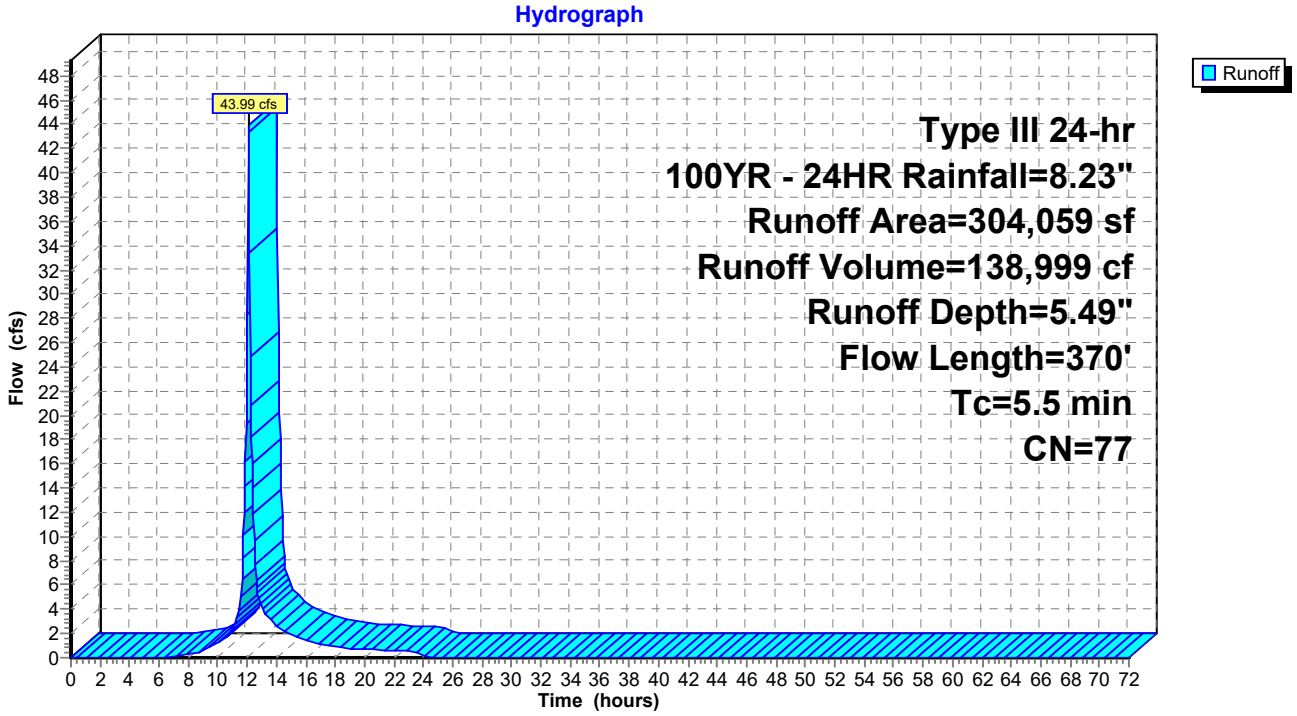
Runoff = 43.99 cfs @ 12.08 hrs, Volume= 138,999 cf, Depth= 5.49"
Routed to Pond CB4 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
169,834	61	>75% Grass cover, Good, HSG B
5	98	Unconnected pavement, HSG A
134,220	98	Unconnected pavement, HSG D
304,059	77	Weighted Average
169,834		55.86% Pervious Area
134,225		44.14% Impervious Area
134,225		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	101	0.0094	1.03		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
3.5	184	0.0159	0.88		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.4	85	0.0034	3.28	118.04	**Trap/Vee/Rect Channel Flow, C-D** Bot.W=0.00' D=2.50' Z= 1.5 & 10.0 '/' Top.W=28.75' n= 0.030 Earth, grassed & winding
5.5	370	Total			

Subcatchment 16B: SC 16B



Summary for Subcatchment 16S: SC 16

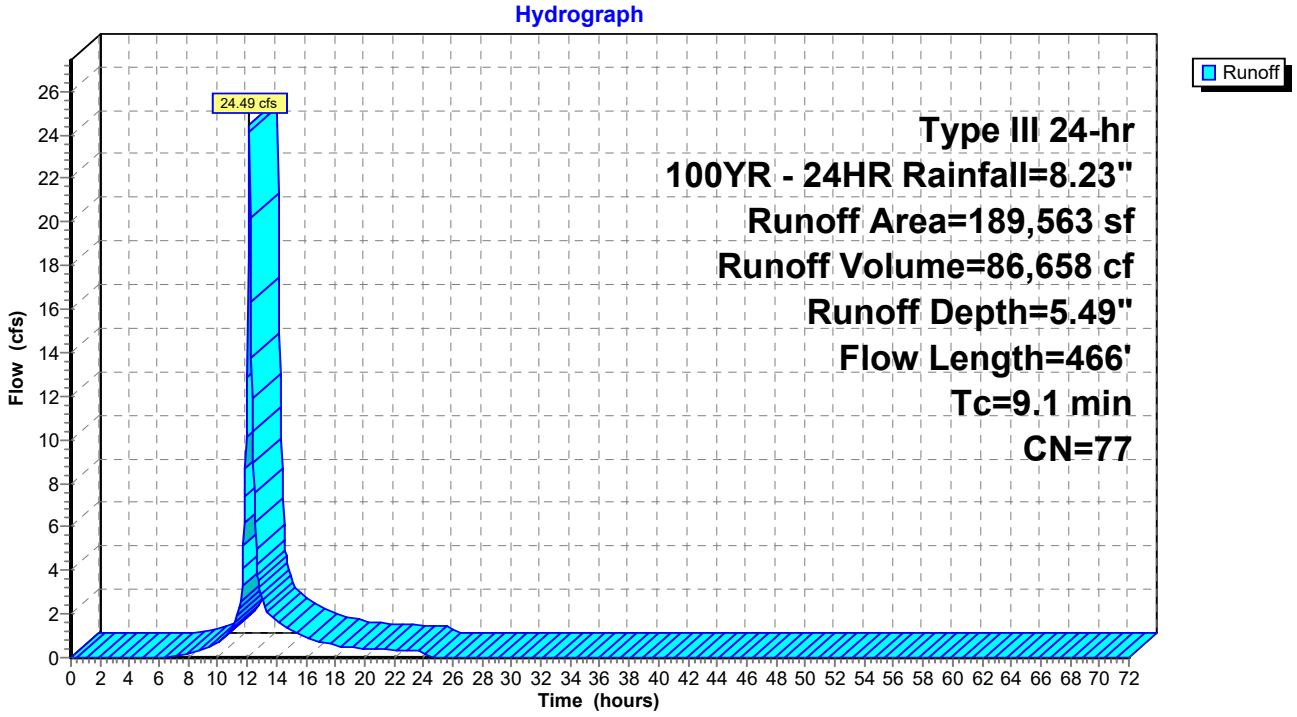
Runoff = 24.49 cfs @ 12.13 hrs, Volume= 86,658 cf, Depth= 5.49"
Routed to Pond CB3 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
110,029	61	>75% Grass cover, Good, HSG B
67,280	98	Unconnected pavement, HSG A
12,254	98	Unconnected pavement, HSG D
189,563	77	Weighted Average
110,029		58.04% Pervious Area
79,534		41.96% Impervious Area
79,534		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	117	0.0103	1.11		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.3	349	0.0129	0.80		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
9.1	466	Total			

Subcatchment 16S: SC 16



Summary for Subcatchment 17S: SC 17

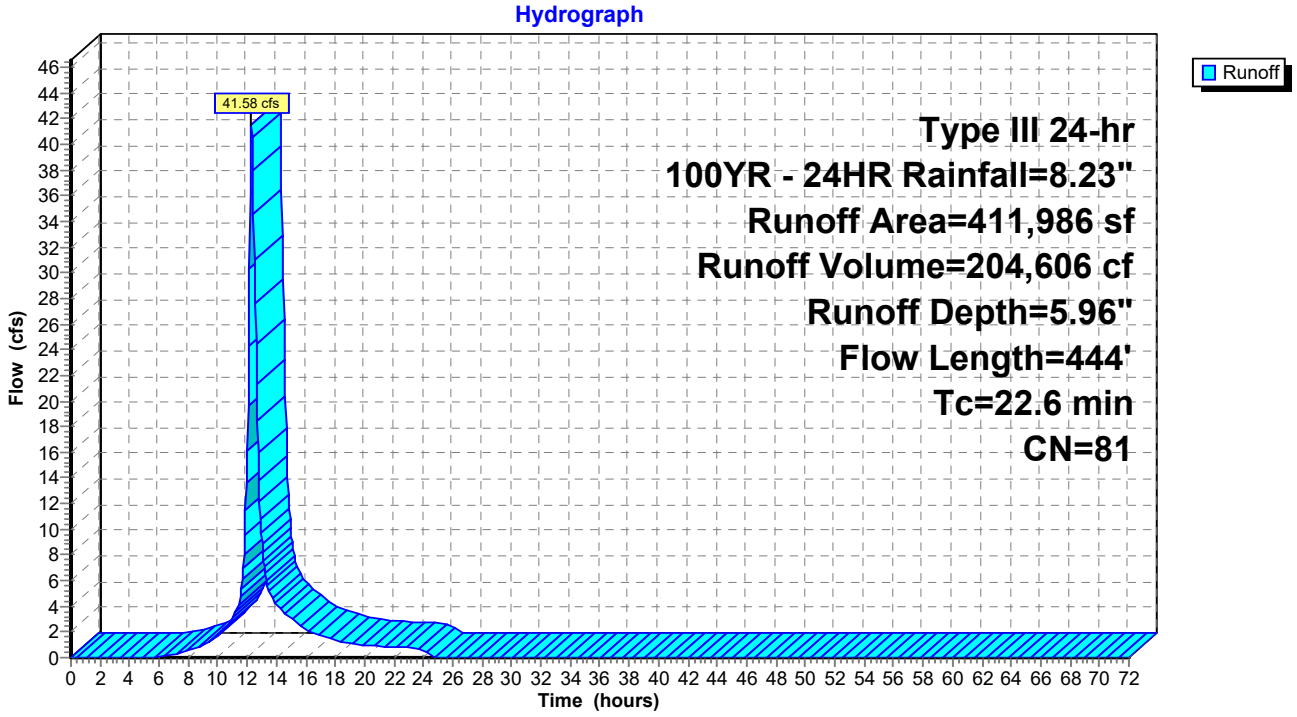
Runoff = 41.58 cfs @ 12.30 hrs, Volume= 204,606 cf, Depth= 5.96"
Routed to Link 1L : WEST WETL

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
189,518	61	>75% Grass cover, Good, HSG B
89,409	98	Unconnected pavement, HSG A
133,059	98	Unconnected pavement, HSG D
411,986	81	Weighted Average
189,518		46.00% Pervious Area
222,468		54.00% Impervious Area
222,468		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	115	0.0107	1.12		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
20.9	329	0.0014	0.26		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
22.6	444	Total			

Subcatchment 17S: SC 17



Summary for Subcatchment 18S: SC 18

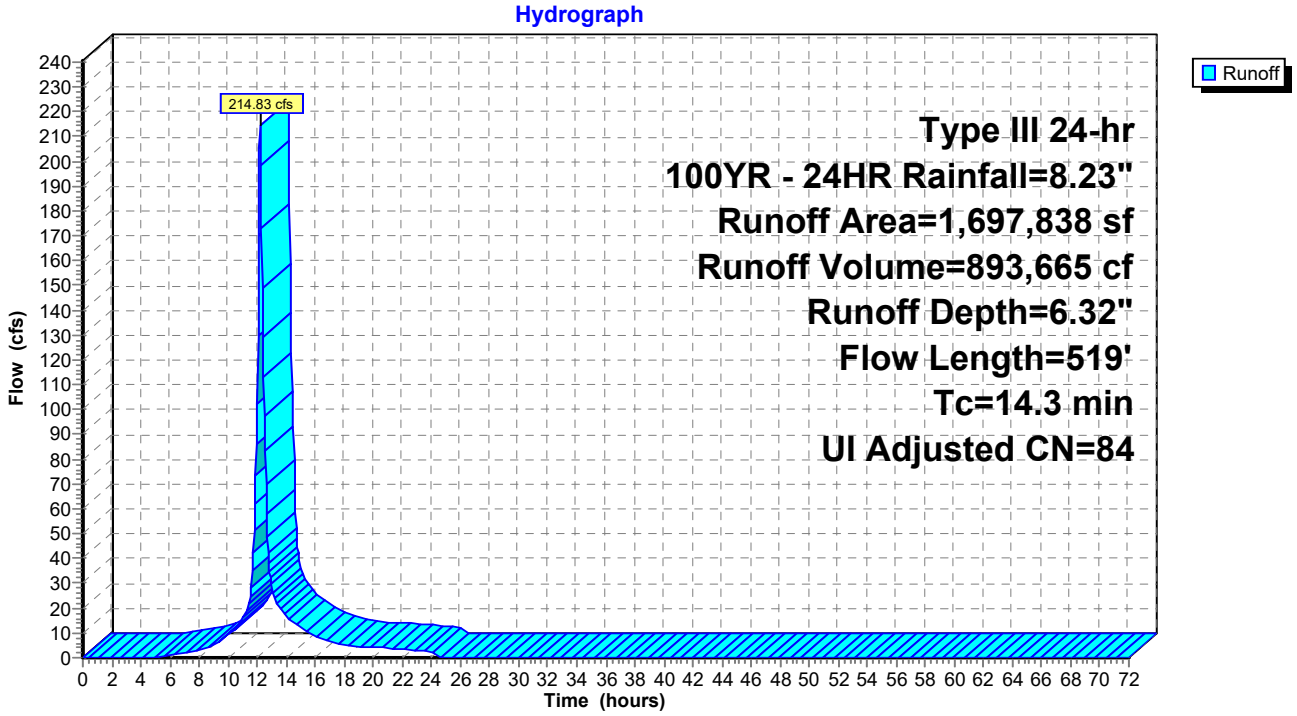
Runoff = 214.83 cfs @ 12.19 hrs, Volume= 893,665 cf, Depth= 6.32"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	528,385	61		>75% Grass cover, Good, HSG B
	145,596	98		Water Surface, 0% imp, HSG D
	108,069	98		Unconnected pavement, HSG A
	88,963	98		Unconnected pavement, HSG D
	92,068	70		Woods, Good, HSG C
*	734,757	98		Wetland/water Surface, 0% imp, HSG D
	1,697,838	85	84	Weighted Average, UI Adjusted
	1,500,806			88.40% Pervious Area
	197,032			11.60% Impervious Area
	197,032			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	69	0.0099	0.98		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
13.1	450	0.0067	0.57		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.3	519	Total			

Subcatchment 18S: SC 18



Summary for Subcatchment 19A: SC 19A

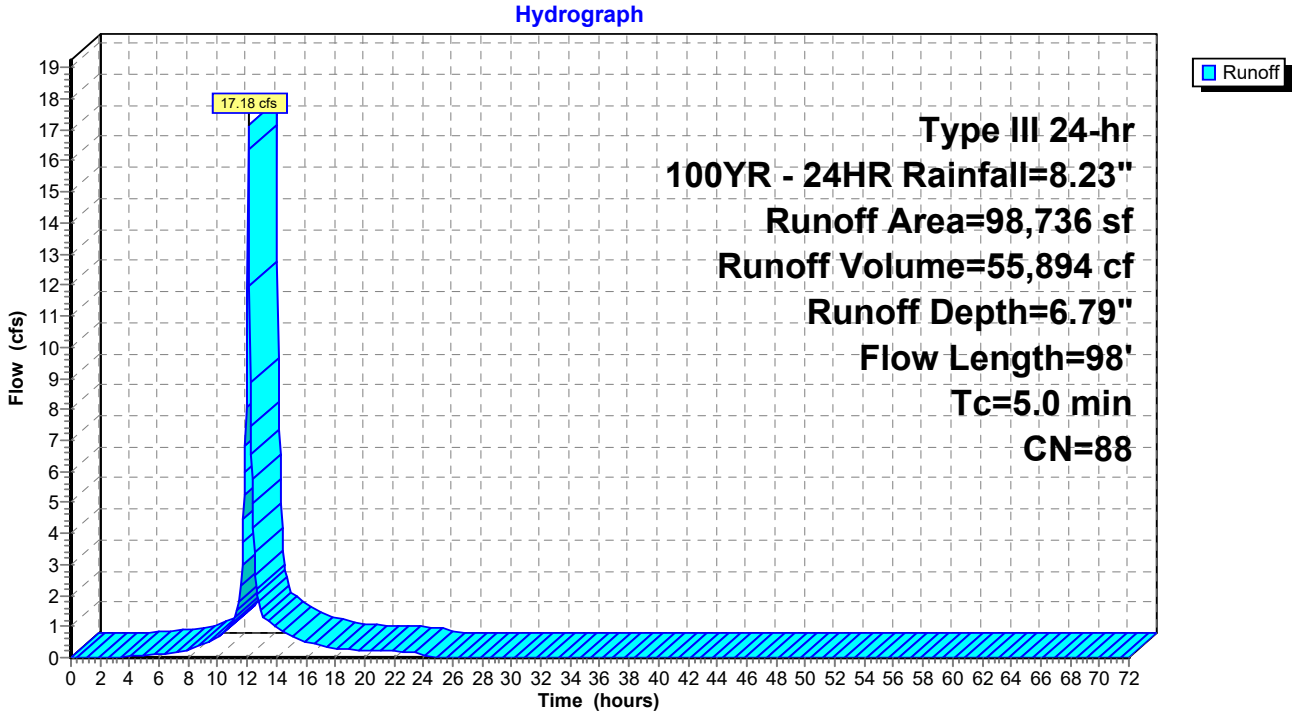
Runoff = 17.18 cfs @ 12.07 hrs, Volume= 55,894 cf, Depth= 6.79"
Routed to Reach PT1 : Overland Flow

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
27,532	61	>75% Grass cover, Good, HSG B
71,204	98	Unconnected pavement, HSG A
98,736	88	Weighted Average
27,532		27.88% Pervious Area
71,204		72.12% Impervious Area
71,204		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	69	0.0125	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
0.5	29	0.0197	0.98		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
3.4					**Direct Entry, minimum 5 min**
5.0	98	Total			

Subcatchment 19A: SC 19A



Summary for Subcatchment 19S: SC 19

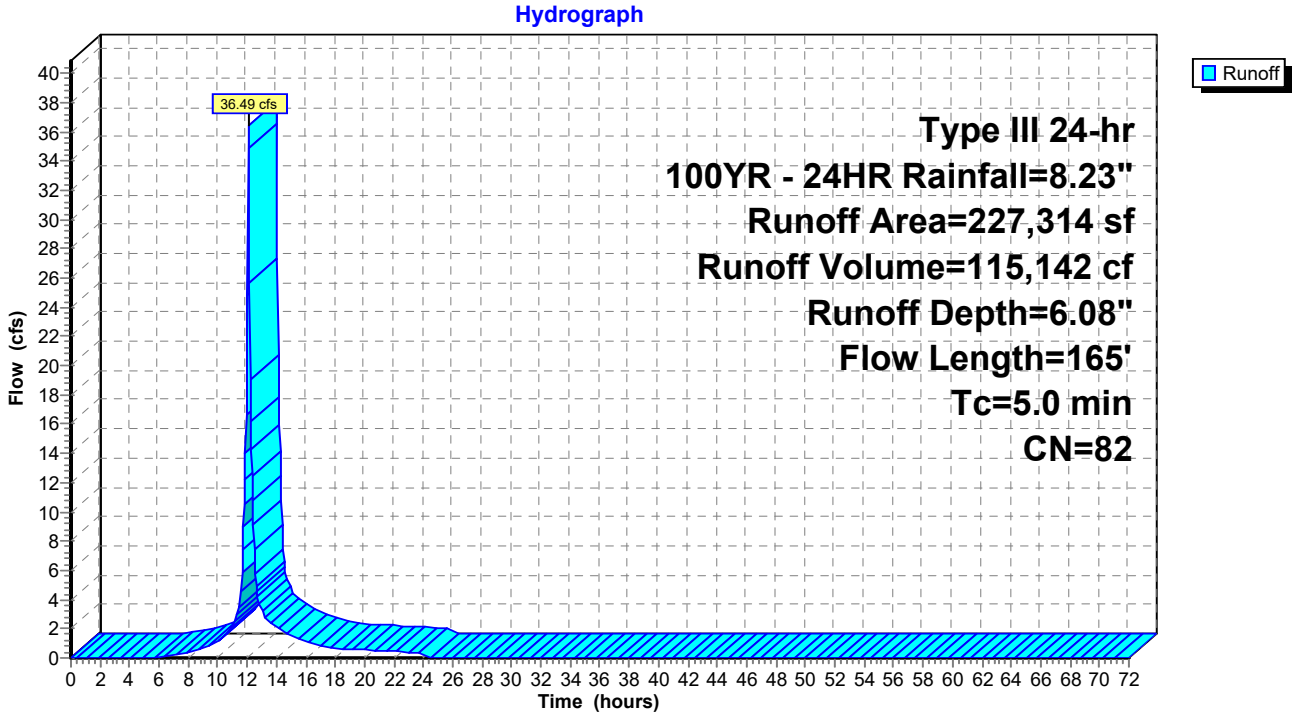
Runoff = 36.49 cfs @ 12.07 hrs, Volume= 115,142 cf, Depth= 6.08"
Routed to Link 2L : TUTTLE BROOK

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	98,182	61	>75% Grass cover, Good, HSG B
	15,781	98	Water Surface, 0% imp, HSG D
*	113,351	98	Wetland/water Surface, 0% imp, HSG D
	227,314	82	Weighted Average
	227,314		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.8	100	0.0075	0.94		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
2.5	65	0.0039	0.44		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
0.7					**Direct Entry, minimum 5 min**
5.0	165	Total			

Subcatchment 19S: SC 19



Summary for Subcatchment 20S: SC 20

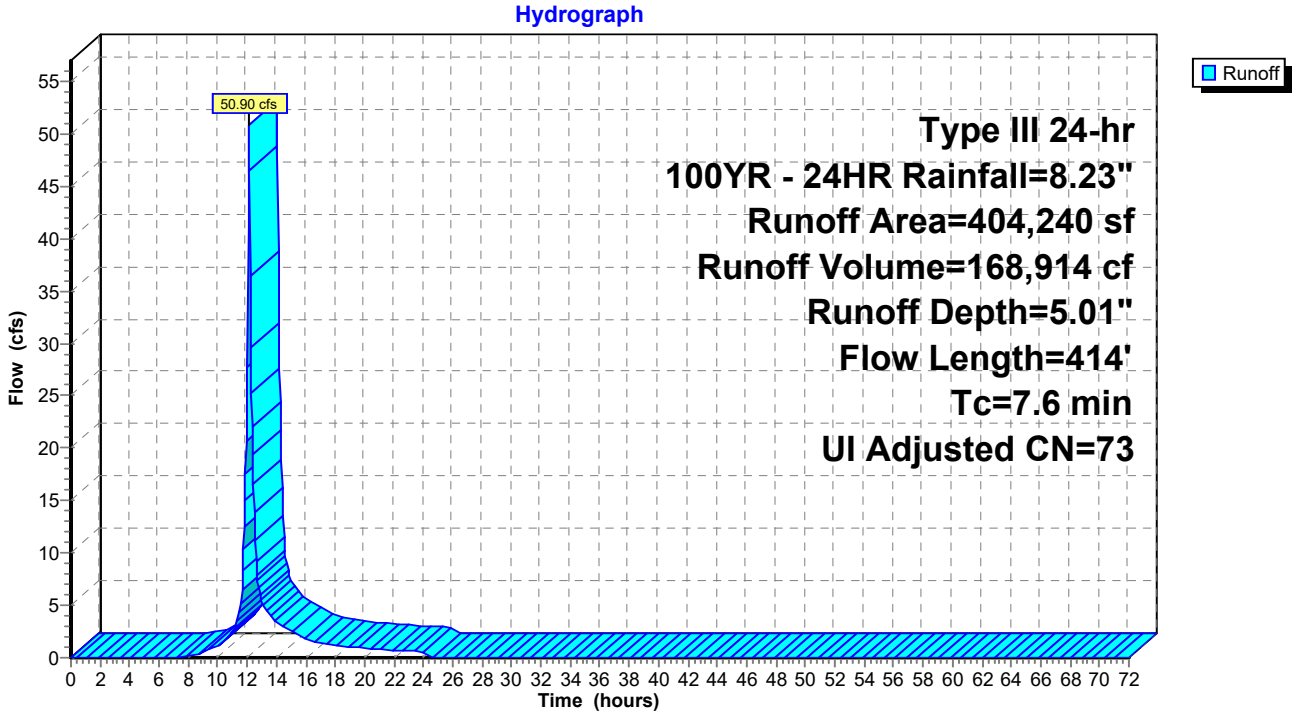
Runoff = 50.90 cfs @ 12.11 hrs, Volume= 168,914 cf, Depth= 5.01"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	246,051	61		>75% Grass cover, Good, HSG B
	2,273	96		Gravel surface, HSG B
	23,627	98		Water Surface, 0% imp, HSG D
	66,507	98		Unconnected pavement, HSG A
	1,831	98		Unconnected pavement, HSG D
	1,971	30		Woods, Good, HSG A
*	61,980	98		Wetland/water Surface, 0% imp, HSG D
	404,240	75	73	Weighted Average, UI Adjusted
	335,902			83.09% Pervious Area
	68,338			16.91% Impervious Area
	68,338			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.2	83	0.0128	1.13		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.30"
6.4	331	0.0153	0.87		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
7.6	414	Total			

Subcatchment 20S: SC 20



Summary for Subcatchment 21S: SC 21

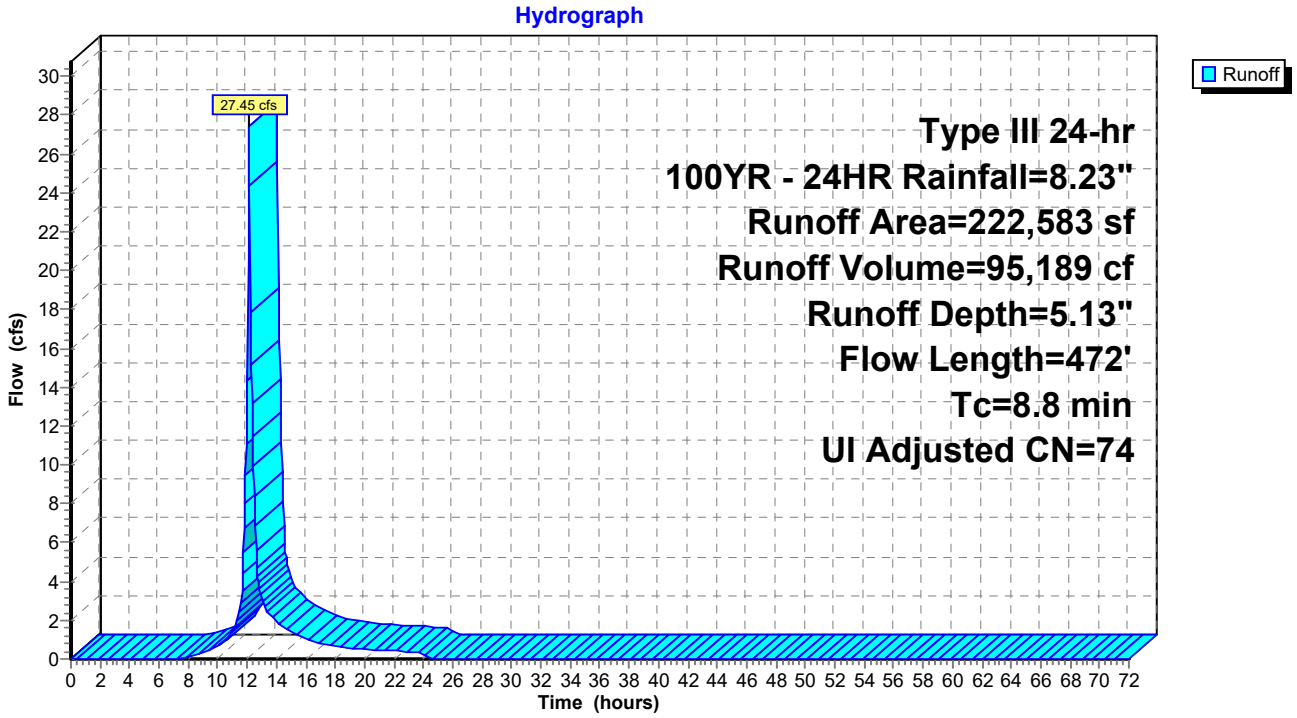
Runoff = 27.45 cfs @ 12.12 hrs, Volume= 95,189 cf, Depth= 5.13"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	138,267	61		>75% Grass cover, Good, HSG B
	16,801	98		Water Surface, 0% imp, HSG D
	23,650	98		Unconnected pavement, HSG D
*	43,865	98		Wetland/water Surface, 0% imp, HSG D
	222,583	75	74	Weighted Average, UI Adjusted
	198,933			89.37% Pervious Area
	23,650			10.63% Impervious Area
	23,650			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	73	0.0119	1.07		**Sheet Flow, A-B** Smooth surfaces n= 0.011 P2= 3.30"
7.7	399	0.0152	0.86		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
8.8	472	Total			

Subcatchment 21S: SC 21



Summary for Subcatchment 22S: SC 22

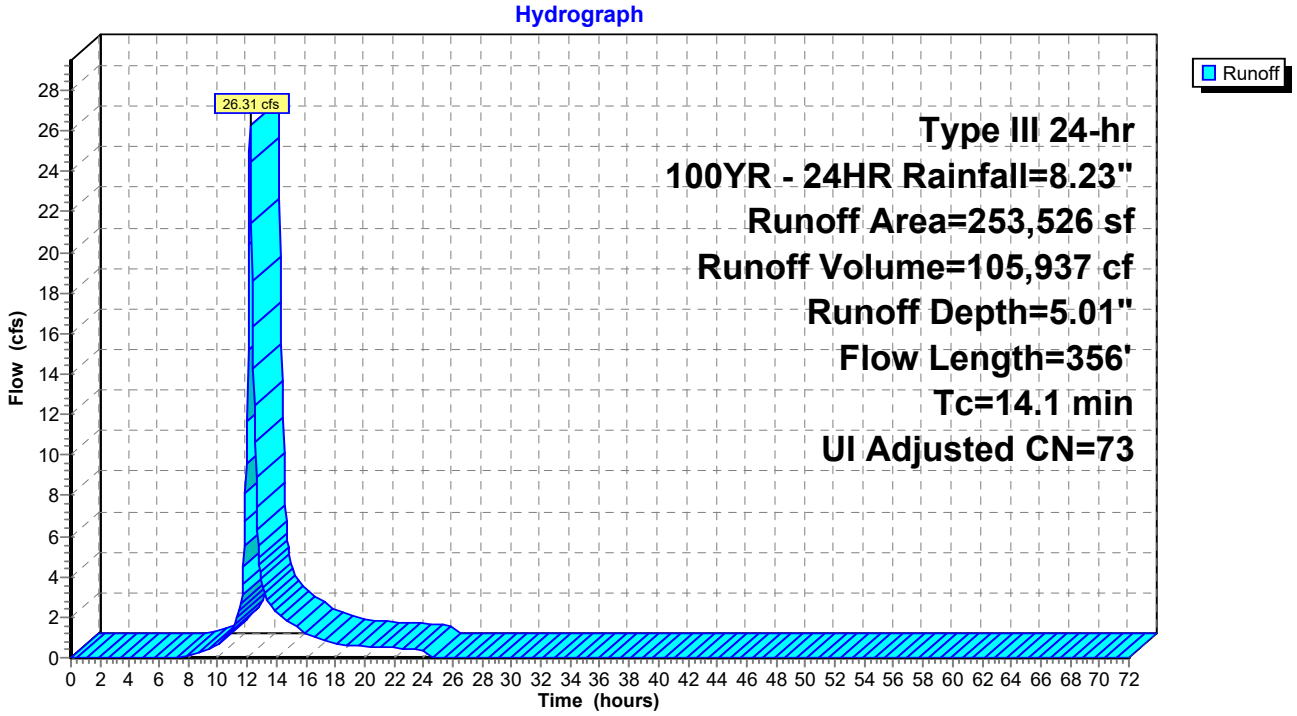
Runoff = 26.31 cfs @ 12.20 hrs, Volume= 105,937 cf, Depth= 5.01"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	162,251	61		>75% Grass cover, Good, HSG B
	9,076	96		Gravel surface, HSG B
	29,012	98		Water Surface, 0% imp, HSG D
	29,583	98		Unconnected pavement, HSG A
*	23,604	98		Wetland/water Surface, 0% imp, HSG D
	253,526	74	73	Weighted Average, UI Adjusted
	223,943			88.33% Pervious Area
	29,583			11.67% Impervious Area
	29,583			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.7	72	0.0102	0.12		**Sheet Flow, A-B** Grass: Short n= 0.150 P2= 3.30"
4.4	284	0.0241	1.09		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
14.1	356	Total			

Subcatchment 22S: SC 22



Summary for Subcatchment 23S: SC 23

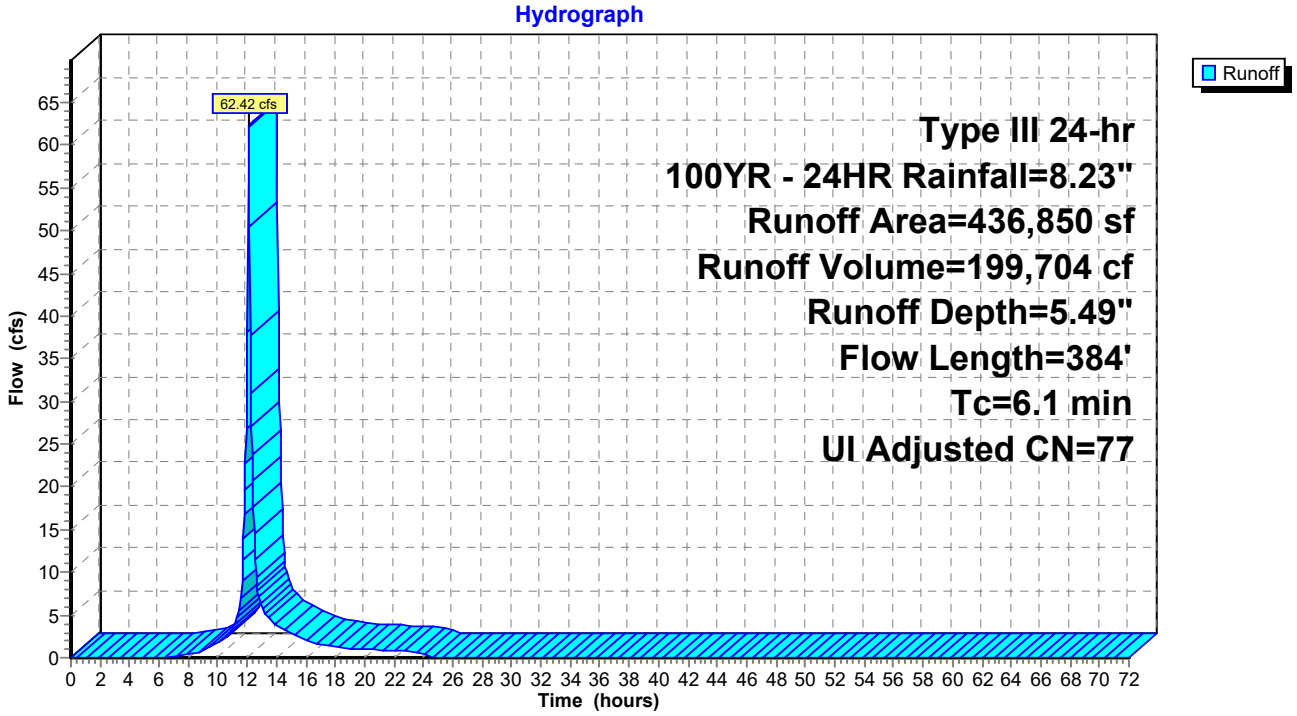
Runoff = 62.42 cfs @ 12.09 hrs, Volume= 199,704 cf, Depth= 5.49"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	172,047	61		>75% Grass cover, Good, HSG B
	16,592	96		Gravel surface, HSG B
	53,251	98		Water Surface, 0% imp, HSG D
	33,520	98		Unconnected pavement, HSG A
	59,182	55		Woods, Good, HSG B
*	102,258	98		Wetland/water Surface, 0% imp, HSG D
	436,850	78	77	Weighted Average, UI Adjusted
	403,330			92.33% Pervious Area
	33,520			7.67% Impervious Area
	33,520			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.5	88	0.0090	0.99		**Sheet Flow, A-B**
					Smooth surfaces n= 0.011 P2= 3.30"
4.6	296	0.0234	1.07		**Shallow Concentrated Flow, B-C**
					Short Grass Pasture Kv= 7.0 fps
6.1	384	Total			

Subcatchment 23S: SC 23



Summary for Subcatchment 24S: SC 24

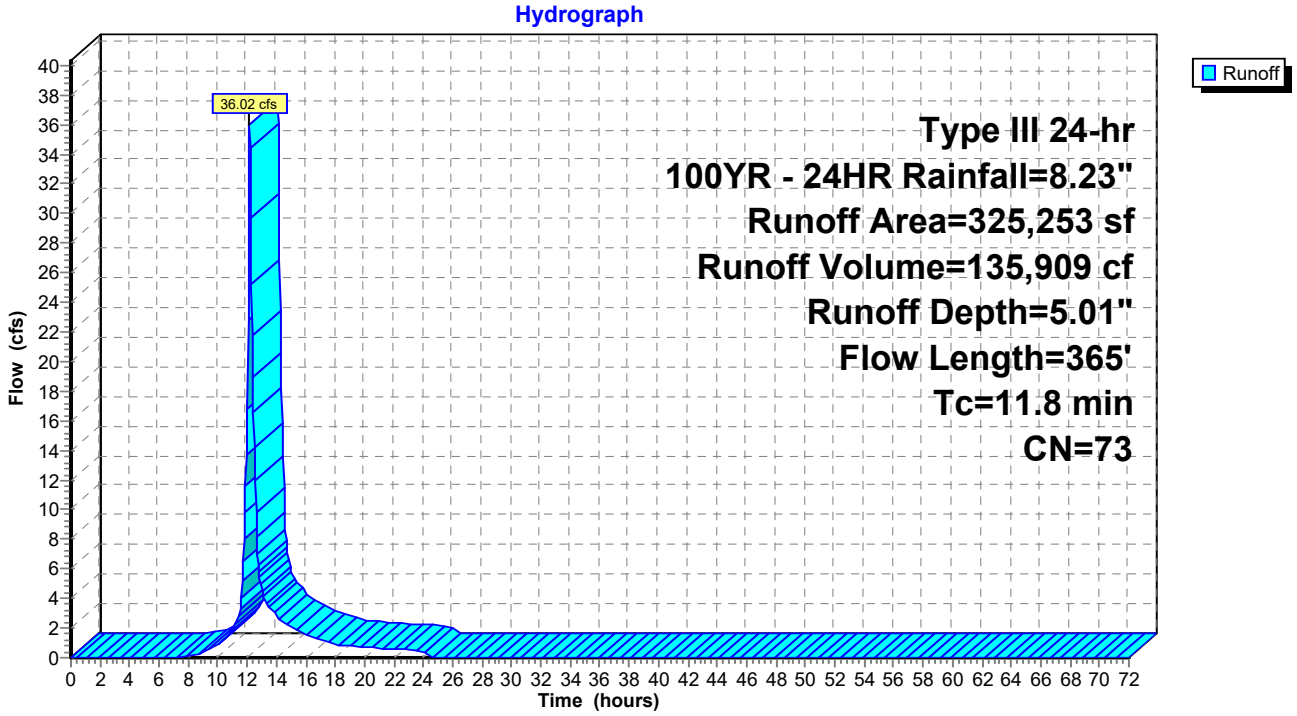
Runoff = 36.02 cfs @ 12.16 hrs, Volume= 135,909 cf, Depth= 5.01"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Description
	65,366	61	>75% Grass cover, Good, HSG B
	13,384	96	Gravel surface, HSG B
	56,260	98	Water Surface, 0% imp, HSG D
	5,050	98	Unconnected pavement, HSG A
	129,703	55	Woods, Good, HSG B
*	55,490	98	Wetland/water Surface, 0% imp, HSG D
	325,253	73	Weighted Average
	320,203		98.45% Pervious Area
	5,050		1.55% Impervious Area
	5,050		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.9	25	0.0171	0.08		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
0.1	21	0.0152	2.50		**Shallow Concentrated Flow, B-C** Paved Kv= 20.3 fps
2.0	89	0.0115	0.75		**Shallow Concentrated Flow, C-D** Short Grass Pasture Kv= 7.0 fps
0.1	15	0.0120	2.22		**Shallow Concentrated Flow, D-E** Paved Kv= 20.3 fps
4.7	215	0.0120	0.77		**Shallow Concentrated Flow, E-F** Short Grass Pasture Kv= 7.0 fps
11.8	365	Total			

Subcatchment 24S: SC 24



Summary for Subcatchment 27S: SC 27

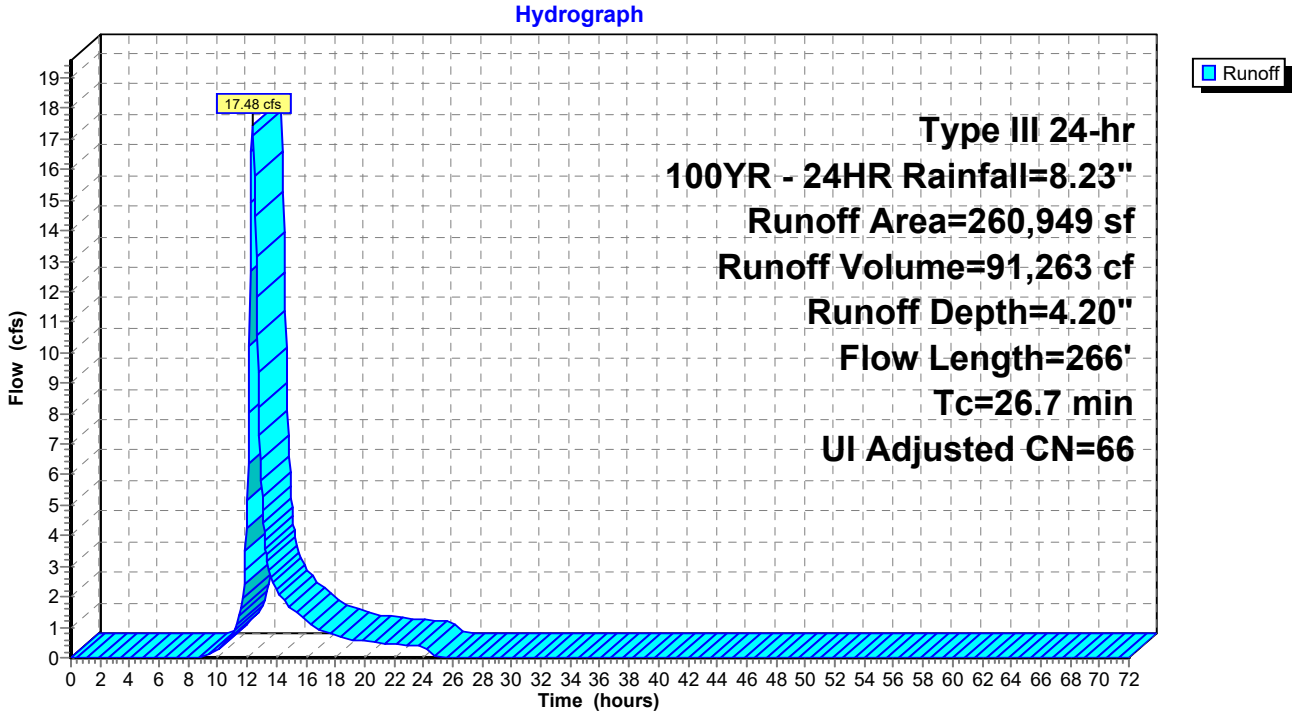
Runoff = 17.48 cfs @ 12.38 hrs, Volume= 91,263 cf, Depth= 4.20"
Routed to Link AP1 : TIDE GATE

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	189,955	61		>75% Grass cover, Good, HSG B
	364	96		Gravel surface, HSG B
	69,758	98		Unconnected pavement, HSG A
	0	98		Unconnected pavement, HSG D
*	872	98		Wetland/Water Surface, 0% imp, HSG A
	260,949	71	66	Weighted Average, UI Adjusted
	191,191			73.27% Pervious Area
	69,758			26.73% Impervious Area
	69,758			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
24.1	100	0.0052	0.07		**Sheet Flow, A-B** Grass: Dense n= 0.240 P2= 3.30"
2.6	166	0.0233	1.07		**Shallow Concentrated Flow, B-C** Short Grass Pasture Kv= 7.0 fps
26.7	266	Total			

Subcatchment 27S: SC 27



Summary for Subcatchment A1: Area A1

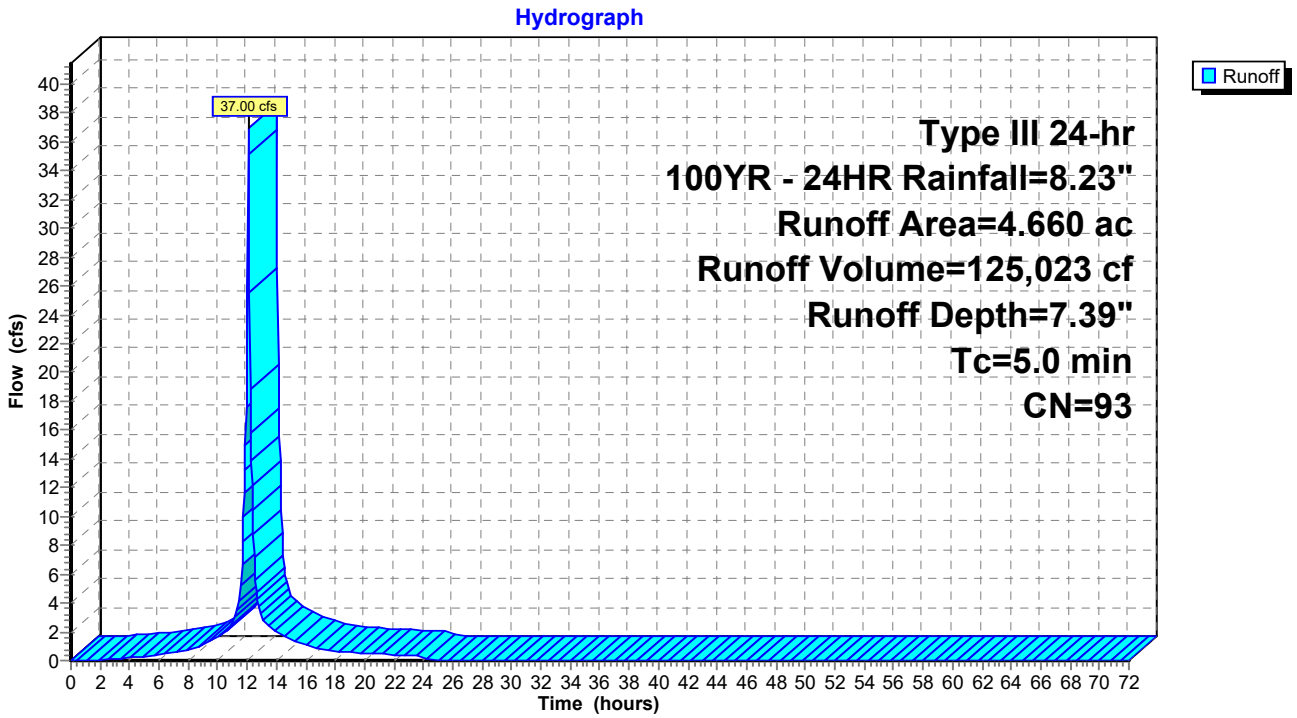
Runoff = 37.00 cfs @ 12.07 hrs, Volume= 125,023 cf, Depth= 7.39"
Routed to Pond SFA1 : SAND FILTER AREA A1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
3.900	98	Paved parking, HSG A
0.760	68	<50% Grass cover, Poor, HSG A
4.660	93	Weighted Average
0.760		16.31% Pervious Area
3.900		83.69% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A1: Area A1



Summary for Subcatchment A2: Area A2

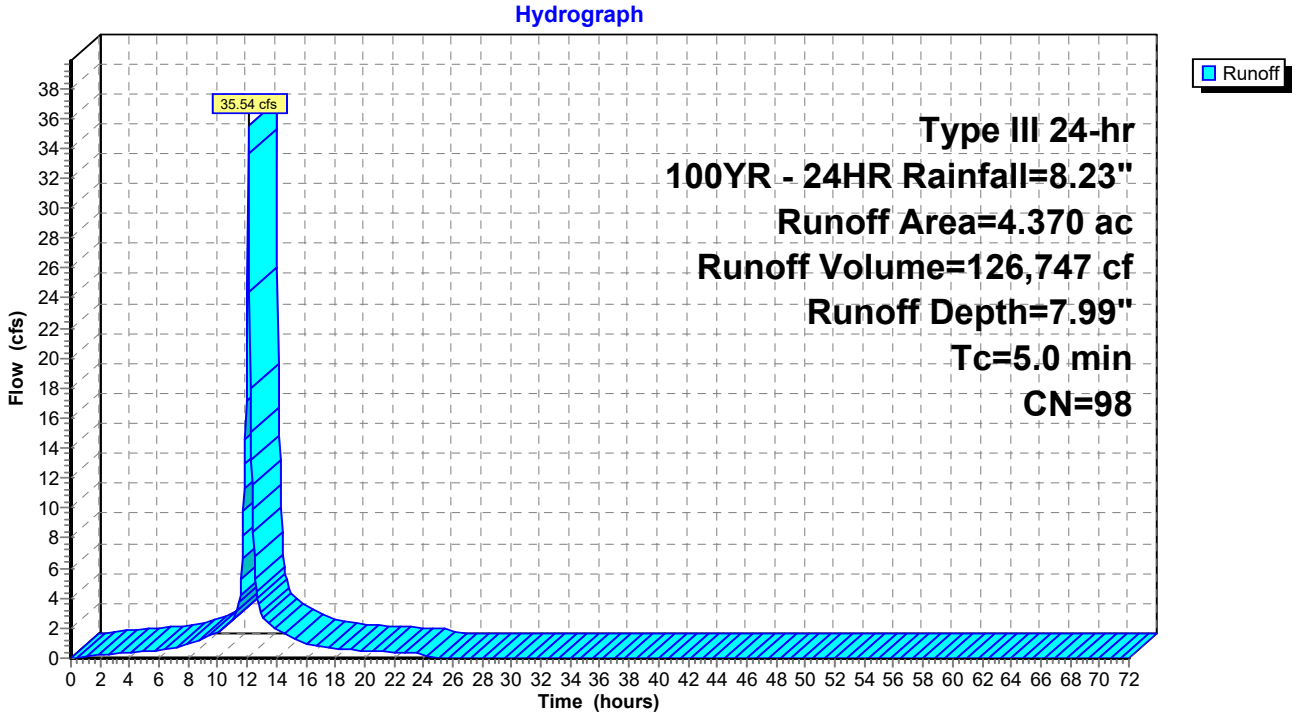
Runoff = 35.54 cfs @ 12.07 hrs, Volume= 126,747 cf, Depth= 7.99"
Routed to Pond SFA2 : SAND FILTER AREA A2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
4.370	98	Paved parking, HSG A
0.000	68	<50% Grass cover, Poor, HSG A
4.370	98	Weighted Average
4.370		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A2: Area A2



Summary for Subcatchment A3: Area A3

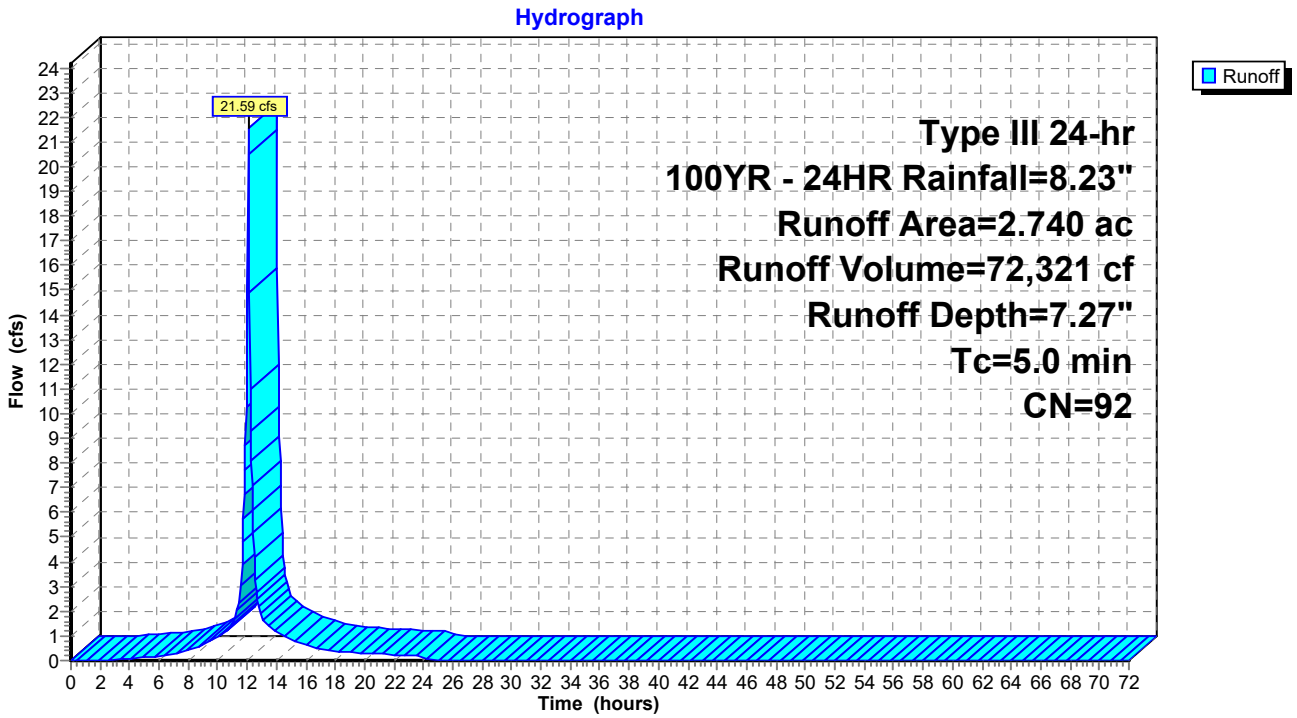
Runoff = 21.59 cfs @ 12.07 hrs, Volume= 72,321 cf, Depth= 7.27"
Routed to Link SS8 : SITESAVER 8 - STSS-7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (ac)	CN	Description
2.210	98	Paved parking, HSG A
0.530	68	<50% Grass cover, Poor, HSG A
2.740	92	Weighted Average
0.530		19.34% Pervious Area
2.210		80.66% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment A3: Area A3



Summary for Subcatchment DS1: Ditch Segment 1

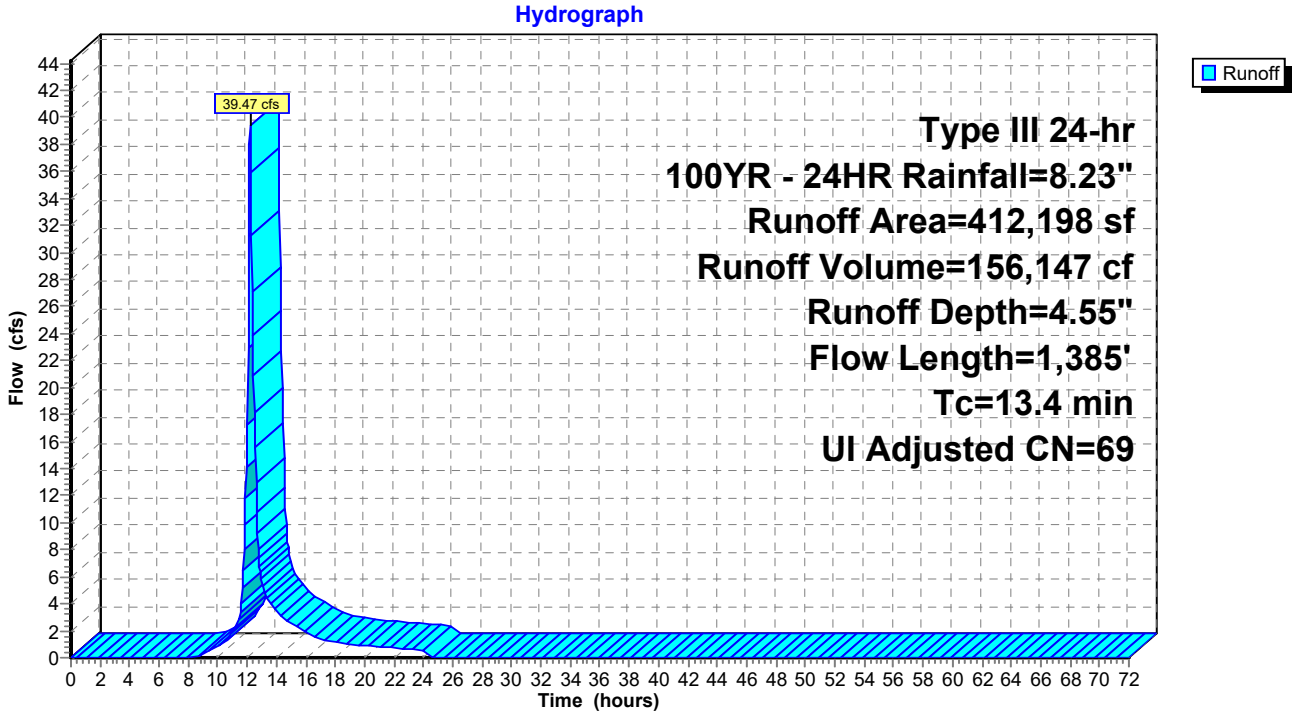
Runoff = 39.47 cfs @ 12.19 hrs, Volume= 156,147 cf, Depth= 4.55"
Routed to Reach 1R : WQS Segment 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	242,115	61		>75% Grass cover, Good, HSG B
	2,212	76		Gravel roads, HSG A
	0	98		Water Surface, 0% imp, HSG A
	0	98		Unconnected pavement, HSG A
	117,963	98		Unconnected pavement, HSG D
	20,768	55		Woods, Good, HSG B
*	29,140	98		Wetland/Water Surface, 0% imp, HSG A
	412,198	74	69	Weighted Average, UI Adjusted
	294,235			71.38% Pervious Area
	117,963			28.62% Impervious Area
	117,963			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	110	0.0200	1.42		**Sheet Flow, Pavement**
					Smooth surfaces n= 0.011 P2= 3.30"
0.8	65	0.0400	1.40		**Shallow Concentrated Flow, Grass**
					Short Grass Pasture Kv= 7.0 fps
11.3	1,210	0.0005	1.79	48.22	**Channel Flow, Ditch**
					Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
13.4	1,385	Total			

Subcatchment DS1: Ditch Segment 1



Summary for Subcatchment DS2: Ditch Segment 2

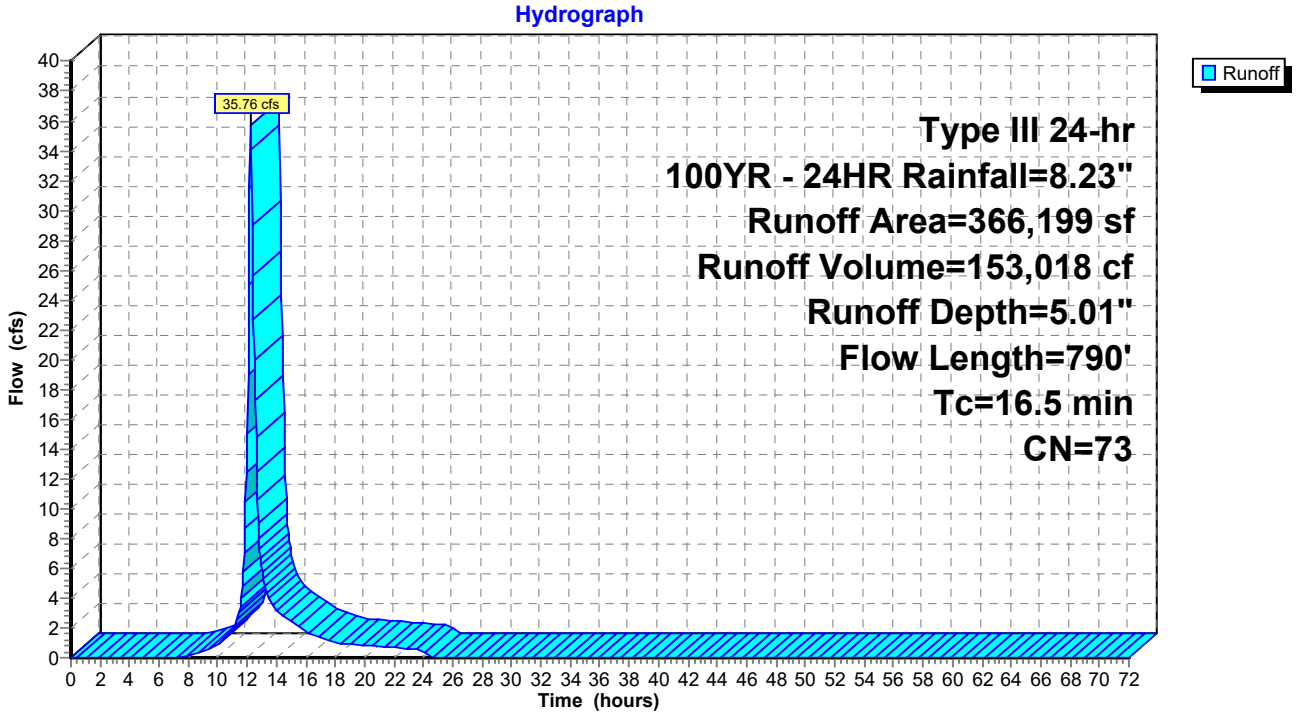
Runoff = 35.76 cfs @ 12.23 hrs, Volume= 153,018 cf, Depth= 5.01"
Routed to Reach 2R : WQS Segment 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
158,039	39	>75% Grass cover, Good, HSG A
9,172	98	Water Surface, 0% imp, HSG A
198,988	98	Unconnected pavement, HSG D
366,199	73	Weighted Average
167,211		45.66% Pervious Area
198,988		54.34% Impervious Area
198,988		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	140	0.0050	0.86		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
10.3	280	0.0005	0.45		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
3.5	370	0.0005	1.79	48.22	**Channel Flow, Ditch** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
16.5	790	Total			

Subcatchment DS2: Ditch Segment 2



Summary for Subcatchment DS3: Ditch Segment 3

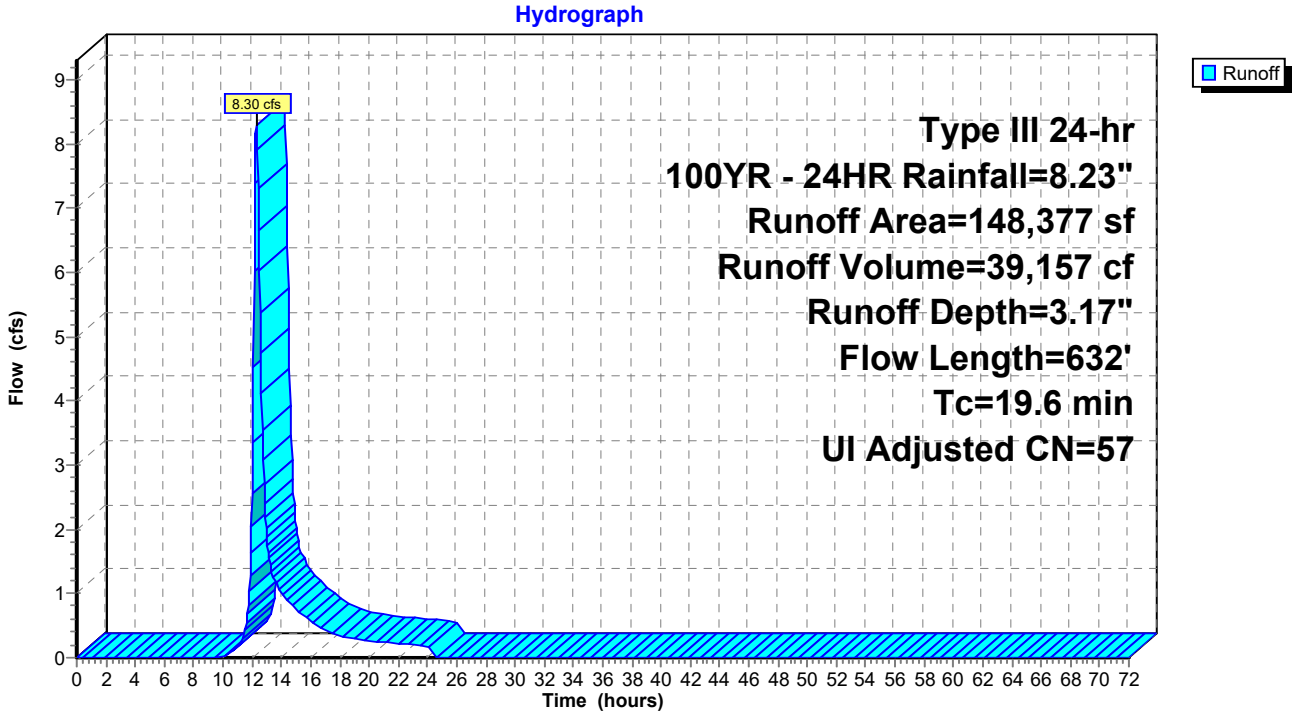
Runoff = 8.30 cfs @ 12.29 hrs, Volume= 39,157 cf, Depth= 3.17"
Routed to Reach 3R : WQS Segment 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	18,935	61		>75% Grass cover, Good, HSG B
	7,512	76		Gravel roads, HSG A
	9	98		Water Surface, 0% imp, HSG A
	6,613	98		Unconnected pavement, HSG D
	75,261	30		Woods, Good, HSG A
*	40,047	98		Wetland/Water Surface, 0% imp, HSG B
	148,377	58	57	Weighted Average, UI Adjusted
	141,764			95.54% Pervious Area
	6,613			4.46% Impervious Area
	6,613			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.0	42	0.0050	0.67		**Sheet Flow, Pavement A-B** Smooth surfaces n= 0.011 P2= 3.30"
16.3	345	0.0050	0.35		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.3	245	0.0005	1.79	48.22	**Channel Flow,** Area= 27.0 sf Perim= 21.0' r= 1.29' n= 0.022
19.6	632	Total			

Subcatchment DS3: Ditch Segment 3



Summary for Subcatchment N10: DA-N10

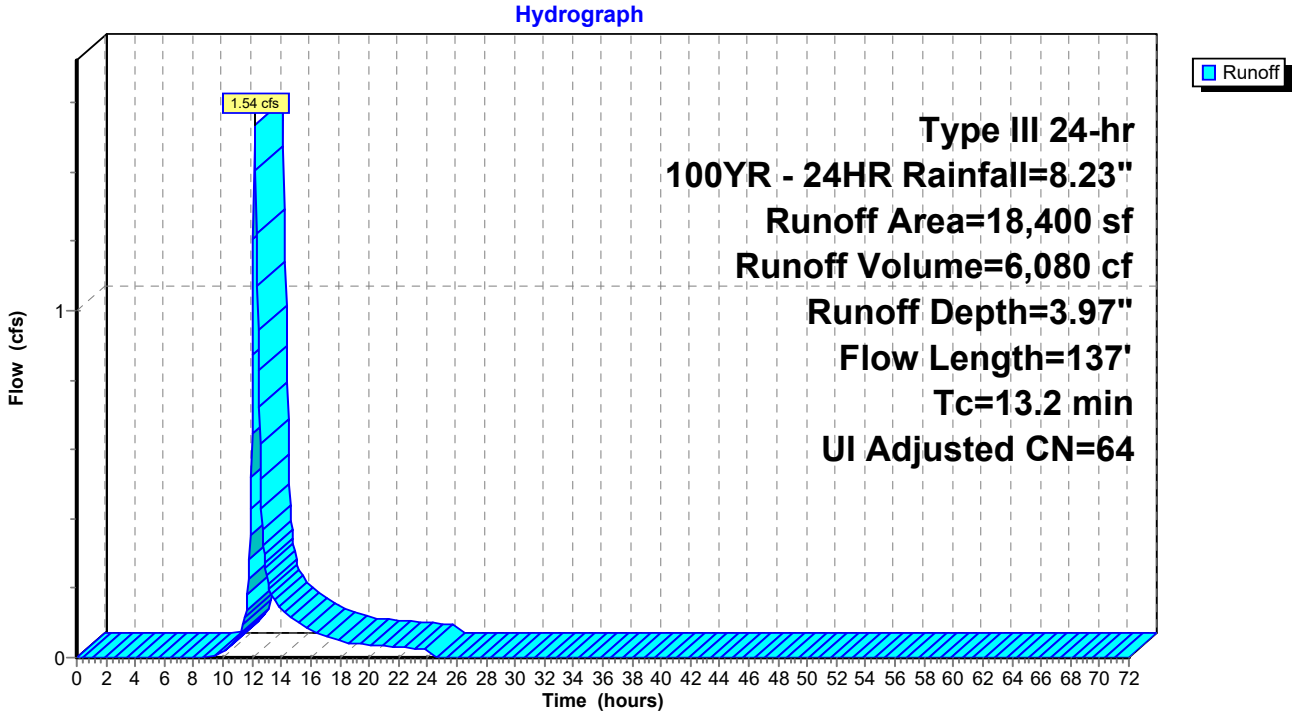
Runoff = 1.54 cfs @ 12.19 hrs, Volume= 6,080 cf, Depth= 3.97"
Routed to Pond P9 : Pond 9

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
13,317	58		Meadow, non-grazed, HSG B
3,878	98		Unconnected pavement, HSG A
1,205	98		Unconnected pavement, HSG D
18,400	69	64	Weighted Average, UI Adjusted
13,317			72.38% Pervious Area
5,083			27.62% Impervious Area
5,083			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.8	79	0.0709	0.27		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
8.4	58	0.0095	0.12		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
13.2	137	Total			

Subcatchment N10: DA-N10



Summary for Subcatchment N12: DA-N12

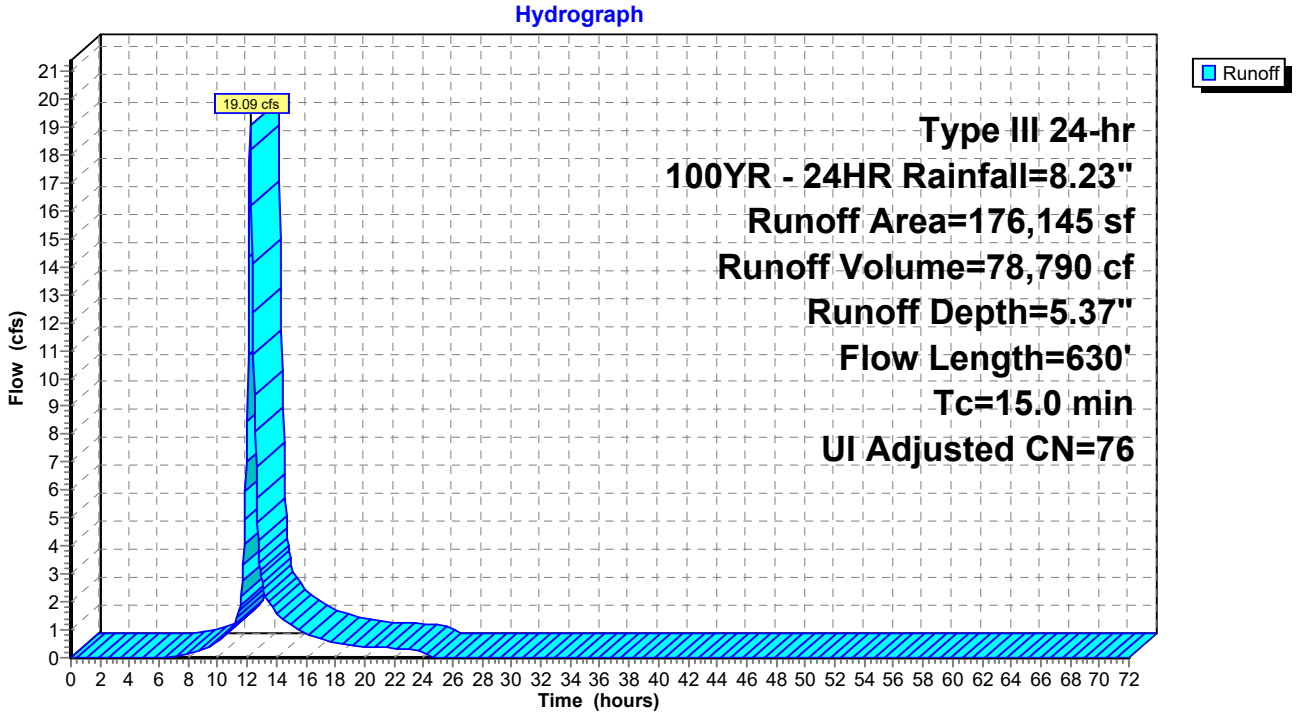
Runoff = 19.09 cfs @ 12.21 hrs, Volume= 78,790 cf, Depth= 5.37"
Routed to Pond P10 : Wetland Ditch

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

	Area (sf)	CN	Adj	Description
	31,420	61		>75% Grass cover, Good, HSG B
	13,488	98		Unconnected pavement, HSG A
	12,916	98		Unconnected pavement, HSG D
	54,749	55		Woods, Good, HSG B
*	63,572	98		Wetland/Water Surface, 0% imp, HSG D
	176,145	78	76	Weighted Average, UI Adjusted
	149,741			85.01% Pervious Area
	26,404			14.99% Impervious Area
	26,404			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.2	152	0.0105	1.17		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
8.1	251	0.0054	0.51		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
4.7	227	0.0029	0.81		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
15.0	630	Total			

Subcatchment N12: DA-N12



Summary for Subcatchment N13: DA-N13

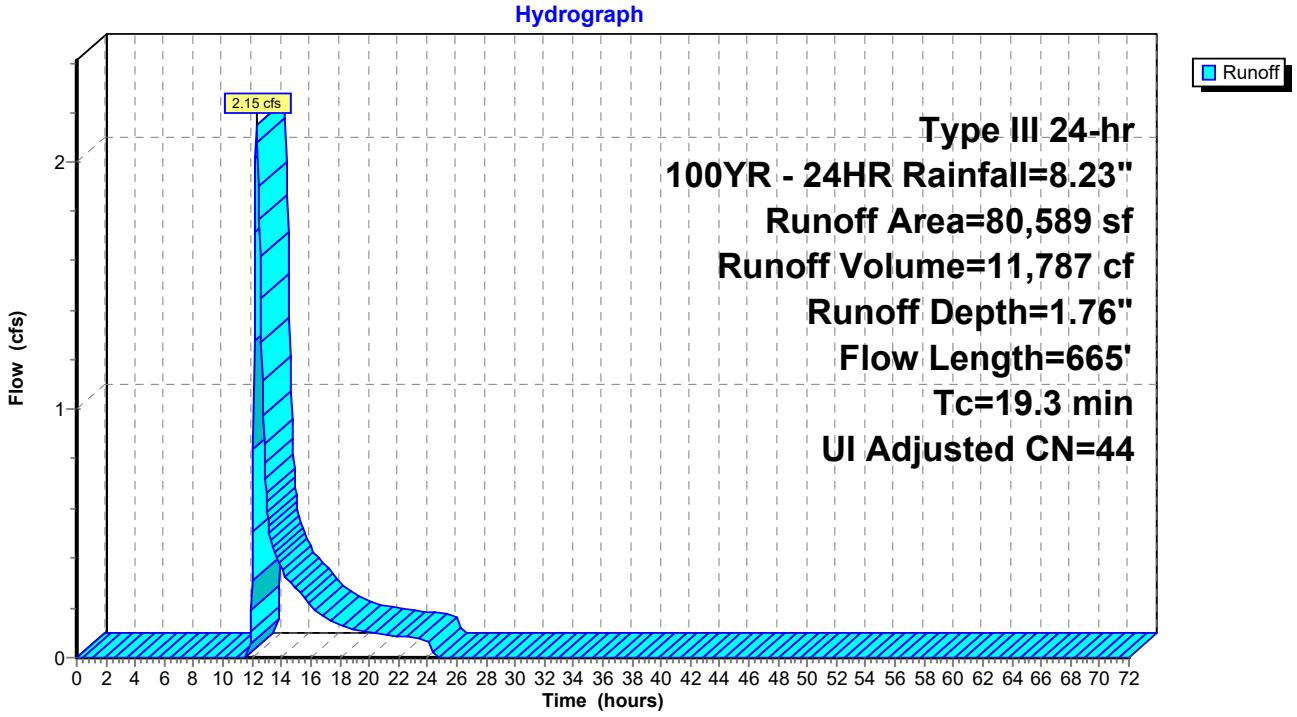
Runoff = 2.15 cfs @ 12.32 hrs, Volume= 11,787 cf, Depth= 1.76"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
12,512	98		Unconnected pavement, HSG A
48	98		Unconnected pavement, HSG D
68,029	39		>75% Grass cover, Good, HSG A
80,589	48	44	Weighted Average, UI Adjusted
68,029			84.41% Pervious Area
12,560			15.59% Impervious Area
12,560			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
8.3	115	0.0391	0.23		**Sheet Flow,** Grass: Short n= 0.150 P2= 3.30"
11.0	550	0.0141	0.83		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
19.3	665	Total			

Subcatchment N13: DA-N13



Summary for Subcatchment N14: DA-N14

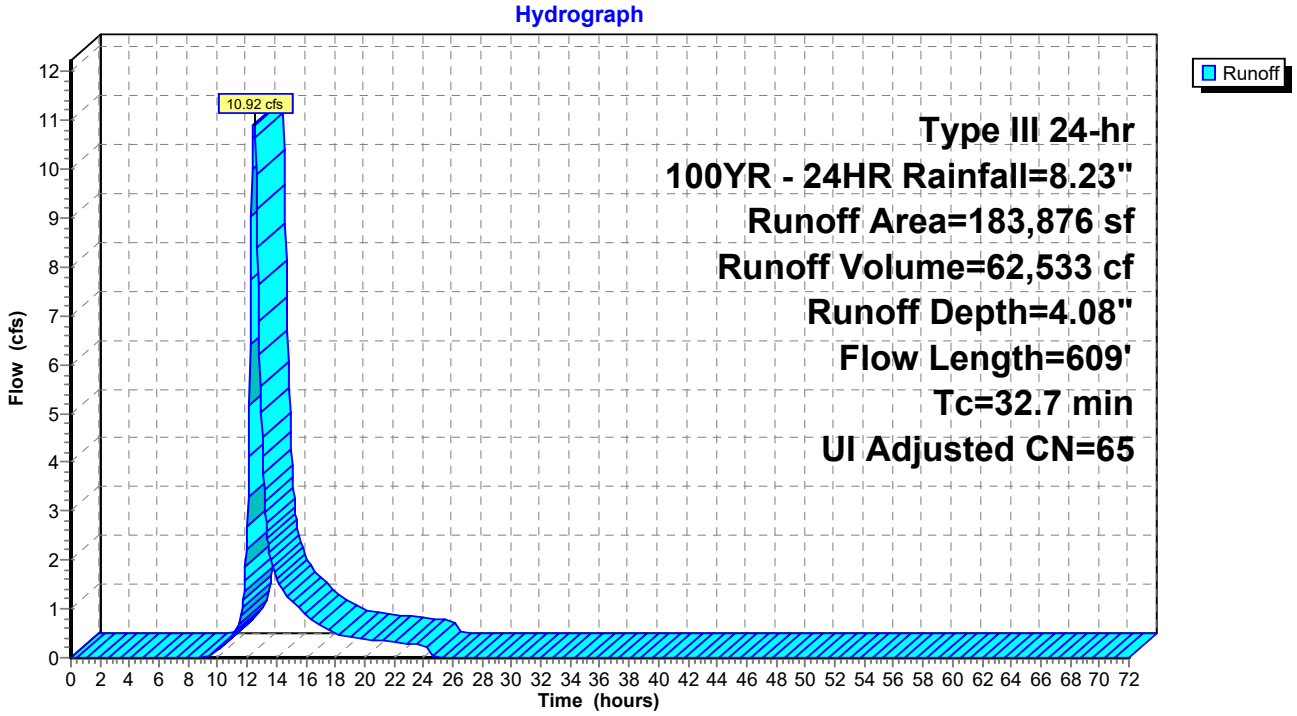
Runoff = 10.92 cfs @ 12.46 hrs, Volume= 62,533 cf, Depth= 4.08"
Routed to Pond P6 : Pond 6

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
140,023	61		>75% Grass cover, Good, HSG B
20,811	98		Unconnected pavement, HSG A
23,042	98		Unconnected pavement, HSG A
183,876	70	65	Weighted Average, UI Adjusted
140,023			76.15% Pervious Area
43,853			23.85% Impervious Area
43,853			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.1	74	0.0122	1.08		**Sheet Flow, Pavement** Smooth surfaces n= 0.011 P2= 3.30"
13.2	122	0.0135	0.15		**Sheet Flow, Grasss** Grass: Short n= 0.150 P2= 3.30"
18.4	413	0.0036	0.37	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
32.7	609	Total			

Subcatchment N14: DA-N14



Summary for Subcatchment N15: DA-N15

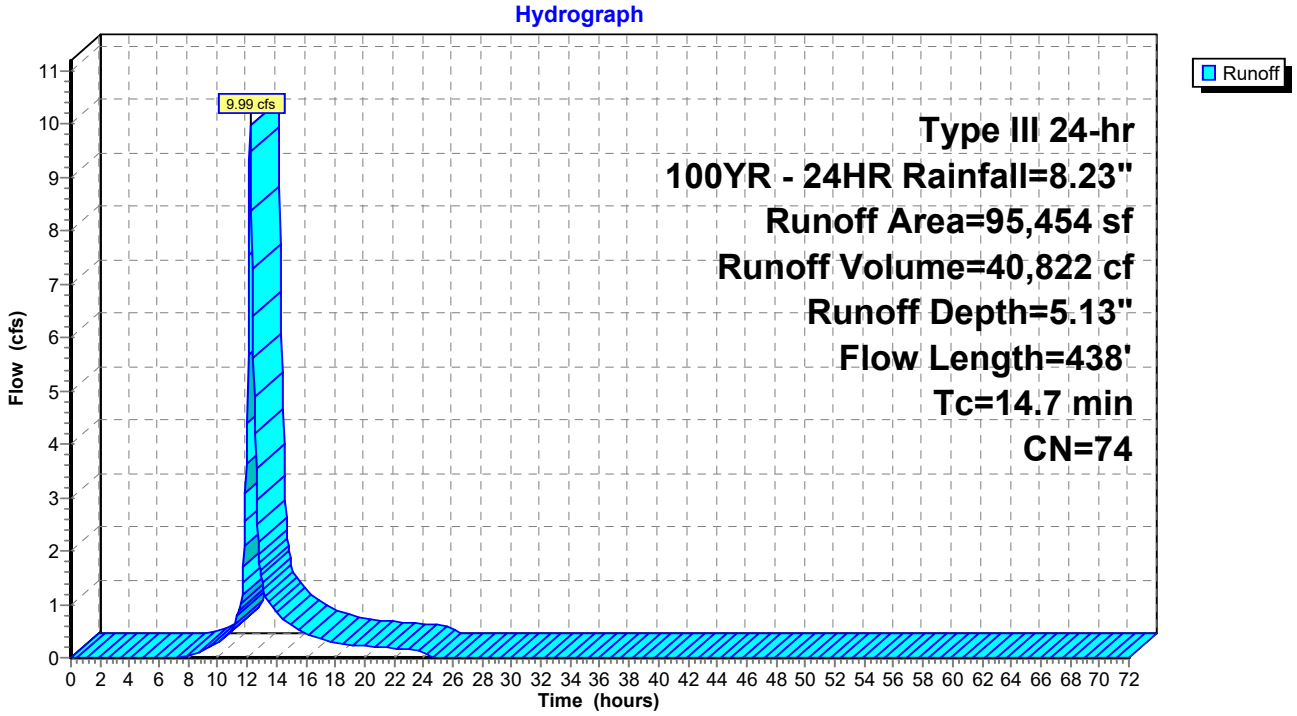
Runoff = 9.99 cfs @ 12.20 hrs, Volume= 40,822 cf, Depth= 5.13"
Routed to Pond P8 : Pond 8

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
61,700	61	>75% Grass cover, Good, HSG B
8,846	98	Unconnected pavement, HSG A
24,908	98	Unconnected pavement, HSG D
95,454	74	Weighted Average
61,700		64.64% Pervious Area
33,754		35.36% Impervious Area
33,754		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.7	60	0.0783	0.27		**Sheet Flow, Grass**
					Grass: Short n= 0.150 P2= 3.30"
6.9	60	0.0166	0.14		**Sheet Flow, grass**
					Grass: Short n= 0.150 P2= 3.30"
4.1	318	0.0075	1.30		**Shallow Concentrated Flow, Grass**
					Grassed Waterway Kv= 15.0 fps
14.7	438	Total			

Subcatchment N15: DA-N15



Summary for Subcatchment N2: DA-N2

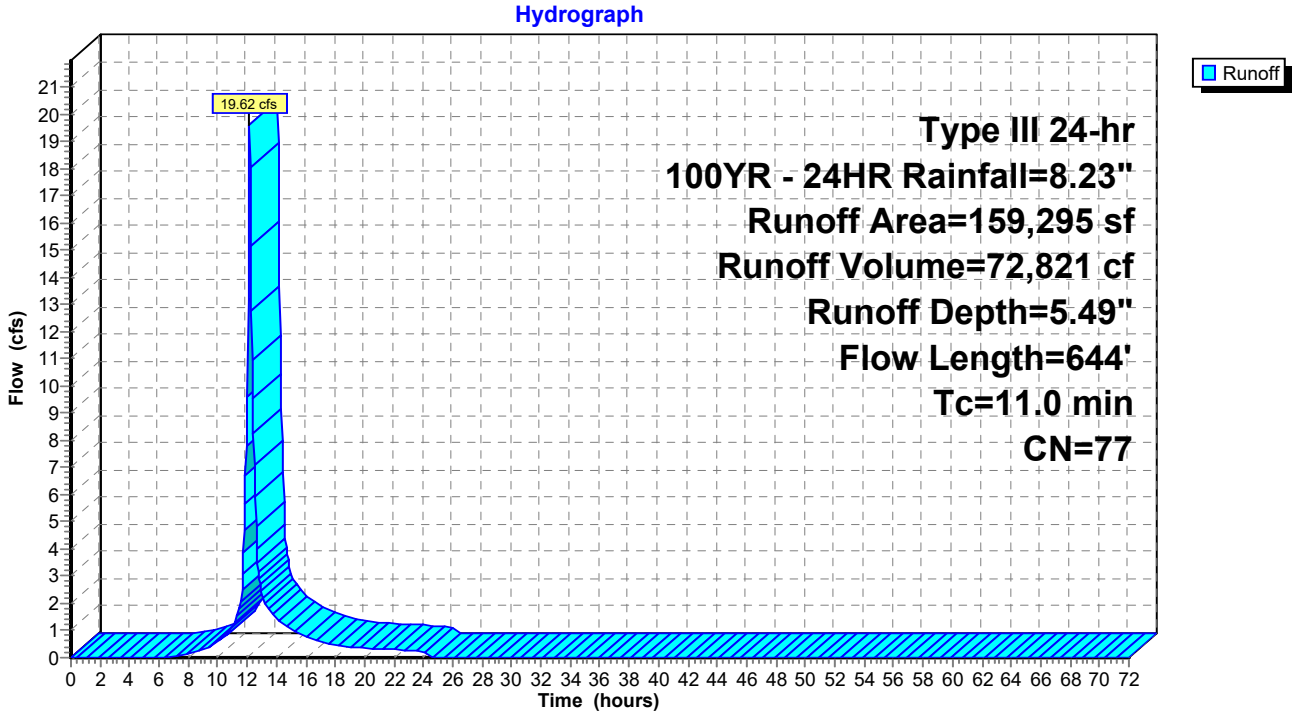
Runoff = 19.62 cfs @ 12.15 hrs, Volume= 72,821 cf, Depth= 5.49"
Routed to Pond CB2 : Exist CB

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
76,508	98	Paved parking, HSG B
82,787	58	Meadow, non-grazed, HSG B
159,295	77	Weighted Average
82,787		51.97% Pervious Area
76,508		48.03% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.9	146	0.0137	1.30		**Sheet Flow, Taxiway** Smooth surfaces n= 0.011 P2= 3.30"
9.1	498	0.0169	0.91		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
11.0	644	Total			

Subcatchment N2: DA-N2



Summary for Subcatchment N3: DA-N3

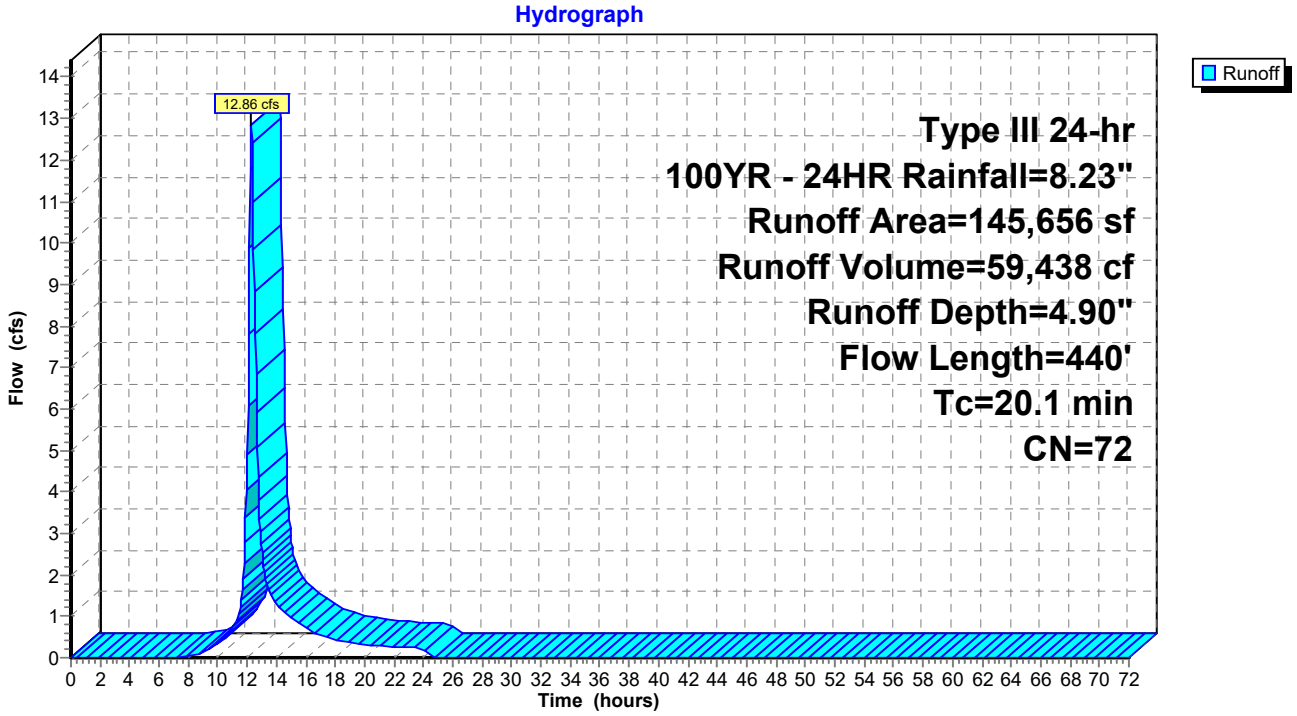
Runoff = 12.86 cfs @ 12.28 hrs, Volume= 59,438 cf, Depth= 4.90"
Routed to Pond P2 : Pond 2

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
95,136	58	Meadow, non-grazed, HSG B
716	85	Gravel roads, HSG B
39,197	98	Unconnected pavement, HSG A
10,607	98	Unconnected pavement, HSG D
145,656	72	Weighted Average
95,852		65.81% Pervious Area
49,804		34.19% Impervious Area
49,804		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.7	124	0.0127	1.22		**Sheet Flow, Taxiway A-B** Smooth surfaces n= 0.011 P2= 3.30"
12.3	140	0.0214	0.19		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
6.1	176	0.0059	0.48	0.01	**Trap/Vee/Rect Channel Flow, PCC Channel C-D** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
20.1	440	Total			

Subcatchment N3: DA-N3



Summary for Subcatchment N4: DA-N4

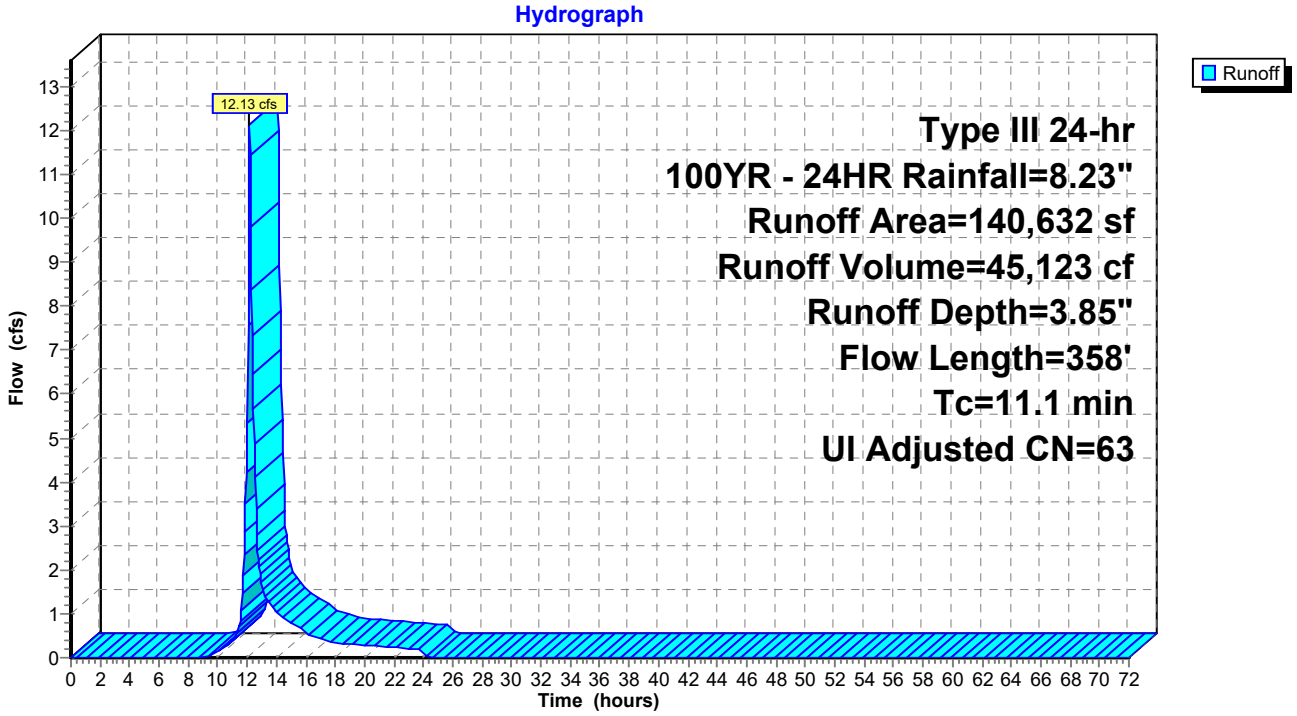
Runoff = 12.13 cfs @ 12.16 hrs, Volume= 45,123 cf, Depth= 3.85"
Routed to Pond P4 : Pond 4

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
103,196	58		Meadow, non-grazed, HSG B
28,491	98		Unconnected pavement, HSG A
8,945	98		Unconnected pavement, HSG D
140,632	69	63	Weighted Average, UI Adjusted
103,196			73.38% Pervious Area
37,436			26.62% Impervious Area
37,436			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.3	75	0.0100	1.00		**Sheet Flow, Runway A-B** Smooth surfaces n= 0.011 P2= 3.30"
4.2	25	0.0100	0.10		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
4.1	200	0.0135	0.81		**Shallow Concentrated Flow, Grass C-D** Short Grass Pasture Kv= 7.0 fps
1.5	58	0.0103	0.63	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
11.1	358	Total			

Subcatchment N4: DA-N4



Summary for Subcatchment N6: DA-N6

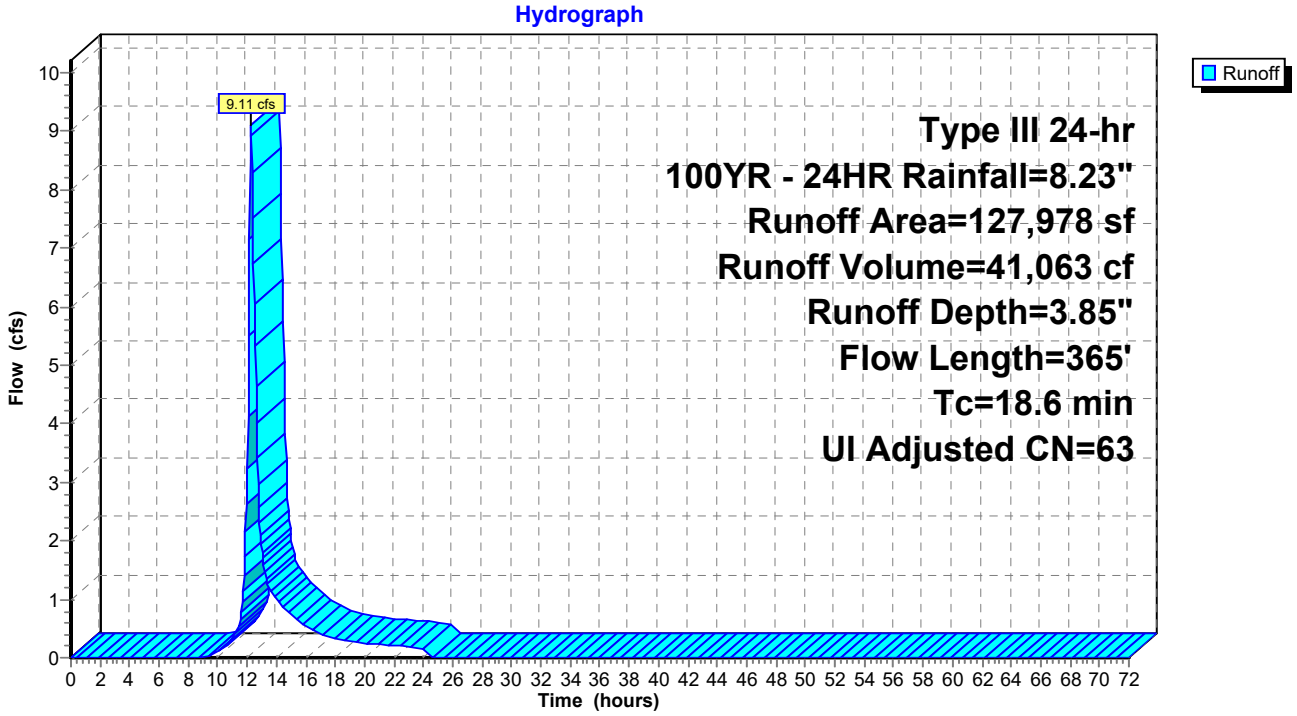
Runoff = 9.11 cfs @ 12.26 hrs, Volume= 41,063 cf, Depth= 3.85"
Routed to Pond P5 : Pond 5

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
93,344	58		Meadow, non-grazed, HSG B
709	76		Gravel roads, HSG A
25,067	98		Unconnected pavement, HSG A
8,858	98		Unconnected pavement, HSG D
127,978	69	63	Weighted Average, UI Adjusted
94,053			73.49% Pervious Area
33,925			26.51% Impervious Area
33,925			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.4	78	0.0102	0.13		**Sheet Flow, Runway A-B** Grass: Short n= 0.150 P2= 3.30"
2.7	22	0.0242	0.14		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
3.6	143	0.0088	0.66		**Shallow Concentrated Flow, Grass C-D** Short Grass Pasture Kv= 7.0 fps
0.4	55	0.0120	2.22		**Shallow Concentrated Flow, PCC Channel D-E** Paved Kv= 20.3 fps
1.5	67	0.0149	0.76	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
18.6	365	Total			

Subcatchment N6: DA-N6



Summary for Subcatchment N7: DA-N7

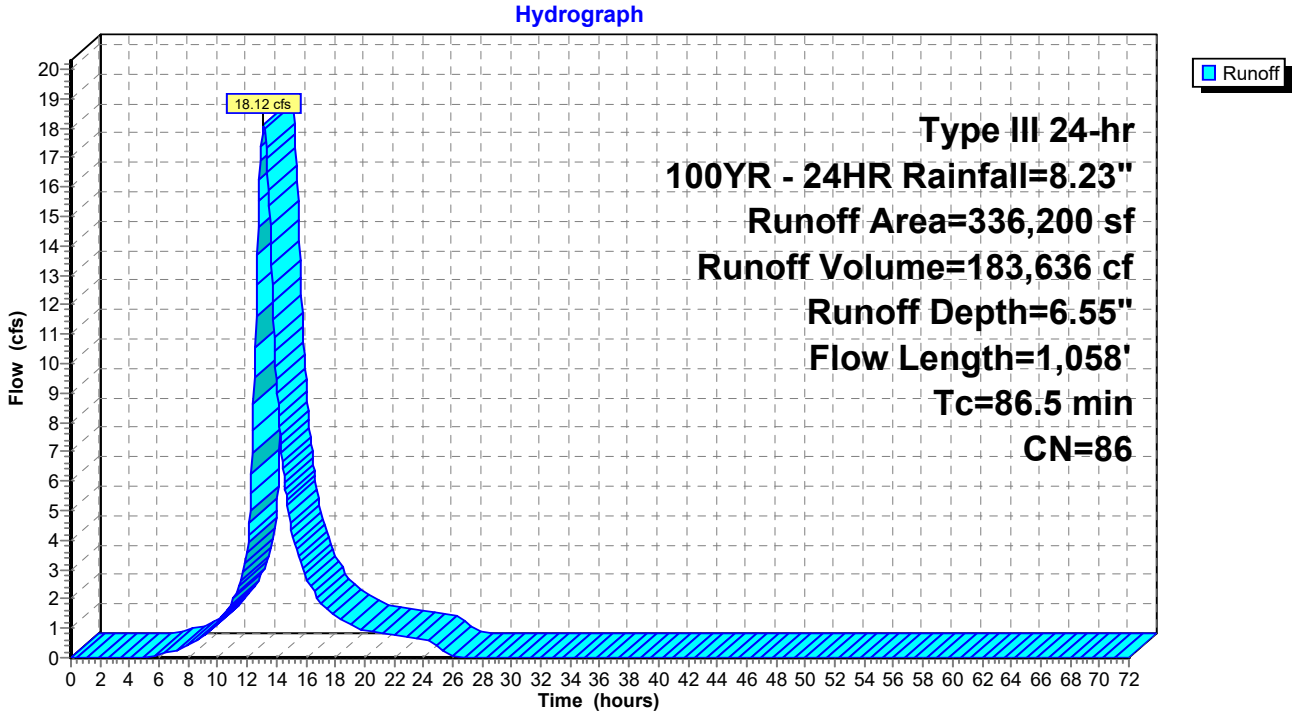
Runoff = 18.12 cfs @ 13.13 hrs, Volume= 183,636 cf, Depth= 6.55"
Routed to Pond P3 : Pond 3

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
104,683	58	Meadow, non-grazed, HSG B
2,298	98	Unconnected pavement, HSG A
229,219	98	Unconnected pavement, HSG D
336,200	86	Weighted Average
104,683		31.14% Pervious Area
231,517		68.86% Impervious Area
231,517		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.3	300	0.0043	0.94		**Sheet Flow, Apron** Smooth surfaces n= 0.011 P2= 3.30"
4.0	318	0.0043	1.33		**Shallow Concentrated Flow, Apron** Paved Kv= 20.3 fps
0.4	33	0.0424	1.44		**Shallow Concentrated Flow, Grass** Short Grass Pasture Kv= 7.0 fps
76.8	407	0.0002	0.09	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
86.5	1,058	Total			

Subcatchment N7: DA-N7



Summary for Subcatchment N8: DA-N8

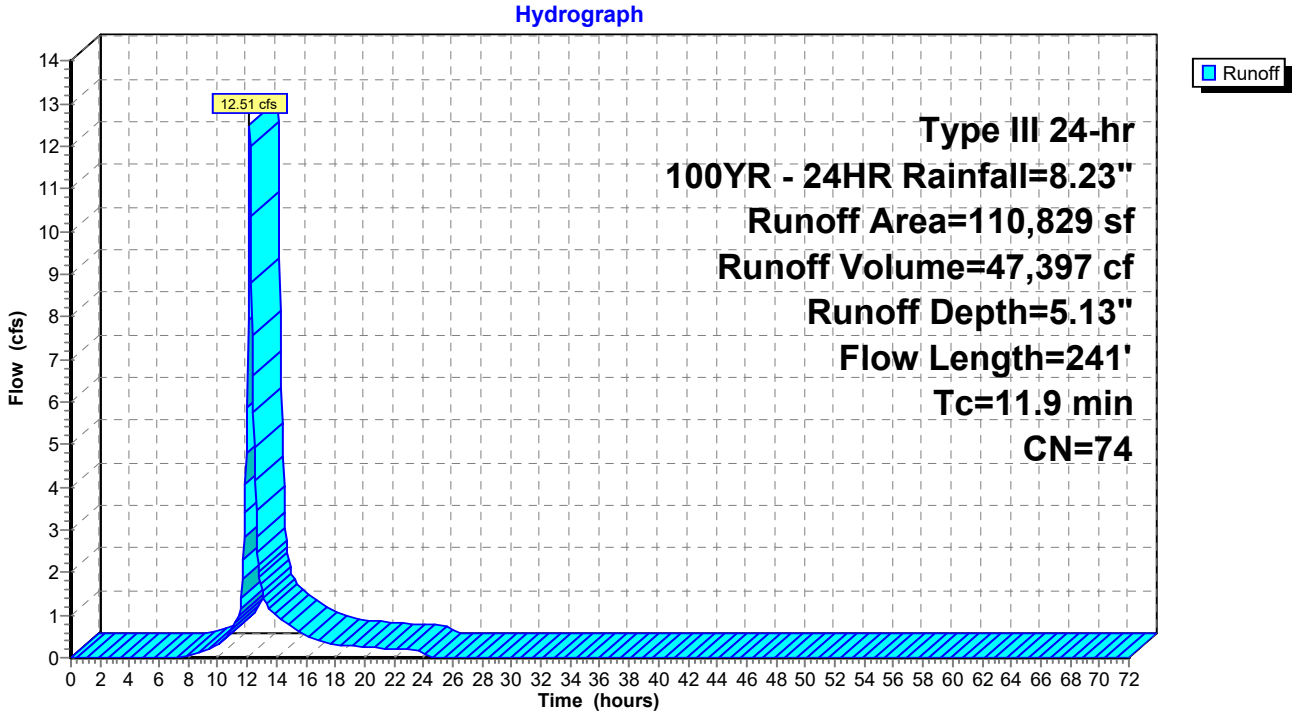
Runoff = 12.51 cfs @ 12.16 hrs, Volume= 47,397 cf, Depth= 5.13"
Routed to Pond P7 : Pond 7

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Description
66,418	58	Meadow, non-grazed, HSG B
36,227	98	Unconnected pavement, HSG A
8,184	98	Unconnected pavement, HSG D
110,829	74	Weighted Average
66,418		59.93% Pervious Area
44,411		40.07% Impervious Area
44,411		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
1.6	102	0.0107	1.09		**Sheet Flow, Pavement A-B** Smooth surfaces n= 0.011 P2= 3.30"
9.6	105	0.0221	0.18		**Sheet Flow, Grass B-C** Grass: Short n= 0.150 P2= 3.30"
0.7	34	0.0174	0.82	0.02	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
11.9	241	Total			

Subcatchment N8: DA-N8



Summary for Subcatchment N9: DA-N9

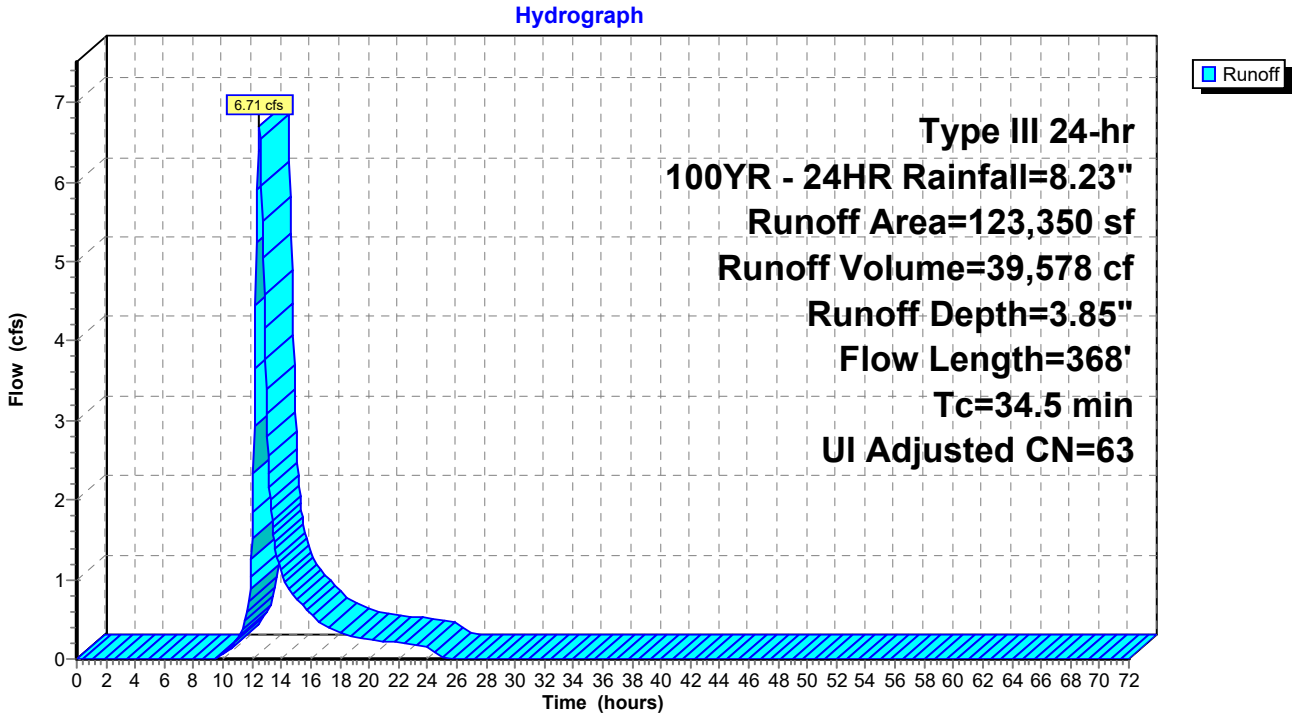
Runoff = 6.71 cfs @ 12.49 hrs, Volume= 39,578 cf, Depth= 3.85"
Routed to Pond P1 : Pond 1

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Type III 24-hr 100YR - 24HR Rainfall=8.23"

Area (sf)	CN	Adj	Description
94,082	58		Meadow, non-grazed, HSG B
3,983	98		Unconnected pavement, HSG A
25,285	98		Unconnected pavement, HSG D
123,350	67	63	Weighted Average, UI Adjusted
94,082			76.27% Pervious Area
29,268			23.73% Impervious Area
29,268			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.7	214	0.0201	0.20		**Sheet Flow, Grass** Grass: Short n= 0.150 P2= 3.30"
16.8	154	0.0006	0.15	0.00	**Trap/Vee/Rect Channel Flow, PCC Channel** Bot.W=3.00' D=0.01' n= 0.011 Concrete pipe, straight & clean
34.5	368	Total			

Subcatchment N9: DA-N9



Summary for Reach 1R: WQS Segment 1

Inflow Area = 1,462,159 sf, 36.00% Impervious, Inflow Depth = 4.35" for 100YR - 24HR event
Inflow = 62.88 cfs @ 12.21 hrs, Volume= 530,358 cf
Outflow = 52.32 cfs @ 12.36 hrs, Volume= 530,358 cf, Atten= 17%, Lag= 9.1 min
Routed to Pond Cr-B : Robinson Driveway

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.85 fps, Min. Travel Time= 11.3 min
Avg. Velocity = 0.48 fps, Avg. Travel Time= 43.4 min

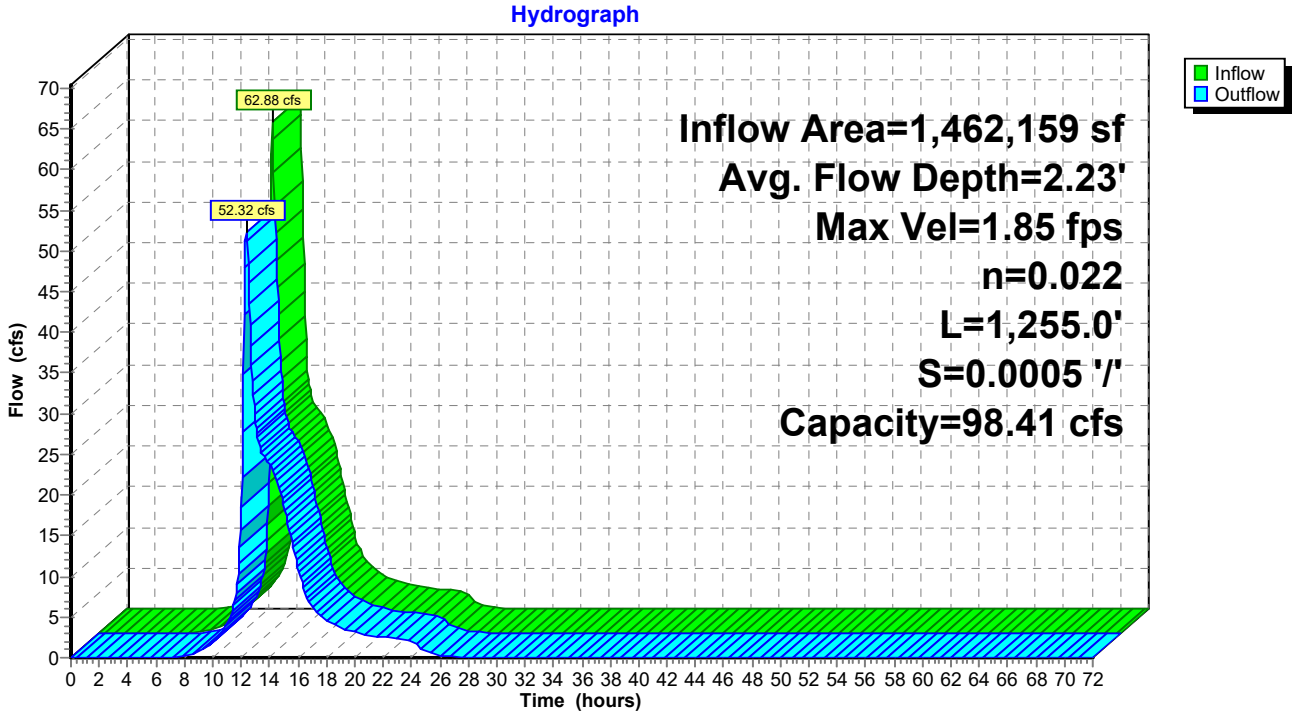
Peak Storage= 35,429 cf @ 12.36 hrs
Average Depth at Peak Storage= 2.23' , Surface Width= 19.36'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 239.23 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.41 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 1,255.0' Slope= 0.0005 '/'
Inlet Invert= 2.32', Outlet Invert= 1.72'



‡

Reach 1R: WQS Segment 1



Summary for Reach 2R: WQS Segment 2

Inflow Area = 1,828,358 sf, 39.67% Impervious, Inflow Depth = 4.49" for 100YR - 24HR event
Inflow = 84.17 cfs @ 12.28 hrs, Volume= 683,377 cf
Outflow = 79.86 cfs @ 12.37 hrs, Volume= 683,377 cf, Atten= 5%, Lag= 5.5 min
Routed to Pond Cr-CD : Utility Crossing

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.08 fps, Min. Travel Time= 6.1 min
Avg. Velocity = 0.50 fps, Avg. Travel Time= 25.3 min

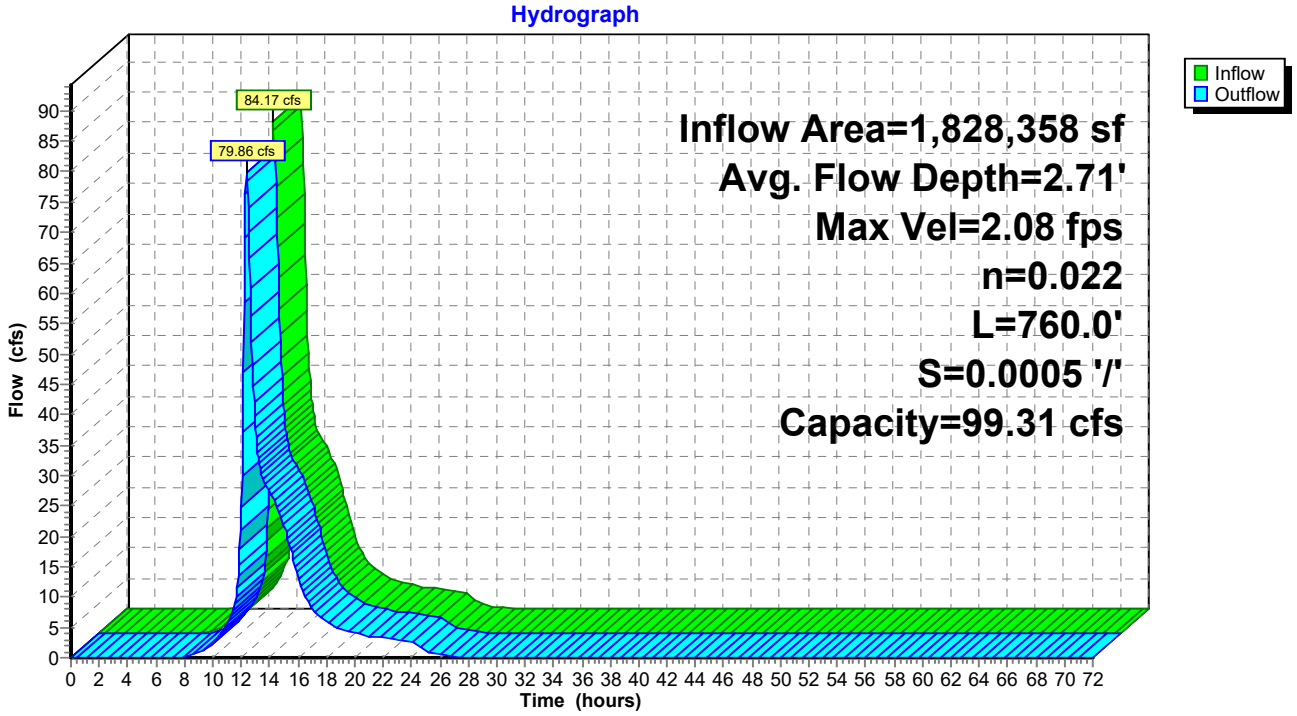
Peak Storage= 29,108 cf @ 12.37 hrs
Average Depth at Peak Storage= 2.71' , Surface Width= 22.26'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 241.41 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 99.31 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 760.0' Slope= 0.0005 '/'
Inlet Invert= 1.70', Outlet Invert= 1.33'



‡

Reach 2R: WQS Segment 2



Summary for Reach 3R: WQS Segment 3

Inflow Area = 2,385,294 sf, 36.01% Impervious, Inflow Depth = 4.37" for 100YR - 24HR event
Inflow = 110.44 cfs @ 12.35 hrs, Volume= 869,453 cf
Outflow = 99.69 cfs @ 12.42 hrs, Volume= 869,453 cf, Atten= 10%, Lag= 4.0 min
Routed to Pond CC1 : CC1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.19 fps, Min. Travel Time= 4.6 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 23.5 min

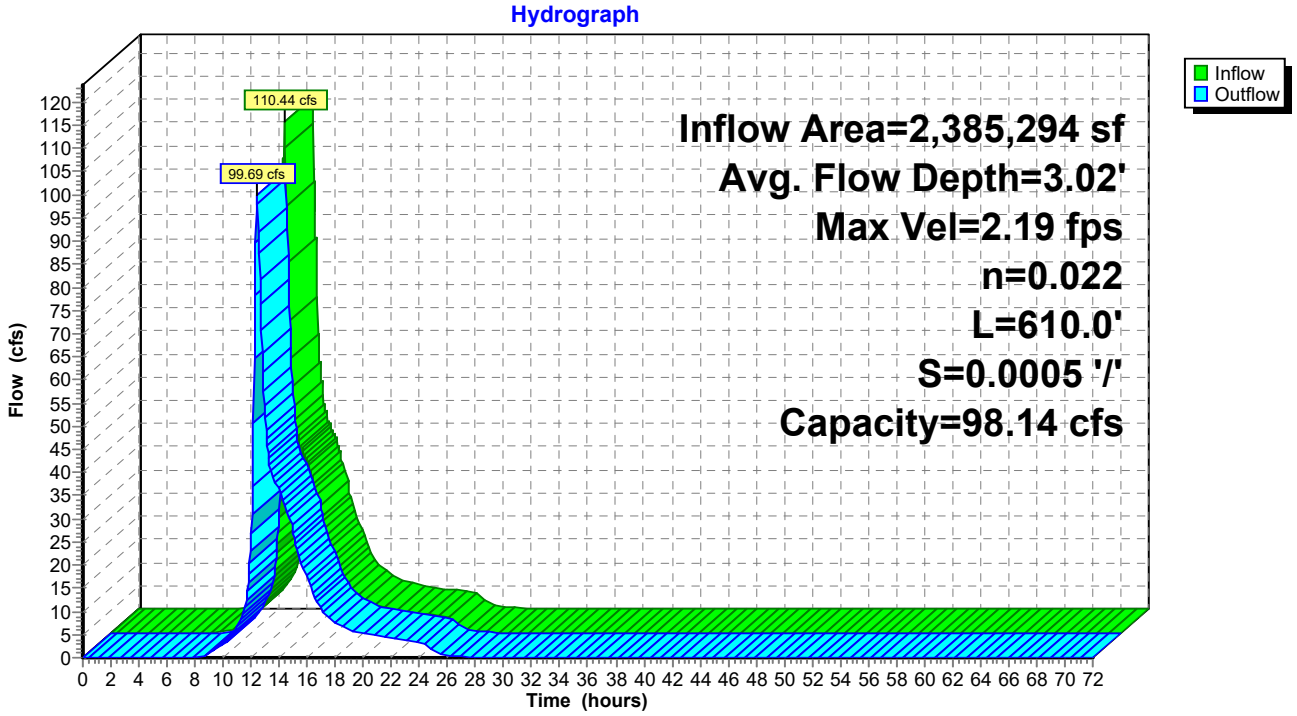
Peak Storage= 27,772 cf @ 12.42 hrs
Average Depth at Peak Storage= 3.02' , Surface Width= 24.13'
Defined Flood Depth= 5.00' Flow Area= 92.8 sf, Capacity= 238.55 cfs
Bank-Full Depth= 3.00' Flow Area= 45.0 sf, Capacity= 98.14 cfs

6.00' x 3.00' deep channel, n= 0.022 Earth, clean & straight
Side Slope Z-value= 3.0 '/' Top Width= 24.00'
Length= 610.0' Slope= 0.0005 '/'
Inlet Invert= 1.28', Outlet Invert= 0.99'



‡

Reach 3R: WQS Segment 3



Summary for Reach PT1: Overland Flow

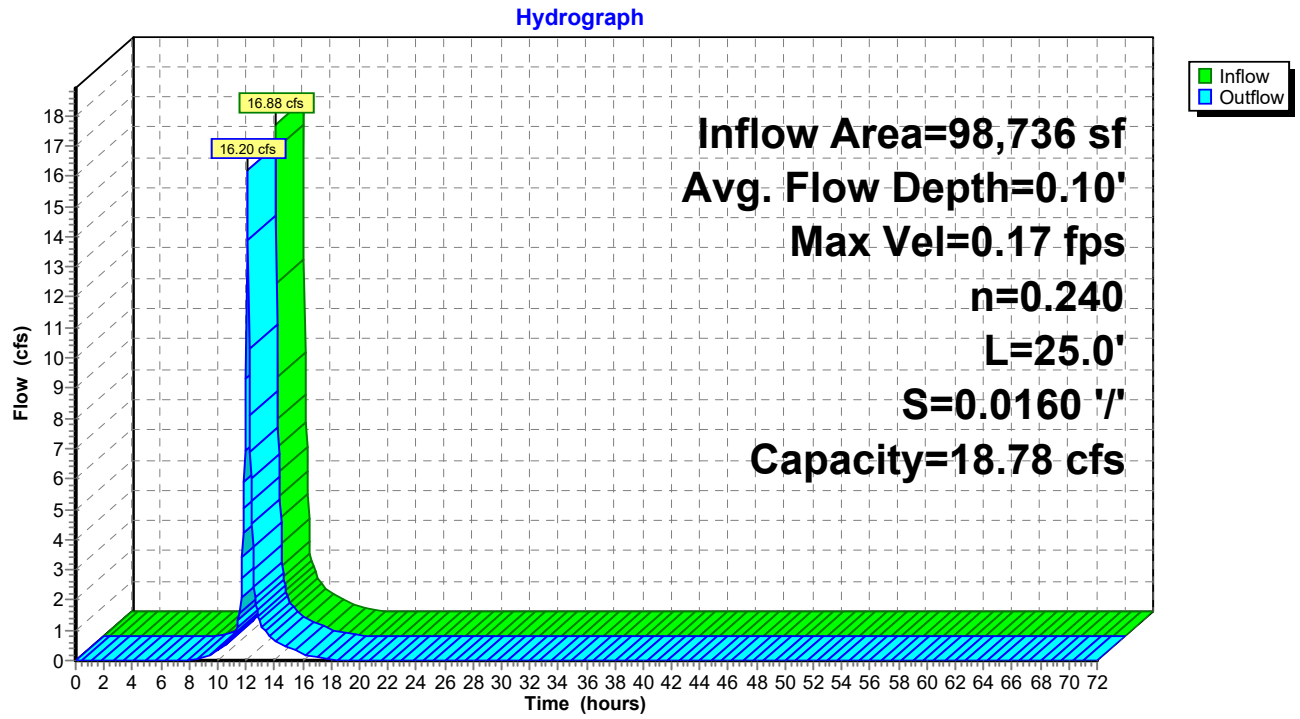
Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 4.68" for 100YR - 24HR event
Inflow = 16.88 cfs @ 12.07 hrs, Volume= 38,545 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 16.20 cfs @ 12.10 hrs, Volume= 38,545 cf, Atten= 4%, Lag= 1.8 min
Routed to Pond T1 : Sand Filter 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.17 fps, Min. Travel Time= 2.5 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 14.8 min

Peak Storage= 2,393 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.10' , Surface Width= 953.03'
Bank-Full Depth= 0.11' Flow Area= 104.6 sf, Capacity= 18.78 cfs

949.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 953.40'
Length= 25.0' Slope= 0.0160 '/'
Inlet Invert= 4.15', Outlet Invert= 3.75'





Summary for Reach PT2: Overland Flow

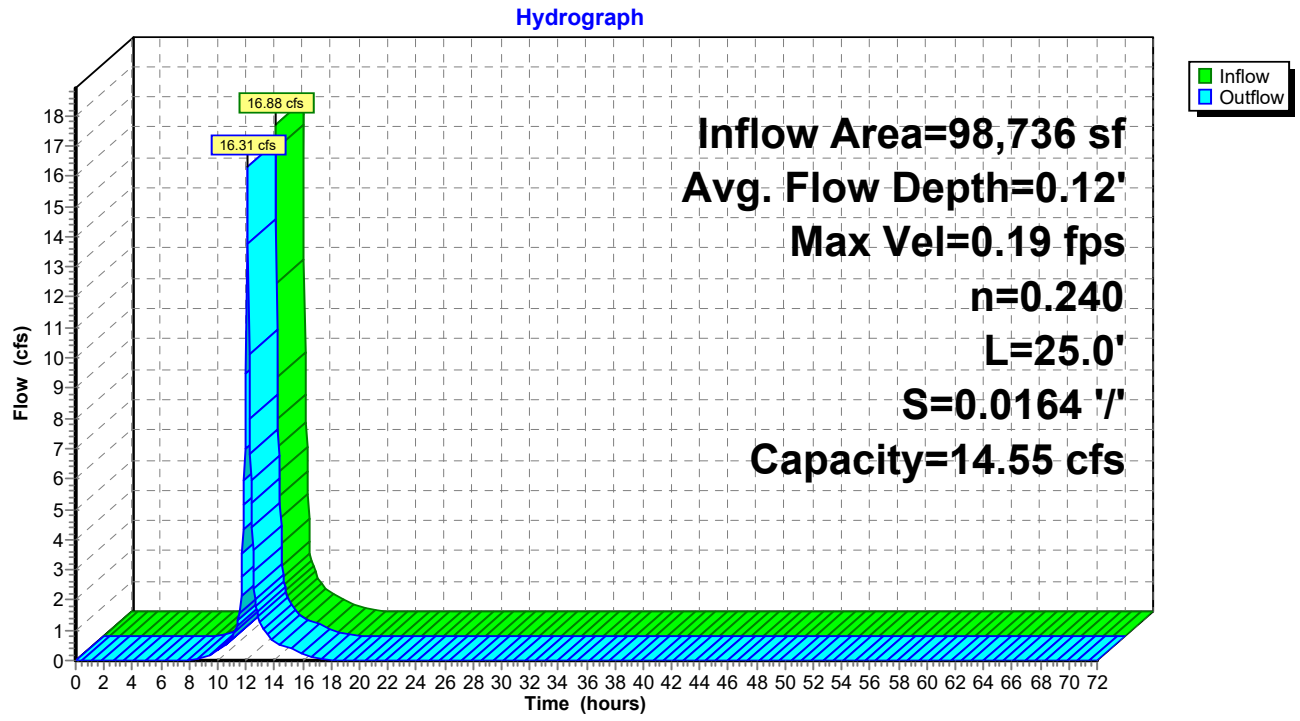
Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 4.68" for 100YR - 24HR event
Inflow = 16.88 cfs @ 12.07 hrs, Volume= 38,545 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 16.31 cfs @ 12.10 hrs, Volume= 38,545 cf, Atten= 3%, Lag= 1.6 min
Routed to Pond T2 : Sand Filter 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.19 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 0.03 fps, Avg. Travel Time= 13.2 min

Peak Storage= 2,149 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.12' , Surface Width= 730.72'
Bank-Full Depth= 0.11' Flow Area= 80.1 sf, Capacity= 14.55 cfs

726.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 730.40'
Length= 25.0' Slope= 0.0164 '/'
Inlet Invert= 4.15', Outlet Invert= 3.74'





Summary for Reach PT3: Overland Flow

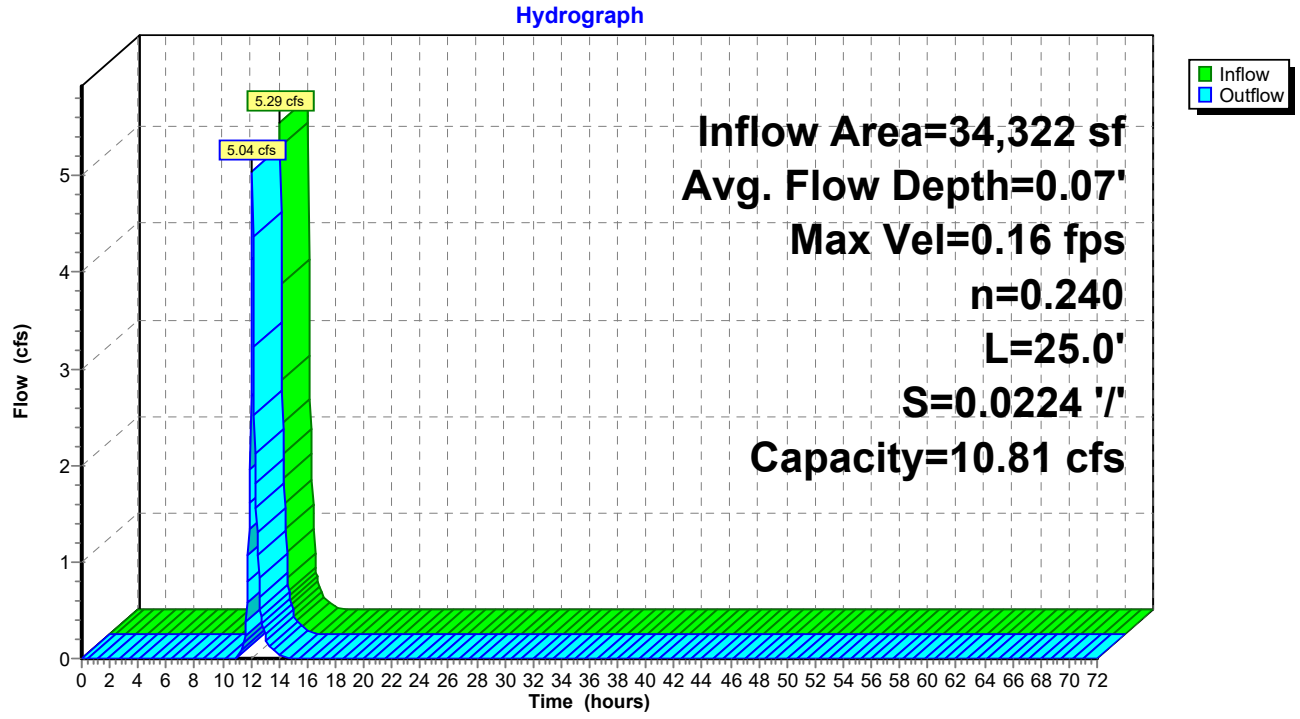
Inflow Area = 34,322 sf, 59.30% Impervious, Inflow Depth = 2.86" for 100YR - 24HR event
Inflow = 5.29 cfs @ 12.07 hrs, Volume= 8,173 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 5.04 cfs @ 12.10 hrs, Volume= 8,173 cf, Atten= 5%, Lag= 1.9 min
Routed to Pond T3 : Sand Filter 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.16 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 16.7 min

Peak Storage= 805 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.07' , Surface Width= 463.78'
Bank-Full Depth= 0.11' Flow Area= 51.0 sf, Capacity= 10.81 cfs

461.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 465.40'
Length= 25.0' Slope= 0.0224 '/'
Inlet Invert= 3.86', Outlet Invert= 3.30'





Summary for Reach PT4: Overland Flow

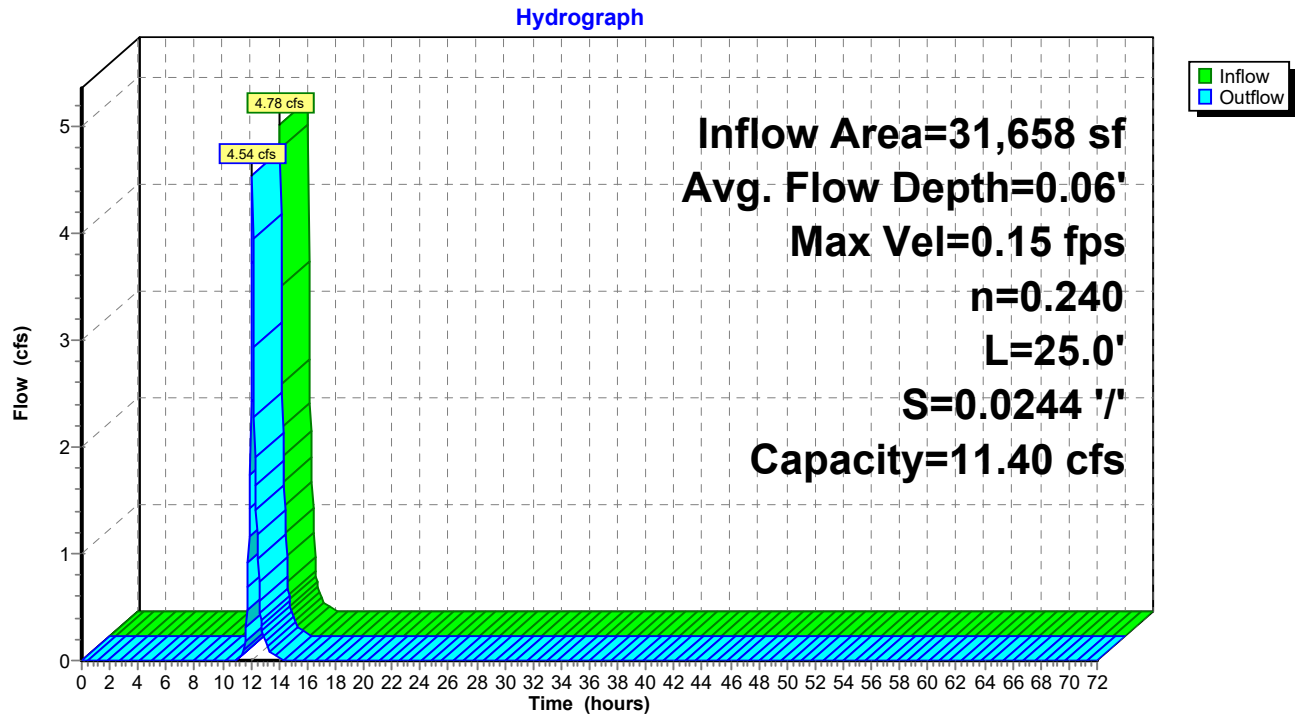
Inflow Area = 31,658 sf, 56.17% Impervious, Inflow Depth = 2.70" for 100YR - 24HR event
Inflow = 4.78 cfs @ 12.07 hrs, Volume= 7,122 cf, Incl. 0.30 cfs Inflow Loss
Outflow = 4.54 cfs @ 12.10 hrs, Volume= 7,122 cf, Atten= 5%, Lag= 1.9 min
Routed to Pond T4 : Sand Filter 4

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.15 fps, Min. Travel Time= 2.7 min
Avg. Velocity = 0.02 fps, Avg. Travel Time= 16.7 min

Peak Storage= 740 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.06' , Surface Width= 468.53'
Bank-Full Depth= 0.11' Flow Area= 51.5 sf, Capacity= 11.40 cfs

466.00' x 0.11' deep channel, n= 0.240 Sheet flow over Dense Grass
Side Slope Z-value= 20.0 '/' Top Width= 470.40'
Length= 25.0' Slope= 0.0244 '/'
Inlet Invert= 3.79', Outlet Invert= 3.18'





Summary for Pond 11P: (5) Culvert 6X3

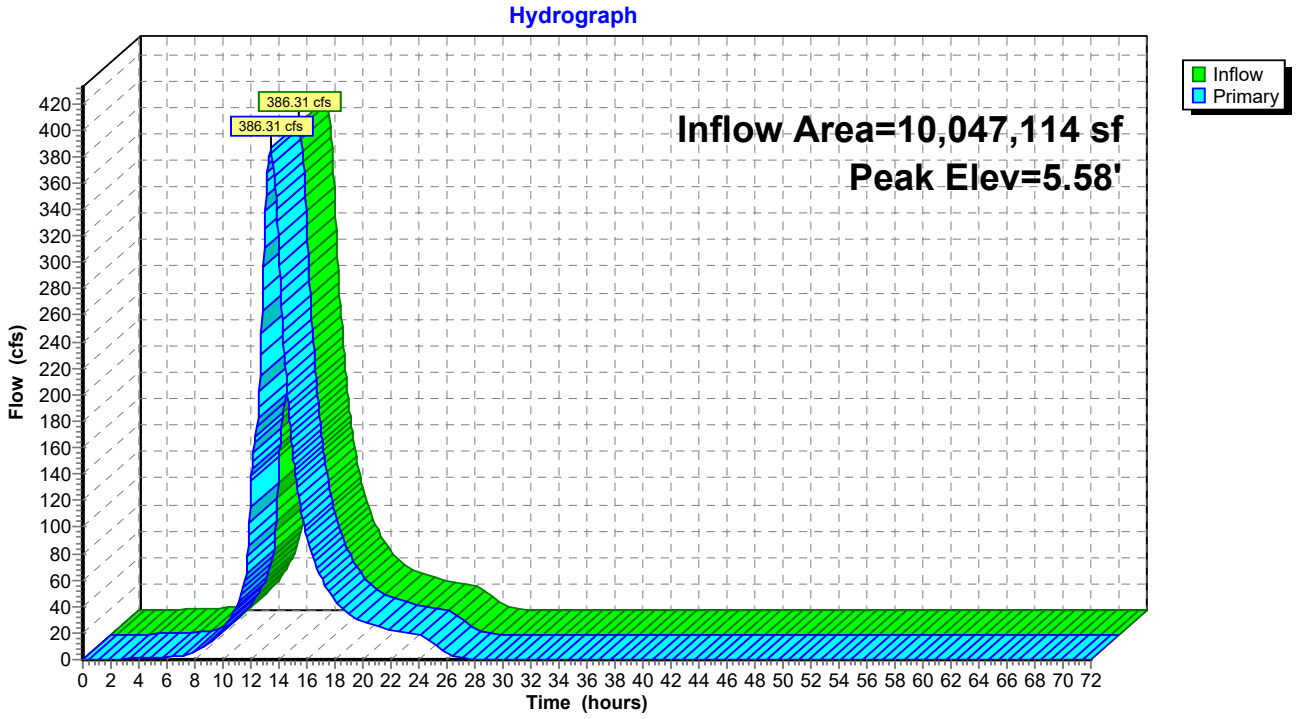
Inflow Area = 10,047,114 sf, 45.76% Impervious, Inflow Depth = 5.85" for 100YR - 24HR event
Inflow = 386.31 cfs @ 13.41 hrs, Volume= 4,895,555 cf
Outflow = 386.31 cfs @ 13.41 hrs, Volume= 4,895,555 cf, Atten= 0%, Lag= 0.0 min
Primary = 386.31 cfs @ 13.41 hrs, Volume= 4,895,555 cf
Routed to Link 3L : EAST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.58' @ 13.41 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	3.00'	**72.0" W x 36.0" H Box Box 6x3, n=0.012 X 5.00** L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.00' / 2.80' S= 0.0033 '/' Cc= 0.900 n= 0.012, Flow Area= 18.00 sf
#2	Primary	5.51'	**1,000.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=385.74 cfs @ 13.41 hrs HW=5.58' (Free Discharge)
1=Box 6x3, n=0.012 (Barrel Controls 327.72 cfs @ 5.65 fps)
2=Sharp-Crested Rectangular Weir (Weir Controls 58.02 cfs @ 0.85 fps)

Pond 11P: (5) Culvert 6X3



Summary for Pond CB1: Exist CB

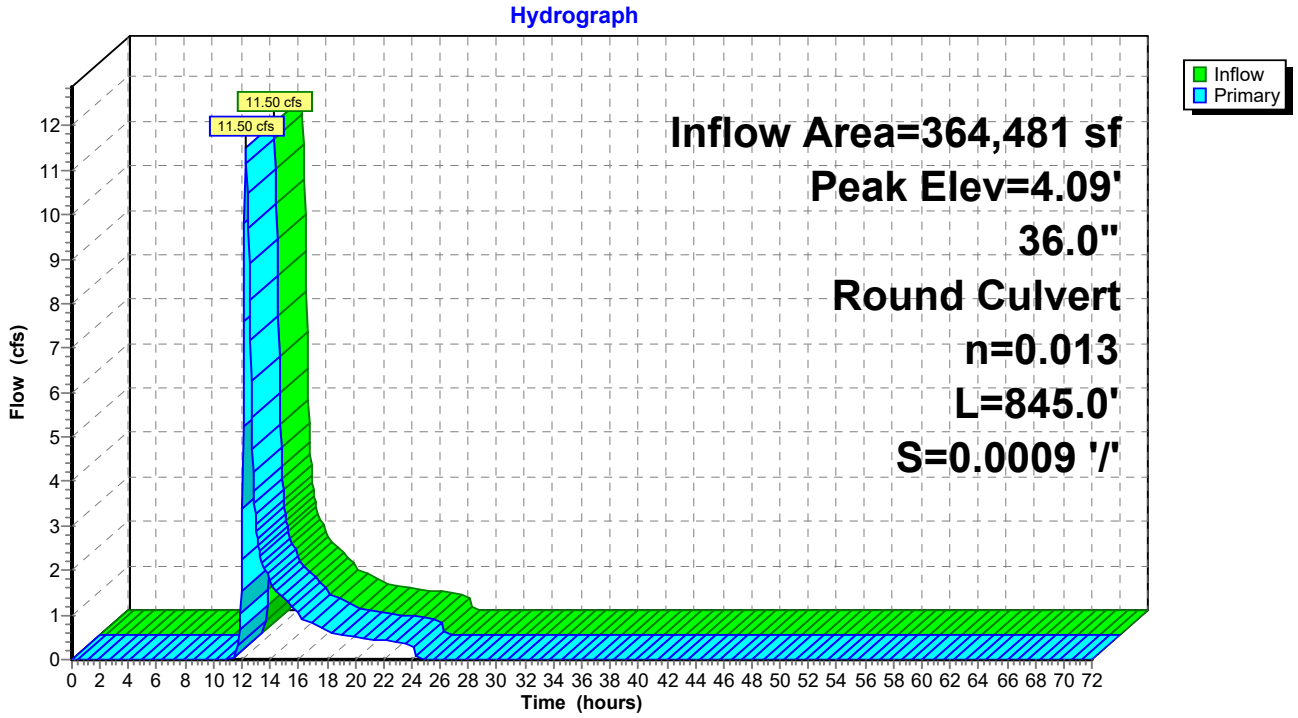
Inflow Area = 364,481 sf, 23.60% Impervious, Inflow Depth = 1.96" for 100YR - 24HR event
Inflow = 11.50 cfs @ 12.30 hrs, Volume= 59,639 cf
Outflow = 11.50 cfs @ 12.30 hrs, Volume= 59,639 cf, Atten= 0%, Lag= 0.0 min
Primary = 11.50 cfs @ 12.30 hrs, Volume= 59,639 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.09' @ 12.30 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	2.10'	**36.0" Round Culvert** L= 845.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 2.10' / 1.32' S= 0.0009 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 7.07 sf

Primary OutFlow Max=11.50 cfs @ 12.30 hrs HW=4.09' (Free Discharge)
1=Culvert (Barrel Controls 11.50 cfs @ 3.28 fps)

Pond CB1: Exist CB



Summary for Pond CB10: Exist CB

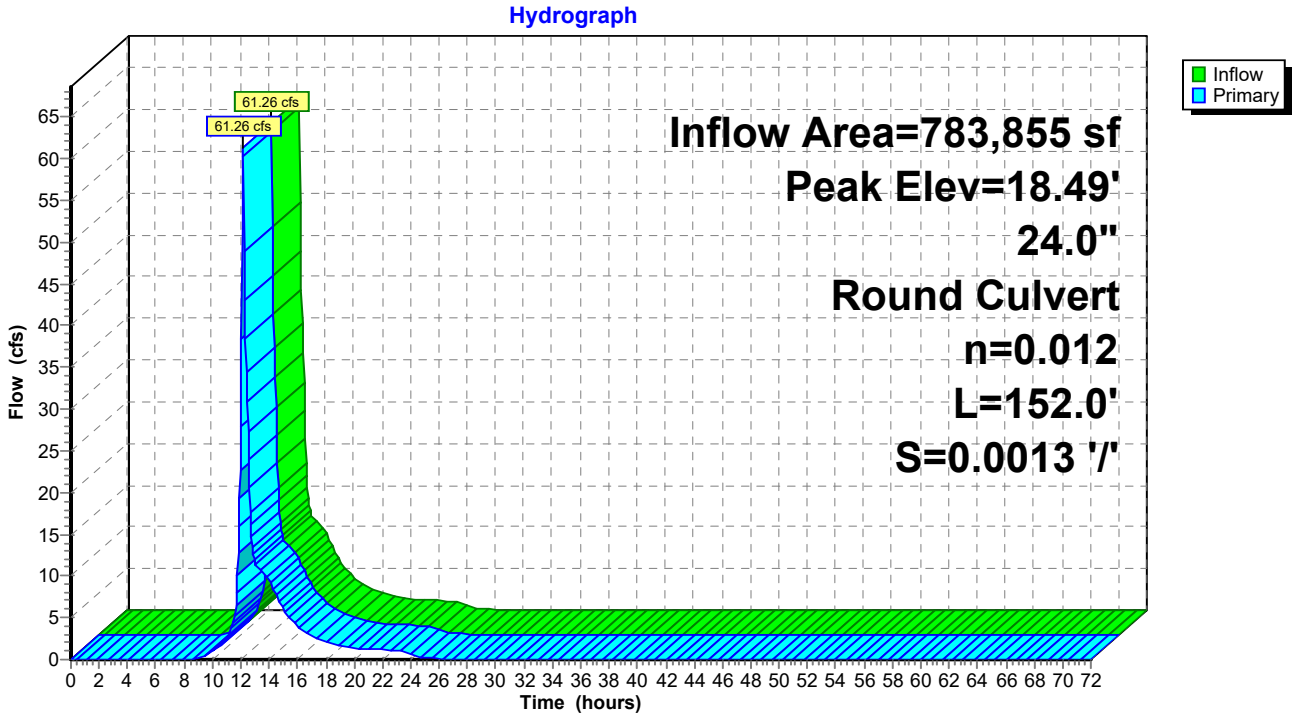
Inflow Area = 783,855 sf, 32.36% Impervious, Inflow Depth = 4.25" for 100YR - 24HR event
Inflow = 61.26 cfs @ 12.18 hrs, Volume= 277,348 cf
Outflow = 61.26 cfs @ 12.18 hrs, Volume= 277,348 cf, Atten= 0%, Lag= 0.0 min
Primary = 61.26 cfs @ 12.18 hrs, Volume= 277,348 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 18.49' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.62'	**24.0" Round Culvert** L= 152.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -1.62' / -1.82' S= 0.0013 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=59.76 cfs @ 12.18 hrs HW=17.68' (Free Discharge)
1=Culvert (Barrel Controls 59.76 cfs @ 19.02 fps)

Pond CB10: Exist CB



Summary for Pond CB11: Exist CB

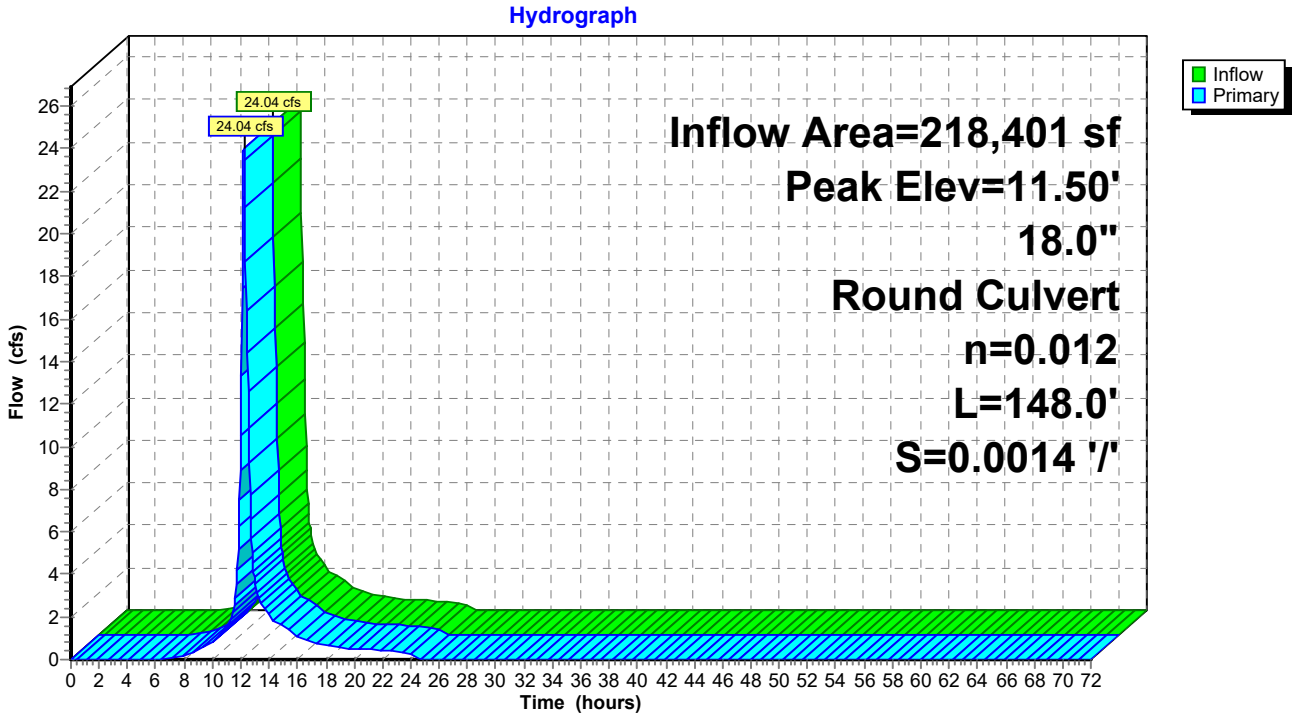
Inflow Area = 218,401 sf, 45.10% Impervious, Inflow Depth = 5.60" for 100YR - 24HR event
Inflow = 24.04 cfs @ 12.22 hrs, Volume= 101,994 cf
Outflow = 24.04 cfs @ 12.22 hrs, Volume= 101,994 cf, Atten= 0%, Lag= 0.0 min
Primary = 24.04 cfs @ 12.22 hrs, Volume= 101,994 cf
Routed to Link 4l : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 11.50' @ 12.22 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.73'	**18.0" Round RCP_Round 18"** L= 148.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.73' / -0.93' S= 0.0014 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=23.74 cfs @ 12.22 hrs HW=11.24' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 23.74 cfs @ 13.43 fps)

Pond CB11: Exist CB



Summary for Pond CB2: Exist CB

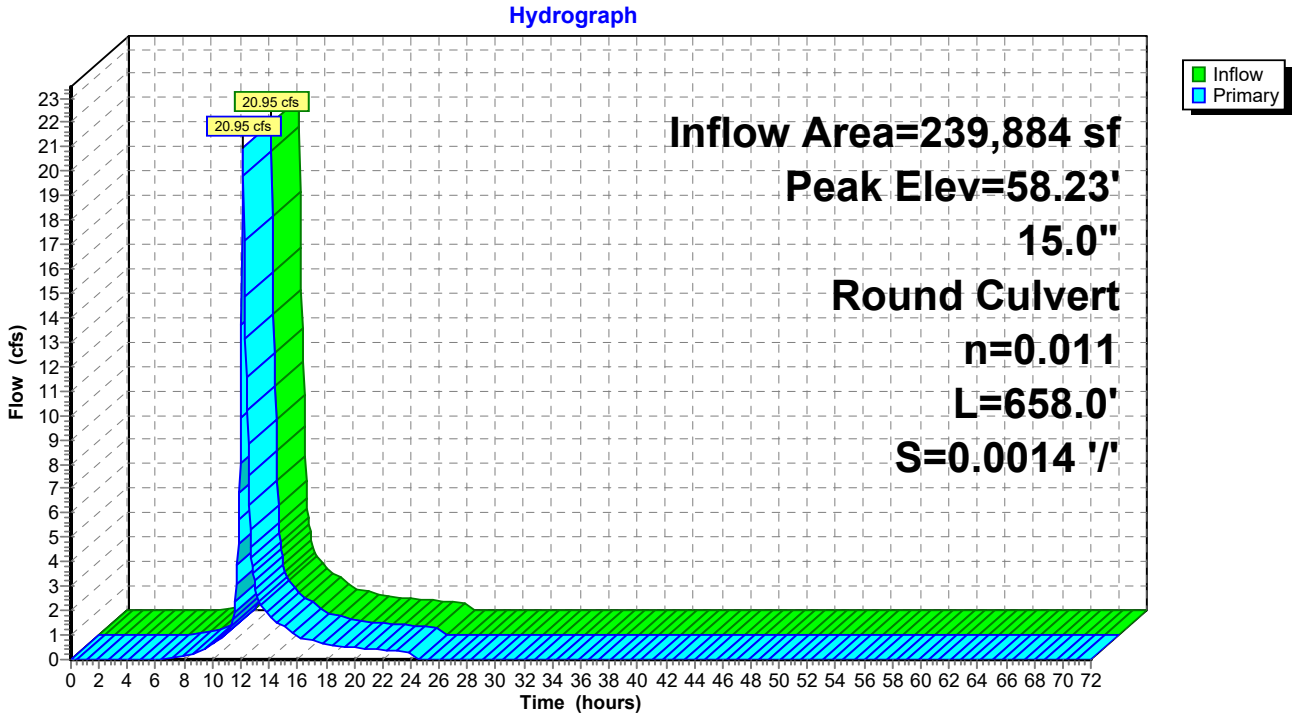
Inflow Area = 239,884 sf, 37.13% Impervious, Inflow Depth = 4.23" for 100YR - 24HR event
Inflow = 20.95 cfs @ 12.16 hrs, Volume= 84,608 cf
Outflow = 20.95 cfs @ 12.16 hrs, Volume= 84,608 cf, Atten= 0%, Lag= 0.0 min
Primary = 20.95 cfs @ 12.16 hrs, Volume= 84,608 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 58.23' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.40'	**15.0" Round Culvert** L= 658.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.40' / 0.50' S= 0.0014 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=20.68 cfs @ 12.16 hrs HW=56.82' (Free Discharge)
1=Culvert (Barrel Controls 20.68 cfs @ 16.85 fps)

Pond CB2: Exist CB



Summary for Pond CB3: Exist CB

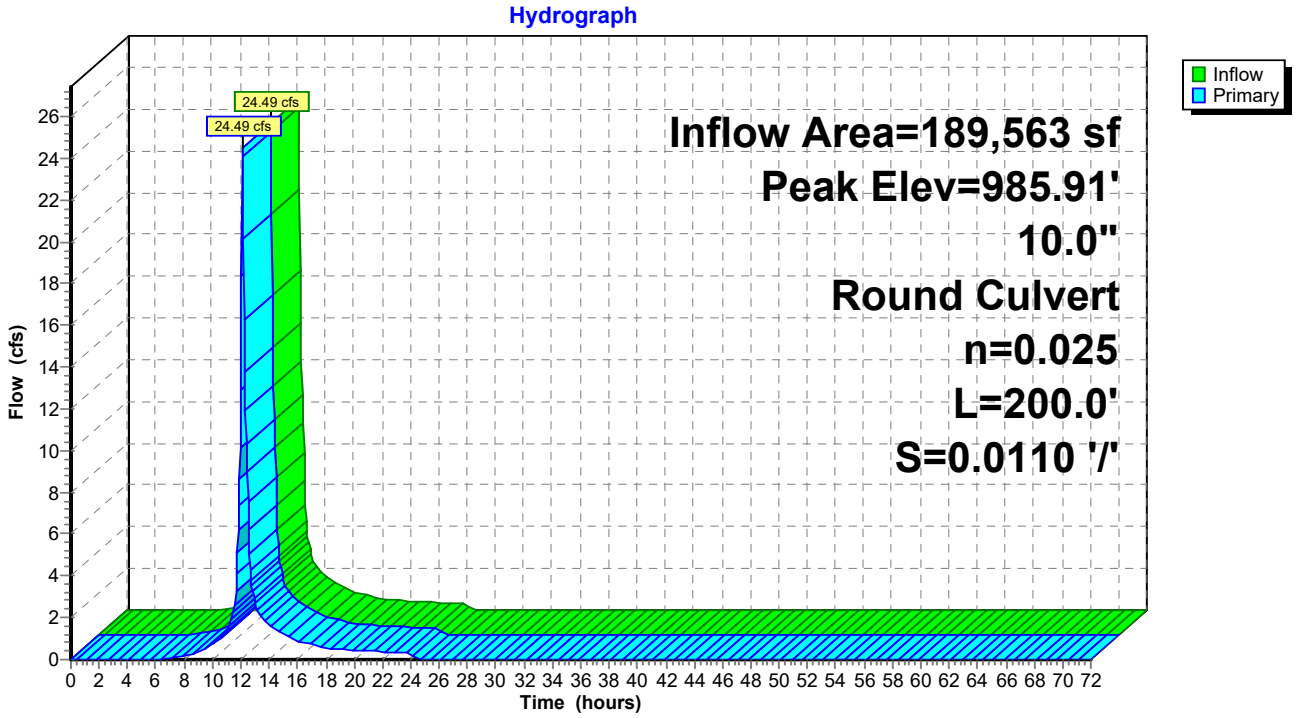
Inflow Area = 189,563 sf, 41.96% Impervious, Inflow Depth = 5.49" for 100YR - 24HR event
Inflow = 24.49 cfs @ 12.13 hrs, Volume= 86,658 cf
Outflow = 24.49 cfs @ 12.13 hrs, Volume= 86,658 cf, Atten= 0%, Lag= 0.0 min
Primary = 24.49 cfs @ 12.13 hrs, Volume= 86,658 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 985.91' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.14'	**10.0" Round CMP_Round 10"** L= 200.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 4.14' / 1.94' S= 0.0110 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 0.55 sf

Primary OutFlow Max=23.97 cfs @ 12.13 hrs HW=948.14' (Free Discharge)
1=CMP_Round 10" (Barrel Controls 23.97 cfs @ 43.95 fps)

Pond CB3: Exist CB



Summary for Pond CB4: Exist CB

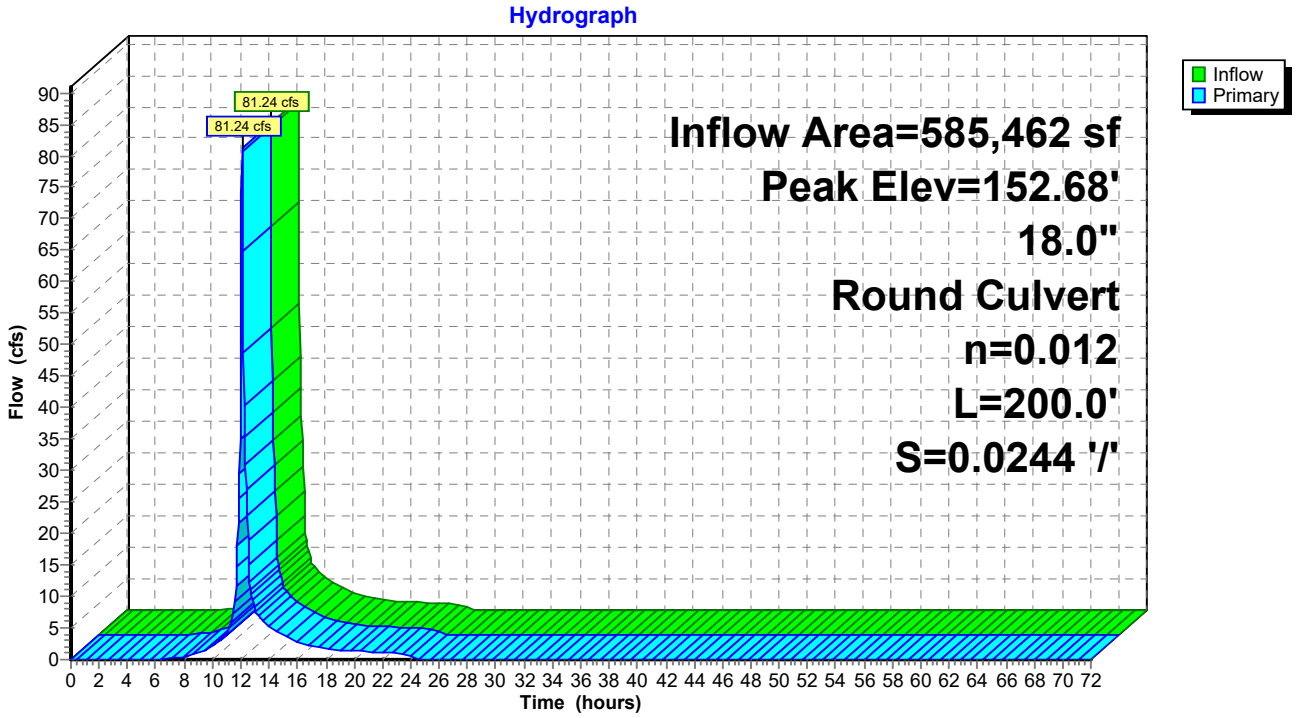
Inflow Area = 585,462 sf, 39.56% Impervious, Inflow Depth = 5.32" for 100YR - 24HR event
Inflow = 81.24 cfs @ 12.09 hrs, Volume= 259,343 cf
Outflow = 81.24 cfs @ 12.09 hrs, Volume= 259,343 cf, Atten= 0%, Lag= 0.0 min
Primary = 81.24 cfs @ 12.09 hrs, Volume= 259,343 cf
Routed to Link 1L : WEST WETL

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 152.68' @ 12.09 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	4.89'	**18.0" Round RCP_Round 18"** L= 200.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.89' / 0.00' S= 0.0244 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=79.47 cfs @ 12.09 hrs HW=146.47' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 79.47 cfs @ 44.97 fps)

Pond CB4: Exist CB



Summary for Pond CB5: New CB

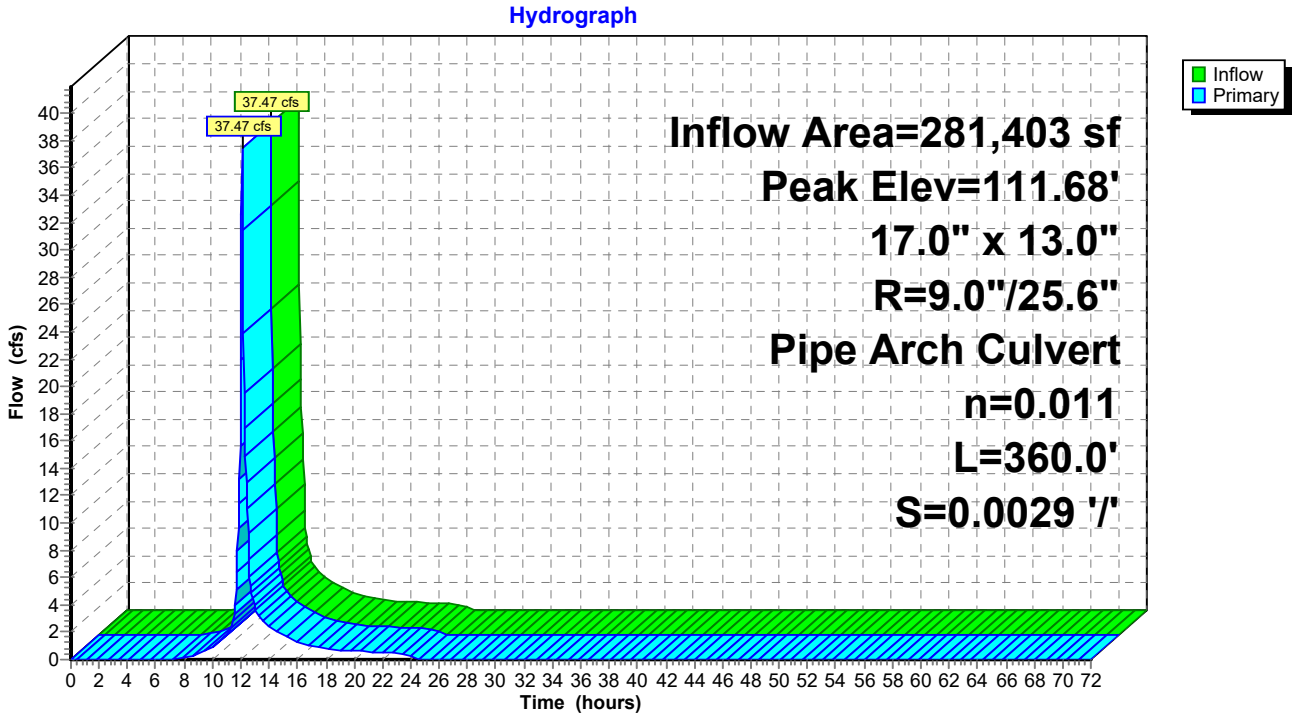
Inflow Area = 281,403 sf, 34.62% Impervious, Inflow Depth = 5.13" for 100YR - 24HR event
Inflow = 37.47 cfs @ 12.10 hrs, Volume= 120,344 cf
Outflow = 37.47 cfs @ 12.10 hrs, Volume= 120,344 cf, Atten= 0%, Lag= 0.0 min
Primary = 37.47 cfs @ 12.10 hrs, Volume= 120,344 cf
Routed to Pond CB4 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 111.68' @ 12.10 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.55'	**17.0" W x 13.0" H, R=9.0"/25.6" Pipe Arch CMP_Arch_1/2 17x13** L= 360.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 1.55' / 0.50' S= 0.0029 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.23 sf

Primary OutFlow Max=37.21 cfs @ 12.10 hrs HW=110.16' (Free Discharge)
1=CMP_Arch_1/2 17x13 (Barrel Controls 37.21 cfs @ 30.27 fps)

Pond CB5: New CB



Summary for Pond CB6: New CB

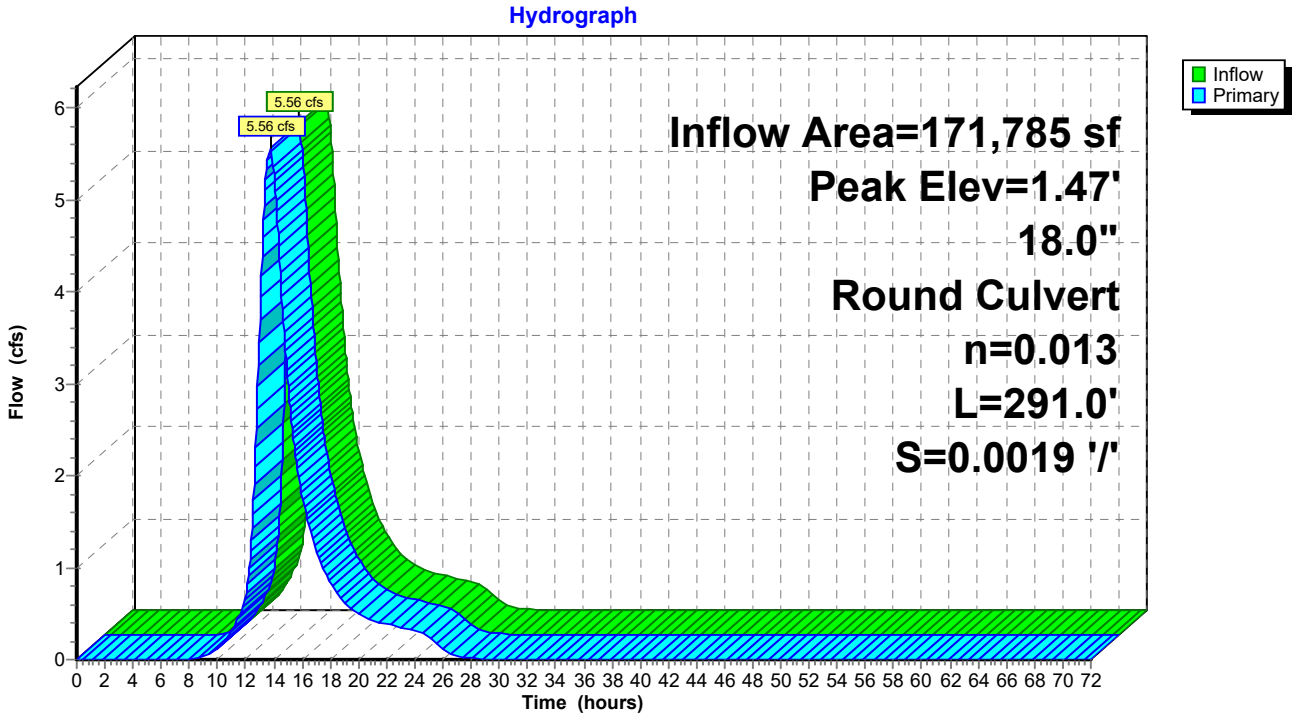
Inflow Area = 171,785 sf, 31.18% Impervious, Inflow Depth = 5.01" for 100YR - 24HR event
Inflow = 5.56 cfs @ 13.74 hrs, Volume= 71,781 cf
Outflow = 5.56 cfs @ 13.74 hrs, Volume= 71,781 cf, Atten= 0%, Lag= 0.0 min
Primary = 5.56 cfs @ 13.74 hrs, Volume= 71,781 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 1.47' @ 13.74 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.30'	**18.0" Round Culvert** L= 291.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.30' / -0.85' S= 0.0019 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.77 sf

Primary OutFlow Max=5.56 cfs @ 13.74 hrs HW=1.47' (Free Discharge)
1=Culvert (Barrel Controls 5.56 cfs @ 3.36 fps)

Pond CB6: New CB



Summary for Pond CB7: Exist CB

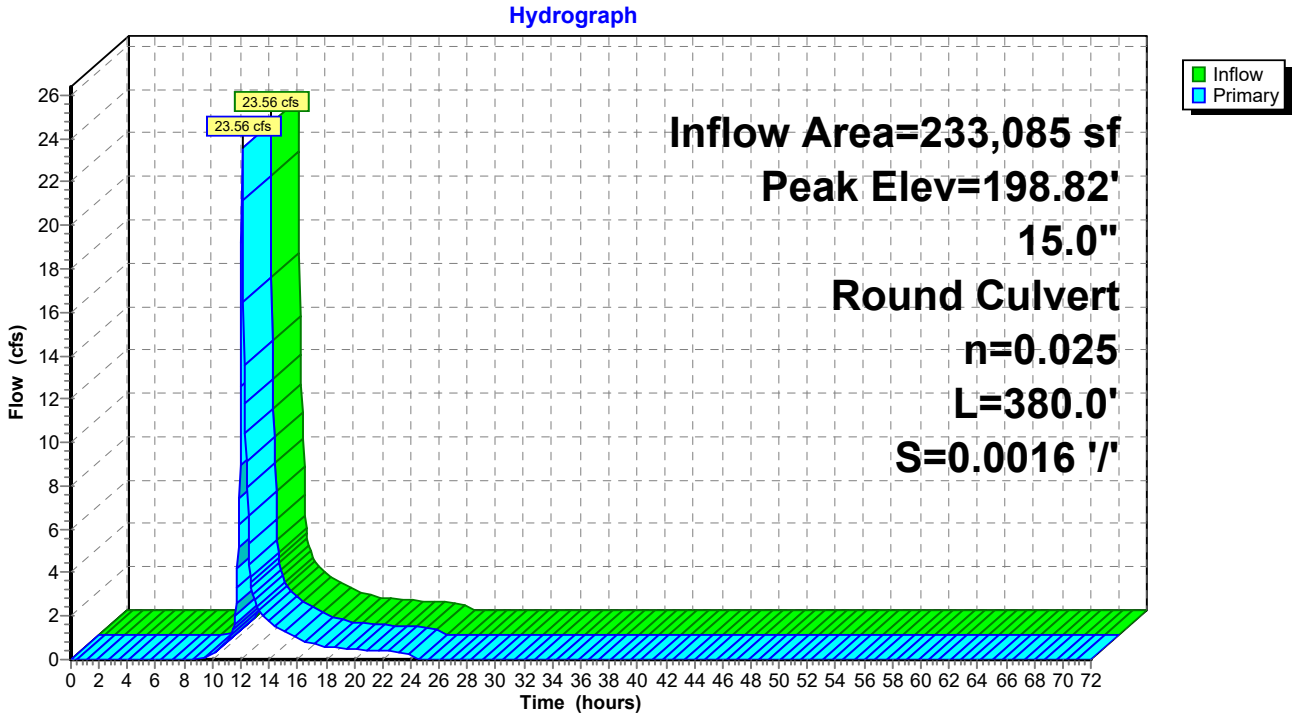
Inflow Area = 233,085 sf, 13.62% Impervious, Inflow Depth = 3.97" for 100YR - 24HR event
Inflow = 23.56 cfs @ 12.11 hrs, Volume= 77,025 cf
Outflow = 23.56 cfs @ 12.11 hrs, Volume= 77,025 cf, Atten= 0%, Lag= 0.0 min
Primary = 23.56 cfs @ 12.11 hrs, Volume= 77,025 cf
Routed to Pond MH1 : MH

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 198.82' @ 12.11 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	**15.0" Round CMP_Round 15"** L= 380.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 0.00' / -0.62' S= 0.0016 '/' Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 1.23 sf

Primary OutFlow Max=23.16 cfs @ 12.11 hrs HW=192.45' (Free Discharge)
1=CMP_Round 15" (Barrel Controls 23.16 cfs @ 18.88 fps)

Pond CB7: Exist CB



Summary for Pond CB8: CB

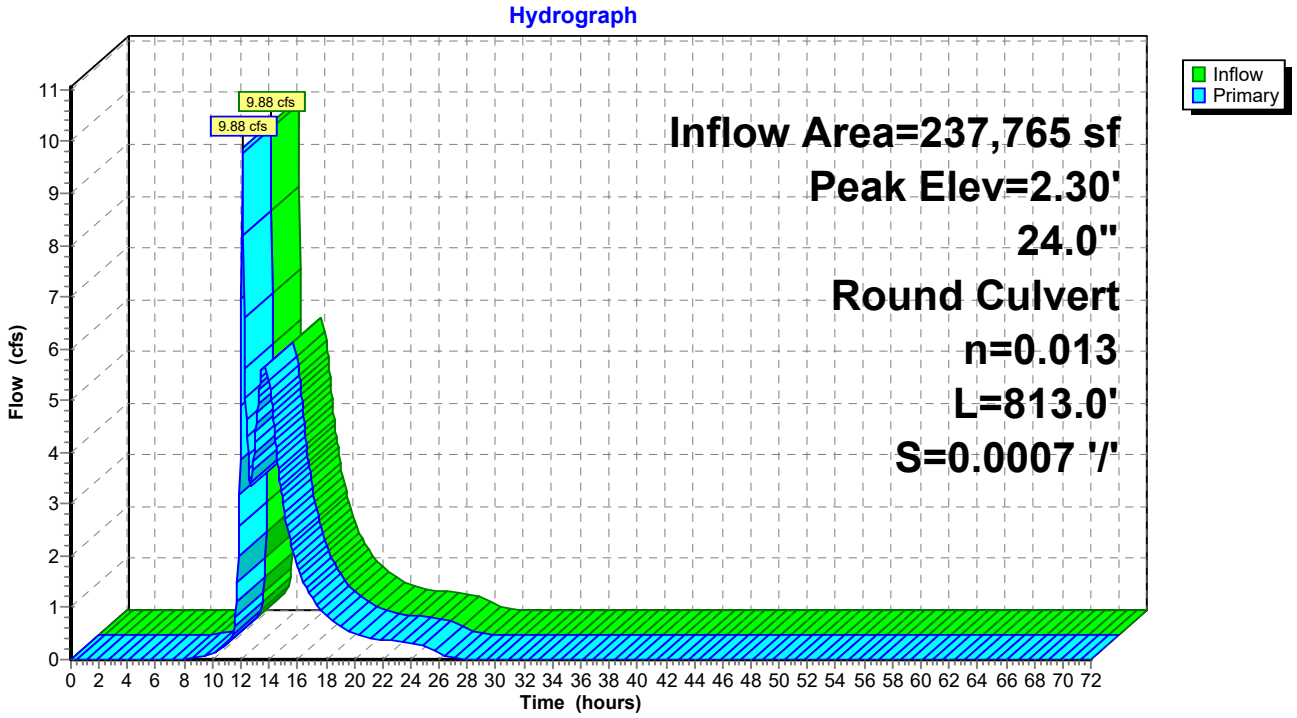
Inflow Area = 237,765 sf, 38.57% Impervious, Inflow Depth = 4.39" for 100YR - 24HR event
Inflow = 9.88 cfs @ 12.13 hrs, Volume= 86,892 cf
Outflow = 9.88 cfs @ 12.13 hrs, Volume= 86,892 cf, Atten= 0%, Lag= 0.0 min
Primary = 9.88 cfs @ 12.13 hrs, Volume= 86,892 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 2.30' @ 12.13 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.95'	**24.0" Round RCP_Round 24"** L= 813.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.95' / -1.52' S= 0.0007 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf

Primary OutFlow Max=9.67 cfs @ 12.13 hrs HW=2.19' (Free Discharge)
1=RCP_Round 24" (Barrel Controls 9.67 cfs @ 3.08 fps)

Pond CB8: CB



Summary for Pond CC1: CC1

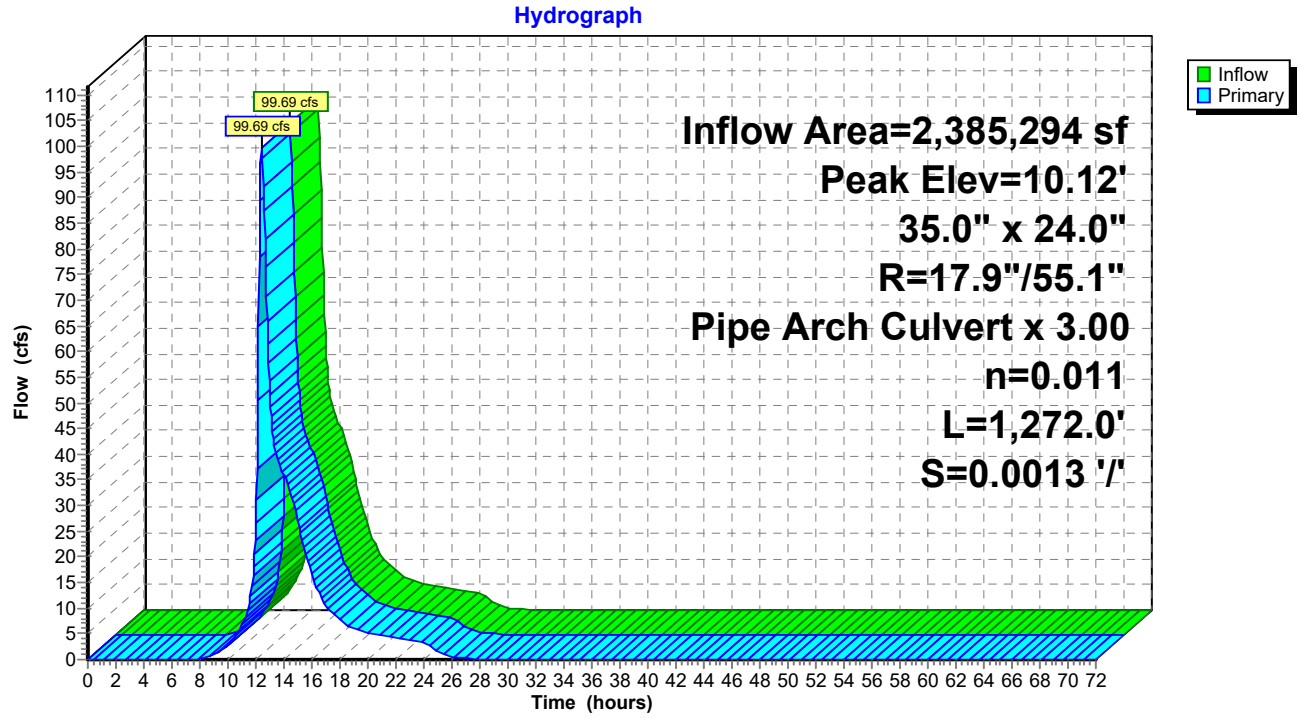
Inflow Area = 2,385,294 sf, 36.01% Impervious, Inflow Depth = 4.37" for 100YR - 24HR event
Inflow = 99.69 cfs @ 12.42 hrs, Volume= 869,453 cf
Outflow = 99.69 cfs @ 12.42 hrs, Volume= 869,453 cf, Atten= 0%, Lag= 0.0 min
Primary = 99.69 cfs @ 12.42 hrs, Volume= 869,453 cf
Routed to Link 4L : MORRIS CREEK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 10.12' @ 12.42 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	1.20'	**35.0" W x 24.0" H, R=17.9"/55.1" Pipe Arch CMP_Arch_1/2 35x24 X 3.00** L= 1,272.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1.20' / -0.40' S= 0.0013 '/' Cc= 0.900 n= 0.011 Steel, smooth, Flow Area= 4.63 sf

Primary OutFlow Max=99.29 cfs @ 12.42 hrs HW=10.06' (Free Discharge)
1=CMP_Arch_1/2 35x24 (Barrel Controls 99.29 cfs @ 7.14 fps)

Pond CC1: CC1



Summary for Pond Cr-B: Robinson Driveway

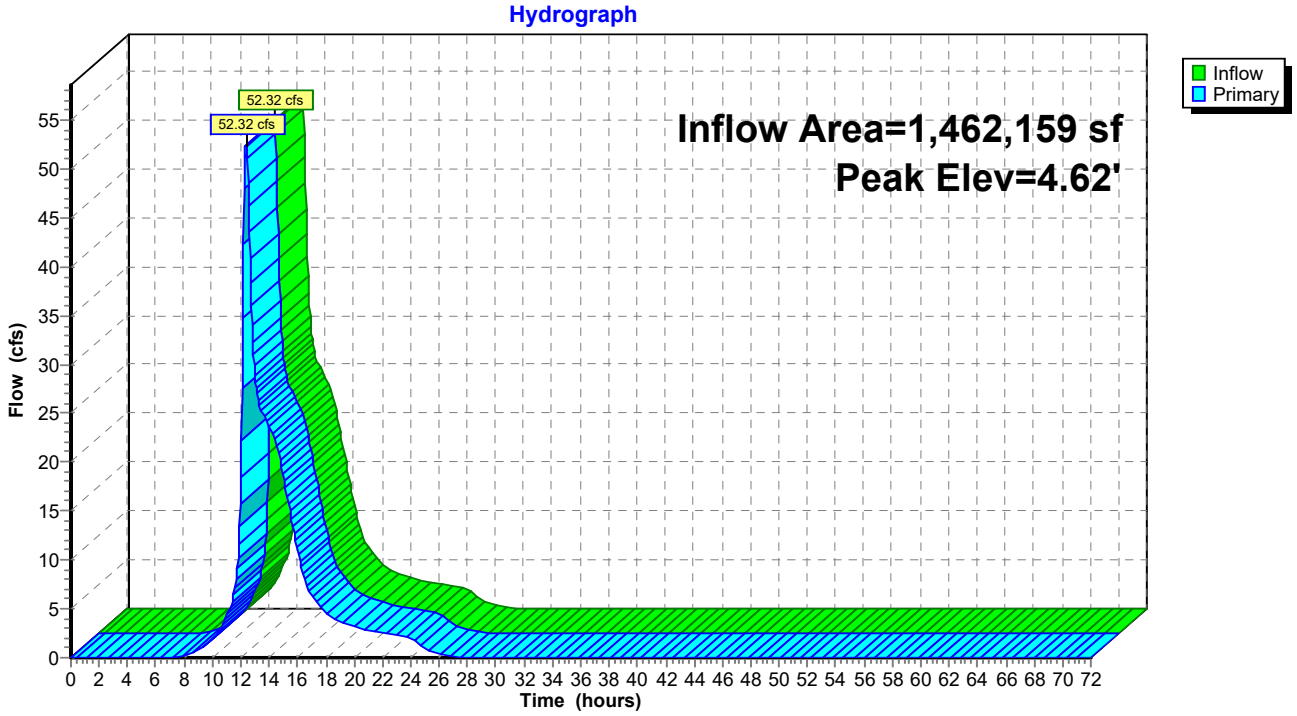
Inflow Area = 1,462,159 sf, 36.00% Impervious, Inflow Depth = 4.35" for 100YR - 24HR event
Inflow = 52.32 cfs @ 12.36 hrs, Volume= 530,358 cf
Outflow = 52.32 cfs @ 12.36 hrs, Volume= 530,358 cf, Atten= 0%, Lag= 0.0 min
Primary = 52.32 cfs @ 12.36 hrs, Volume= 530,358 cf
Routed to Reach 2R : WQS Segment 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.62' @ 12.36 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#2	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf
#3	Primary	1.72'	**24.0" Round RCP_Round 24"** L= 48.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.72' / 1.70' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 3.14 sf

Primary OutFlow Max=52.21 cfs @ 12.36 hrs HW=4.62' (Free Discharge)
- **1=RCP_Round 24"** (Barrel Controls 17.40 cfs @ 5.54 fps)
- **2=RCP_Round 24"** (Barrel Controls 17.40 cfs @ 5.54 fps)
- **3=RCP_Round 24"** (Barrel Controls 17.40 cfs @ 5.54 fps)

Pond Cr-B: Robinson Driveway



Summary for Pond Cr-CD: Utility Crossing

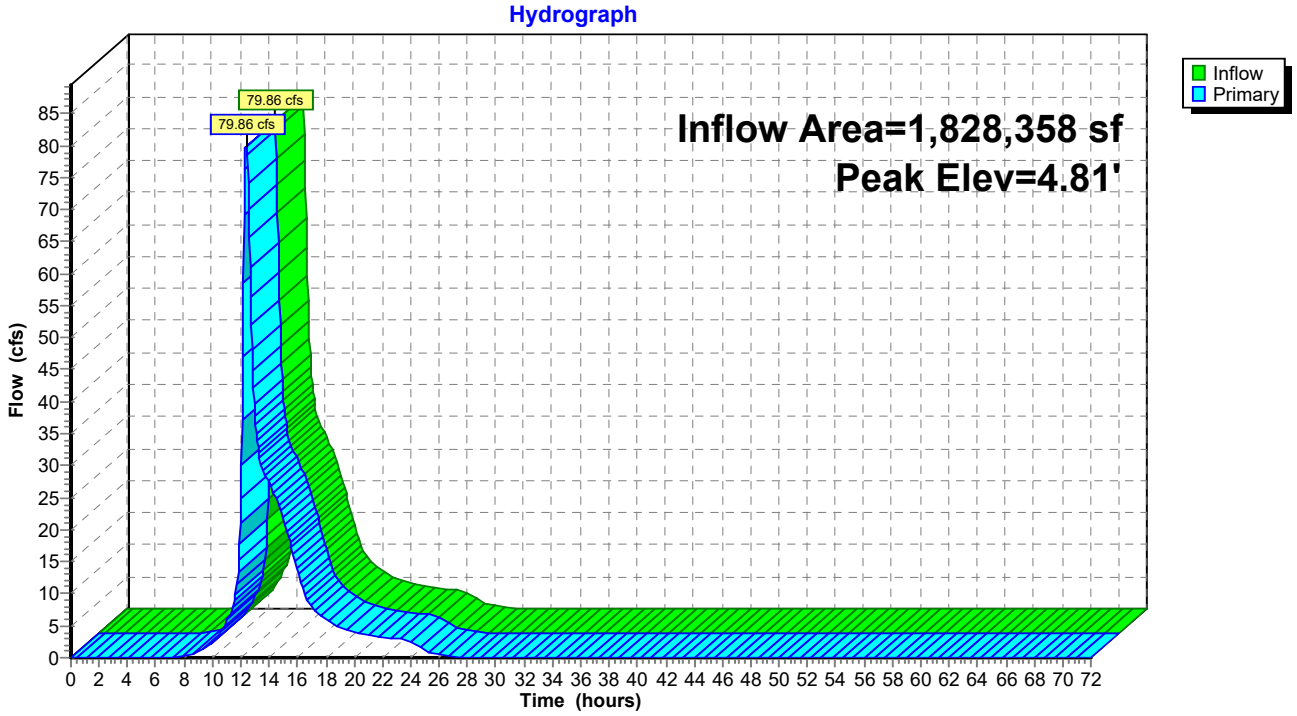
Inflow Area = 1,828,358 sf, 39.67% Impervious, Inflow Depth = 4.49" for 100YR - 24HR event
Inflow = 79.86 cfs @ 12.37 hrs, Volume= 683,377 cf
Outflow = 79.86 cfs @ 12.37 hrs, Volume= 683,377 cf, Atten= 0%, Lag= 0.0 min
Primary = 79.86 cfs @ 12.37 hrs, Volume= 683,377 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.81' @ 12.37 hrs
Flood Elev= 5.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#2	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf
#3	Primary	1.33'	**30.0" Round RCP_Round 30"** L= 114.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 1.33' / 1.28' S= 0.0004 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 4.91 sf

Primary OutFlow Max=79.47 cfs @ 12.37 hrs HW=4.80' (Free Discharge)
- **1=RCP_Round 30"** (Barrel Controls 26.49 cfs @ 5.40 fps)
- **2=RCP_Round 30"** (Barrel Controls 26.49 cfs @ 5.40 fps)
- **3=RCP_Round 30"** (Barrel Controls 26.49 cfs @ 5.40 fps)

Pond Cr-CD: Utility Crossing



Summary for Pond MH1: MH

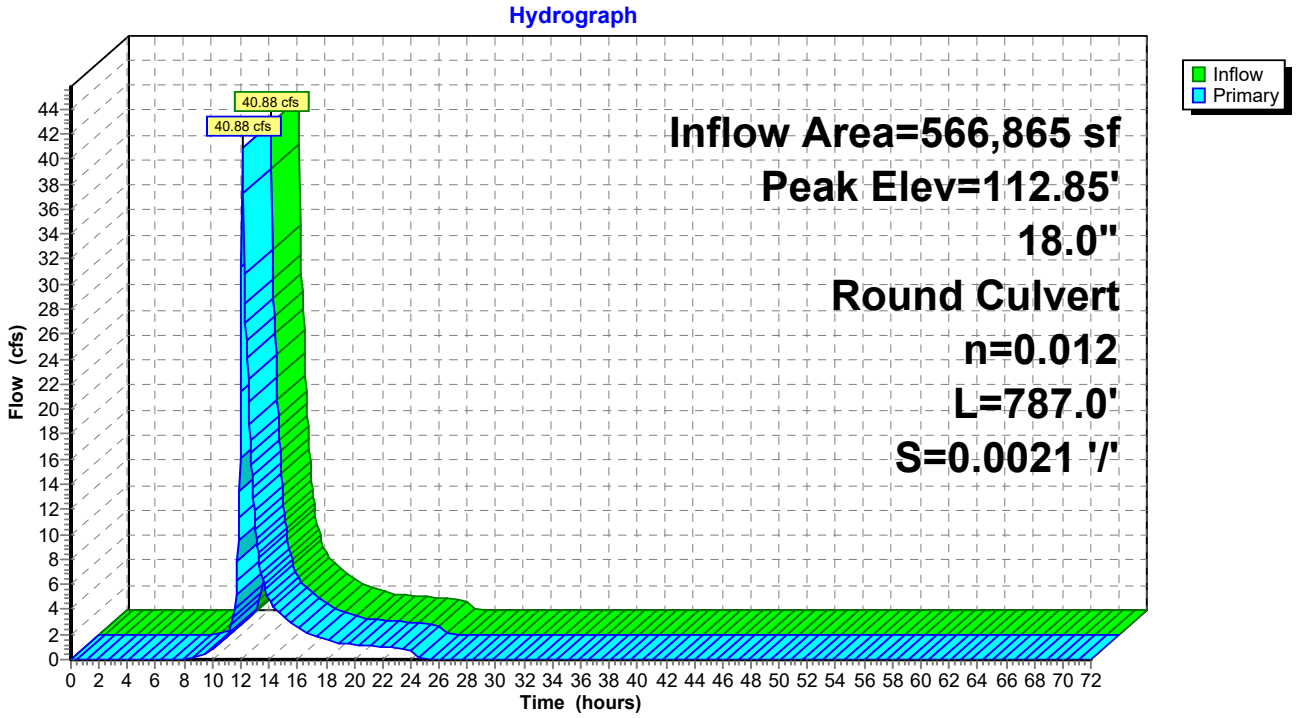
Inflow Area = 566,865 sf, 16.40% Impervious, Inflow Depth = 4.23" for 100YR - 24HR event
Inflow = 40.88 cfs @ 12.12 hrs, Volume= 199,837 cf
Outflow = 40.88 cfs @ 12.12 hrs, Volume= 199,837 cf, Atten= 0%, Lag= 0.0 min
Primary = 40.88 cfs @ 12.12 hrs, Volume= 199,837 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 112.85' @ 12.12 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.72'	**18.0" Round RCP_Round 18"** L= 787.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= -0.72' / -2.37' S= 0.0021 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.77 sf

Primary OutFlow Max=39.82 cfs @ 12.12 hrs HW=107.65' (Free Discharge)
1=RCP_Round 18" (Barrel Controls 39.82 cfs @ 22.53 fps)

Pond MH1: MH



Summary for Pond P1: Pond 1

Inflow Area = 873,816 sf, 43.71% Impervious, Inflow Depth = 4.52" for 100YR - 24HR event
Inflow = 23.14 cfs @ 12.60 hrs, Volume= 329,018 cf
Outflow = 20.16 cfs @ 13.52 hrs, Volume= 329,018 cf, Atten= 13%, Lag= 54.9 min
Discarded = 1.70 cfs @ 13.52 hrs, Volume= 33,597 cf
Primary = 18.46 cfs @ 13.52 hrs, Volume= 295,421 cf
Routed to Pond P10 : Wetland Ditch

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.90' @ 13.52 hrs Surf.Area= 30,571 sf Storage= 21,462 cf

Plug-Flow detention time= 15.0 min calculated for 328,790 cf (100% of inflow)
Center-of-Mass det. time= 15.0 min (892.1 - 877.1)

Volume	Invert	Avail.Storage	Storage Description
#1	2.40'	69,114 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

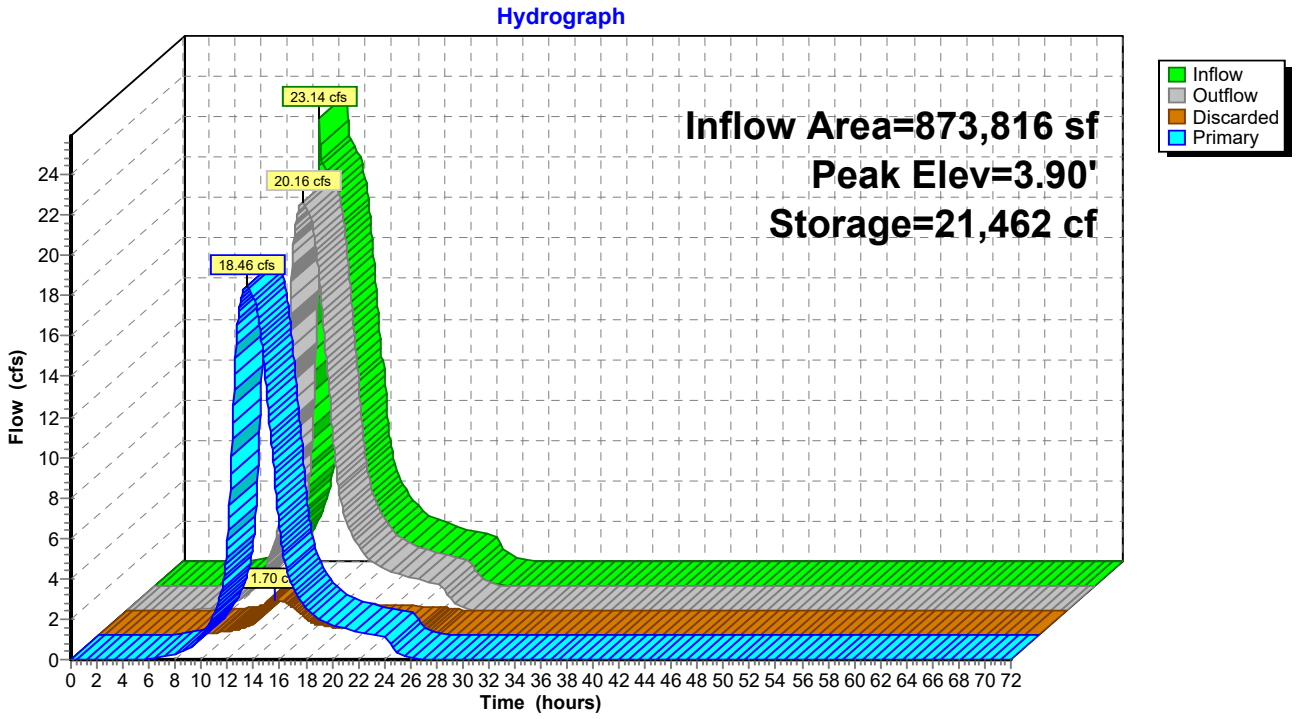
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.40	0	0.0	0	0	0
2.50	1,116	311.0	37	37	7,697
3.00	11,546	598.0	2,709	2,746	28,458
3.50	22,069	715.0	8,263	11,009	40,688
4.00	32,945	769.0	13,663	24,672	47,075
4.50	44,009	867.0	19,172	43,844	59,841
5.00	57,369	999.0	25,271	69,114	79,447

Device	Routing	Invert	Outlet Devices
#1	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.40'	**21.0" Round Culvert** L= 48.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.40' / 2.35' S= 0.0010 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#4	Discarded	2.40'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.30'

Discarded OutFlow Max=1.70 cfs @ 13.52 hrs HW=3.90' (Free Discharge)
└**4=Exfiltration** (Controls 1.70 cfs)

Primary OutFlow Max=18.46 cfs @ 13.52 hrs HW=3.90' (Free Discharge)
├**1=Culvert** (Barrel Controls 6.15 cfs @ 3.77 fps)
├**2=Culvert** (Barrel Controls 6.15 cfs @ 3.77 fps)
└**3=Culvert** (Barrel Controls 6.15 cfs @ 3.77 fps)

Pond P1: Pond 1



Summary for Pond P10: Wetland Ditch

Inflow Area = 1,049,961 sf, 38.89% Impervious, Inflow Depth = 4.28" for 100YR - 24HR event
Inflow = 27.68 cfs @ 12.22 hrs, Volume= 374,212 cf
Outflow = 25.48 cfs @ 12.33 hrs, Volume= 374,212 cf, Atten= 8%, Lag= 6.6 min
Primary = 25.48 cfs @ 12.33 hrs, Volume= 374,212 cf
Routed to Reach 1R : WQS Segment 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.18' @ 12.33 hrs Surf.Area= 11,057 sf Storage= 6,629 cf

Plug-Flow detention time= 4.7 min calculated for 374,212 cf (100% of inflow)
Center-of-Mass det. time= 4.7 min (879.8 - 875.1)

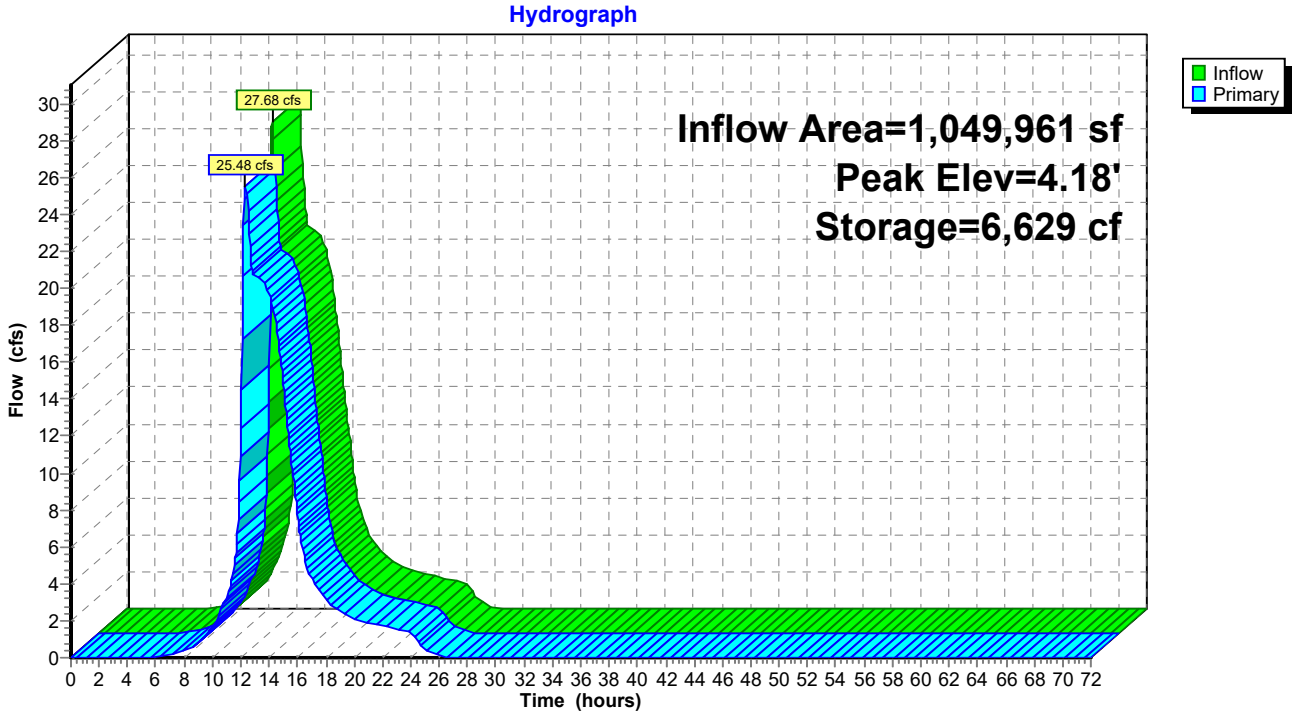
Volume	Invert	Avail.Storage	Storage Description
#1	2.33'	34,944 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.33	0	0.0	0	0	0
2.50	2,079	556.0	118	118	24,600
3.00	2,792	564.0	1,213	1,331	25,366
3.50	3,765	606.0	1,633	2,964	29,288
4.00	5,218	646.0	2,236	5,200	33,285
4.50	26,868	1,785.0	7,321	12,521	253,629
5.00	65,665	1,908.0	22,423	34,944	289,788

Device	Routing	Invert	Outlet Devices
#1	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#2	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf
#3	Primary	2.33'	**21.0" Round RCP_Round 21"** L= 32.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 2.33' / 2.32' S= 0.0003 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 2.41 sf

Primary OutFlow Max=25.45 cfs @ 12.33 hrs HW=4.18' (Free Discharge)
- **1=RCP_Round 21"** (Barrel Controls 8.48 cfs @ 4.15 fps)
- **2=RCP_Round 21"** (Barrel Controls 8.48 cfs @ 4.15 fps)
- **3=RCP_Round 21"** (Barrel Controls 8.48 cfs @ 4.15 fps)

Pond P10: Wetland Ditch



Summary for Pond P2: Pond 2

Inflow Area = 145,656 sf, 34.19% Impervious, Inflow Depth = 4.90" for 100YR - 24HR event
Inflow = 12.86 cfs @ 12.28 hrs, Volume= 59,438 cf
Outflow = 7.72 cfs @ 12.60 hrs, Volume= 59,438 cf, Atten= 40%, Lag= 19.4 min
Discarded = 1.65 cfs @ 12.60 hrs, Volume= 6,926 cf
Primary = 6.07 cfs @ 12.60 hrs, Volume= 52,512 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 6.13' @ 12.60 hrs Surf.Area= 34,152 sf Storage= 13,689 cf

Plug-Flow detention time= 20.8 min calculated for 59,397 cf (100% of inflow)
Center-of-Mass det. time= 20.8 min (853.2 - 832.4)

Volume	Invert	Avail.Storage	Storage Description
#1	3.35'	13,689 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

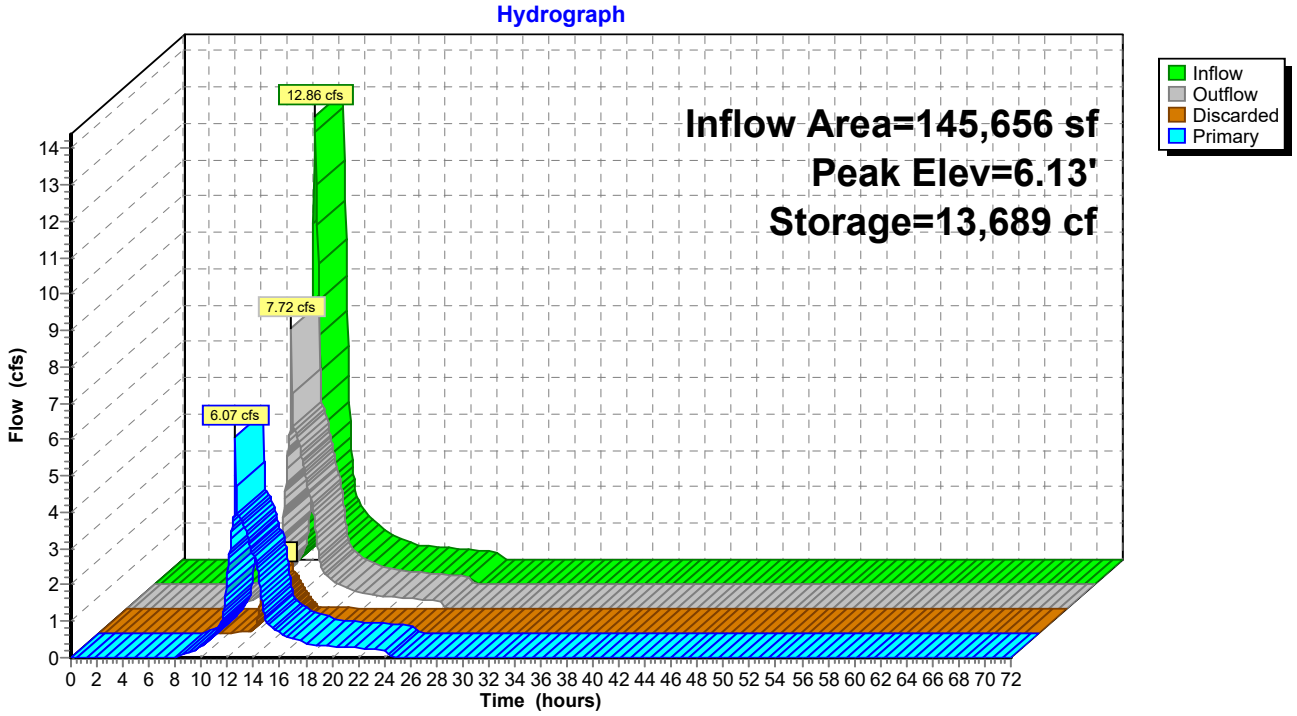
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.35	0	0.0	0	0	0
3.50	170	63.0	8	8	316
4.00	2,037	330.0	466	474	8,667
4.50	10,588	652.0	2,878	3,353	33,831
4.75	19,541	773.0	3,709	7,062	47,553
5.00	34,152	971.0	6,627	13,689	75,033

Device	Routing	Invert	Outlet Devices
#1	Primary	3.35'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 133.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.35' / 3.25' S= 0.0008 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.35'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=1.64 cfs @ 12.60 hrs HW=6.13' (Free Discharge)
└**2=Exfiltration** (Controls 1.64 cfs)

Primary OutFlow Max=6.07 cfs @ 12.60 hrs HW=6.13' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.07 cfs @ 5.57 fps)

Pond P2: Pond 2



Summary for Pond P3: Pond 3

Inflow Area = 604,810 sf, 50.08% Impervious, Inflow Depth = 5.25" for 100YR - 24HR event
Inflow = 25.25 cfs @ 13.03 hrs, Volume= 264,717 cf
Outflow = 17.86 cfs @ 13.61 hrs, Volume= 264,717 cf, Atten= 29%, Lag= 34.6 min
Discarded = 2.48 cfs @ 13.61 hrs, Volume= 27,789 cf
Primary = 15.38 cfs @ 13.61 hrs, Volume= 236,928 cf
Routed to Pond P1 : Pond 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.89' @ 13.61 hrs Surf.Area= 51,251 sf Storage= 40,581 cf

Plug-Flow detention time= 20.5 min calculated for 264,533 cf (100% of inflow)
Center-of-Mass det. time= 20.5 min (882.1 - 861.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2.65'	46,661 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

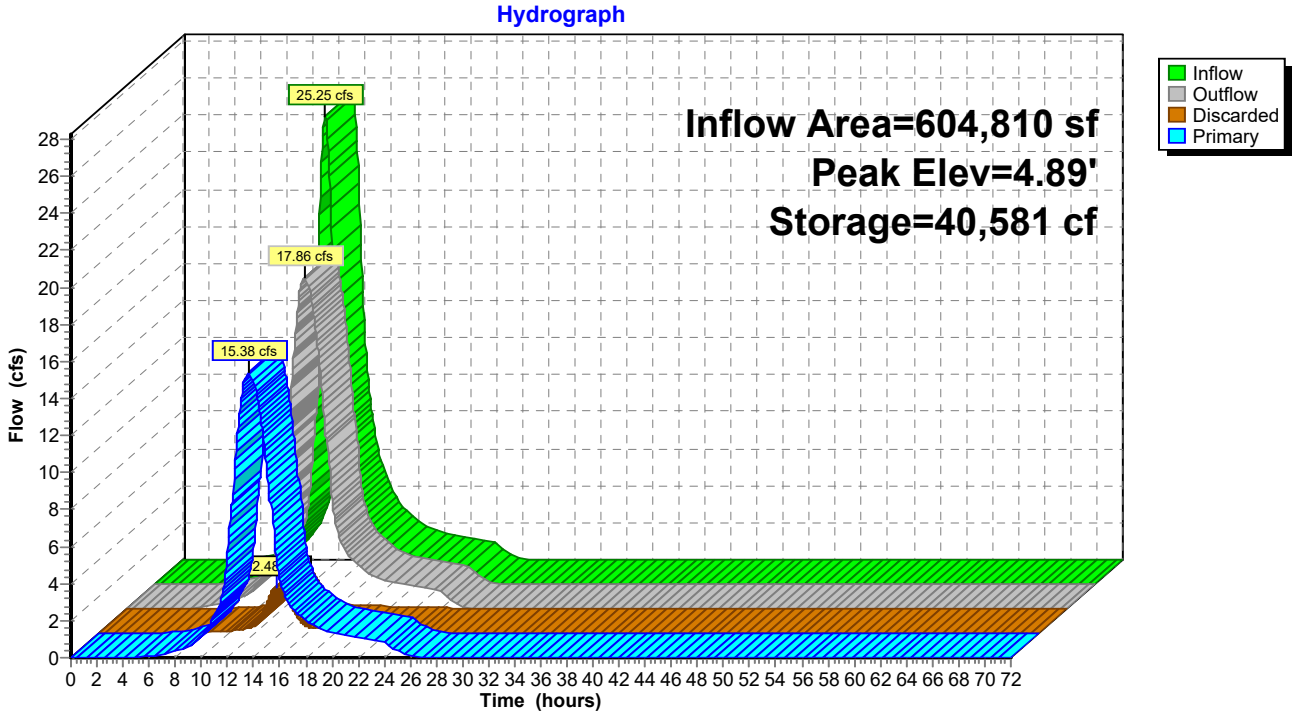
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.65	0	0.0	0	0	0
3.00	4,059	888.0	474	474	62,751
3.50	10,848	1,191.0	3,590	4,064	112,882
4.00	19,089	1,350.0	7,388	11,452	145,039
4.50	33,127	1,447.0	12,894	24,346	166,641
5.00	57,227	1,543.0	22,316	46,661	189,495

Device	Routing	Invert	Outlet Devices
#1	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#3	Primary	2.65'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 136.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.65' / 2.55' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#4	Discarded	2.65'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.55'

Discarded OutFlow Max=2.48 cfs @ 13.61 hrs HW=4.89' (Free Discharge)
└**4=Exfiltration** (Controls 2.48 cfs)

Primary OutFlow Max=15.38 cfs @ 13.61 hrs HW=4.89' (Free Discharge)
├**1=Culvert** (Barrel Controls 5.13 cfs @ 4.71 fps)
├**2=Culvert** (Barrel Controls 5.13 cfs @ 4.71 fps)
└**3=Culvert** (Barrel Controls 5.13 cfs @ 4.71 fps)

Pond P3: Pond 3



Summary for Pond P4: Pond 4

Inflow Area = 140,632 sf, 26.62% Impervious, Inflow Depth = 3.85" for 100YR - 24HR event
Inflow = 12.13 cfs @ 12.16 hrs, Volume= 45,123 cf
Outflow = 4.74 cfs @ 12.51 hrs, Volume= 45,123 cf, Atten= 61%, Lag= 20.9 min
Discarded = 0.73 cfs @ 12.51 hrs, Volume= 3,318 cf
Primary = 4.01 cfs @ 12.51 hrs, Volume= 41,806 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.88' @ 12.51 hrs Surf.Area= 23,029 sf Storage= 9,264 cf

Plug-Flow detention time= 13.3 min calculated for 45,092 cf (100% of inflow)
Center-of-Mass det. time= 13.3 min (856.2 - 842.9)

Volume	Invert	Avail.Storage	Storage Description
#1	3.20'	12,438 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

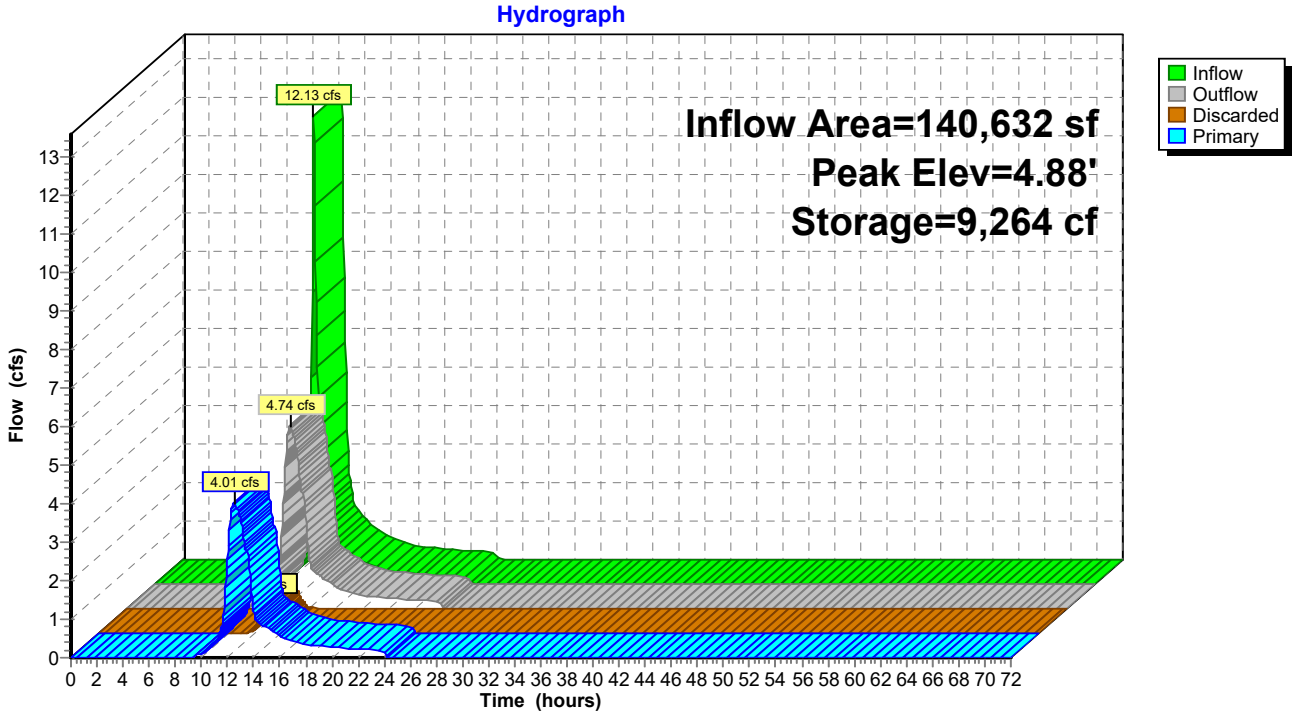
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
3.20	0	0.0	0	0	0
3.50	149	61.0	15	15	296
4.00	2,440	293.0	532	547	6,832
4.50	9,823	539.0	2,860	3,407	23,121
4.75	16,825	666.0	3,292	6,699	35,300
5.00	29,698	866.0	5,740	12,438	59,683

Device	Routing	Invert	Outlet Devices
#1	Primary	3.20'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 134.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 3.20' / 3.10' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	3.20'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 3.00'

Discarded OutFlow Max=0.73 cfs @ 12.51 hrs HW=4.88' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.73 cfs)

Primary OutFlow Max=4.01 cfs @ 12.51 hrs HW=4.88' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.01 cfs @ 3.69 fps)

Pond P4: Pond 4



Summary for Pond P5: Pond 5

Inflow Area = 127,978 sf, 26.51% Impervious, Inflow Depth = 3.85" for 100YR - 24HR event
Inflow = 9.11 cfs @ 12.26 hrs, Volume= 41,063 cf
Outflow = 4.84 cfs @ 12.59 hrs, Volume= 41,063 cf, Atten= 47%, Lag= 19.4 min
Discarded = 0.49 cfs @ 12.59 hrs, Volume= 1,788 cf
Primary = 4.35 cfs @ 12.59 hrs, Volume= 39,275 cf
Routed to Pond P3 : Pond 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.72' @ 12.59 hrs Surf.Area= 15,447 sf Storage= 6,378 cf

Plug-Flow detention time= 8.2 min calculated for 41,035 cf (100% of inflow)
Center-of-Mass det. time= 8.1 min (858.0 - 849.9)

Volume	Invert	Avail.Storage	Storage Description
#1	2.85'	12,246 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

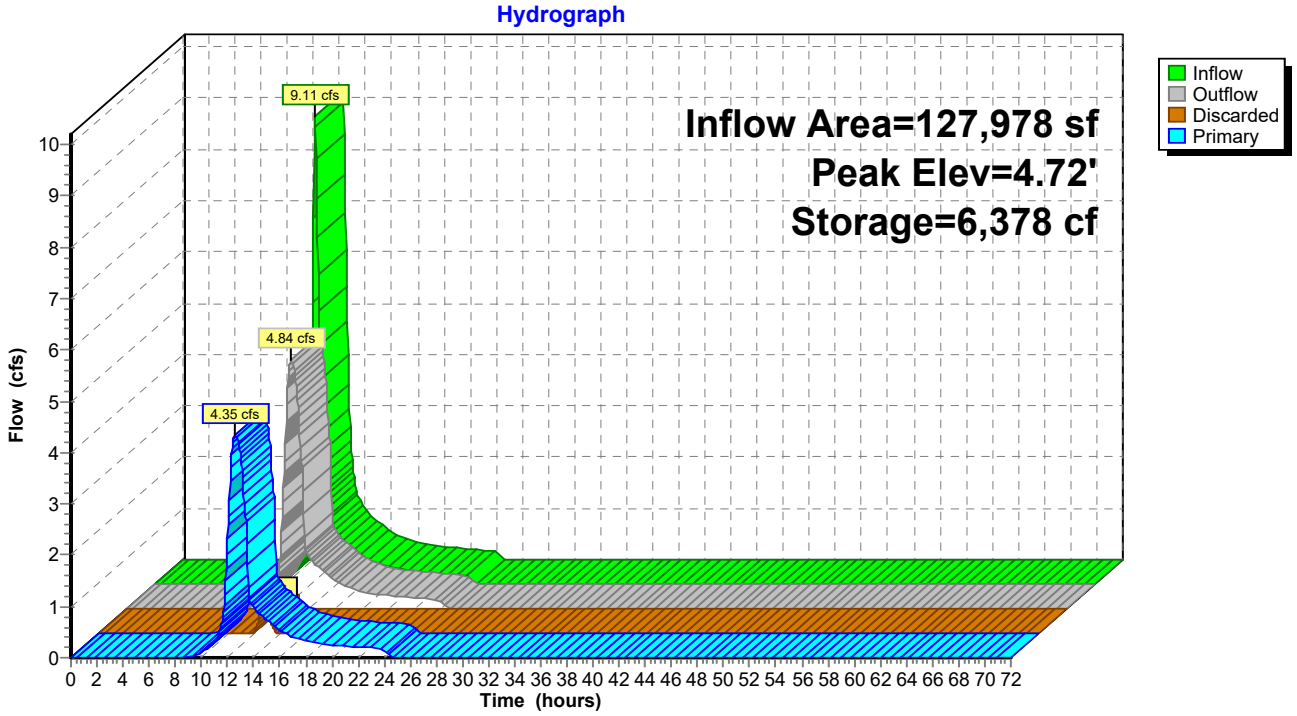
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.85	0	0.0	0	0	0
3.00	22	19.0	1	1	29
3.50	418	102.0	89	90	829
4.00	2,904	284.0	737	828	6,420
4.50	9,309	476.0	2,902	3,730	18,033
4.90	21,881	695.0	6,062	9,791	38,442
5.00	27,310	796.0	2,455	12,246	50,426

Device	Routing	Invert	Outlet Devices
#1	Primary	2.85'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 142.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.85' / 2.75' S= 0.0007 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.85'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.75'

Discarded OutFlow Max=0.49 cfs @ 12.59 hrs HW=4.72' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.49 cfs)

Primary OutFlow Max=4.34 cfs @ 12.59 hrs HW=4.72' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.34 cfs @ 3.99 fps)

Pond P5: Pond 5



Summary for Pond P6: Pond 6

Inflow Area = 294,705 sf, 29.95% Impervious, Inflow Depth = 4.36" for 100YR - 24HR event
Inflow = 15.14 cfs @ 12.47 hrs, Volume= 107,009 cf
Outflow = 8.13 cfs @ 13.02 hrs, Volume= 107,253 cf, Atten= 46%, Lag= 33.3 min
Discarded = 1.27 cfs @ 13.02 hrs, Volume= 6,859 cf
Primary = 6.87 cfs @ 13.02 hrs, Volume= 100,394 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.14' @ 13.02 hrs Surf.Area= 32,341 sf Storage= 15,871 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 12.8 min (862.7 - 849.8)

Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	48,739 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

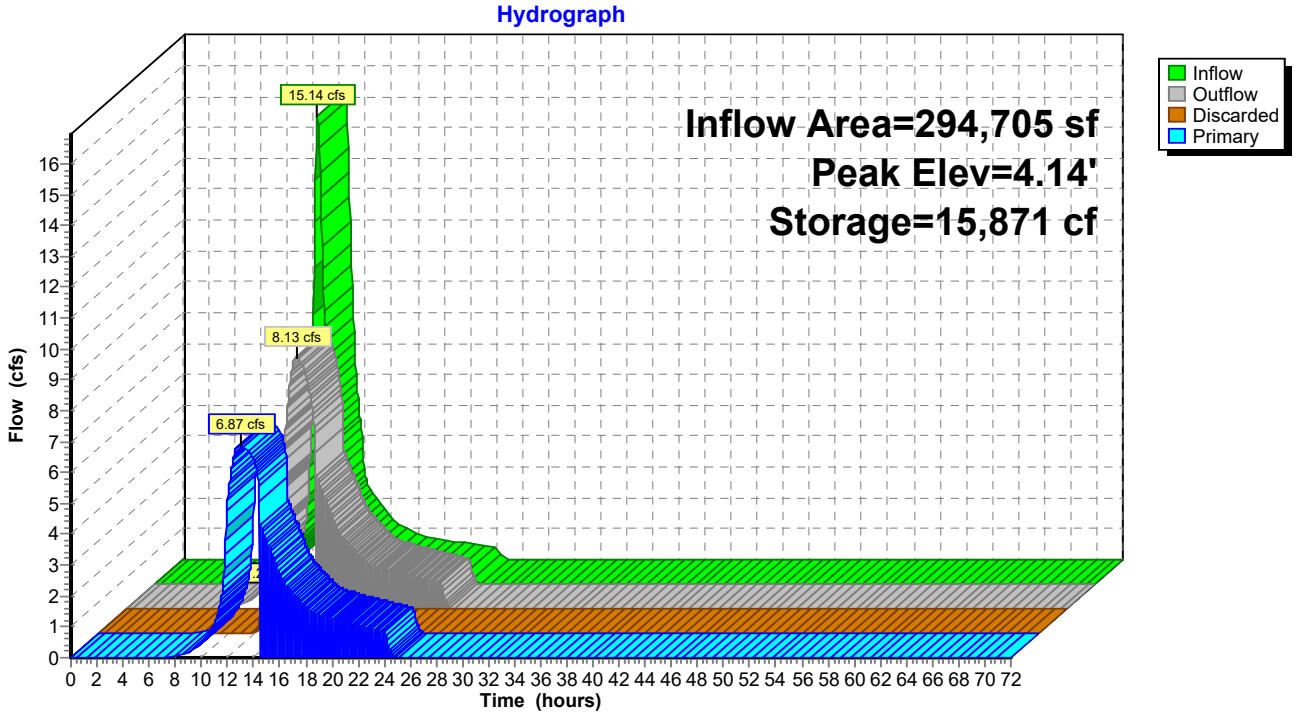
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
3.00	3,571	520.0	595	595	21,518
3.50	9,437	727.0	3,136	3,731	42,062
4.00	24,344	1,116.0	8,156	11,887	99,115
4.50	57,812	1,402.0	19,945	31,832	156,426
4.75	77,941	1,580.0	16,907	48,739	198,667

Device	Routing	Invert	Outlet Devices
#1	Primary	0.50'	**15.0" Round CMP_Round 15"** L= 265.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 0.50' / -0.40' S= 0.0034 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#2	Discarded	2.50'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.40'

Discarded OutFlow Max=1.26 cfs @ 13.02 hrs HW=4.14' (Free Discharge)
↑**2=Exfiltration** (Controls 1.26 cfs)

Primary OutFlow Max=6.87 cfs @ 13.02 hrs HW=4.14' (Free Discharge)
↑**1=CMP_Round 15"** (Barrel Controls 6.87 cfs @ 5.60 fps)

Pond P6: Pond 6



Summary for Pond P7: Pond 7

Inflow Area = 110,829 sf, 40.07% Impervious, Inflow Depth = 5.13" for 100YR - 24HR event
Inflow = 12.51 cfs @ 12.16 hrs, Volume= 47,397 cf
Outflow = 4.88 cfs @ 12.50 hrs, Volume= 47,397 cf, Atten= 61%, Lag= 20.4 min
Discarded = 0.66 cfs @ 12.50 hrs, Volume= 2,922 cf
Primary = 4.23 cfs @ 12.50 hrs, Volume= 44,475 cf
Routed to Pond P6 : Pond 6

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 4.73' @ 12.50 hrs Surf.Area= 19,892 sf Storage= 9,709 cf

Plug-Flow detention time= 12.8 min calculated for 47,364 cf (100% of inflow)
Center-of-Mass det. time= 12.8 min (833.4 - 820.6)

Volume	Invert	Avail.Storage	Storage Description
#1	2.75'	16,286 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

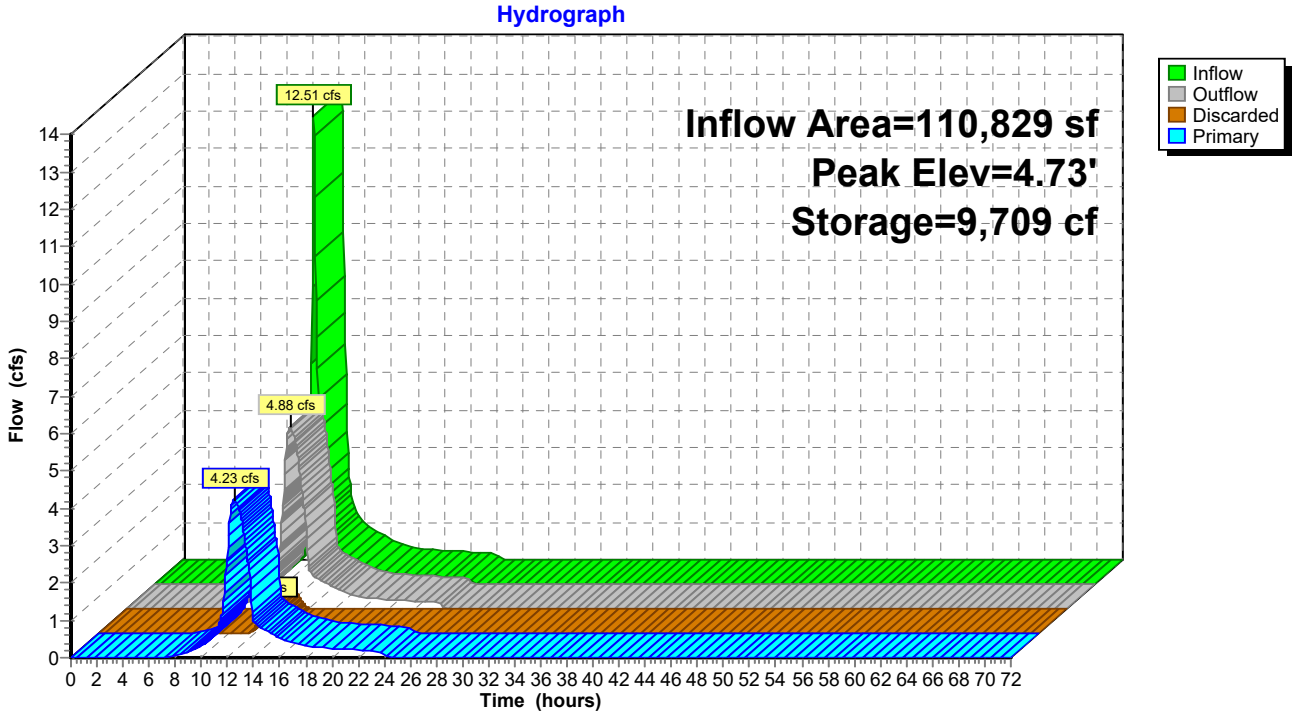
Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.75	0	0.0	0	0	0
3.00	47	29.0	4	4	67
3.50	992	154.0	209	213	1,888
4.00	4,809	305.0	1,331	1,544	7,405
4.50	13,313	480.0	4,354	5,898	18,338
4.90	25,536	679.0	7,638	13,536	36,694
5.00	29,518	743.0	2,750	16,286	43,936

Device	Routing	Invert	Outlet Devices
#1	Primary	2.75'	**18.0" W x 11.0" H, R=10.5"/22.5" Pipe Arch Culvert** L= 180.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 2.75' / 2.65' S= 0.0006 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 1.09 sf
#2	Discarded	2.75'	**1.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 2.65'

Discarded OutFlow Max=0.66 cfs @ 12.50 hrs HW=4.73' (Free Discharge)
↑—**2=Exfiltration** (Controls 0.66 cfs)

Primary OutFlow Max=4.23 cfs @ 12.50 hrs HW=4.73' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.23 cfs @ 3.88 fps)

Pond P7: Pond 7



Summary for Pond P8: Pond 8

Inflow Area = 408,559 sf, 31.11% Impervious, Inflow Depth = 4.31" for 100YR - 24HR event
Inflow = 17.64 cfs @ 12.20 hrs, Volume= 146,887 cf
Outflow = 25.25 cfs @ 12.25 hrs, Volume= 146,920 cf, Atten= 0%, Lag= 2.7 min
Primary = 25.25 cfs @ 12.25 hrs, Volume= 146,920 cf
Routed to Reach 3R : WQS Segment 3

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 47.56' @ 12.25 hrs Surf.Area= 21,292 sf Storage= 4,397 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 5.0 min (860.5 - 855.5)

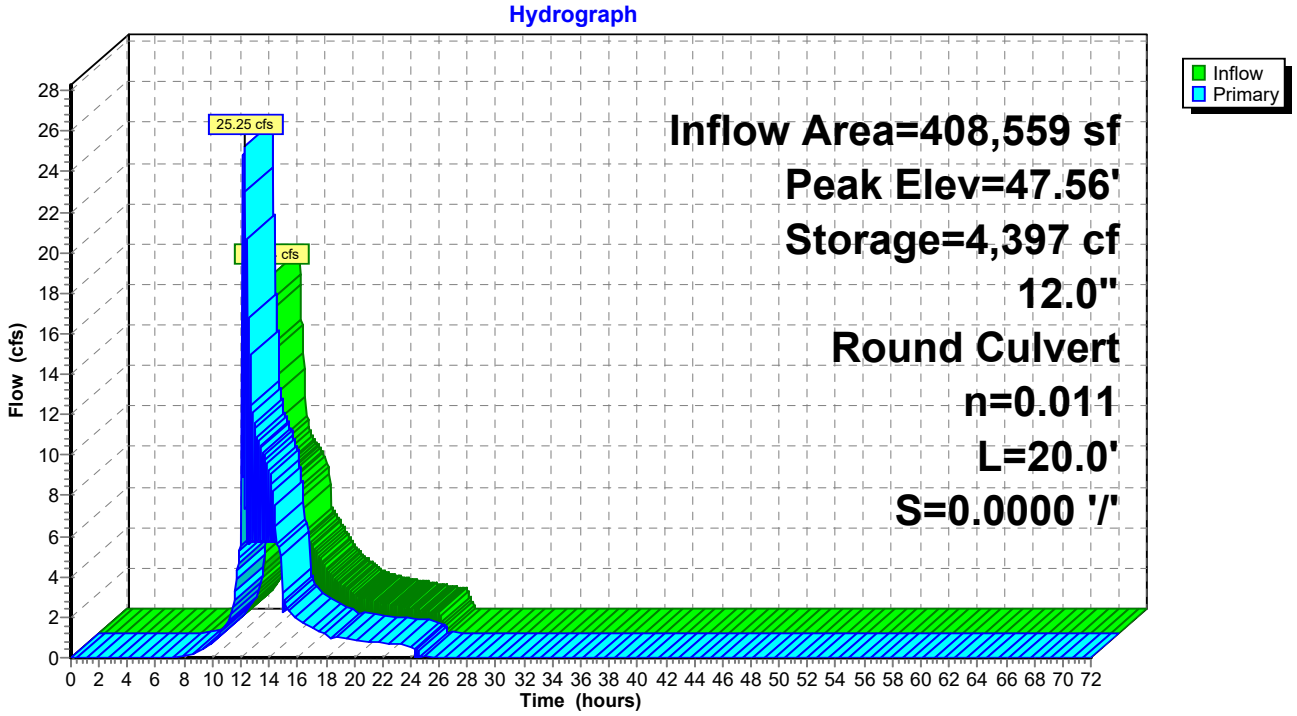
Volume	Invert	Avail.Storage	Storage Description
#1	2.50'	4,397 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
2.50	0	0.0	0	0	0
4.00	44	40.0	22	22	131
4.50	348	192.0	86	108	2,938
5.00	5,358	771.0	1,179	1,287	47,309
5.25	21,292	781.0	3,111	4,397	48,559

Device	Routing	Invert	Outlet Devices
#1	Primary	2.50'	**12.0" Round Culvert**
			L= 20.0' RCP, sq.cut end projecting, Ke= 0.500
			Inlet / Outlet Invert= 2.50' / 2.50' S= 0.0000 '/' Cc= 0.900
			n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=24.98 cfs @ 12.25 hrs HW=46.64' (Free Discharge)
1=Culvert (Inlet Controls 24.98 cfs @ 31.81 fps)

Pond P8: Pond 8



Summary for Pond P9: Pond 9

Inflow Area = 18,400 sf, 27.62% Impervious, Inflow Depth = 3.97" for 100YR - 24HR event
Inflow = 1.54 cfs @ 12.19 hrs, Volume= 6,080 cf
Outflow = 1.85 cfs @ 12.20 hrs, Volume= 5,672 cf, Atten= 0%, Lag= 0.6 min
Primary = 1.85 cfs @ 12.20 hrs, Volume= 5,672 cf
Routed to Pond P8 : Pond 8

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 5.26' @ 12.20 hrs Surf.Area= 2,618 sf Storage= 532 cf

Plug-Flow detention time= 68.8 min calculated for 5,668 cf (93% of inflow)
Center-of-Mass det. time= 34.9 min (877.7 - 842.8)

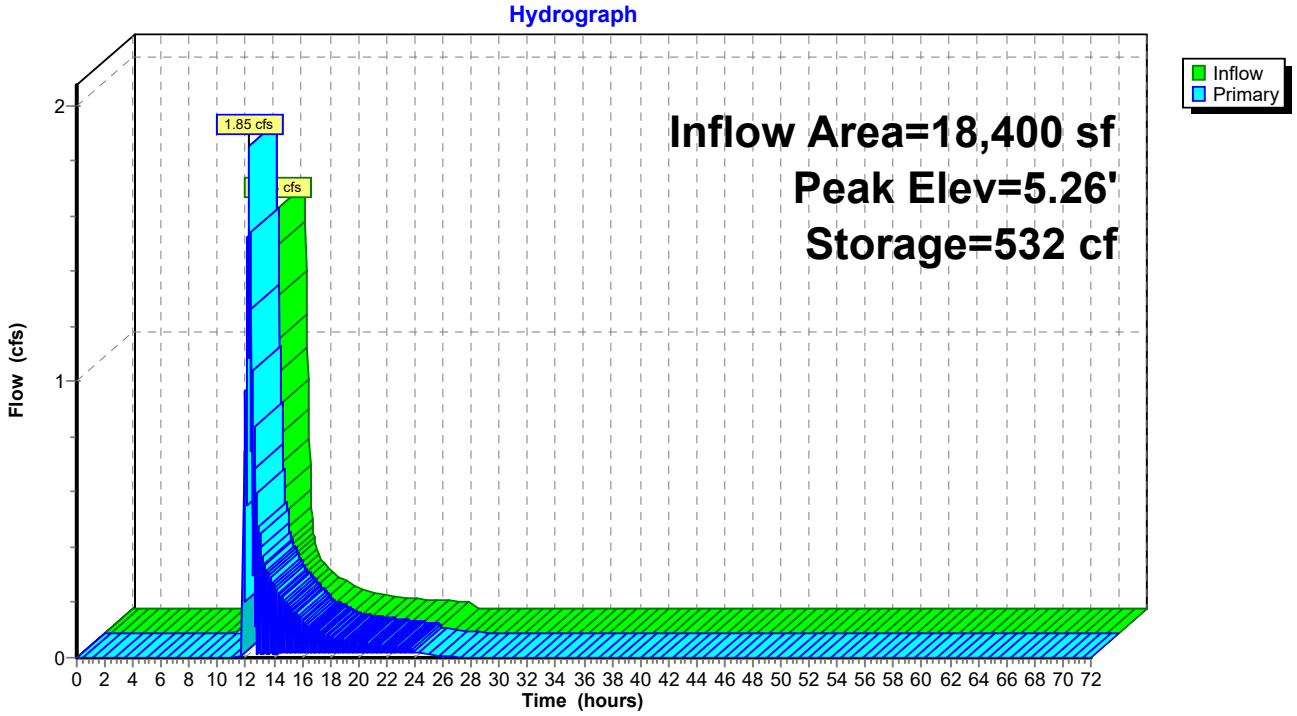
Volume	Invert	Avail.Storage	Storage Description
#1	1.60'	532 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
1.60	12	12.0	0	0	12
4.45	12	12.0	34	34	46
4.50	1,258	168.0	23	57	2,281
4.75	2,618	234.0	474	532	4,393

Device	Routing	Invert	Outlet Devices
#1	Primary	4.70'	**12.0" Round Culvert** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Primary	4.70'	**12.0" Round RCP_Round 12"** L= 37.0' RCP, sq.cut end projecting, Ke= 0.500 Inlet / Outlet Invert= 4.70' / 4.50' S= 0.0054 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.83 cfs @ 12.20 hrs HW=5.25' (Free Discharge)
1=Culvert (Barrel Controls 0.91 cfs @ 2.96 fps)
2=RCP_Round 12" (Barrel Controls 0.91 cfs @ 2.96 fps)

Pond P9: Pond 9



Summary for Pond SF2: Sand Filter Area 2

Inflow Area = 168,577 sf, 97.16% Impervious, Inflow Depth = 7.87" for 100YR - 24HR event
Inflow = 31.39 cfs @ 12.07 hrs, Volume= 110,561 cf
Outflow = 27.48 cfs @ 12.12 hrs, Volume= 110,561 cf, Atten= 12%, Lag= 2.8 min
Primary = 27.48 cfs @ 12.12 hrs, Volume= 110,561 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.16' @ 12.12 hrs Surf.Area= 0.220 ac Storage= 0.195 af

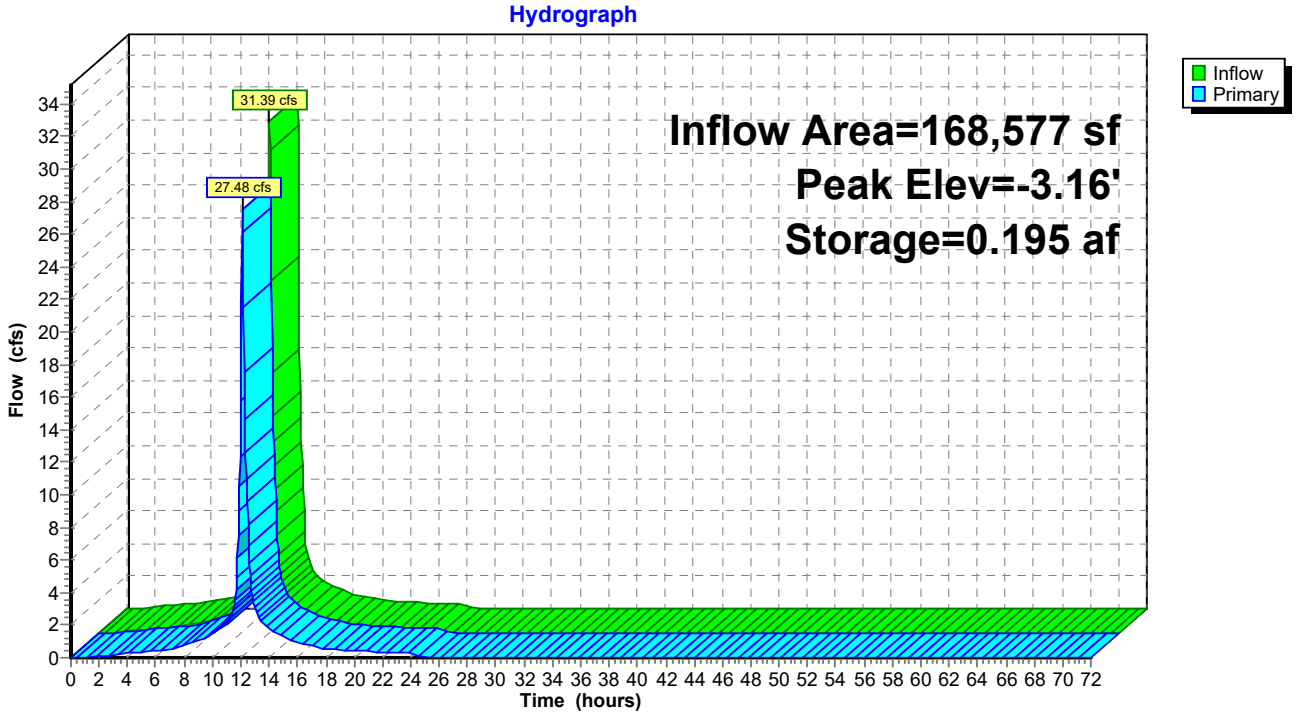
Plug-Flow detention time= 13.3 min calculated for 110,561 cf (100% of inflow)
Center-of-Mass det. time= 13.1 min (758.8 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.582 af	**StormTrap SingleTrap 4-0** x 54 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 54 Chambers in 8 Rows 67.83' x 107.77' Core + 6.66' Border = 81.15' x 121.08' System 0.979 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=26.78 cfs @ 12.12 hrs HW=-3.18' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 26.78 cfs @ 4.05 fps)

Pond SF2: Sand Filter Area 2



Summary for Pond SF3: Sand Filter Area 3

Inflow Area = 182,081 sf, 91.63% Impervious, Inflow Depth = 7.63" for 100YR - 24HR event
Inflow = 33.61 cfs @ 12.07 hrs, Volume= 115,780 cf
Outflow = 27.35 cfs @ 12.13 hrs, Volume= 115,780 cf, Atten= 19%, Lag= 3.6 min
Primary = 27.35 cfs @ 12.13 hrs, Volume= 115,780 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.16' @ 12.13 hrs Surf.Area= 0.305 ac Storage= 0.273 af

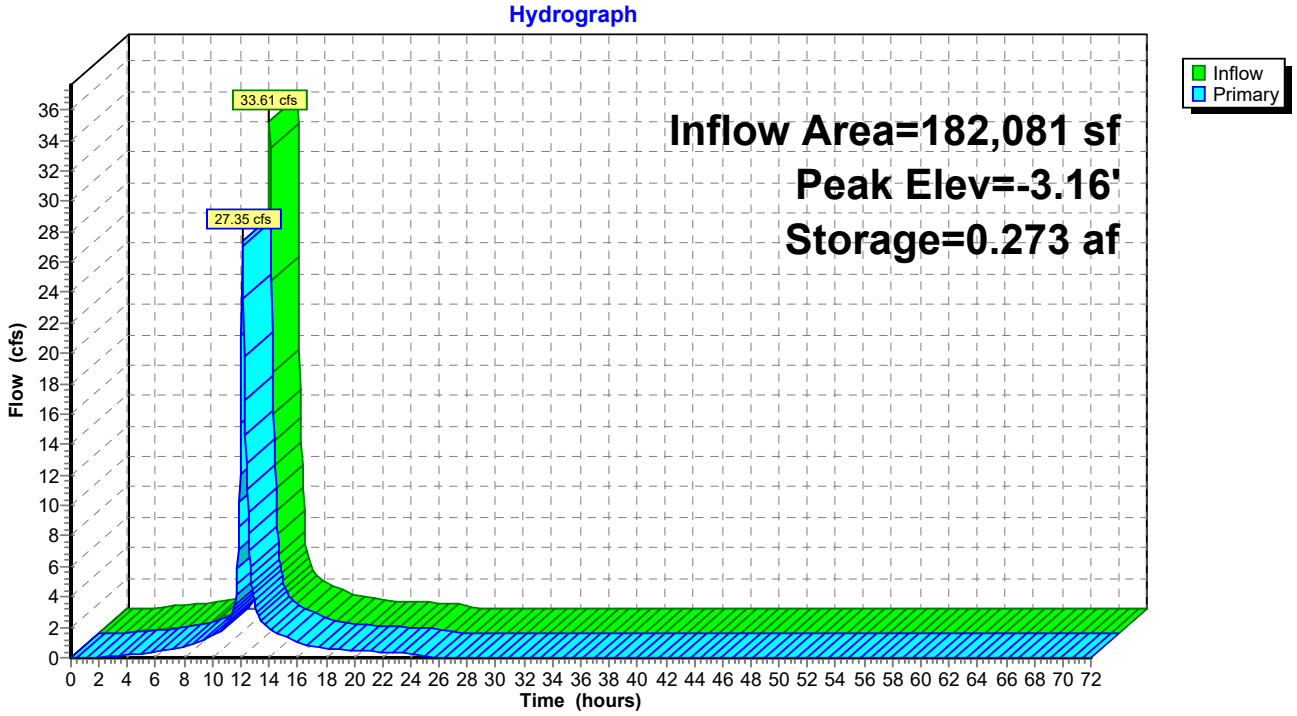
Plug-Flow detention time= 17.7 min calculated for 115,699 cf (100% of inflow)
Center-of-Mass det. time= 17.8 min (773.3 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.815 af	**StormTrap SingleTrap 4-0** x 77 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 77 Chambers in 7 Rows 59.35' x 169.35' Core + 6.66' Border = 72.67' x 182.67' System 1.371 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=26.88 cfs @ 12.13 hrs HW=-3.17' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 26.88 cfs @ 4.06 fps)

Pond SF3: Sand Filter Area 3



Summary for Pond SF5: SAND FILTER AREA 5

Inflow Area = 109,336 sf, 91.63% Impervious, Inflow Depth = 7.63" for 100YR - 24HR event
Inflow = 20.18 cfs @ 12.07 hrs, Volume= 69,523 cf
Outflow = 17.43 cfs @ 12.12 hrs, Volume= 69,523 cf, Atten= 14%, Lag= 3.0 min
Primary = 17.43 cfs @ 12.12 hrs, Volume= 69,523 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.48' @ 12.12 hrs Surf.Area= 0.205 ac Storage= 0.137 af

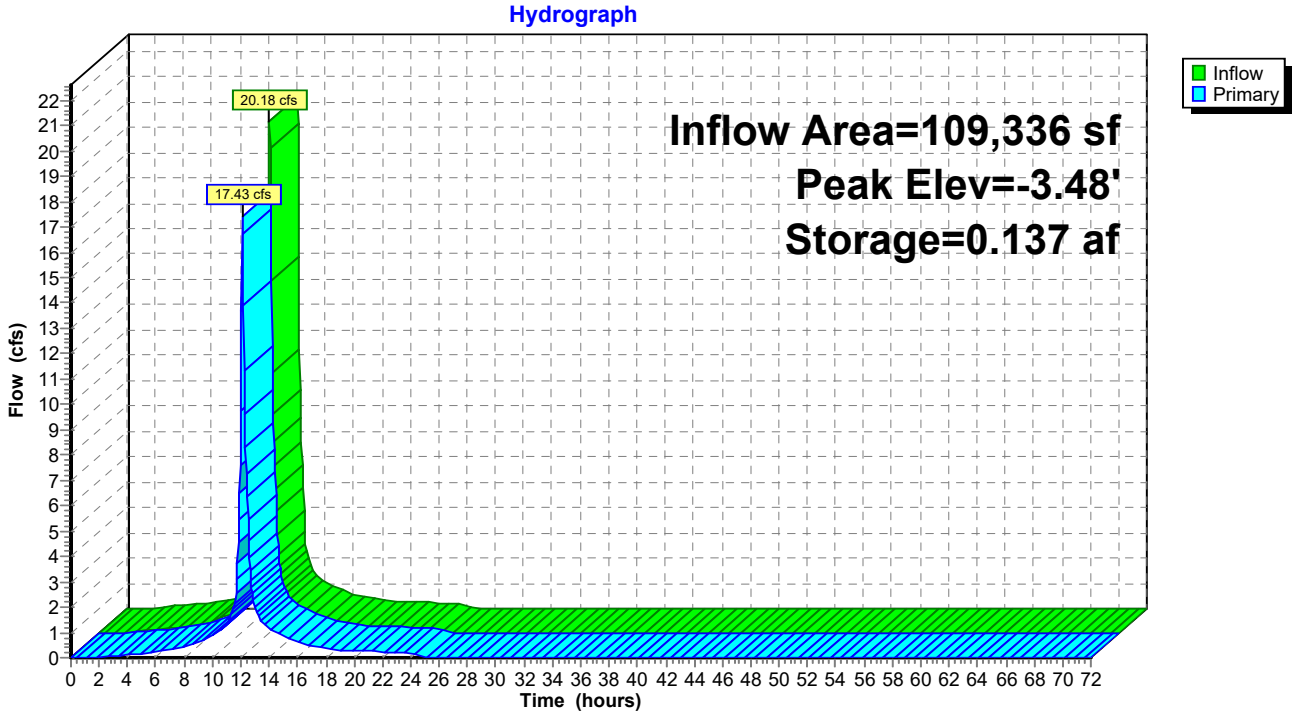
Plug-Flow detention time= 14.1 min calculated for 69,523 cf (100% of inflow)
Center-of-Mass det. time= 13.9 min (769.4 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.538 af	**StormTrap SingleTrap 4-0** x 50 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 50 Chambers in 9 Rows 76.31' x 92.38' Core + 6.66' Border = 89.63' x 105.69' System 0.906 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=16.97 cfs @ 12.12 hrs HW=-3.50' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 16.97 cfs @ 3.38 fps)

Pond SF5: SAND FILTER AREA 5



Summary for Pond SF6: SAND FILTER AREA 6

Inflow Area = 171,191 sf, 92.11% Impervious, Inflow Depth = 7.75" for 100YR - 24HR event
Inflow = 31.75 cfs @ 12.07 hrs, Volume= 110,565 cf
Outflow = 25.95 cfs @ 12.13 hrs, Volume= 110,565 cf, Atten= 18%, Lag= 3.6 min
Primary = 25.95 cfs @ 12.13 hrs, Volume= 110,565 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.20' @ 12.13 hrs Surf.Area= 0.296 ac Storage= 0.254 af

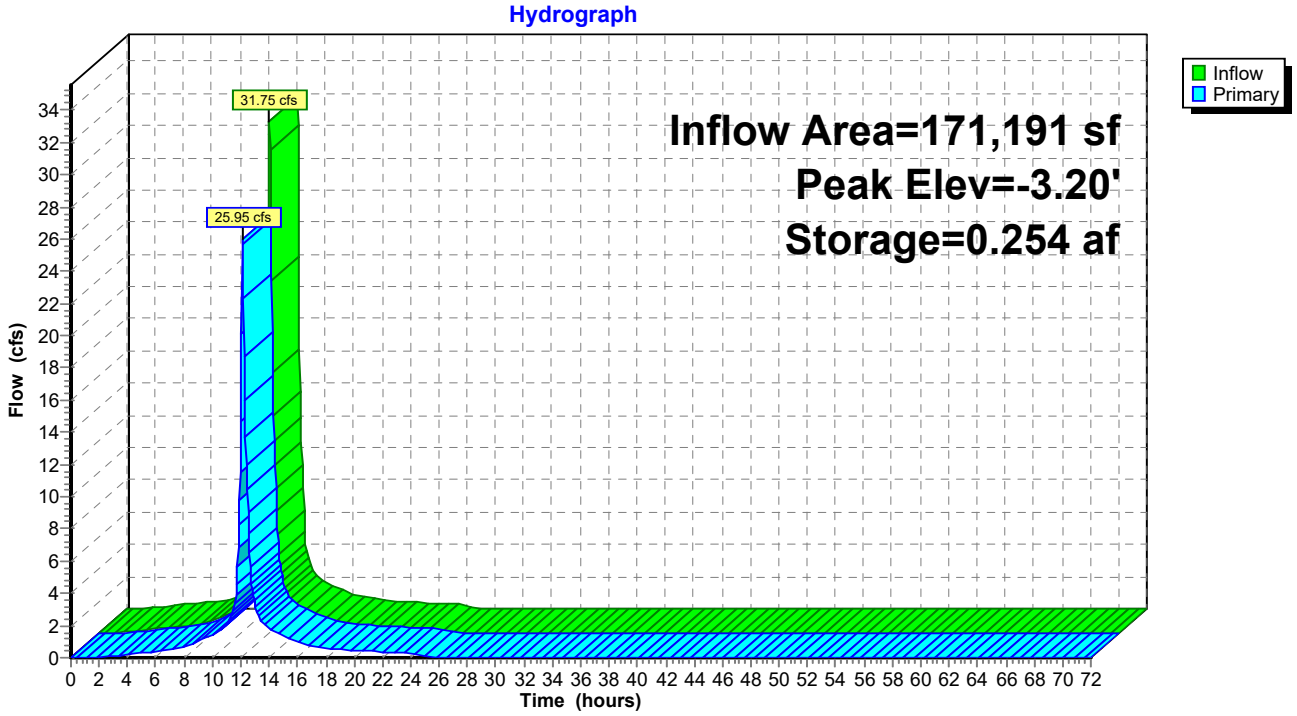
Plug-Flow detention time= 17.4 min calculated for 110,488 cf (100% of inflow)
Center-of-Mass det. time= 17.5 min (768.4 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.784 af	**StormTrap SingleTrap 4-0** x 74 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 74 Chambers in 7 Rows 59.35' x 169.35' Core + 6.66' Border = 72.67' x 182.67' System 1.318 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=25.49 cfs @ 12.13 hrs HW=-3.22' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 25.49 cfs @ 3.97 fps)

Pond SF6: SAND FILTER AREA 6



Summary for Pond SF7: SAND FILTER AREA 7

Inflow Area = 67,954 sf, 92.31% Impervious, Inflow Depth = 7.75" for 100YR - 24HR event
Inflow = 12.60 cfs @ 12.07 hrs, Volume= 43,888 cf
Outflow = 11.34 cfs @ 12.11 hrs, Volume= 43,888 cf, Atten= 10%, Lag= 2.5 min
Primary = 11.34 cfs @ 12.11 hrs, Volume= 43,888 cf
Routed to Link PS1 : Pump Station 1

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.70' @ 12.11 hrs Surf.Area= 0.131 ac Storage= 0.069 af

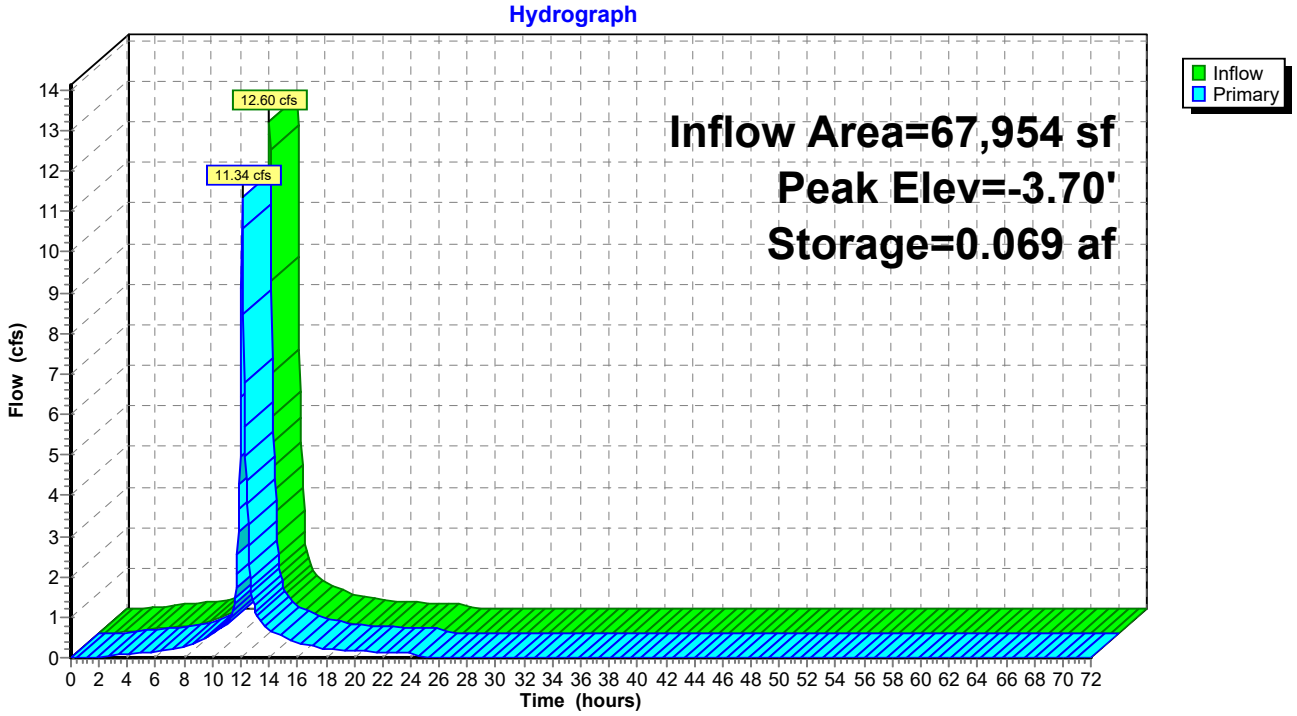
Plug-Flow detention time= 10.7 min calculated for 43,888 cf (100% of inflow)
Center-of-Mass det. time= 10.6 min (761.5 - 750.9)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.350 af	**StormTrap SingleTrap 4-0** x 28 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 28 Chambers in 4 Rows 33.92' x 107.77' Core + 6.66' Border = 47.23' x 121.08' System 0.591 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=11.07 cfs @ 12.11 hrs HW=-3.72' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 11.07 cfs @ 2.82 fps)

Pond SF7: SAND FILTER AREA 7



Summary for Pond SF8: SAND FILTER AREA 8

Inflow Area = 53,579 sf, 90.24% Impervious, Inflow Depth = 7.63" for 100YR - 24HR event
Inflow = 9.89 cfs @ 12.07 hrs, Volume= 34,069 cf
Outflow = 8.71 cfs @ 12.12 hrs, Volume= 34,069 cf, Atten= 12%, Lag= 2.8 min
Primary = 8.71 cfs @ 12.12 hrs, Volume= 34,069 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.82' @ 12.12 hrs Surf.Area= 0.131 ac Storage= 0.060 af

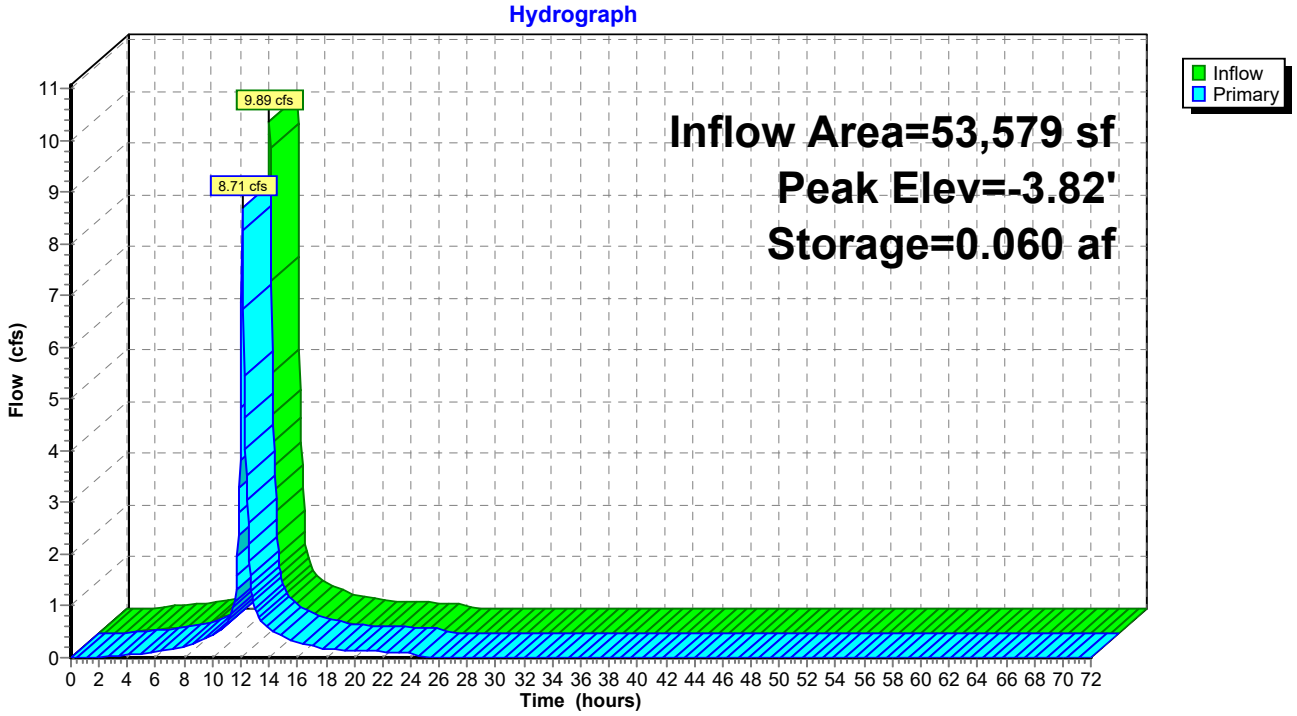
Plug-Flow detention time= 11.3 min calculated for 34,046 cf (100% of inflow)
Center-of-Mass det. time= 11.3 min (766.9 - 755.5)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.350 af	**StormTrap SingleTrap 4-0** x 28 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 28 Chambers in 4 Rows 33.92' x 107.77' Core + 6.66' Border = 47.23' x 121.08' System 0.591 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=8.48 cfs @ 12.12 hrs HW=-3.83' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 8.48 cfs @ 2.53 fps)

Pond SF8: SAND FILTER AREA 8



Summary for Pond SFA1: SAND FILTER AREA A1

Inflow Area = 202,990 sf, 83.69% Impervious, Inflow Depth = 7.39" for 100YR - 24HR event
Inflow = 37.00 cfs @ 12.07 hrs, Volume= 125,023 cf
Outflow = 32.01 cfs @ 12.12 hrs, Volume= 125,023 cf, Atten= 13%, Lag= 2.9 min
Primary = 32.01 cfs @ 12.12 hrs, Volume= 125,023 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.03' @ 12.12 hrs Surf.Area= 0.248 ac Storage= 0.243 af

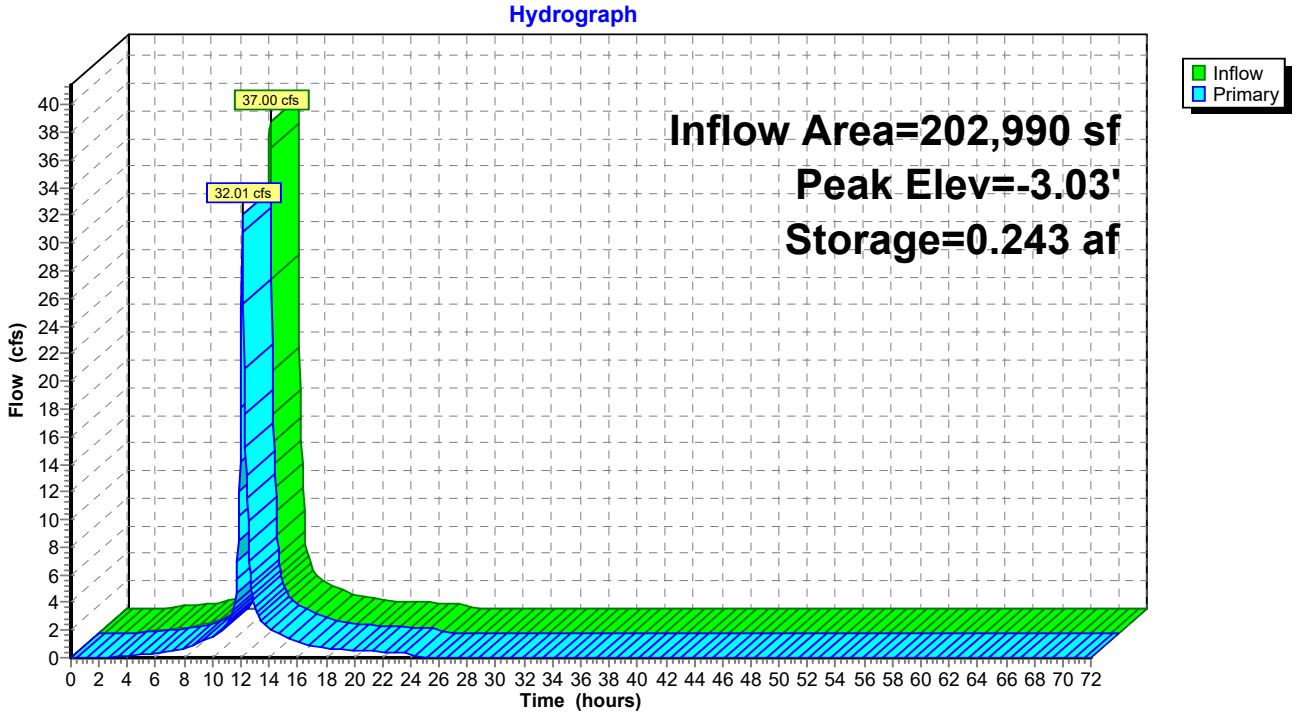
Plug-Flow detention time= 13.7 min calculated for 124,937 cf (100% of inflow)
Center-of-Mass det. time= 13.8 min (777.5 - 763.7)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	0.659 af	**StormTrap SingleTrap 4-0** x 62 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 62 Chambers in 8 Rows 67.83' x 123.17' Core + 6.66' Border = 81.15' x 136.48' System 1.108 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=31.18 cfs @ 12.12 hrs HW=-3.05' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 31.18 cfs @ 4.30 fps)

Pond SFA1: SAND FILTER AREA A1



Summary for Pond SFA2: SAND FILTER AREA A2

Inflow Area = 190,357 sf,100.00% Impervious, Inflow Depth = 7.99" for 100YR - 24HR event
Inflow = 35.54 cfs @ 12.07 hrs, Volume= 126,747 cf
Outflow = 27.44 cfs @ 12.14 hrs, Volume= 126,747 cf, Atten= 23%, Lag= 4.2 min
Primary = 27.44 cfs @ 12.14 hrs, Volume= 126,747 cf
Routed to Link PS2 : Pump Station 2

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= -3.16' @ 12.14 hrs Surf.Area= 0.382 ac Storage= 0.345 af

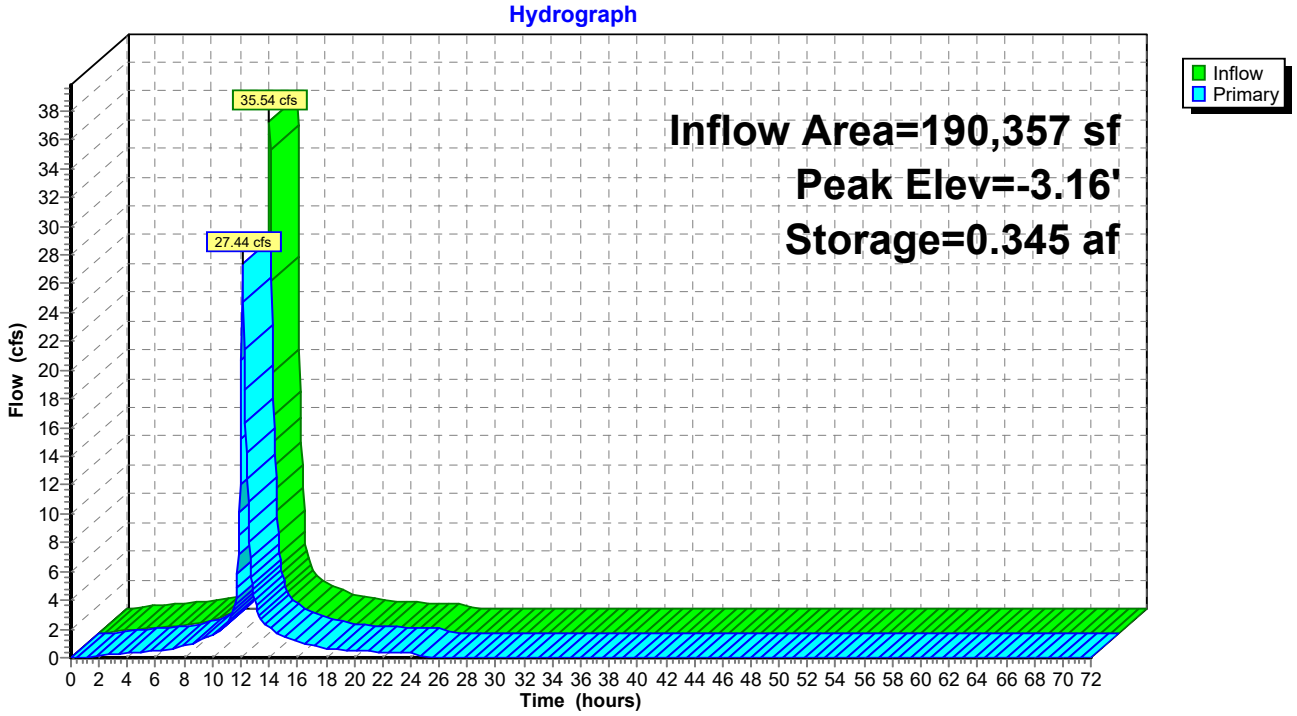
Plug-Flow detention time= 22.8 min calculated for 126,747 cf (100% of inflow)
Center-of-Mass det. time= 22.4 min (762.3 - 739.9)

Volume	Invert	Avail.Storage	Storage Description
#1	-4.50'	1.027 af	**StormTrap SingleTrap 4-0** x 101 Inside= 101.7"W x 48.0"H => 30.55 sf x 15.40'L = 470.3 cf Outside= 101.7"W x 54.0"H => 38.16 sf x 15.40'L = 587.4 cf 101 Chambers in 9 Rows 76.31' x 169.35' Core + 6.66' Border = 89.63' x 182.67' System 1.725 af Overall x 75.0% Voids

Device	Routing	Invert	Outlet Devices
#1	Primary	-4.50'	**5.0' long (Profile 1) Broad-Crested Rectangular Weir** Head (feet) 0.49 0.98 1.48 Coef. (English) 2.92 3.37 3.59

Primary OutFlow Max=27.15 cfs @ 12.14 hrs HW=-3.17' (Free Discharge)
↑—**1=Broad-Crested Rectangular Weir** (Weir Controls 27.15 cfs @ 4.07 fps)

Pond SFA2: SAND FILTER AREA A2



Summary for Pond T1: Sand Filter 1

Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 4.68" for 100YR - 24HR event
Inflow = 16.20 cfs @ 12.10 hrs, Volume= 38,545 cf
Outflow = 21.96 cfs @ 12.10 hrs, Volume= 38,291 cf, Atten= 0%, Lag= 0.0 min
Primary = 6.49 cfs @ 12.10 hrs, Volume= 33,487 cf
Routed to Link 2L : TUTTLE BROOK
Secondary = 15.47 cfs @ 12.10 hrs, Volume= 4,804 cf
Routed to Link 2L : TUTTLE BROOK

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.76' @ 12.10 hrs Surf.Area= 4,723 sf Storage= 5,652 cf

Plug-Flow detention time= 22.7 min calculated for 38,264 cf (99% of inflow)
Center-of-Mass det. time= 21.8 min (766.5 - 744.7)

Volume	Invert	Avail.Storage	Storage Description
#1	0.04'	5,004 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 17,428 cf Overall - 749 cf Embedded = 16,679 cf x 30.0% Voids
#2	0.21'	648 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 928.0' S= 0.0014 '/' 749 cf Overall - 0.3" Wall Thickness = 648 cf
		5,652 cf	Total Available Storage

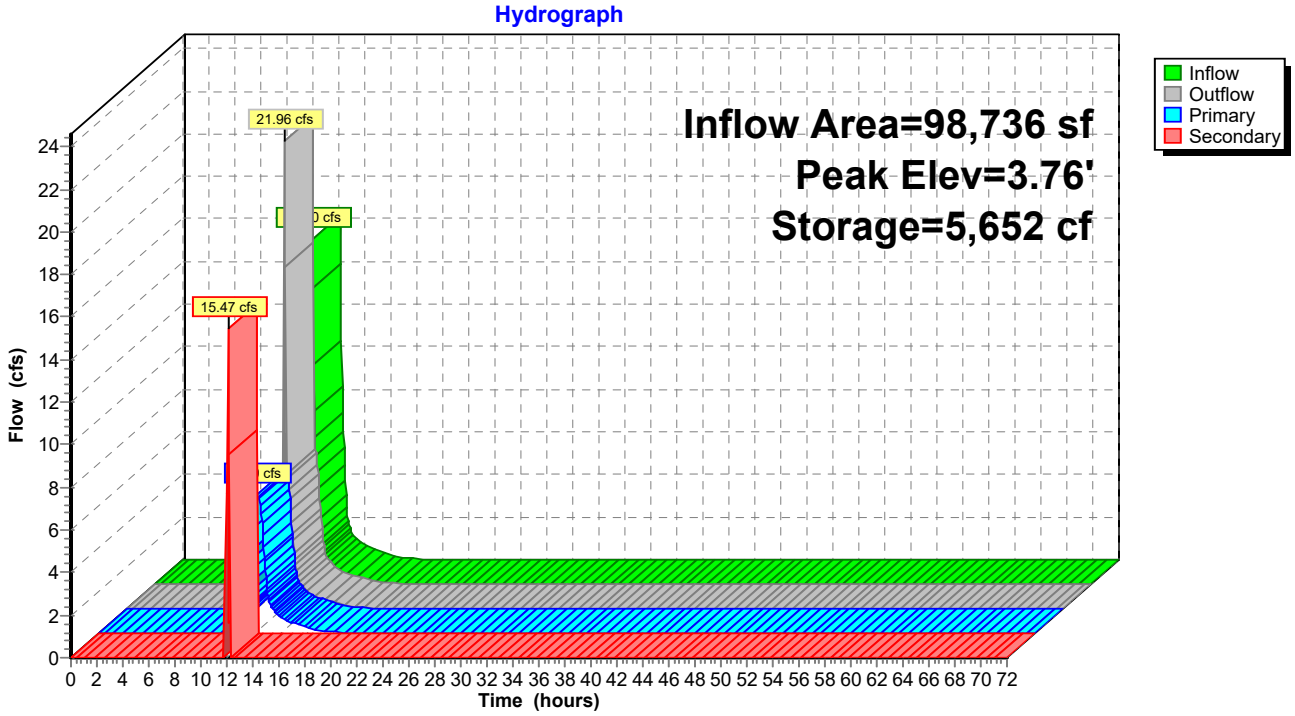
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
0.04	4,723	0	0
1.50	4,723	6,896	6,896
3.50	4,723	9,446	16,342
3.73	4,723	1,086	17,428

Device	Routing	Invert	Outlet Devices
#1	Primary	0.21'	**18.0" Round Culvert** L= 202.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 0.21' / 0.11' S= 0.0005 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Secondary	3.73'	**928.0' long overflow** 2 End Contraction(s)
#3	Device 1	0.21'	**0.5" Vert. perf pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=6.49 cfs @ 12.10 hrs HW=3.76' (Free Discharge)
└**1=Culvert** (Barrel Controls 6.49 cfs @ 3.67 fps)
└**3=perf pipe holes** (Passes 6.49 cfs of 12.32 cfs potential flow)

Secondary OutFlow Max=12.60 cfs @ 12.10 hrs HW=3.76' (Free Discharge)
└**2=overflow** (Weir Controls 12.60 cfs @ 0.53 fps)

Pond T1: Sand Filter 1



Summary for Pond T2: Sand Filter 2

Inflow Area = 98,736 sf, 72.12% Impervious, Inflow Depth = 4.68" for 100YR - 24HR event
Inflow = 16.31 cfs @ 12.10 hrs, Volume= 38,545 cf
Outflow = 13.34 cfs @ 12.20 hrs, Volume= 38,318 cf, Atten= 18%, Lag= 6.0 min
Primary = 9.17 cfs @ 12.19 hrs, Volume= 37,564 cf
Routed to Pond CB10 : Exist CB
Secondary = 4.19 cfs @ 12.20 hrs, Volume= 754 cf
Routed to Pond CB10 : Exist CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 3.74' @ 12.19 hrs Surf.Area= 4,723 sf Storage= 7,387 cf

Plug-Flow detention time= 17.1 min calculated for 38,318 cf (99% of inflow)
Center-of-Mass det. time= 14.9 min (759.0 - 744.1)

Volume	Invert	Avail.Storage	Storage Description
#1	-1.26'	6,880 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 23,521 cf Overall - 586 cf Embedded = 22,935 cf x 30.0% Voids
#2	-1.10'	507 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 726.0' S= 0.0035 '/' 586 cf Overall - 0.3" Wall Thickness = 507 cf
		7,387 cf	Total Available Storage

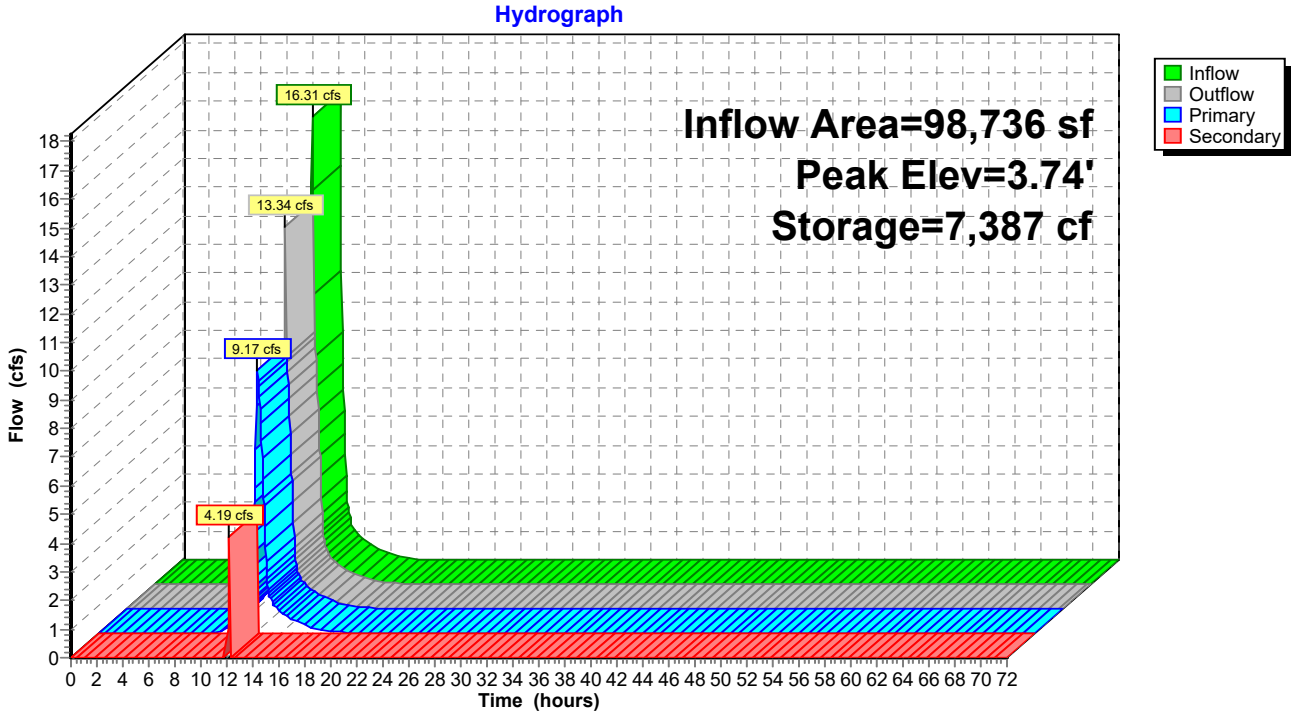
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-1.26	4,723	0	0
1.50	4,723	13,035	13,035
3.49	4,723	9,399	22,434
3.72	4,723	1,086	23,521

Device	Routing	Invert	Outlet Devices
#1	Primary	-1.20'	**18.0" Round Culvert** L= 177.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= -1.20' / -1.59' S= 0.0022 '/' Cc= 0.900 n= 0.020 Corrugated PE, corrugated interior, Flow Area= 1.77 sf
#2	Secondary	3.72'	**726.0' long overflow** 2 End Contraction(s)
#3	Device 1	-1.10'	**0.5" Vert. Perf Pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.13 cfs @ 12.19 hrs HW=3.70' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 9.13 cfs @ 5.16 fps)
↑—**3=Perf Pipe holes** (Passes 9.13 cfs of 14.35 cfs potential flow)

Secondary OutFlow Max=1.67 cfs @ 12.20 hrs HW=3.73' (Free Discharge)
↑—**2=overflow** (Weir Controls 1.67 cfs @ 0.29 fps)

Pond T2: Sand Filter 2



Summary for Pond T3: Sand Filter 3

Inflow Area = 34,322 sf, 59.30% Impervious, Inflow Depth = 2.86" for 100YR - 24HR event
Inflow = 5.04 cfs @ 12.10 hrs, Volume= 8,173 cf
Outflow = 4.77 cfs @ 12.13 hrs, Volume= 8,081 cf, Atten= 5%, Lag= 1.7 min
Primary = 4.77 cfs @ 12.13 hrs, Volume= 8,081 cf
Routed to Pond CB8 : CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.26' @ 12.13 hrs Surf.Area= 1,808 sf Storage= 699 cf

Plug-Flow detention time= 4.8 min calculated for 8,081 cf (99% of inflow)
Center-of-Mass det. time= 3.2 min (736.9 - 733.8)

Volume	Invert	Avail.Storage	Storage Description
#1	-0.92'	2,103 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 7,377 cf Overall - 365 cf Embedded = 7,011 cf x 30.0% Voids
#2	-0.75'	316 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 453.0' S= 0.0050 '/' 365 cf Overall - 0.3" Wall Thickness = 316 cf
		2,420 cf	Total Available Storage

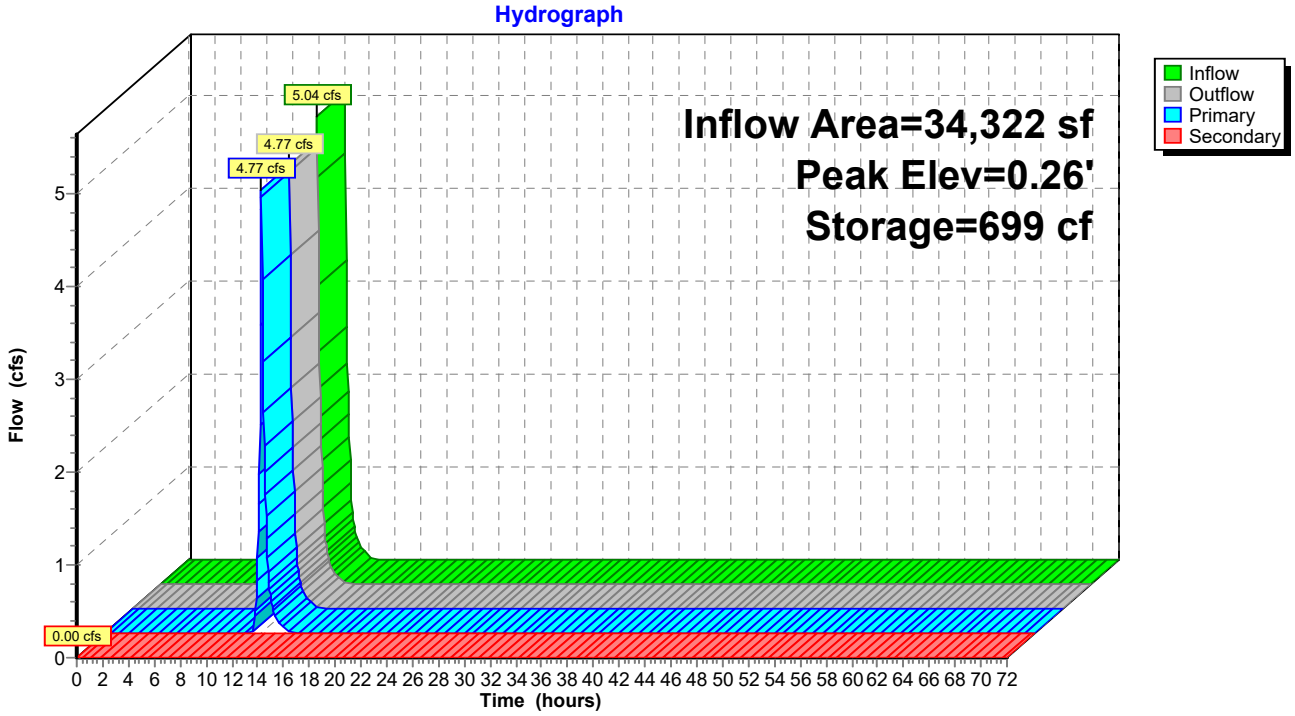
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-0.92	1,808	0	0
0.08	1,808	1,808	1,808
1.66	1,808	2,857	4,665
3.16	1,808	2,712	7,377

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.95'	**24.0" Round Culvert** L= 38.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= -0.95' / -1.01' S= 0.0016 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf
#2	Secondary	3.16'	**453.0' long overflow** 2 End Contraction(s)
#3	Device 1	-0.75'	**0.5" Vert. Perf Pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.65 cfs @ 12.13 hrs HW=0.24' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.65 cfs @ 3.44 fps)
↑—**3=Perf Pipe holes** (Passes 4.65 cfs of 6.45 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-0.92' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T3: Sand Filter 3



Summary for Pond T4: Sand Filter 4

Inflow Area = 31,658 sf, 56.17% Impervious, Inflow Depth = 2.70" for 100YR - 24HR event
Inflow = 4.54 cfs @ 12.10 hrs, Volume= 7,122 cf
Outflow = 4.28 cfs @ 12.14 hrs, Volume= 7,030 cf, Atten= 6%, Lag= 1.9 min
Primary = 4.28 cfs @ 12.14 hrs, Volume= 7,030 cf
Routed to Pond CB8 : CB
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Pond CB8 : CB

Routing by Stor-Ind method, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs
Peak Elev= 0.55' @ 12.14 hrs Surf.Area= 1,808 sf Storage= 758 cf

Plug-Flow detention time= 6.1 min calculated for 7,030 cf (99% of inflow)
Center-of-Mass det. time= 4.5 min (737.7 - 733.2)

Volume	Invert	Avail.Storage	Storage Description
#1	-0.72'	1,946 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 6,852 cf Overall - 365 cf Embedded = 6,487 cf x 30.0% Voids
#2	-0.55'	316 cf	**8.0" Round Pipe Storage** x 2 Inside #1 L= 453.0' S= 0.0050 '/' 365 cf Overall - 0.3" Wall Thickness = 316 cf
		2,262 cf	Total Available Storage

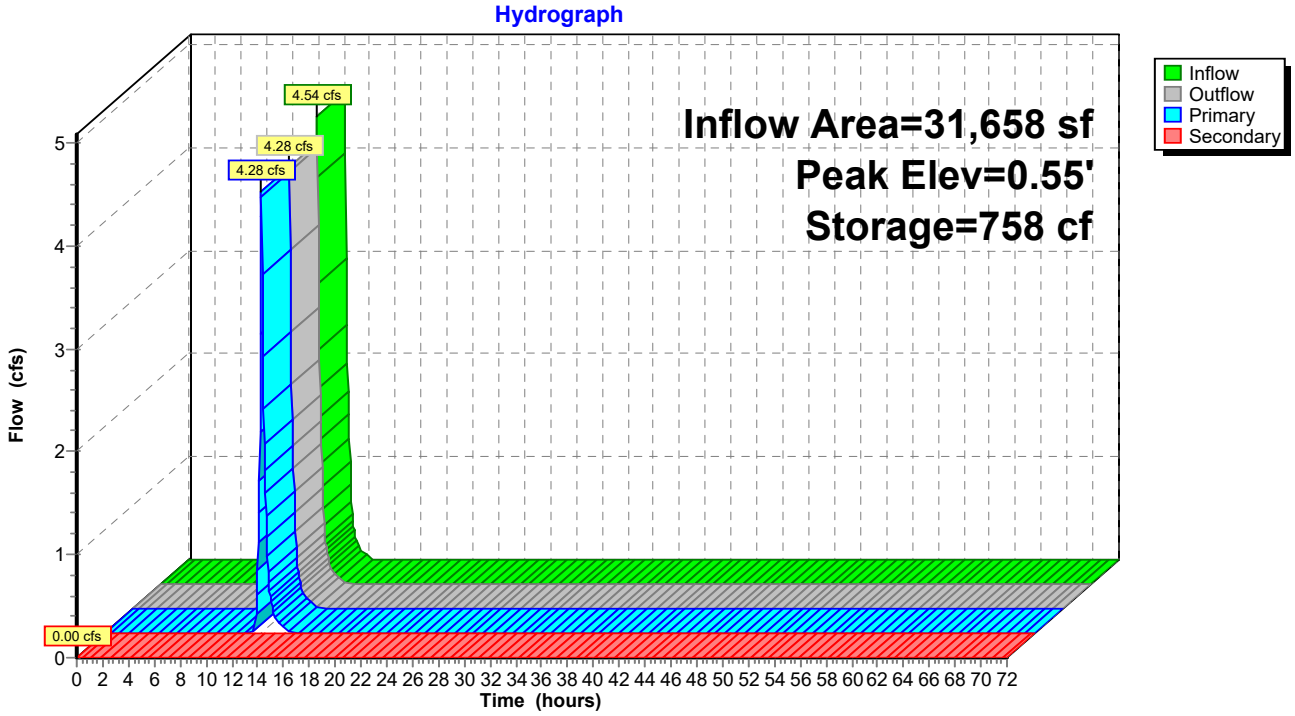
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
-0.72	1,808	0	0
1.50	1,808	4,014	4,014
2.93	1,808	2,585	6,599
3.07	1,808	253	6,852

Device	Routing	Invert	Outlet Devices
#1	Primary	-0.65'	**24.0" Round Culvert** L= 131.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= -0.65' / -0.85' S= 0.0015 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 3.14 sf
#2	Secondary	3.07'	**453.0' long overflow** 2 End Contraction(s)
#3	Device 1	-0.55'	**0.5" Vert. Perf pipe holes X 999.00** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=4.18 cfs @ 12.14 hrs HW=0.53' (Free Discharge)
↑—**1=Culvert** (Barrel Controls 4.18 cfs @ 3.10 fps)
↑—**3=Perf pipe holes** (Passes 4.18 cfs of 6.76 cfs potential flow)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=-0.72' (Free Discharge)
↑—**2=overflow** (Controls 0.00 cfs)

Pond T4: Sand Filter 4

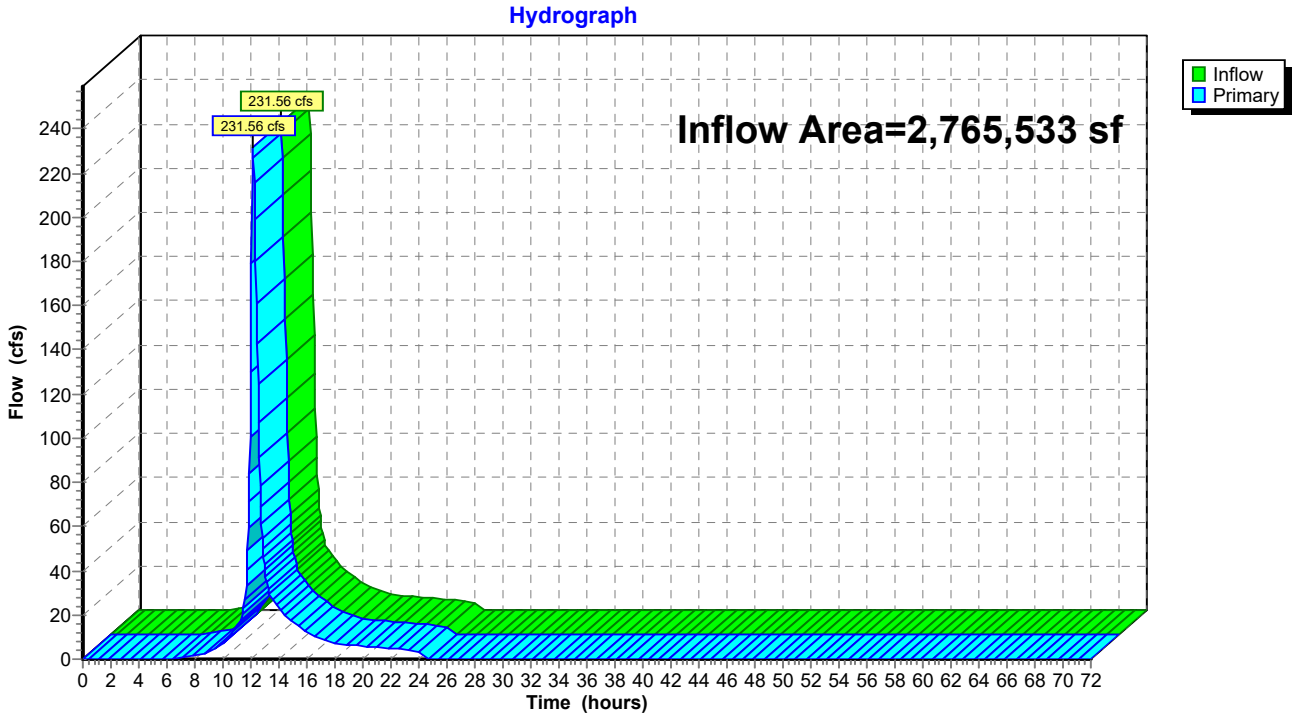


Summary for Link 1L: WEST WETL

Inflow Area = 2,765,533 sf, 39.83% Impervious, Inflow Depth = 4.70" for 100YR - 24HR event
Inflow = 231.56 cfs @ 12.16 hrs, Volume= 1,082,862 cf
Primary = 231.56 cfs @ 12.16 hrs, Volume= 1,082,862 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 2L : TUTTLE BROOK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 1L: WEST WETL

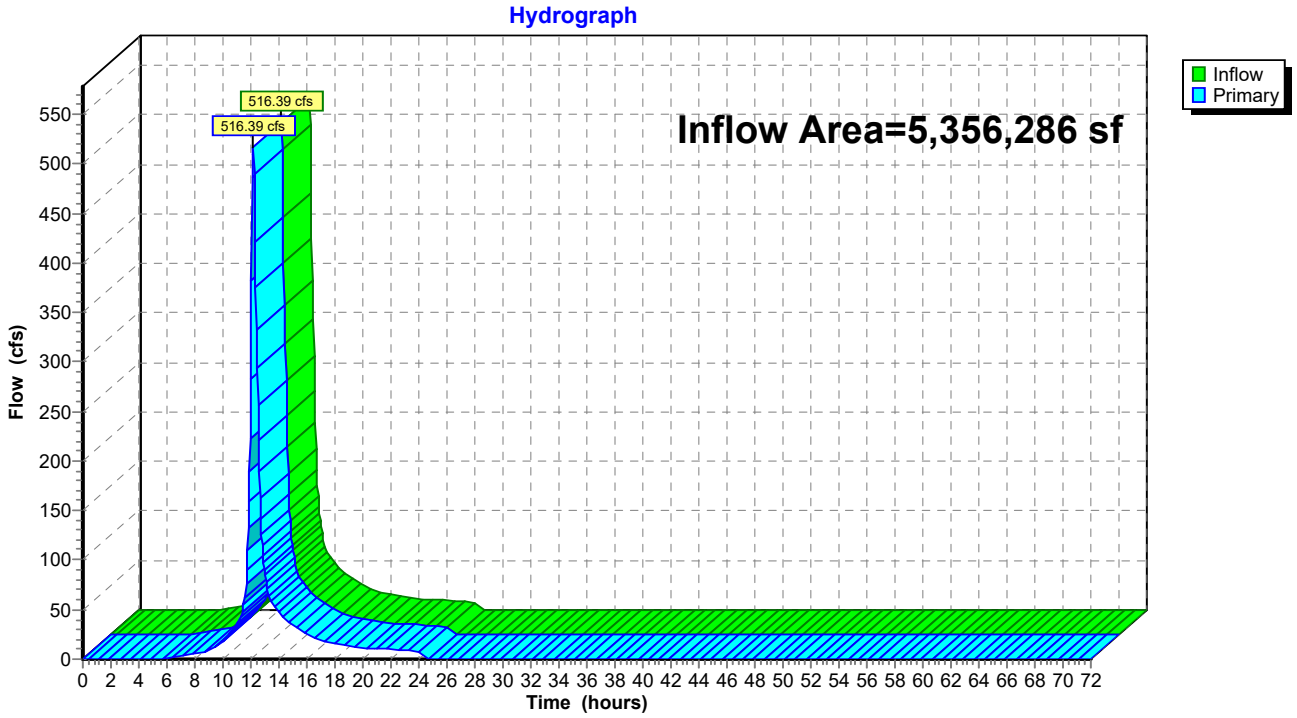


Summary for Link 2L: TUTTLE BROOK

Inflow Area = 5,356,286 sf, 27.31% Impervious, Inflow Depth = 5.22" for 100YR - 24HR event
Inflow = 516.39 cfs @ 12.18 hrs, Volume= 2,329,796 cf
Primary = 516.39 cfs @ 12.18 hrs, Volume= 2,329,796 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 2L: TUTTLE BROOK

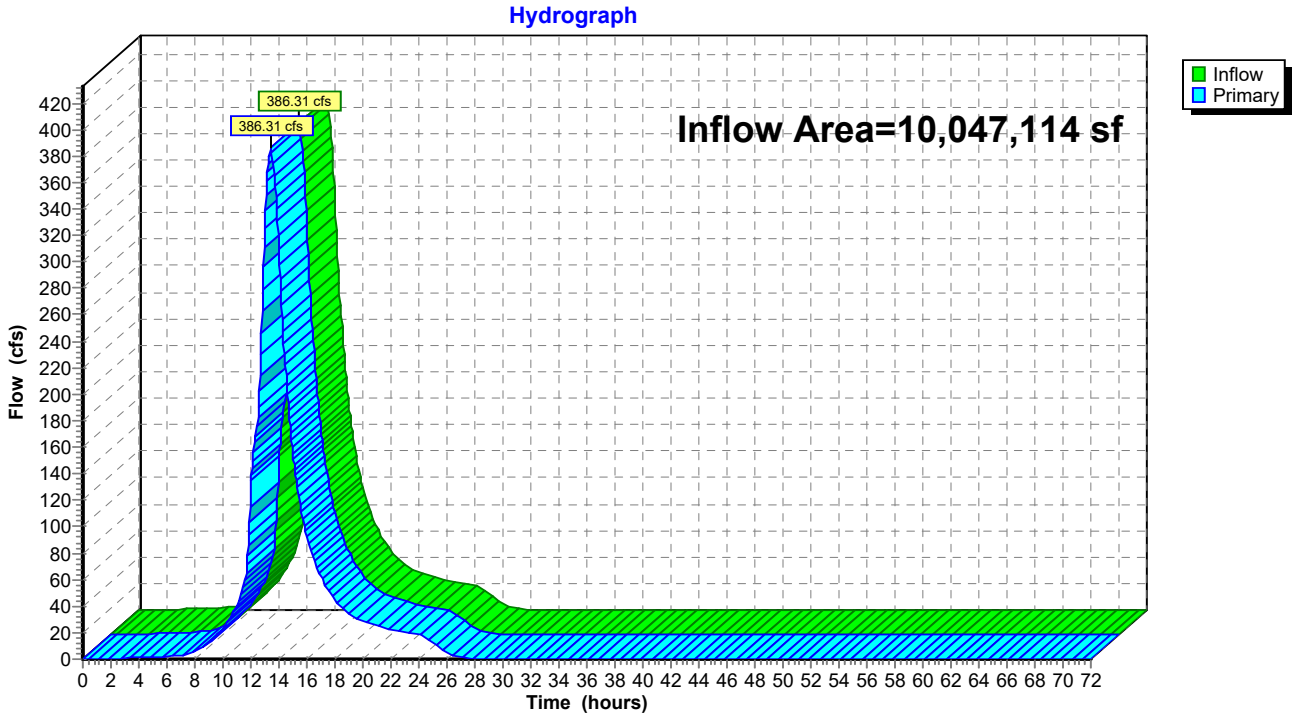


Summary for Link 3L: EAST WETL

Inflow Area = 10,047,114 sf, 45.76% Impervious, Inflow Depth = 5.85" for 100YR - 24HR event
Inflow = 386.31 cfs @ 13.41 hrs, Volume= 4,895,555 cf
Primary = 386.31 cfs @ 13.41 hrs, Volume= 4,895,555 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 3L: EAST WETL

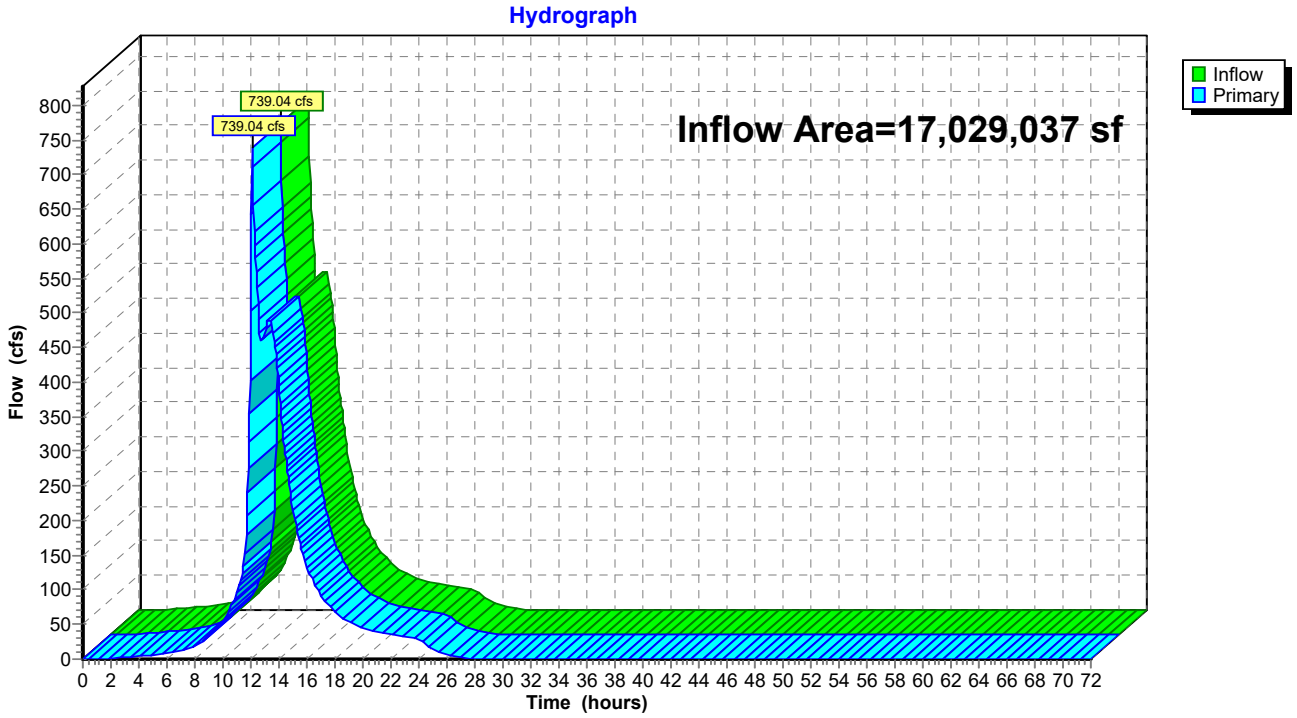


Summary for Link 4L: MORRIS CREEK

Inflow Area = 17,029,037 sf, 42.77% Impervious, Inflow Depth = 5.90" for 100YR - 24HR event
Inflow = 739.04 cfs @ 12.11 hrs, Volume= 8,372,412 cf
Primary = 739.04 cfs @ 12.11 hrs, Volume= 8,372,412 cf, Atten= 0%, Lag= 0.0 min
Routed to Link AP1 : TIDE GATE

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link 4L: MORRIS CREEK



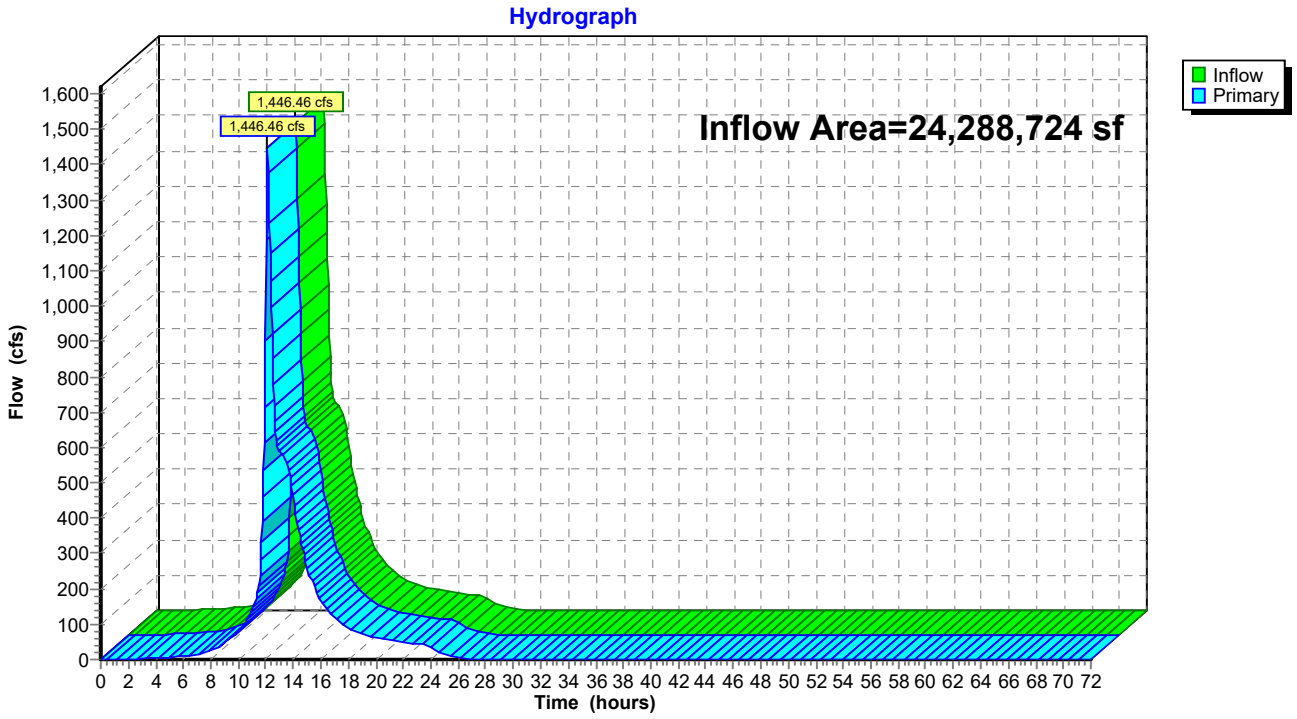
Summary for Link AP1: TIDE GATE

Inflow Area = 24,288,724 sf, 36.95% Impervious, Inflow Depth = 5.68" for 100YR - 24HR event
Inflow = 1,446.46 cfs @ 12.12 hrs, Volume= 11,499,125 cf
Primary = 1,446.46 cfs @ 12.12 hrs, Volume= 11,499,125 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Fixed water surface Elevation= 2.50'

Link AP1: TIDE GATE

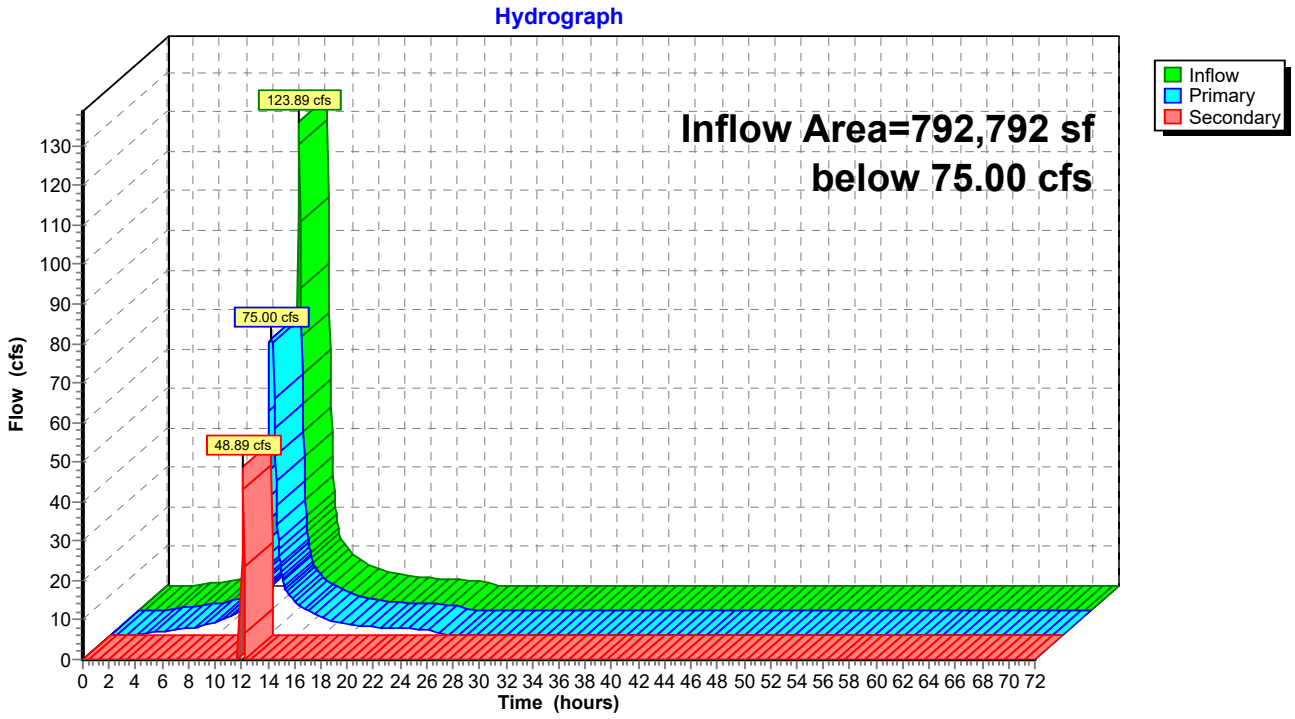


Summary for Link PS1: Pump Station 1

Inflow Area = 792,792 sf, 92.69% Impervious, Inflow Depth = 7.70" for 100YR - 24HR event
Inflow = 123.89 cfs @ 12.12 hrs, Volume= 508,880 cf
Primary = 75.00 cfs @ 12.05 hrs, Volume= 482,466 cf, Atten= 39%, Lag= 0.0 min
Routed to Link W1 : EAST WETL
Secondary = 48.89 cfs @ 12.12 hrs, Volume= 26,414 cf

Primary outflow = Inflow below 75.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PS1: Pump Station 1

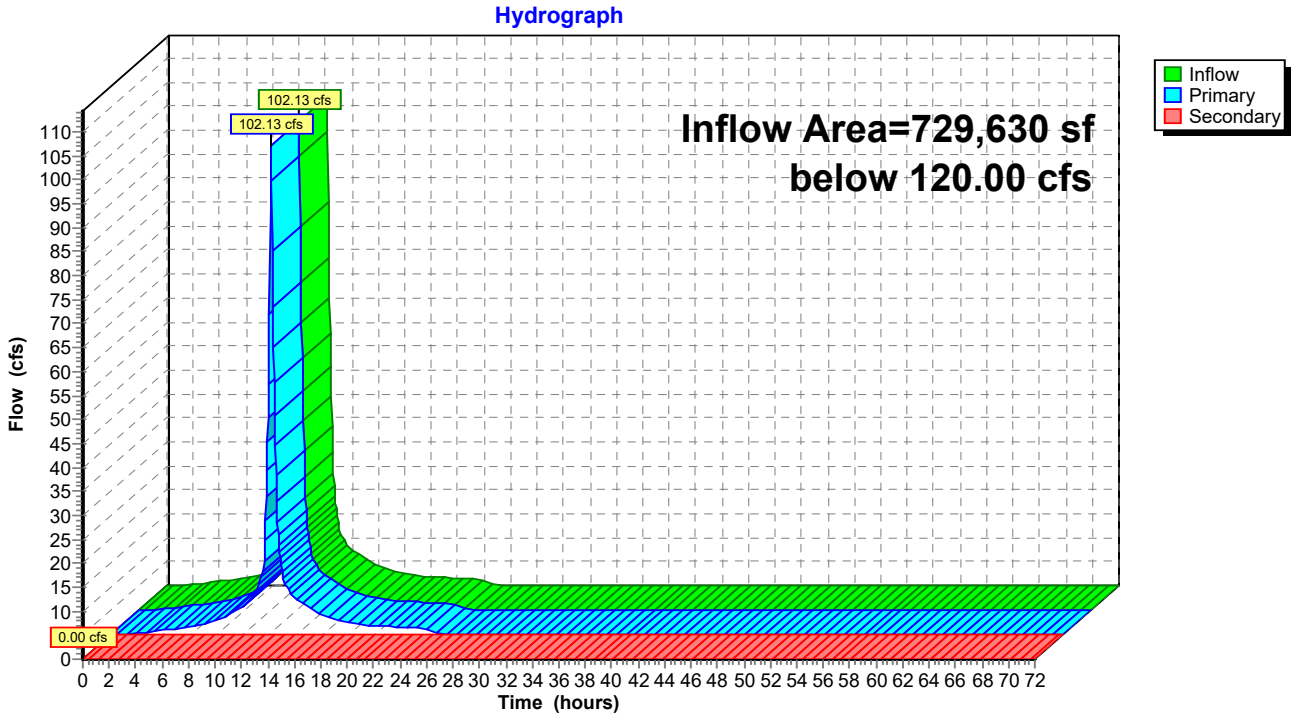


Summary for Link PS2: Pump Station 2

Inflow Area = 729,630 sf, 90.33% Impervious, Inflow Depth = 7.48" for 100YR - 24HR event
Inflow = 102.13 cfs @ 12.11 hrs, Volume= 454,945 cf
Primary = 102.13 cfs @ 12.11 hrs, Volume= 454,945 cf, Atten= 0%, Lag= 0.0 min
Routed to Link 4L : MORRIS CREEK
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
Routed to Link 4L : MORRIS CREEK

Primary outflow = Inflow below 120.00 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link PS2: Pump Station 2

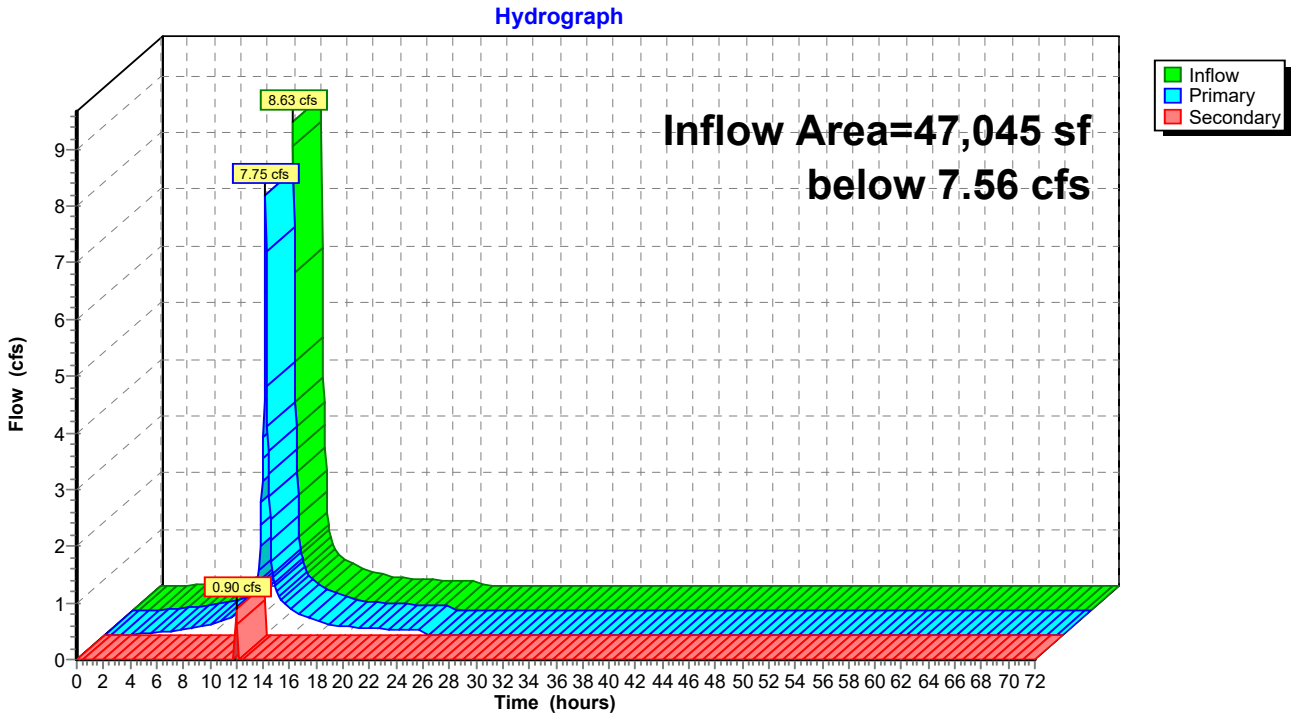


Summary for Link SS1: SITESAVER 1 - STSS-7

Inflow Area = 47,045 sf, 87.04% Impervious, Inflow Depth = 7.51" for 100YR - 24HR event
Inflow = 8.63 cfs @ 12.07 hrs, Volume= 29,445 cf
Primary = 7.75 cfs @ 12.08 hrs, Volume= 29,180 cf, Atten= 10%, Lag= 0.3 min
Routed to Link PS1 : Pump Station 1
Secondary = 0.90 cfs @ 12.06 hrs, Volume= 265 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS1: SITESAVER 1 - STSS-7

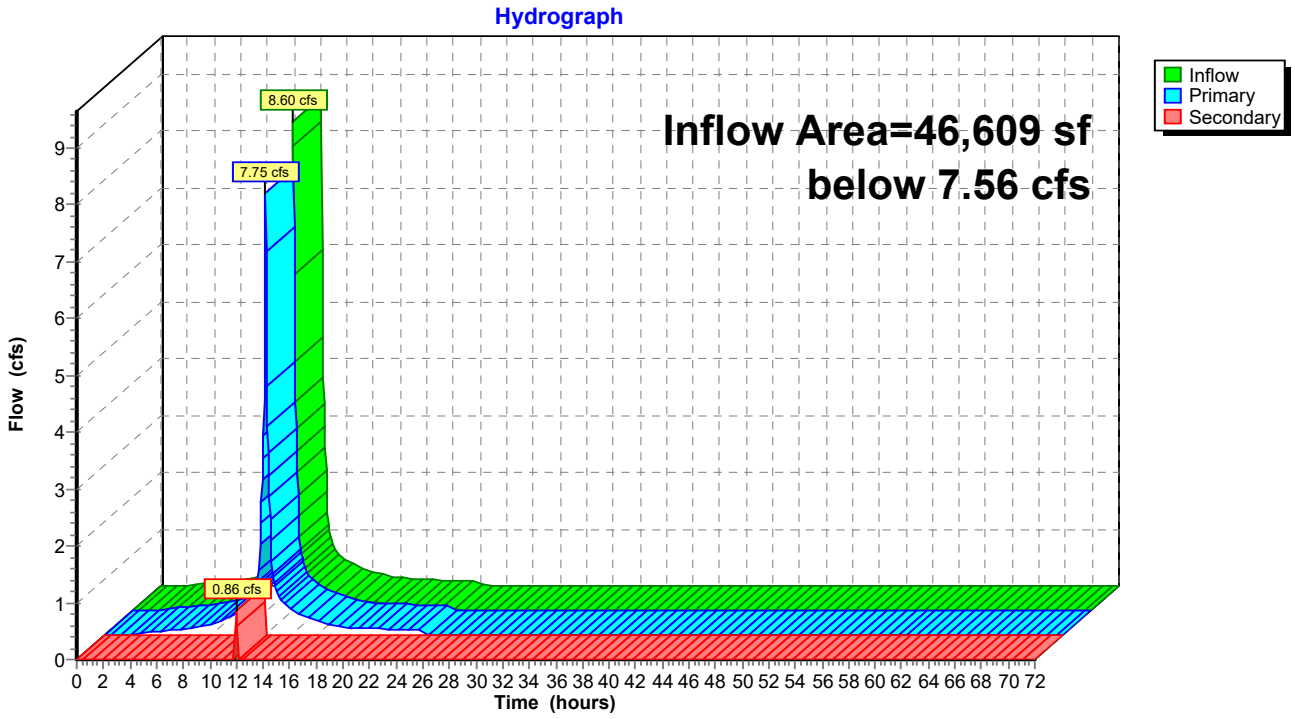


Summary for Link SS2: SITESAVER 2 - STSS-7

Inflow Area = 46,609 sf, 91.59% Impervious, Inflow Depth = 7.63" for 100YR - 24HR event
Inflow = 8.60 cfs @ 12.07 hrs, Volume= 29,637 cf
Primary = 7.75 cfs @ 12.08 hrs, Volume= 29,383 cf, Atten= 10%, Lag= 0.3 min
Routed to Link PS1 : Pump Station 1
Secondary = 0.86 cfs @ 12.06 hrs, Volume= 254 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS2: SITESAVER 2 - STSS-7

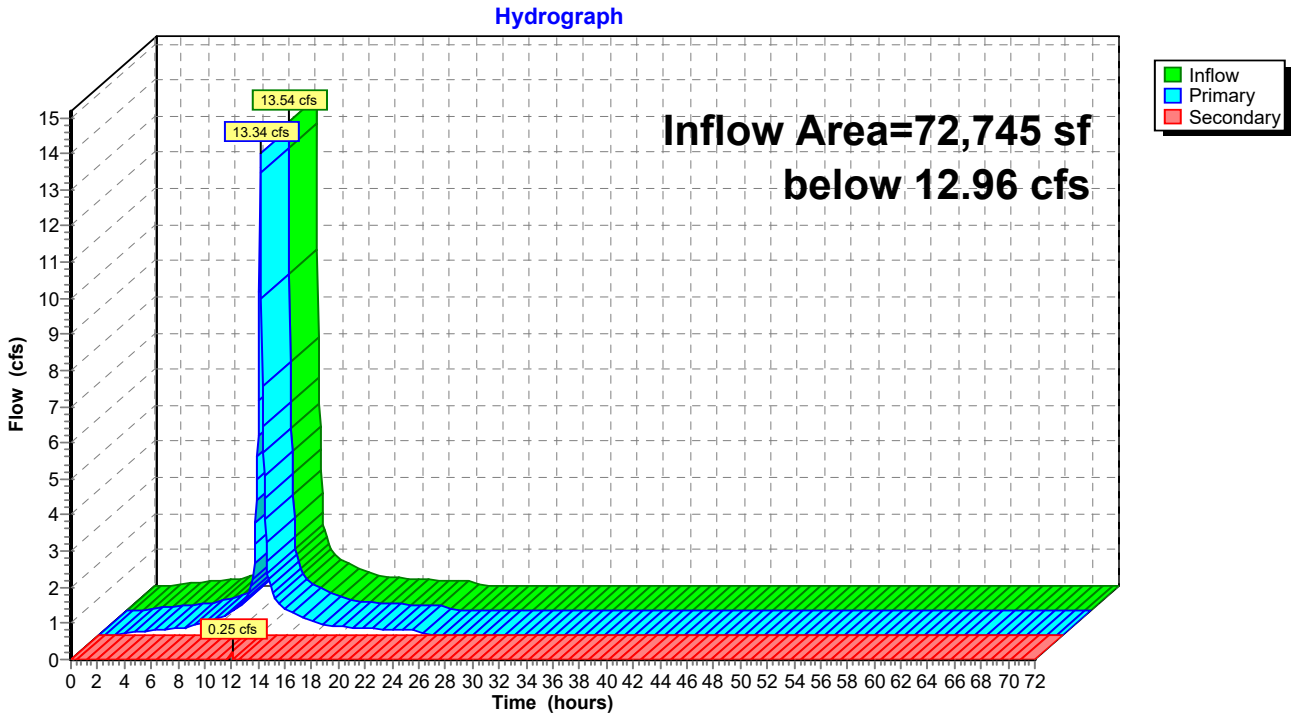


Summary for Link SS3: SITESAVER 3 - STSS-12

Inflow Area = 72,745 sf, 95.21% Impervious, Inflow Depth = 7.87" for 100YR - 24HR event
Inflow = 13.54 cfs @ 12.07 hrs, Volume= 47,710 cf
Primary = 13.34 cfs @ 12.07 hrs, Volume= 47,665 cf, Atten= 1%, Lag= 0.2 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.25 cfs @ 12.05 hrs, Volume= 44 cf

Primary outflow = Inflow below 12.96 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS3: SITESAVER 3 - STSS-12

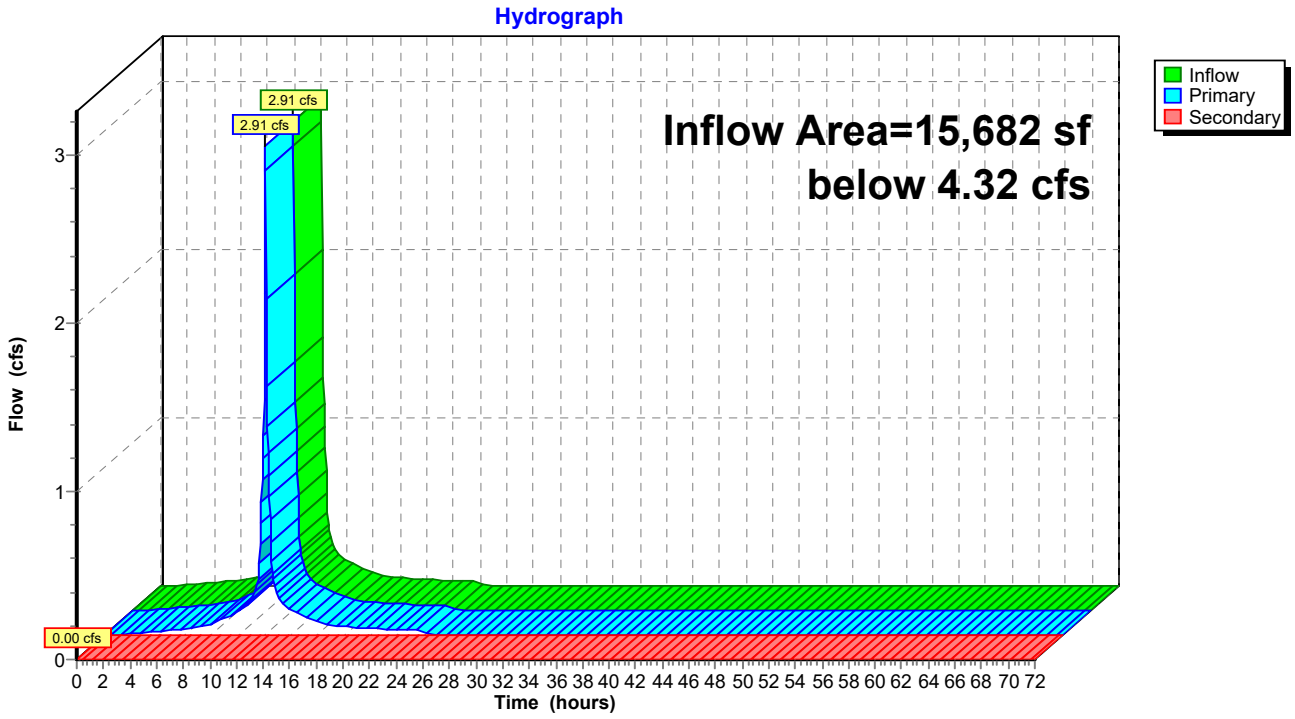


Summary for Link SS4: SITESAVER 4 - STSS-4

Inflow Area = 15,682 sf, 91.67% Impervious, Inflow Depth = 7.75" for 100YR - 24HR event
Inflow = 2.91 cfs @ 12.07 hrs, Volume= 10,128 cf
Primary = 2.91 cfs @ 12.07 hrs, Volume= 10,128 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS4: SITESAVER 4 - STSS-4

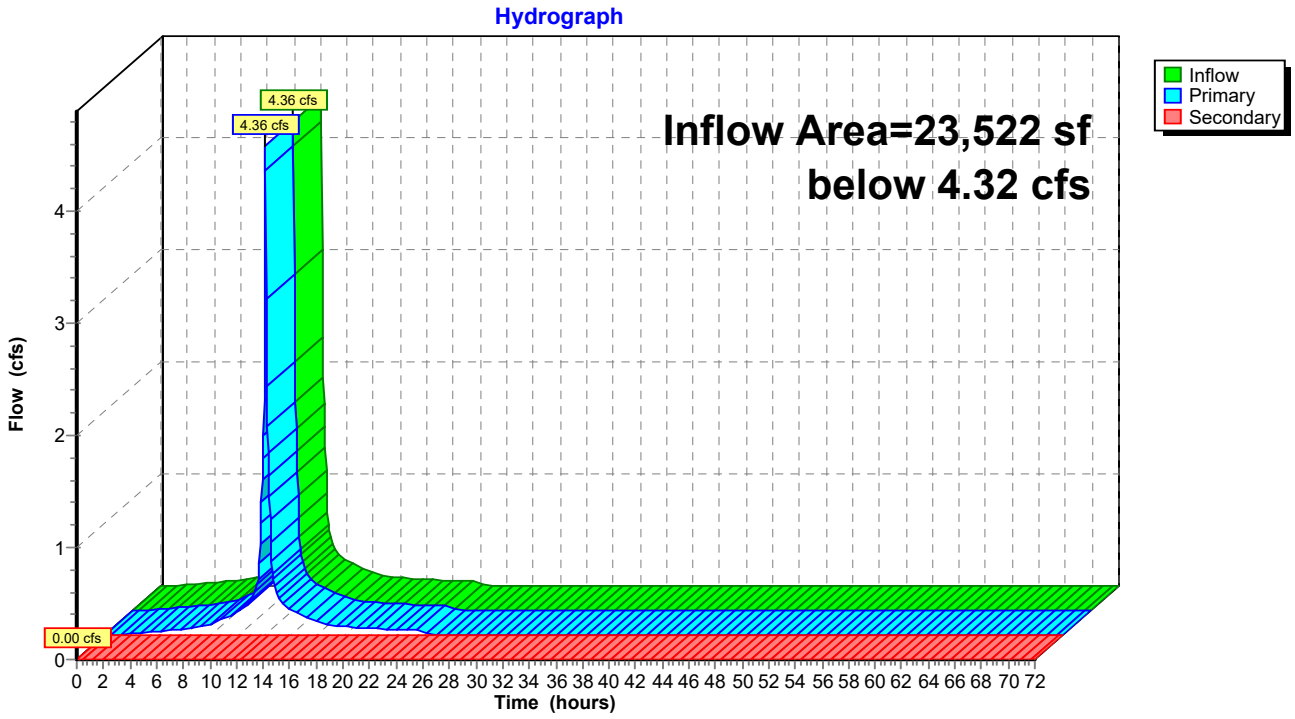


Summary for Link SS5: SITESAVER 5 - STSS-4

Inflow Area = 23,522 sf, 94.44% Impervious, Inflow Depth = 7.75" for 100YR - 24HR event
Inflow = 4.36 cfs @ 12.07 hrs, Volume= 15,192 cf
Primary = 4.36 cfs @ 12.07 hrs, Volume= 15,192 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS5: SITESAVER 5 - STSS-4

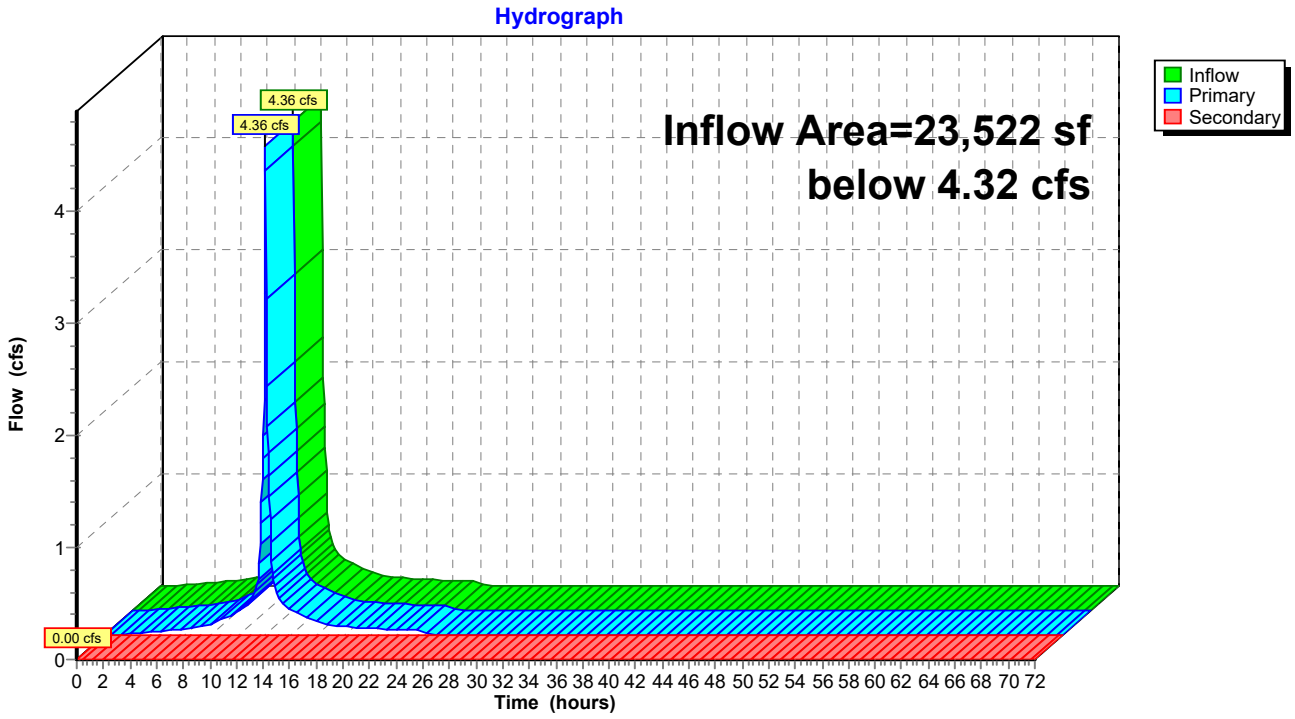


Summary for Link SS6: SITESAVER 6 - STSS-4

Inflow Area = 23,522 sf, 94.44% Impervious, Inflow Depth = 7.75" for 100YR - 24HR event
Inflow = 4.36 cfs @ 12.07 hrs, Volume= 15,192 cf
Primary = 4.36 cfs @ 12.07 hrs, Volume= 15,192 cf, Atten= 0%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS6: SITESAVER 6 - STSS-4

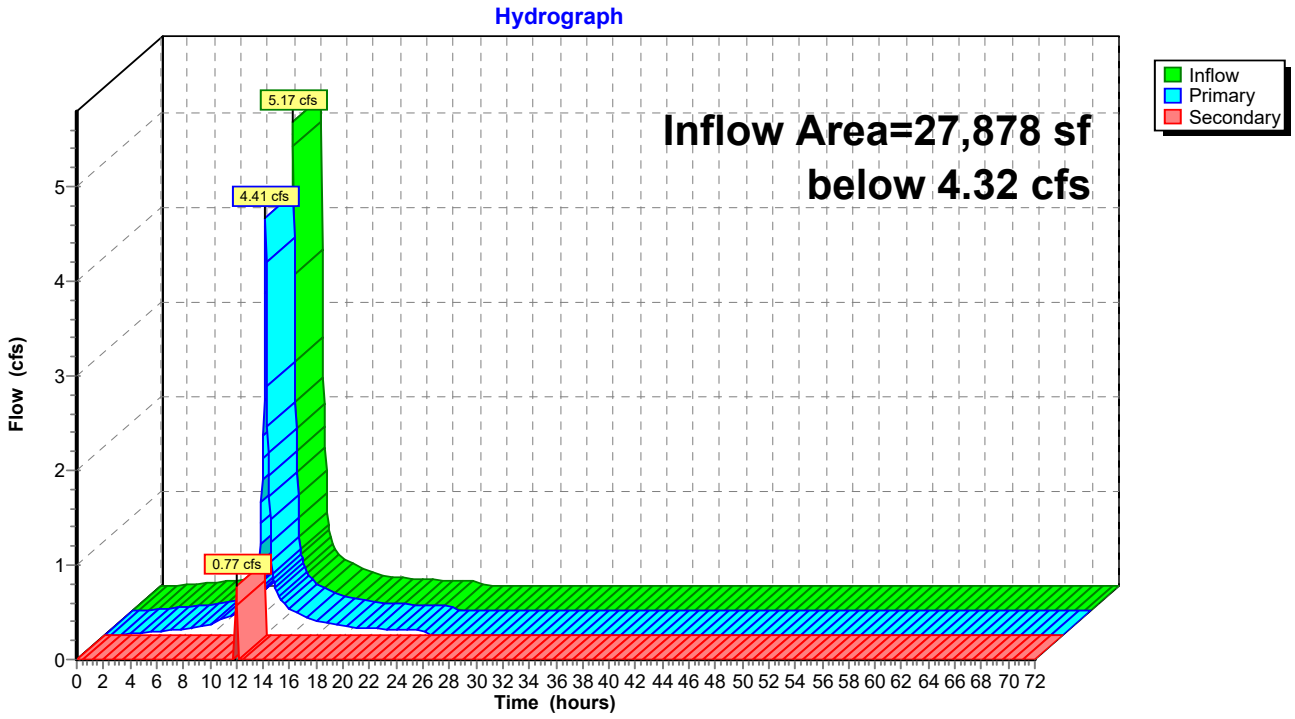


Summary for Link SS7: SITESAVER 7 - STSS-4

Inflow Area = 27,878 sf, 93.75% Impervious, Inflow Depth = 7.75" for 100YR - 24HR event
Inflow = 5.17 cfs @ 12.07 hrs, Volume= 18,005 cf
Primary = 4.41 cfs @ 12.08 hrs, Volume= 17,772 cf, Atten= 15%, Lag= 0.3 min
Routed to Link PS2 : Pump Station 2
Secondary = 0.77 cfs @ 12.07 hrs, Volume= 233 cf

Primary outflow = Inflow below 4.32 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS7: SITESAVER 7 - STSS-4

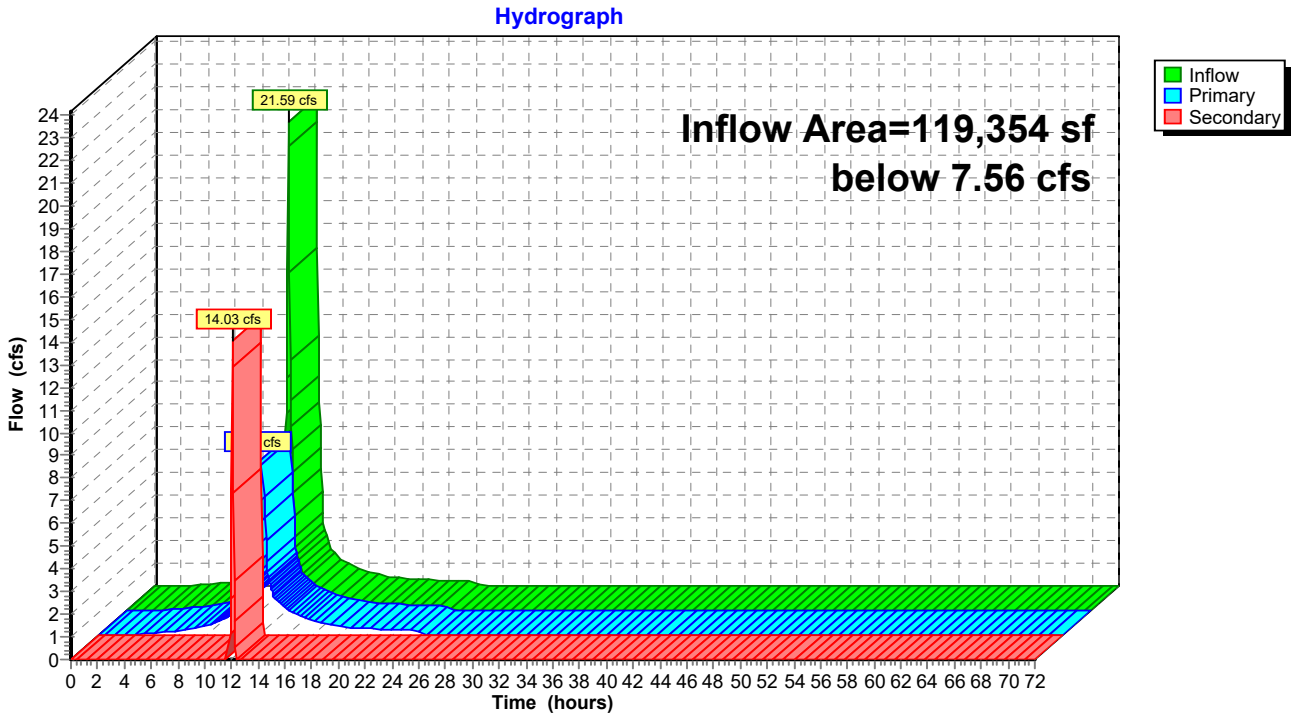


Summary for Link SS8: SITESAVER 8 - STSS-7

Inflow Area = 119,354 sf, 80.66% Impervious, Inflow Depth = 7.27" for 100YR - 24HR event
Inflow = 21.59 cfs @ 12.07 hrs, Volume= 72,321 cf
Primary = 7.56 cfs @ 11.85 hrs, Volume= 63,156 cf, Atten= 65%, Lag= 0.0 min
Routed to Link PS2 : Pump Station 2
Secondary = 14.03 cfs @ 12.07 hrs, Volume= 9,166 cf

Primary outflow = Inflow below 7.56 cfs, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link SS8: SITESAVER 8 - STSS-7

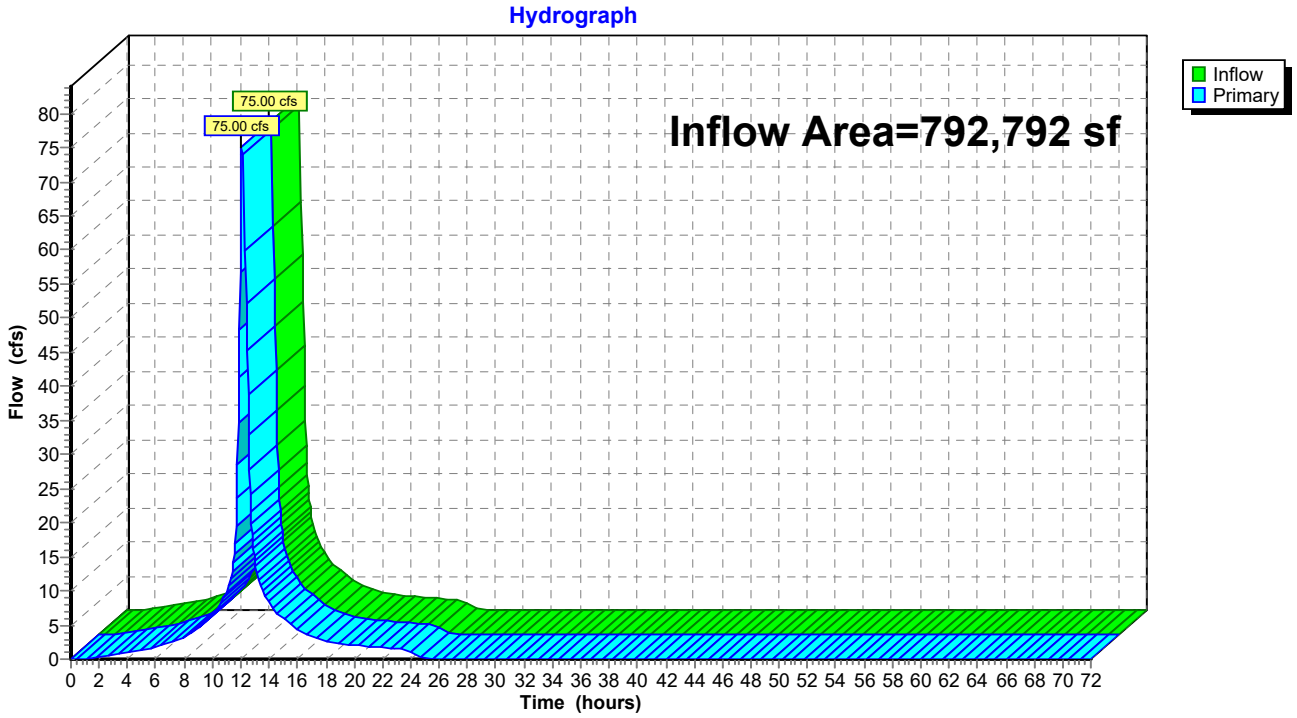


Summary for Link W1: EAST WETL

Inflow Area = 792,792 sf, 92.69% Impervious, Inflow Depth = 7.30" for 100YR - 24HR event
Inflow = 75.00 cfs @ 12.05 hrs, Volume= 482,466 cf
Primary = 75.00 cfs @ 12.05 hrs, Volume= 482,466 cf, Atten= 0%, Lag= 0.0 min
Routed to Pond 11P : (5) Culvert 6X3

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.05 hrs

Link W1: EAST WETL



APPENDIX C

Runway - Water Quality Calculations, Treatment Plan, Buoyancy Calculations

SAND FILTER 1

Table 4.3 Minimum Average Annual Pollutant Load Reductions

DCIA 1		
Water Quality Parameter	Required Reduction (Redevelopment)	Reduction Provided by Sand Filter 1
Total Suspended Solids (TSS)	80%	99.04%
Total Phosphorus (TP)	50%	72.72%
Total Nitrogen (TN)	30%	63.19%

Pretreatment - Vegetated Filter Strip (BMP 1)

Impervious area to Pervious area ratio = 3:1

HSG B

Pollutant Reductions = **46.5%**

*BMP performance table from NE Stormwater Retrofit Manual

Pollutant Reduction

HSG	Impervious Area to Pervious Area Ratio										
	8:1	6:1	4:1	2:1	1:1	1:2	1:4	1:10	1:30	1:50	1:70
HSG A	45%	52%	63%	78%	88%	93%	95%	99%	99%	100%	100%
HSG B	26%	31%	39%	54%	66%	74%	78%	88%	89%	90%	100%
HSG C	16%	20%	26%	37%	48%	57%	62%	73%	79%	82%	94%
HSG D	10%	12%	16%	24%	32%	39%	44%	62%	68%	71%	75%

Treatment - Sand Filter (BMP 2)

$$Depth\ of\ Runoff\ from\ Impervious\ Area\ (inches) = \frac{V}{DCIA} * 12\frac{inches}{foot}$$

Volume of sand filter 1	4961.25	Appendix C - Static Storage Volume Eq.
DCIA 1	70800	See Treatment Plan
Depth of runoff	0.84	

TSS reduction	98.20%
TP reduction	49.00%
TN reduction	31.20%

*Sand Filter BMP performance table from NE Stormwater Retrofit Manual

Pollutant	Design Storage Volume: Runoff Depth from Impervious Area (in)								
	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50	2.00
TP	0%	14%	25%	37%	44%	48%	53%	58%	63%
TN	0%	9%	16%	23%	28%	31%	32%	37%	40%
Bacteria	0%	11%	19%	30%	40%	48%	55%	67%	75%
TSS	0%	44%	69%	91%	97%	98%	99%	100%	100%
Metals	0%	68%	88%	95%	96%	96%	97%	98%	99%

SAND FILTER 1

BMPs in series calculation (TSS)	
Initial TSS load upstream of BMP 1	1.000
TSS load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TSS load downstream of BMP 1 (1.0 - 0.465)	0.535
TSS load removed by BMP 2 (0.535 * 98.20% removal rate)	0.525
Final TSS load downstream of BMP 2 (0.535 - 0.525)	0.010
Total TSS removal rate (1.0 - 0.010)	99.04%

BMPs in series calculation (TP)	
Initial TP load upstream of BMP 1	1.000
TP load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TP load downstream of BMP 1 (1.0 - 0.465)	0.535
TP load removed by BMP 2 (0.535 * 49.00% removal rate)	0.262
Final TP load downstream of BMP 2 (0.535 - 0.262)	0.273
Total TP removal rate (1.0 - 0.273)	72.72%

BMPs in series calculation (TN)	
Initial TN Load Upstream of BMP 1	1.000
TN load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TN load downstream of BMP 1 (1.0 - 0.465)	0.535
TN load removed by BMP 2 (0.535 * 31.20% removal rate)	0.167
Final TN load downstream of BMP 2 (0.535 - 0.167)	0.368
Total TN removal rate (1.0 - 0.368)	63.19%

SAND FILTER 2

Table 4.3 Minimum Average Annual Pollutant Load Reductions

DCIA 2		
Water Quality Parameter	Required Reduction (Redevelopment)	Reduction Provided by Sand Filter 2
Total Suspended Solids (TSS)	80%	99.04%
Total Phosphorus (TP)	50%	72.72%
Total Nitrogen (TN)	30%	63.19%

Pretreatment - Vegetated Filter Strip (BMP 1)

Impervious area to Pervious area ratio = 3:1

HSG B

Pollutant Reductions = **46.5%**

*BMP performance table from NE Stormwater Retrofit Manual

Pollutant Reduction

HSG	Impervious Area to Pervious Area Ratio										
	8:1	6:1	4:1	2:1	1:1	1:2	1:4	1:10	1:30	1:50	1:70
HSG A	45%	52%	63%	78%	88%	93%	95%	99%	99%	100%	100%
HSG B	26%	31%	39%	54%	66%	74%	78%	88%	89%	90%	100%
HSG C	16%	20%	26%	37%	48%	57%	62%	73%	79%	82%	94%
HSG D	10%	12%	16%	24%	32%	39%	44%	62%	68%	71%	75%

Treatment - Sand Filter (BMP 2)

$$Depth\ of\ Runoff\ from\ Impervious\ Area\ (inches) = \frac{V}{DCIA} * 12\frac{inches}{foot}$$

Volume of sand filter 2	4961.25	Appendix C - Static Storage Volume Eq.
DCIA 1	70800	See Treatment Plan
Depth of runoff	0.84	

TSS reduction	98.20%
TP reduction	49.00%
TN reduction	31.20%

*Sand Filter BMP performance table from NE Stormwater Retrofit Manual

Pollutant	Design Storage Volume: Runoff Depth from Impervious Area (in)								
	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50	2.00
TP	0%	14%	25%	37%	44%	48%	53%	58%	63%
TN	0%	9%	16%	23%	28%	31%	32%	37%	40%
Bacteria	0%	11%	19%	30%	40%	48%	55%	67%	75%
TSS	0%	44%	69%	91%	97%	98%	99%	100%	100%
Metals	0%	68%	88%	95%	96%	96%	97%	98%	99%

SAND FILTER 2

BMPs in series calculation (TSS)	
Initial TSS load upstream of BMP 1	1.000
TSS load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TSS load downstream of BMP 1 (1.0 - 0.465)	0.535
TSS load removed by BMP 2 (0.535 * 98.20% removal rate)	0.525
Final TSS load downstream of BMP 2 (0.535 - 0.525)	0.010
Total TSS removal rate (1.0 - 0.010)	99.04%

BMPs in series calculation (TP)	
Initial TP load upstream of BMP 1	1.000
TP load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TP load downstream of BMP 1 (1.0 - 0.465)	0.535
TP load removed by BMP 2 (0.535 * 49.00% removal rate)	0.262
Final TP load downstream of BMP 2 (0.535 - 0.262)	0.273
Total TP removal rate (1.0 - 0.273)	72.72%

BMPs in series calculation (TN)	
Initial TN Load Upstream of BMP 1	1.000
TN load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TN load downstream of BMP 1 (1.0 - 0.465)	0.535
TN load removed by BMP 2 (0.535 * 31.20% removal rate)	0.167
Final TN load downstream of BMP 2 (0.535 - 0.167)	0.368
Total TN removal rate (1.0 - 0.368)	63.19%

SAND FILTER 3

Table 4.3 Minimum Average Annual Pollutant Load Reductions

DCIA 3		
Water Quality Parameter	Required Reduction (Redevelopment)	Reduction Provided by Sand Filter 3
Total Suspended Solids (TSS)	80%	99.61%
Total Phosphorus (TP)	50%	75.59%
Total Nitrogen (TN)	30%	64.36%

Pretreatment - Vegetated Filter Strip (BMP 1)

Impervious area to Pervious area ratio = 3:1

HSG B

Pollutant Reductions = **46.5%**

*BMP performance table from NE Stormwater Retrofit Manual

Pollutant Reduction

HSG	Impervious Area to Pervious Area Ratio										
	8:1	6:1	4:1	2:1	1:1	1:2	1:4	1:10	1:30	1:50	1:70
HSG A	45%	52%	63%	78%	88%	93%	95%	99%	99%	100%	100%
HSG B	26%	31%	39%	54%	66%	74%	78%	88%	89%	90%	100%
HSG C	16%	20%	26%	37%	48%	57%	62%	73%	79%	82%	94%
HSG D	10%	12%	16%	24%	32%	39%	44%	62%	68%	71%	75%

Treatment - Sand Filter (BMP 2)

$$Depth\ of\ Runoff\ from\ Impervious\ Area\ (inches) = \frac{V}{DCIA} * 12\frac{inches}{foot}$$

Volume of sand filter 3	1898.40	Appendix C - Static Storage Volume Eq.
DCIA 3	20000	See Treatment Plan
Depth of runoff	1.14	

TSS reduction	99.28%
TP reduction	54.38%
TN reduction	33.38%

*Sand Filter BMP performance table from NE Stormwater Retrofit Manual

Pollutant	Design Storage Volume: Runoff Depth from Impervious Area (in)								
	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50	2.00
TP	0%	14%	25%	37%	44%	48%	53%	58%	63%
TN	0%	9%	16%	23%	28%	31%	32%	37%	40%
Bacteria	0%	11%	19%	30%	40%	48%	55%	67%	75%
TSS	0%	44%	69%	91%	97%	98%	99%	100%	100%
Metals	0%	68%	88%	95%	96%	96%	97%	98%	99%

SAND FILTER 3

BMPs in series calculation (TSS)	
Initial TSS load upstream of BMP 1	1.000
TSS load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TSS load downstream of BMP 1 (1.0 - 0.465)	0.535
TSS load removed by BMP 2 (0.535 * 99.28% removal rate)	0.531
Final TSS load downstream of BMP 2 (0.535 - 0.531)	0.004
Total TSS removal rate (1.0 - 0.004)	99.61%

BMPs in series calculation (TP)	
Initial TP load upstream of BMP 1	1.000
TP load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TP load downstream of BMP 1 (1.0 - 0.465)	0.535
TP load removed by BMP 2 (0.535 * 54.38% removal rate)	0.291
Final TP load downstream of BMP 2 (0.535 - 0.291)	0.244
Total TP removal rate (1.0 - 0.244)	75.59%

BMPs in series calculation (TN)	
Initial TN Load Upstream of BMP 1	1.000
TN load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TN load downstream of BMP 1 (1.0 - 0.465)	0.535
TN load removed by BMP 2 (0.535 * 33.38% removal rate)	0.179
Final TN load downstream of BMP 2 (0.535 - 0.179)	0.356
Total TN removal rate (1.0 - 0.356)	64.36%

SAND FILTER 4

Table 4.3 Minimum Average Annual Pollutant Load Reductions

DCIA 4		
Water Quality Parameter	Required Reduction (Redevelopment)	Reduction Provided by Sand Filter 4
Total Suspended Solids (TSS)	80%	99.74%
Total Phosphorus (TP)	50%	76.25%
Total Nitrogen (TN)	30%	65.01%

Pretreatment - Vegetated Filter Strip (BMP 1)

Impervious area to Pervious area ratio = 3:1

HSG B

Pollutant Reductions = **46.5%**

*BMP performance table from NE Stormwater Retrofit Manual

Pollutant Reduction

HSG	Impervious Area to Pervious Area Ratio										
	8:1	6:1	4:1	2:1	1:1	1:2	1:4	1:10	1:30	1:50	1:70
HSG A	45%	52%	63%	78%	88%	93%	95%	99%	99%	100%	100%
HSG B	26%	31%	39%	54%	66%	74%	78%	88%	89%	90%	100%
HSG C	16%	20%	26%	37%	48%	57%	62%	73%	79%	82%	94%
HSG D	10%	12%	16%	24%	32%	39%	44%	62%	68%	71%	75%

Treatment - Sand Filter (BMP 2)

$$Depth\ of\ Runoff\ from\ Impervious\ Area\ (inches) = \frac{V}{DCIA} * 12\frac{inches}{foot}$$

Volume of sand filter 4	1898.40	Appendix C - Static Storage Volume Eq.
DCIA 4	18100	See Treatment Plan
Depth of runoff	1.26	

TSS reduction	99.52%
TP reduction	55.60%
TN reduction	34.60%

*Sand Filter BMP performance table from NE Stormwater Retrofit Manual

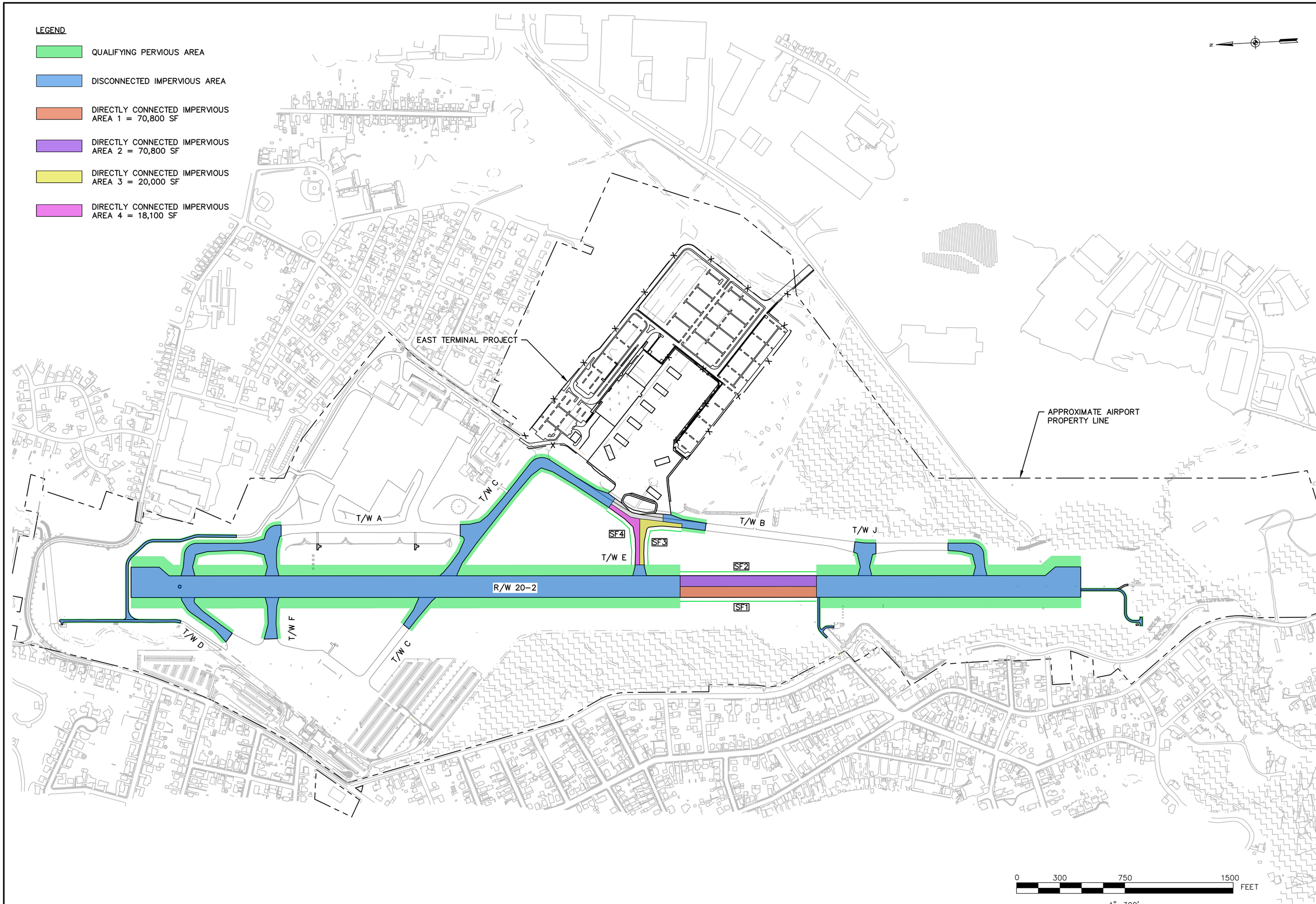
Pollutant	Design Storage Volume: Runoff Depth from Impervious Area (in)								
	0	0.10	0.20	0.40	0.60	0.80	1.00	1.50	2.00
TP	0%	14%	25%	37%	44%	48%	53%	58%	63%
TN	0%	9%	16%	23%	28%	31%	32%	37%	40%
Bacteria	0%	11%	19%	30%	40%	48%	55%	67%	75%
TSS	0%	44%	69%	91%	97%	98%	99%	100%	100%
Metals	0%	68%	88%	95%	96%	96%	97%	98%	99%

SAND FILTER 4

BMPs in series calculation (TSS)	
Initial TSS load upstream of BMP 1	1.000
TSS load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TSS load downstream of BMP 1 (1.0 - 0.465)	0.535
TSS load removed by BMP 2 (0.535 * 99.52% removal rate)	0.532
Final TSS load downstream of BMP 2 (0.535 - 0.532)	0.003
Total TSS removal rate (1.0 - 0.003)	99.74%

BMPs in series calculation (TP)	
Initial TP load upstream of BMP 1	1.000
TP load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TP load downstream of BMP 1 (1.0 - 0.465)	0.535
TP load removed by BMP 2 (0.535 * 55.60% removal rate)	0.297
Final TP load downstream of BMP 2 (0.535 - 0.297)	0.238
Total TP removal rate (1.0 - 0.238)	76.25%

BMPs in series calculation (TN)	
Initial TN Load Upstream of BMP 1	1.000
TN load removed by BMP 1 (1.0 * 46.5% removal rate)	0.465
Remaining TN load downstream of BMP 1 (1.0 - 0.535)	0.535
TN load removed by BMP 2 (0.535 * 34.60% removal rate)	0.185
Final TN load downstream of BMP 2 (0.535 - 0.185)	0.350
Total TN removal rate (1.0 - 0.350)	65.01%



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DESIGNED BY NEG | DRAWN BY RHG | CHECKED BY RMF

DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

TREATMENT PLAN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	4/11/25	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

DRAWING NO.

TP1.1

SHEET 1 OF ##

HTA 4/7/2025 2:37:02 PM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD\5-Permitting\dwg\Treatment Plan.dwg

Buoyancy, check minimum and maximum depths

	1/7/2025
checked	4/7/2025

	Check at Minimum depth				Check at Maximum depth			
Ground Water Elevation	2				2			
Bottom of Excavation Elevation	0.5				-0.66			
Volume of Water	L (ft)	W (ft)	Depth (ft)	Volume (cf)	L (ft)	W (ft)	Depth (ft)	Volume (cf)
	1	4	1.5	6	1	4	2.66	10.64
Mass of Water	Unit Weight (lbs/cf)			Mass	Unit Weight (lbs/cf)			Mass
	62.4			374.4	62.4			663.936
Volume of Infiltration Trench	L (ft)	W (ft)	Depth (ft)	Volume (cf)	L (ft)	W (ft)	Depth (ft)	Volume (cf)
Rock Surface Course	1	4	0.25	1	1	4	0.25	1
Sand	1	4	1.5	6	1	4	1.5	6
Pea Gravel	1	4	0.25	1	1	4	0.25	1
Rock Bottom Course	1	4	1	4	1	4	2.38	9.52
Pipe Diameter	1	0.667		-1.39766	1	0.667		-1.39766
Mass of Infiltration Trench	Unit Weight (lbs/cf)			Mass	Unit Weight (lbs/cf)			Mass
Rock Surface Course	125			125	125			125
Sand	115			690	115			690
Pea Gravel	110			110	110			110
Rock Bottom Course	125			494.4094	125			1176.694
Total				1419.409				2101.694
Mass of trench/Mass of Water, must be greater than 1.5				3.791157 **OK**				5.6135 **OK**

Input	
Output	

APPENDIX D

East Terminal - Water Quality Calculations

Area Calculations

Date: February 26, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Austin Puchalski Date: 1/6/2025
Checked By: Date:

	Pre Impervious	0	0.00	FLOW	
Area - 1	Post Impervious	42042	0.87	CFS 10yr	
	Total Area	48833	1.01	5.8	STSS-7
	Pre Impervious	25505	0.53		
Area - 2	Post Impervious	129216	2.66		
	Total Area	134672	2.77		
	Pre Impervious	42609	0.88		
Area - 3	Post Impervious	157597	3.25		
	Total Area	174710	3.60		
	Pre Impervious	0	0.00	FLOW	
Area - 4	Post Impervious	47321	0.97	CFS 10yr	
	Total Area	51648	1.06	5.2	STSS-7
	Pre Impervious	34274	0.71		
Area - 5	Post Impervious	131147	2.70		
	Total Area	141515	2.91		
	Pre Impervious	69113	1.42		
Area - 6	Post Impervious	175739	3.62		
	Total Area	190727	3.93		
	Pre Impervious	0	0.00		
Area - 7	Post Impervious	70053	1.44		
	Total Area	75918	1.56		
	Pre Impervious	0	0.00		
Area - 8	Post Impervious	54105	1.11		
	Total Area	59989	1.24		
	Pre Impervious	0	0.00	FLOW	
Area - 9a	Post Impervious	77084	1.59	CFS 10yr	
	Total Area	80804	1.66	7.78	STSS-12
	Pre Impervious	0	0.00	FLOW	
Area - 9b	Post Impervious	16204	0.33	CFS 10yr	
	Total Area	17539	0.36	1.82	STSS-4
	Pre Impervious	0	0.00	FLOW	
Area - 9c	Post Impervious	24967	0.51	CFS 10yr	
	Total Area	26378	0.54	2.88	STSS-4
	Pre Impervious	0	0.00	FLOW	
Area - 9d	Post Impervious	24878	0.51	CFS 10yr	
	Total Area	26289	0.54	2.88	STSS-4
	Pre Impervious	0	0.00	FLOW	
Area - 9e	Post Impervious	29071	0.60	CFS 10yr	
	Total Area	30911	0.64	3.23	STSS-4
	Pre Impervious	13864	0.29		
Airside - 1	Post Impervious	189530	3.90		
	Total Area	226236	4.66		
	Pre Impervious	72338	1.49	FLOW	
Airside - 2	Post Impervious	212136	4.37	CFS 10yr	
	Total Area	212136	4.37	12.03	STSS-12
	Pre Impervious	55242	1.14		
Airside - 3	Post Impervious	107277	2.21		
	Total Area	132786	2.73		

WATER QUALITY VOLUME CALCULATIONS (AREA 1)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.00	acre
Post-development Impervious Area=	0.87	acre
Area to Filter=	1.01	acre
I=	**86.0928**	%
R=	0.8248	

WQV= **3,370** **ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.08 ac
Total Impervious area treated through BMPs = **0.58 ac** ok

Infiltration Basin
Total Volume = **ft^3**

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**3,370**	

SAND FILTER SIZE CALCULATIONS - AREA 1

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	3,535	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 151 ft2
SAY: **160 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln(1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0017	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 10 ft2
SAY: **40 ft2** 25% Minimum
Length (ft) 10 Width (ft) 4

WATER QUALITY VOLUME CALCULATIONS (AREA 2)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.53	acre
Post-development Impervious Area=	2.66	acre
Area to Filter=	2.77	acre
I=	**95.9485**	%
R=	0.9135	
WQV=	**11,471**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.26 ac
Total Impervious area treated through BMPs = 0.58 ac ok

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**11,471**	

SAND FILTER SIZE CALCULATIONS - AREA 2

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=		minimum required surface area of filter bed (square feet)
WQV=		water quality volume (cubic feet)
d=		filter bed depth (feet)
k=		hydraulic conductivity of filter media (ft/day)
t=		time for the water quality vol ume to drain from the system (24 hours)
h=		average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	12,682	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 543 ft2
SAY: **550 ft2** Length (ft) 45 Width (ft) 12.2

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=		sedimentation surface area (square feet)
Q=		discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=		particle settling velocity (0.0004 ft/s reccomended for silt)
E=		sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0061	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 35 ft2
SAY: **137.5 ft2** 25% Minimum
Length (ft) 21 Width (ft) 6.55

WATER QUALITY VOLUME CALCULATIONS (AREA 3)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.88	acre
Post-development Impervious Area=	3.25	acre
Area to Filter=	3.60	acre
I=	**90.2051**	%
R=	0.8618	

WQV= **13,199** **ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.30 ac
Total Impervious area treated through BMPs = **0.58 ac** ok

Infiltration Basin
Total Volume = **ft^3**

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**13,199**	

SAND FILTER SIZE CALCULATIONS - AREA 3

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	15,314	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 656 ft2
SAY: **660 ft2** Length (ft) 45 Width (ft) 14.7

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0074	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 43 ft2
SAY: **165 ft2** 25% Minimum
Length (ft) 24 Width (ft) 7

WATER QUALITY VOLUME CALCULATIONS (AREA 4)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria: $WQV = \frac{(P)(R)(A)}{12}$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.00	acre
Post-development Impervious Area=	0.97	acre
Area to Filter=	1.06	acre
I=	**91.6205**	%
R=	0.8746	
WQV=	**4,022**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.09 ac
Total Impervious area treated through BMPs = 0.58 ac **ok**

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	(ft^3)	Provided
Subsurface Chambers	**4,022**	

SAND FILTER SIZE CALCULATIONS - AREA 4

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	3,893	**ft³**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 167 ft2
SAY: **170 ft2** Length (ft) 42 Width (ft) 4.05

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln(1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0019	**ft³/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 11 ft2
SAY: **42.5 ft2** 25% Minimum
Length (ft) 6 Width (ft) 7

WATER QUALITY VOLUME CALCULATIONS (AREA A2)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009 *I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	1.49	acre
Post-development Impervious Area=	4.37	acre
Area to Filter=	4.37	acre
I=	**100**	%
R=	0.95	
WQV=	**19,584**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.45 ac
Total Impervious area treated through BMPs = **0.58 ac** ok

Infiltration Basin
Total Volume = **ft^3**

Provided Volume:

Designation	(ft^3)	Provided
Subsurface Chambers	**19,584**	

SAND FILTER SIZE CALCULATIONS - AREA A2

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	21,000	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 900 ft2
SAY: **910 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0101	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 58 ft2
SAY: **227.5 ft2** 25% Minimum
Length (ft) 57 Width (ft) 4

WATER QUALITY VOLUME CALCULATIONS (AREA 5)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.71	acre
Post-development Impervious Area=	2.70	acre
Area to Filter=	2.91	acre
I=	**92.6738**	%
R=	0.8841	
WQV=	**11,267**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.26 ac
Total Impervious area treated through BMPs = 0.58 ac ok

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**11,267**	

SAND FILTER SIZE CALCULATIONS - AREA 5

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	9,815	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 421 ft2
SAY: **430 ft2** Length (ft) 42 Width (ft) 10.2

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0047	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 27 ft2
SAY: **107.5 ft2** 25% Minimum
Length (ft) 15 Width (ft) 7

WATER QUALITY VOLUME CALCULATIONS (AREA 6)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)\,(R)\,(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	1.42	acre
Post-development Impervious Area=	3.62	acre
Area to Filter=	3.93	acre
I=	**92.1419**	%
R=	0.8793	
WQV=	**15,016**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.34 ac
Total Impervious area treated through BMPs = 0.58 ac ok

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**15,016**	

SAND FILTER SIZE CALCULATIONS - AREA 6

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	14,883	**ft^3**	
d=	2	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 638 ft2
SAY: **640 ft2** Length (ft) 42 Width (ft) 15.2

Pretreatment:

$$A(s) = \frac{-(Q/W)\ln(1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0072	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 41 ft2
SAY: **160 ft2** 25% Minimum
Length (ft) 23 Width (ft) 7

WATER QUALITY VOLUME CALCULATIONS (AREA 7)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

- W= water quality volume (cubic feet)
- P= 1.3 inches (90th percentile rainfall event)
- R= volumetric runoff coefficient = 0.05+0.009*I*
- *I*= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
- A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.00	acre
Post-development Impervious Area=	1.44	acre
Area to Filter=	1.56	acre
I=	**92.2754**	%
R=	0.8805	
WQV=	**5,994**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.14 ac
Total Impervious area treated through BMPs = 0.58 ac ok

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**5,994**	

SAND FILTER SIZE CALCULATIONS - AREA 7

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	5,222	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 224 ft2
SAY: **230 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0025	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 14 ft2
SAY: **57.5 ft2** 25% Minimum
Length (ft) 14 Width (ft) 4

WATER QUALITY VOLUME CALCULATIONS (AREA 8)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.00	acre
Post-development Impervious Area=	1.11	acre
Area to Filter=	1.24	acre
I=	**90.1906**	%
R=	0.8617	

WQV= **4,531** **ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.10 ac
Total Impervious area treated through BMPs = **0.58 ac** ok

Infiltration Basin
Total Volume = **ft^3**

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**4,531**	

SAND FILTER SIZE CALCULATIONS - AREA 8

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	5,128	**ft³**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 220 ft2
SAY: **220 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0025	**ft³/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 14 ft2
SAY: **55 ft2** 25% Minimum
Length (ft) 14 Width (ft) 4

WATER QUALITY VOLUME CALCULATIONS (AREA 9)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)(R)(A)}{12}$$

- W= water quality volume (cubic feet)
- P= 1.3 inches (90th percentile rainfall event)
- R= volumetric runoff coefficient = 0.05+0.009*I*
- *I*= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
- A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area= #REF! acre
Post-development Impervious Area= #REF! acre
Area to Filter= #REF! acre
I= **#REF!** %
R= #REF!

WQV= **#REF! ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = #REF! ac
Total Impervious area treated through BMPs = 0.58 ac #REF!

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	Volume Required (ft^3)	Volume Provided (ft^3)
Subsurface Chambers	**#REF!**	

SAND FILTER SIZE CALCULATIONS - AREA 9

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	14,495	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 621 ft2
SAY: **630 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0070	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 40 ft2
SAY: **157.5 ft2** 25% Minimum
Length (ft) 39 Width (ft) 4

WATER QUALITY VOLUME CALCULATIONS (AREA A1)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method.
Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria:

$$WQV = \frac{(P)\,(R)\,(A)}{12}$$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009*I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	0.29	acre
Post-development Impervious Area=	3.90	acre
Area to Filter=	4.66	acre
I=	**83.7755**	%
R=	0.804	
WQV=	**14,808**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.34 ac
Total Impervious area treated through BMPs = **0.58 ac** ok

Infiltration Basin
Total Volume = **ft^3**

Provided Volume:

Designation	(ft^3)	Provided
Subsurface Chambers	**14,808**	

SAND FILTER SIZE CALCULATIONS - AREA A1

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	12,805	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 549 ft2
SAY: **550 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0062	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 36 ft2
SAY: **137.5 ft2** 25% Minimum
Length (ft) 34 Width (ft) 4

WATER QUALITY VOLUME CALCULATIONS (AREA A3)

Date: December 10, 2024
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/6/2025
Checked By: Date:

Objective: To determine the required Water Quality Volume (WQ_V) for adequate stormwater treatment

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024) Appendix D - Water Quality Flow Calculation Method. Per Table 4-1 Stormwater Management Standards and Performance Criteria Summary, Required Retention Volume (RRV) is 100% of the site's Water Quality Volume (WQV) for all new development, redevelopment or retrofit of sites that are currently developed with existing DCIA of less than 40%, or any new stormwater discharges located within 500 feet of tidal wetlands.

Design Criteria: $WQV = \frac{(P)(R)(A)}{12}$

W= water quality volume (cubic feet)
P= 1.3 inches (90th percentile rainfall event)
R= volumetric runoff coefficient = 0.05+0.009 *I*
I= post-development impervious area (percent) after application of non-structural LID site planning and design strategies and before application of structural stormwater BMPs
A= post-development total drainage area of site or design point (square feet)

Volume to be Treated:

Pre-development Impervious Area=	1.14	acre
Post-development Impervious Area=	2.21	acre
Area to Filter=	2.73	acre
I=	**80.7894**	%
R=	0.7771	
WQV=	**8,101**	**ft^3**

Volume Provided:

Required Retention Volume (100% of WQV) = 0.19 ac
Total Impervious area treated through BMPs = 0.58 ac ok

Infiltration Basin
Total Volume = ft^3

Provided Volume:

Designation	(ft^3)	Provided
Subsurface Chambers	**8,101**	

SAND FILTER SIZE CALCULATIONS - AREA A3

Date: January 23, 2025
Project: HVN
Project No:
Location: New Haven, CT

Prepared By: Date: 1/23/2025
Checked By: Date:
Objective: To size a sand filter per CTDOT requirements

Methodology: Calculations are in accordance with methods described in the Connecticut Stormwater Quality Manual (March 2024)
Chapter 10 - General Design Guidance for Stormwater Infiltration Systems

Design Criteria:

$$A(req) = \frac{(WQV)\,(d)}{[(k)(t)(h+d)]}$$

A(req)=	minimum required surface area of filter bed (square feet)
WQV=	water quality volume (cubic feet)
d=	filter bed depth (feet)
k=	hydraulic conductivity of filter media (ft/day)
t=	time for the water quality vol ume to drain from the system (24 hours)
h=	average height of water above filter bed during water quality design storm

Volume to be Treated:

WQV=	7,101	**ft^3**	
d=	1.5	**ft**	
k=	20	**ft/day**	medium sand
t=	0.5	**day**	
h=	2	**ft**	

A(req)= 304 ft2
SAY: **310 ft2** Length (ft) 20 Width (ft) 8

Pretreatment:

$$A(s) = \frac{-(Q/W)\ \ln (1-E)}{}$$

A(s)=	sedimentation surface area (square feet)
Q=	discharge rate from drainage area (cubic feet/second) (WQV/24hr)
W=	particle settling velocity (0.0004 ft/s reccomended for silt)
E=	sediment removal efficiency (assume 0.9 or 90%)

Q=	0.0034	**ft^3/s**	
W=	0.0004	**ft/day**	medium sand
E=	0.9	**hours**	

A(s)= 20 ft2
SAY: **77.5 ft2** 25% Minimum
Length (ft) 19 Width (ft) 4

APPENDIX E

Runway – Outlet Control Calculations

AIP No. 3-09-0013-0XX-2025
Hoyle Tanner Project No. 063201.00'

Calculated By: MWD Date: 3/19/2025
Checked By: CJM Date: 3/26/2025

Outlet Control Calculations

Airport: Tweed New Haven Regional Airport
Project: Runway Extension and Terminal Expansion

Task Size stormwater outlet protection measures (rip-rap) using CT DOT Drainage Manual, Chapter 11
10-year storm, data from post-development HydroCAD model

Outlet	Description	Type	Tailwater	Flow (cfs)	Velocity (fps)	Rip-rap type
1	3 - 35" x 24" CMP Arch	C	Maximum	49.24	4.02	Modified

From the CT DOT Drainage Manual: (Page 11.13-3)

Type C Riprap Apron - The length of a Type C Riprap Apron shall be determined using the formula for a Type B Riprap Apron.

L_a = length of apron, m (ft)
S_p = inside diameter for circular sections or maximum inside pipe span for non-circular sections, m (ft)
Q = pipe (design) discharge, cms (cfs)
TW = tailwater depth, m (ft)
R_p = maximum inside pipe rise, m (ft)
Note: $S_p = R_p$ = inside diameter for circular sections

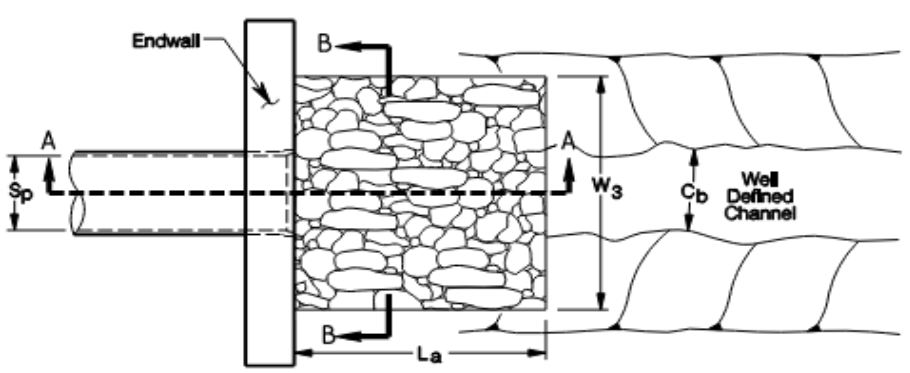
Type B Apron (Maximum Tailwater Condition) TW ≥ 0.5 R_p

$$L_a = \frac{5.44(Q-0.142)}{S_P^{1.5}} + 3.05 \qquad \left(L_a = \frac{3.0(Q-5)}{S_P^{1.5}} + 10 \right) \qquad \textbf{(11.32)}$$

Type C Riprap Apron

For a Type C Riprap Apron when there is a well defined channel downstream of the outlet, the bottom width of the apron should be at least equal to the bottom width of the channel and the lining should extend on the channel side slopes at least 0.3m (1 ft) above the tailwater depth (TW) or at least two-thirds of the vertical conduit dimension (0.7 R_p) above the invert, whichever is greater. (In all cases, the overall width of the apron shall be a minimum of $3S_p$). See Figure 11-13.

	CMP Arch	3 - 35" x 24"	
	Sp =	8.75	ft
	Rp =	2.00	ft
	Q =	49.24	cfs
Per Table	La =	15.13	ft
(11-13.1)	La (min) =	22.00	ft
	Cb =	8.75	ft
	W3 =	26.25	ft
	d =	12.00	in



ENDWALL PLAN VIEW

APPENDIX F

East Terminal – Outlet Control Calculations

PROJECT: Tweed New Haven Airport
PROJECT NO.:
TOWN: New Haven
ROUTE:

Computed by: EAR 4/3/2025
Checked By: RP 4/3/2015

Outlet Protection

Location: Culverts

Preformed Scour Hole
Per CTDOT Drainage Manual Section 11.13.6

Empirical Preformed Scour Hole Equations:

Type 1: Scour Hole Depression = one-half pipe rise, m (ft)

$d_{50} = (0.0276\ R_p^2/TW)\ (Q/R_p^{2.5})^{1.333}$ ($d_{50} = (0.0125 R_p^2/TW)\ (Q/R_p^{2.5})^{1.333}$) **(11.35)**

Type 2: Scour Hole Depression = full pipe rise, m (ft)

$d_{50} = (0.0181\ R_p^2/TW)\ (Q/R_p^{2.5})^{1.333}$ ($d_{50} = (0.0082 R_p^2/TW)\ (Q/R_p^{2.5})^{1.333}$) **(11.36)**

d_{50} = median stone size required, m (ft)

For variables S_p, R_p, TW and Q, see Section 11.13.5.

Type 1 and 2 preformed scour hole dimensions (See Figure 11-15)

$C = 3S_p + 6F$	Basin Length m (ft)	
$B = 2S_p + 6F$	Basin Inlet and Outlet Width m (ft)	**(11.37)**
$F = 0.5R_p$ (Type 1) or R_p (Type 2)	Basin Depression m (ft)	

Table 11-14 solves the above set of equations for Type 1 and 2 preformed scour holes for various pipe sizes.

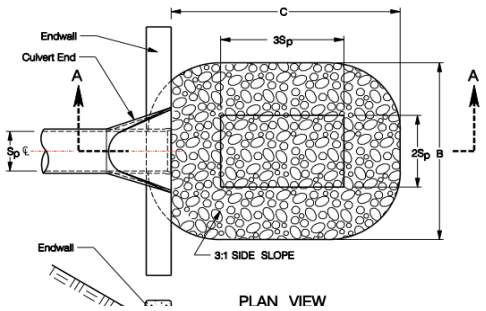
The type of riprap required is as follows:

Modified	$d_{50} < 0.13$m (0.42 ft)
Intermediate	0.13m (0.42 ft) $< d_{50} <$ 0.20m (0.67 ft)
Standard	0.20m (0.67 ft) $< d_{50} <$ 0.38m (1.25 ft)
Special Design	0.38m (1.25 ft) $< d_{50}$

OUTLET PROTECTION
OUTLET VELOCITY > 14 feet/sec or Length of Apron exceeds limits shown on Tables 11-12.1 and 11-13.1

Preformed Scour Hole										
(See Figure 11-15)	PIPE DIAMETER OR SPAN (in)									
	12	15	18	24	30	36	42	48	54	60
Type 1										
B	5	6	8	10	13	15	18	20	23	25
C	6	8	9	12	15	18	21	24	27	30
d	Depends on riprap type(see Figure 11-15)									
$2S_p$	2.0	2.6	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
$3S_p$	3.0	3.9	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
$F = 0.5\ S_p$	0.5	0.625	0.75	1	1.25	1.5	1.75	2	2.25	2.5
Type 2										
B	8	10	12	16	20	24	28	32	36	40
C	9	11	14	18	23	27	32	36	41	45
d	Depends on riprap size (see Figure 11-15)									
$2S_p$	2.0	2.6	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
$3S_p$	3.0	3.9	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
$F = S_p$	1.0	1.3	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0

Table 11-14.1 - Dimensions of Preformed Scour Hole (Feet)



PLAN VIEW

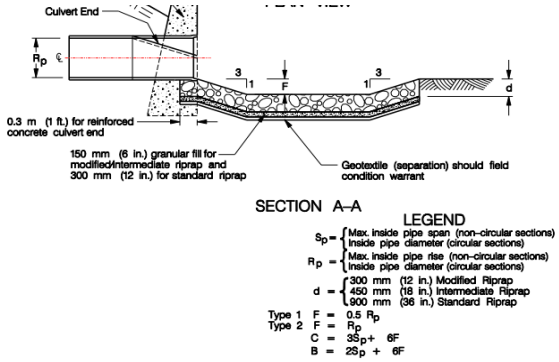


Figure 11-15 Preformed Scour Hole Type 1 and Type 2

Type 1 Riprap Type:

	DESIGN (25-yr)	Check (-yr)	
Rp* (ft) =	6		
Sp* (ft) =	3		
TW (ft) =	0.97		
Q (cfs) =	66.50		
d50 (ft)	0.32		#DIV/0!
Riprap =	**Modified**		#DIV/0!

Using largest culvert dimensions to be conservative, analyzing for flow through one culvert

Type 2 Riprap Type:

	DESIGN (25-yr)	Check (-yr)	
Rp* (ft) =	6		
Sp* (ft) =	3		
TW (ft) =	0.97		
Q (cfs) =	66.50		
d50 (ft)	0.46		#DIV/0!
Riprap =	**Intermediate**		#DIV/0!

TW depth calculated by subtracting the downstream depth from the depth at inlet of culverts

Scour Hole Dimensions:

	Type 1
F (ft) =	3
C (ft) =	27
B (ft) =	24

	Type 2
F (ft) =	3
C (ft) =	27
B (ft) =	24

***Per table 11.14-1, Use Type 2 Scour Hole**
B= width of channel wingwall to wingwall downstream of the culverts based on engineering judgement; B=58'

PROJECT: Tweed New Haven Airport
PROJECT NO
TOWN: New Haven
ROUTE:

Computed by: EAR 4/3/2025
Checked By: RP 4/3/2015

Outlet Protection

Location: Outfall of Stormwater Pump Stations

Outlet Protection Riprap Size:

Table 11.11 Allowable Outlet Velocities for Type A and B Riprap Aprons

Outlet Velocity - mps (fps)	Riprap Specification
0-2.44 (0-8)	Modified
2.44-3.05 (8-10)	Intermediate
3.05-4.27 (10-14)	Standard

The smaller pump station:

Footprint dimensions = 14'4" x 34'
Flow Velocity w/ 1 pump running (Q = 25 cfs): V = 6.64 ft/s
Flow Velocity w/ 2 pumps running (Q = 50 cfs): V = 8.32 ft/s
Flow Velocity w/ 3 pumps running (Q = 75 cfs): V = 9.39 ft/s
*assumed a channel slope of 0.5%

V (ft/s) = 9.39
Riprap = Intermediate
*Worst case scenario V used for rip rap determination

The larger pump station:

Footprint dimensions = 14'4" x 35'
Flow Velocity w/ 1 pump running (Q = 40 cfs): V = 9.35 ft/s
Flow Velocity w/ 2 pumps running (Q = 80 cfs): V = 11.83 ft/s
Flow Velocity w/ 3 pumps running (Q = 120 cfs): V = 13.45 ft/s
*assumed a channel slope of 1.0%

V (ft/s) = 13.45
Riprap = Standard
*Worst case scenario V used for rip rap determination

Using Intermediate Riprap

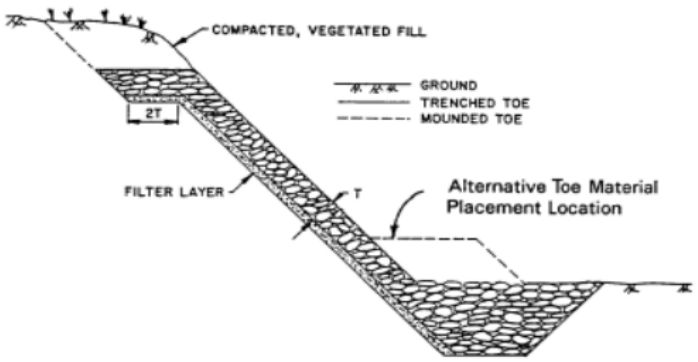


Figure 7-32 Typical Riprap Installation: End View (Bank Protection Only)

**Dimensions for riprap outlet protection to be determined during progression to 90% Design*

APPENDIX G

East Terminal – Time of Concentration Calculations

HVN - STORMWATER CATCHMENT AREAS & Tc CALCULATION				
LANDSIDE (SURFACE: PR-LANDSIDE-V3)				
STRUCTURE	CATCHMENT AREA	Tt LENGTH	Tt(hours)	Tt(min)
P-CB-01	4897.97	96.5	0.03	1.98
P-CB-02	5818.35	102.3	0.03	2.08
P-CB-03	4572.92	102.6	0.03	2.08
P-CB-04	13787	115.82	0.04	2.30
P-CB-05	11638.43	102.43	0.03	2.08
P-CB-06	11580.64	102.43	0.03	2.08
P-CB-07	16786.89	103.58	0.03	2.10
P-CB-08	15455.41	111.77	0.04	2.23
P-CB-09	1934.97	52.15	0.02	1.21
P-CB-10	14383.1	187.35	0.06	3.37
P-CB-11	5645.1	103	0.03	2.09
P-CB-12	3371.59	65.53	0.02	1.46
P-CB-13	16922.74	171.56	0.05	3.14
P-CB-14	8355.58	93.76	0.03	1.94
P-CB-15	15122.8	183.07	0.06	3.31
P-CB-16	10960.84	143.39	0.05	2.72
P-CB-17	6650.61	98.71	0.03	2.02
P-CB-18	6750.45	96.63	0.03	1.99
P-CB-19	6752.53	96.63	0.03	1.99
P-CB-20	6676.88	96.63	0.03	1.99
P-CB-21	8696.31	148.47	0.05	2.80
P-CB-22	37539.18	312.78	0.08	5.08
P-CB-23	10383.26	97.56	0.03	2.00
P-CB-24	9207.9	114.02	0.04	2.27
P-CB-25	6777.74	94.8	0.03	1.96
P-CB-26	8312.85	97.66	0.03	2.00
P-CB-27	15510.73	150.34	0.05	2.83
CB-29	9650.94	158.77	0.05	2.95
CB-30	12094.75	171.7	0.05	3.14
CB-32	10121.81	144	0.05	2.73
CB-33	12800.91	146.7	0.05	2.77
CB-34	13672.06	149.82	0.05	2.82
CB-35	13785.12	162.58	0.05	3.01
CB-36	6941.9	89.17	0.03	1.86
CB-37	7846.92	87.34	0.03	1.83
CB-38	9080.95	96.76	0.03	1.99
CB-39	9048.97	97.56	0.03	2.00
CB-40	6849.1	89.17	0.03	1.86
CB-41	7794.87	86.32	0.03	1.81
CB-42	9058.68	94.8	0.03	1.96

CB-43	9032.37	98.14	0.03	2.01
CB-44	5609.92	89.37	0.03	1.87
CB-45	6481.38	85.14	0.03	1.79
CB-46	7597.09	94.15	0.03	1.94
CB-47	7601.7	98	0.03	2.01
CB-48	8206.14	175.83	0.05	3.21
CB-49	16337.3	171.94	0.05	3.15
CB-50	19192.85	192.99	0.06	3.45
CB-51	8987.74	94.44	0.03	1.95
CB-52	11064.11	110.11	0.04	2.20
CB-53	8935.95	94.44	0.03	1.95
CB-54	11155.93	110.1	0.04	2.20
CB-55	6193.92	87.19	0.03	1.83
CB-56	10252.13	162.62	0.05	3.01
CB-57	5495.78	110.03	0.04	2.20
CB-58	8296.09	94.97	0.03	1.96
CB-59	6957.24	90.69	0.03	1.89
CB-60	9260.05	107.05	0.04	2.15
CB-61	7433.19	88.7	0.03	1.85
CB-62	9398	107.78	0.04	2.17
CB-63	7305.43	90.83	0.03	1.89
CB-64	8669.95	92.84	0.03	1.92
CB-65	8031.52	93	0.03	1.93
CB-66	14597.66	196.64	0.06	3.51
CB-67	4955.66	94.56	0.03	1.95
CB-68	7964.97	95.32	0.03	1.96
CB-69	15492.75	144.54	0.05	2.74
CB-70	9009.78	95.46	0.03	1.97
CB-71	16756.18	142.31	0.05	2.71
CB-72	9015.4	97.57	0.03	2.00
CB-73	17678.62	130.12	0.04	2.52
CB-74	9015.03	99.03	0.03	2.02
CB-75	16897.34	157.5	0.05	2.93
CB-76	7591.89	97.55	0.03	2.00
CB-77	14758.24	122.19	0.04	2.40
CB-78	11726.93	188.78	0.06	3.39
CB-79	8484.4	109.4	0.04	2.19
CB-80	5855.51	91.19	0.03	1.90
CB-81	5953.46	91.19	0.03	1.90
CB-82	11578.6	144.45	0.05	2.74
CB-83	15942.45	155.85	0.05	2.91
CB-84	6437.39	127.25	0.04	2.47
CB-85	4260	92.76	0.03	1.92
CB-86	4259.78	90.47	0.03	1.88

CB-87	4246.69	90.47	0.03	1.88
CB-88	4264.44	91.43	0.03	1.90
CB-89	4268.88	90.51	0.03	1.88
CB-90	5252.89	91.73	0.03	1.90
CB-91	17538.73	166.45	0.05	3.07
CB-92	13183.71	154.48	0.05	2.89
CB-93	13194.03	154.47	0.05	2.89
CB-94	13133.9	154.47	0.05	2.89
CB-95	13154.94	154.48	0.05	2.89
CB-96	12966.37	154.48	0.05	2.89
CB-97	17944.21	171.76	0.05	3.15

AIRSIDE (SURFACE: PR-APRON-TWB

STRUCTURE	CATCHMENT AREA	Tt LENGTH	Tt(hours)	Tt(min)
AS-CB-01	51726.13	174.26	0.05	3.18
AS-CB-02	34060.9	132.91	0.04	2.56
AS-CB-03	44909.45	264.95	0.07	4.45
AS-CB-04	87876.19	445.62	0.11	6.74
AS-CB-05	33799.06	294.58	0.08	4.84
AS-CB-06	48338.87	284.95	0.08	4.72
AS-CB-07	42423.61	277.69	0.08	4.62
AS-CB-08	24628.36	267.7	0.07	4.49
AS-CB-09	24633.2	270.72	0.08	4.53
AS-CB-10	38313.16	245.46	0.07	4.19
AS-CB-11	54453.26	225.43	0.07	3.91
AS-CB-12	44146.72	293.81	0.08	4.83
AS-CB-13	34500.27	293.81	0.08	4.83
AS-CB-14	12148.25	119.09	0.04	2.35
AS-CB-15	14031.48	103.81	0.04	2.10
AS-CB-16	21886.92	183.45	0.06	3.32
AS-CB-17	45068.55	309.95	0.08	5.04

CTDOT 2000 DRAINAGE MANUAL - APPENDIX C

6.C.4 Sheet-Flow Travel Time, T_t

Sheet flow is a shallow mass of runoff on a plane surface with the depth uniform across the sloping surface. **Typically flow depths will not exceed 30mm (1 in). Such flow occurs over relatively short distances, rarely more than about 91.4m (300 ft), but most likely less than 46m (150 ft)**. Sheet flow rates are commonly estimated using the NRCS TR-55 (1986) variation of the kinematic wave equation:

$$T_t = \frac{0.091(nL)^{0.8}}{P_2^{0.5} S^{0.4}} \qquad \left(T_t = \frac{0.007(nL)^{0.8}}{P_2^{0.5} S^{0.4}} \right) \qquad \textbf{(6.C.2)}$$

Where T_t = travel time, h
n = Manning's roughness coefficient (values of n can be obtained from Table C.1)
L = flow length, m (ft)
S = slope of the hydraulic grade line (land slope), m/m (ft/ft)
P_2 = 2 year, 24 hour rainfall depth, mm (in) (See Table B-1.)

APPENDIX H

Documentation of Sources

Documentation of Sources

Documents used in the preparation of this Engineering Report include:

1. Connecticut Stormwater Quality Manual 2024
2. New England Stormwater Retrofit Manual, 2022
3. Connecticut DOT Drainage Manual, 2002
4. Connecticut Guidelines for Soil Erosion & Sediment Control, 2024
5. Langan (Site Topographic Survey)
6. McCue Environmental & FHI Studio (Wetland Delineation)
7. RW Gillespie & Associates, Inc. (Geotechnical Investigation)
8. BL Companies (Subsurface Site Investigation)
9. FAA Advisory Circular 5300-13B, *Airport Design*
10. 2023 HydroCAD Software Solutions LLC, HydroCAD ® 10.20-5c

Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project, Connecticut

Hoyle Tanner Project No. 63201

Floodway/Floodplain Assessment Engineering Report - April 2025 – Permit Application

Prepared for:
Tweed New Haven Airport Authority and The New HVN LLC

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Appendix A: Watershed Map

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1. Project Description

The Tweed New Haven Airport Authority (TNHAA) was created in 1998 by the State of Connecticut (CGS 15-120i) to manage and operate Tweed New Haven Regional Airport (HVN). TNHAA has full control of the operation and management of the airport, including land, buildings and easements by virtue of a lease to the Authority by the City of New Haven, which owns the airport. On August 19, 2022, the Authority entered into a long-term Lease & Development Agreement with The New HVN, LLC. TNHAA and The New HVN LLC are co-applicants for this project.

The applicants propose the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways.

The proposed runway improvements (extension and drainage) include:

- Extension of Runway 02-20, which entails approximately an additional 639 feet at Runway 02 end and 336 feet at Runway 20 end.
- Adjusting runway cross-section and profile to be compliant with FAA standards.
- Strengthen existing the runway to meet pavement design requirements of the existing aircraft fleet.
- Incidental grading, stormwater drainage and markings.
- Adjusting and calibrating navigation aids for both runway ends.
- Installing runway edge lighting, guidance signs, and other accessory features to fully comply with FAA design standards.

The proposed East Terminal development includes:

New East Terminal Building

- Construction of a new terminal building ("East Terminal") on the east side of the Airport with an approximate gross square footage (SF) (functional area) of 80,000 SF, with four gates and two additional boarding positions (6 total, all ground boarding).
- Installation/relocation of security fencing and access gate.
- Incidental site work, including grading, stormwater management system and connection to existing on-site utilities such as electricity, water, wastewater, telephone and internet, and site work activities.

New Apron at East Terminal

- Construction of a new aircraft apron, with an area of approximately 450,000 SF, including ancillary site elements, would include two Remain Overnight (RON) parking positions and six gate parking positions.
- Construction of two access taxilanes from the terminal apron to an extended Taxiway A.
- Incidental site work, including deicing pads, blast deflector fence, grading, stormwater management system and utilities.
- Removal of a FAA owned decommissioned very high frequency omni-directional range (VOR).

New Vehicle Parking and Access Road

- Construction of approximately 2,000 new parking spaces with an approximate footprint of 1,042,000 SF, including building support areas, to serve the new East Terminal.
- Construction of a causeway and new two-lane, with potential to expand to four lane, airport access road from Proto Drive and associated improvements.
- Installation of electrical lighting, wayfinding, signage, landscaping associated with new parking.
- Incidental site work, including grading, stormwater management system and utilities.

Wetland Mitigation that will be included as part of the overall project to address wetland impacts will include enhancement of 28.5 acres of tidal salt marsh complex within existing Phragmites-dominated marsh areas by increasing the depth and duration of inundation of tidal water within these marshes. The enhancement objectives will be primarily achieved by modifying the operational procedure of the existing tide gate. The storm event / wet weather operations procedure of the tide gate will remain unchanged, ensuring flood prevention through the use of the Watershed Drain Mode when severe weather is forecast. Mitigation will also include the creation of 3.61 acres of tidal salt marsh complex within upland areas of the Airport property dominated by Phragmites australis. This process will involve excavating existing upland material, ensuring tidal flow through the creation of tidal channels that connect with existing channels, placing a clean, sandy planting medium, and grading the site to appropriate elevations for tidal inundation—the upper quarter of the tidal cycle. The newly created marsh will be planted with native salt marsh vegetation, including Spartina alterniflora in low marsh zones, to support habitat function and ecological resilience.

The project takes into consideration the Airport's location within the 100-year floodplain. The Federal Flood Risk Management Standard (FFRMS) has been used to determine the flood design class of the proposed buildings and structures. The proposed East Terminal will be designed to the Freeboard Value Approach of Base Flood Elevation (BFE) plus 2 feet for the minimum elevation of

bottom of lowest supporting horizontal structural member of lowest floor (elevation 14 ft (NAVD88)). To achieve this, the proposed East Terminal will be constructed on piers with the space below the finished floor elevation left open to allow floodwater to pass. Escalators and other non-structural components will be designed as breakaway wall(s). The project will incorporate resiliency measures, such as placing key building mechanical systems in a raised mezzanine or roof top location where they would be above flood elevation, and site design considerations to promote drainage and make facilities flood resistant. Additionally, the project would take place within the airport property and within an existing airport dedicated easement. The new access road would connect with existing Proto Drive; therefore, limited construction would occur within public rights-of-way which mainly entails roads in the immediate vicinity of the Airport. No private property is intended to be acquired as part of the project.

2. Watershed Description

The project study area for the Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project is located within the southern portion of the Tuttle Brook-Morris Creek watershed. The Tuttle Brook-Morris Creek watershed is located within New Haven and East Haven Connecticut and drains approximately 2,600 acres (4.1 sq mi). The watershed outlets directly into Long Island Sound near Lighthouse Point Park; therefore, the downstream end of the watershed is subject to tidal flow and has a tide gate located approximately 3,500 ft upstream of Long Island Sound. The Tuttle Brook tributary drains approximately 1,913 acres (3.0 sq mi). The Tuttle Brook watershed extends northerly from the Tweed New Haven Airport and extends past the I-95 Connecticut Turnpike. The Morris Creek tributary drains approximately 723 acres (1.1 sq mi) at the confluence with Tuttle Brook. The Morris Creek watershed extends north-easterly from the Tweed New Haven Airport and is approximately bounded by Cove Ave/Hemingway Ave and Main St. See Watershed Map included in Appendix A.

The watershed is heavily developed with commercial, industrial, and residential land cover. Notable features of the watershed include a tide gate, East Haven Industrial Park, Tweed New Haven Airport, and extensive marshes ranging from saltwater tidal marshes to freshwater nontidal swamps. The project study area is located within a mapped FEMA Zone AE, predominantly a Coastal A Zone, therefore the Flood Insurance Study (FIS) for New Haven County, Connecticut (dated May 16, 2017) includes both a riverine and coastal analysis near the project site.

3. FEMA History

At the start of the analyses of these projects, the effective Flood Insurance Rate Map (FIRM) in the vicinity of the Tweed New Haven Airport site was Map Number 09009C0444J (effective date July 8, 2013). The 2013 map showed a mapped floodway for Tuttle Brook with a floodway limit extending to cross section A-A located near Dodge Avenue. However, that map did not incorporate a previously effective LOMR from 2012 (Map Number 09009C0444H, effective date December 17, 2010, CLOMR effective date October 5, 2012). The 2012 LOMR was associated with the Tweed New Haven Airport Safety Improvements Project. Hoyle Tanner and Associates (Hoyle Tanner) was the engineer which applied for the CLOMR/LOMR for that project. The Safety Improvements Project relocated Dodge Avenue, relocated the stream channel near Dodge Avenue, and added dual culverts under the relocated Dodge Avenue. The 2012 LOMR also determined the floodway limit was located further upstream near Forest Street. FEMA terminates regulatory floodways at the boundary of the VE or V Zone; therefore, the floodway limit reflects the upper limit of the coastal analysis and the downstream end of the riverine analysis. The 2012 CLOMR/LOMR was obtained by documenting a "no rise" scenario with the Post-Project conditions model which is required for floodway impacts. FEMA approved the floodway limit ending near Forest Street and other associated project changes for Map Number 09009C0444H.

Hoyle Tanner and Connecticut Department of Energy and Environmental Protection (CTDEEP) have been coordinating with FEMA about the discrepancy in historical FIRMs and FEMA initiated an internal LOMR process (Case #24-0-0496P) to update the current FIRM. FEMA issued the preliminary LOMR on August 28, 2024 with an effective date of January 10, 2025. During the open comment period of the preliminary LOMR, Hoyle Tanner appealed to FEMA with questions pertaining to the BFE elevations displayed on the preliminary LOMR for the Tuttle Brook Cross Sections located between A and D to verify they match the results of the 2012 LOMR model. FEMA initiated a LOMR to resolve the appeal (Case #25-01-0643X) with a final letter of determination expected, at the earliest, within 90 days of March 10, 2025. During the processing of the appeal, Hoyle Tanner is referencing the 2012 LOMR 1D HEC-RAS model as the effective riverine model. The currently effective 2025 LOMR FIRM, the previously effective FIRM, and the historical 2012 LOMR FIRM are provided in Appendix B. The 2012 LOMR 1D HEC-RAS model is included separately from this report.

The Runway Extension and Terminal Expansion Project site is located completely within the coastal influence of Long Island Sound between FEMA Transects 22 and 24 with all proposed project work occurring within FEMA Transect 23. The project site is located approximately 1,100 ft downstream of the 2012 LOMR designated floodway limit. The BFE, as shown on the FIRM, is elevation 11 ft and 12 ft within the project site. There are a significant number of residential homes

impacted by the BFE limits. There is also a Limit of Moderate Wave Action (LiMWA) line immediately adjacent to the airport site.

4. Means and Methods

Extensive ground survey, bathymetry, and drone survey were obtained for this project. Publicly available LiDAR data was also downloaded from UCONNN (2016 LiDAR Download dataset). All field survey and LiDAR data are relative to NAD83 (2011) CT State Plane coordinates and NAVD88 elevations.

In meetings with CTDEEP and FEMA, it was determined both a riverine and coastal analysis would be beneficial for analyzing the project impacts. There are no proposed changes within the floodway of Tuttle Brook; however, due to the close vicinity of the floodway limit to the proposed project limits, a riverine analysis is needed to ensure the riverine backwater effects on the floodway will not be adversely impacted by the proposed projects. The riverine impacts of the proposed projects were determined utilizing a Hydrologic Engineering Center's River Analysis System (HEC-RAS, version 6.4.1) 2D model. Hoyle Tanner referenced the accepted 2012 LOMR HEC-RAS 1D model for the effective riverine analysis. The effective coastal analysis report and supporting modeling were requested and obtained from FEMA for the analysis completed in July 2013. The coastal impacts of the proposed projects were determined by analyzing the overland wave heights using the Wave Height Analysis for Flood Insurance Studies (WHAFIS) software within the Coastal Hazard Analysis for Mapping Program (CHAMP) following the methodology described in the FEMA Guidelines and Specifications for each coastal transect impacted by the development. Additional details about the modeling inputs and boundary conditions for the FEMA models are detailed in Sections 5 and 6 below.

5. FEMA Coastal Model

In coastal areas, flooding is exacerbated by wave action. The proposed project development occurs directly within Transect 23 of the FEMA FIS coastal analysis – therefore the direct effect of the proposed project on coastal flooding due to wave action can be determined. Streamworks PLLC was a subcontractor to Hoyle Tanner which performed the WHAFIS analysis. A summary of the WHAFIS model runs and results are below:

- **Duplicate Effective Model:** WHAFIS model obtained from FEMA containing terrain information from 2011.
- **Corrected Effective Model:** The duplicate effective model did not contain terrain information associated with the channel modifications associated with the 2012 LOMR.

Therefore, a Corrected Effective model was developed using updated topography from the project survey and bathymetry and supplemented with 2016 CT LiDAR information. This Corrected Effective model is also the **Pre-Project (Existing) Conditions Model**.

- **Post-Project Conditions Model**: The Corrected Effective/Pre-Project Conditions model was revised to include the proposed runway and East Terminal grading modifications as well as the proposed terminal pile design.

The WHAFIS model results show no change between the Corrected Effective/Pre-Project Conditions Model and the Post-Project Conditions Model therefore the proposed development does not change coastal flood hazards due to wind-generated waves. This includes no change to the LiMWA boundary as a result of the project activities. See Appendix C for a plan view and profile of the WHAFIS transect through the project site as well as a memo from Streamworks which includes the in-depth coastal analysis and supporting documentation.

6. FEMA Riverine Models

6.1 Hydrology

The FEMA FIS contains a Frequency Discharge-Drainage Area Curve for Morris Creek – Tuttle Brook. The curves define the 10-, 50-, 100-, and 500-year peak flows. These peak flows were used in the 2012 LOMR analysis and will also be used in this analysis.

Table 1: FEMA Peak Flows

Storm Event	10 year	50 year	100 year	500 year
FEMA Peak Flow (cfs)	830	1150	1360	1860

6.2 Hydraulic Model Development

Hoyle Tanner referenced the accepted 2012 LOMR HEC-RAS models for the effective riverine analysis. The 2012 LOMR models include: the HEC-2 files effective in 2012 obtained from FEMA; a 1D HEC-RAS Duplicate Effective model; a 1D HEC-RAS Corrected Effective/Pre-Project Conditions model; and a 1D HEC-RAS Post-Project Conditions model.

A 2D HEC-RAS model was chosen for the analysis of the proposed runway and East Terminal modifications because the floodplain in this area is very wide and flat with several channels and/or culverts overtopped during the base flood event. This creates extensive overland flow

which is better represented in a 2D versus 1D HEC-RAS model. The extensive survey and bathymetry obtained for this project as well as the supplemental 2016 LiDAR information makes for a very robust and comprehensive terrain input for the 2D model. A summary of the riverine model runs is below:

- **Duplicate Effective Model:** The Post-Project Conditions 1D HEC-RAS model from the 2012 LOMR for the Safety Improvements Project.
- **Corrected Effective Model:** A 2D HEC-RAS model was developed using updated topography from the project survey and bathymetry and supplemented with 2016 CT LiDAR information. There have been no additional changes to the floodplain of floodway area since the Safety Improvements Project associated with the 2012 LOMR; therefore, this Corrected Effective model is also the **Pre-Project (Existing) Conditions Model**.
- **Post-Project Conditions Model**: The Corrected Effective/Pre-Project Conditions model was revised to include the proposed runway and East Terminal grading modifications.

6.3 Hydraulic Study Area

The hydraulic study area encompasses similar stream limits for Tuttle Brook as the 2012 LOMR model with the upstream limit of this study located near Forest Street. The study area in HEC-RAS consists of approximately 179 acres. The study area extends from just upstream of the existing Tweed New Haven parking lot culvert (XS 127+34) to approximately 80 ft upstream of FEMA Section C-C (XS 153+80) (See Cross Section Map in Appendix D).

6.4 Flood Events

The study included analyses of the 10-, 50-, 100-, and 500-year peak flood events for Tuttle Brook listed in Table 1. Separate HEC-RAS 2D flow models were created for each of those events.

6.5 Geometry

Pre-Project model geometry was developed with a combination of field survey data, field bathymetry data, and publicly available LiDAR data. Field survey and bathymetry were completed by Langan. All field survey, bathymetry, and LiDAR data are relative to NAD83 (2011) CT State Plane coordinates and NAVD88 elevations. Field survey and bathymetry data were merged with LiDAR data to produce a comprehensive Pre-Project DEM which covers the entire study area.

There have been no modifications to the floodplain or channel since the effective model of the 2012 LOMR; therefore, the Corrected Effective model is the same as the Pre-Project model. The project bathymetry extends approximately 800 feet upstream of the Dodge Avenue dual conspan culverts. Since FEMA Section C-C was not covered by the bathymetry data, a channel modification was used in HEC-RAS so the existing channel inverts between the limits of the bathymetry data and the Forest Street culvert replicate the 2012 LOMR channel cross sections

within this location. These cross sections (XS 153+80 and 154+85) were not modified by the 2012 LOMR proposed work therefore this channel cross section data also matches the HEC-2 model data from the 2012 LOMR. This Pre-Project model geometry was copied and modified to create a separate comprehensive DEM representing the Post-Project conditions by replacing the existing terrain with terrain data that reflects the proposed runway grading limits as well as the proposed East Terminal grading limits. Note, only the proposed runway grading limits are within the limits of the FEMA riverine hydraulic study area.

A 2D computational mesh covering the hydraulic study area was created for the Pre- and Post-Project comprehensive DEMs. A default 20-ft x 20-ft cell size was specified, however smaller cells were utilized in areas near the existing culverts to better define flow dynamics. Smaller cell sizes were also used where needed in any areas with steep, shallow flow in order to better define rapid changes in terrain and flow dynamics. Breaklines were delineated along high ground and other features like stream banks in order to align cell faces with the terrain breaklines to better reflect overtopping conditions should overtopping occur. The same computational mesh layout and breaklines were used for both the Pre- and Post-Project models.

Hydraulic structures within the study area were added as 2D flow area connections. One dual culvert structure is within the study area (located near Dodge Avenue) for both the Pre- and Post-Project conditions. Hydraulic structure information was modeled using data from the field survey.

6.6 Roughness

Field survey information, field observations, and orthoimagery were used to determine existing land cover within the hydraulic study area. Polygons of each land cover were created in AutoCAD and GIS and then imported into HEC-RAS. Manning's n-values were then assigned to each land cover type in HEC-RAS. N-values were assigned based on recommended n-values published in the HEC-RAS 2D User's Manual as well as the n-values for Tuttle Brook defined in the FIS and n-values assigned in the 2012 LOMR model. Compared to the 1D model, the 2D land cover polygons have finer details (e.g. the runway pavement limits, tree limits, etc.) across the entire terrain incorporated into the 2D model. Table 2 below summarizes the land cover and corresponding n-value. The existing land cover map was then updated to reflect the revised pavement and grass limits within the project site to create the Post-Project land cover map. Occasionally when importing into HEC-RAS, some pixels between land cover boundaries may not receive a land cover designation. For any pixels that did not import with a land cover association, an n-value of 0.03 was used. Pre-Project and Post-Project land cover maps are included in Appendix E.

Table 2: Land Cover Roughness Coefficients

Land Cover	Manning's n-value
Grass	0.035
Gravel	0.03
Industrial	0.14
Pavement	0.025
Stream	0.035
Suburban	0.06
Trees	0.10
Herbaceous Wetland	0.05
Woody Wetland	0.14
No Data	0.03

6.7 Boundary Conditions

External boundary conditions were defined for the upstream and downstream study limits. FEMA guidelines are to compute flood elevations without considering backwater effects therefore the backwater effects from Long Island Sound were not considered for this analysis and normal depth was used as the downstream boundary condition. The energy grade slope used for the downstream boundary condition is the same slope used in the 2012 LOMR model (0.2%) which was verified by the project bathymetry and survey.

Unlike 1D modeling, which requires peak flood discharges, 2D modeling requires modeling flow over time therefore six synthetic 24-hour hydrographs were developed (one for each of the peak flood discharges listed in Table 1) to be used as the upstream boundary conditions in the hydraulic analysis. The 10-, 50-, 100-, and 500-year peak flows for Tuttle Brook are defined by FEMA (Table 1). The hydrograph gradually increases flow until the peak discharge value is reached. To allow water surface elevations (WSEs), depths, velocities and other parameters to stabilize, the peak flow was held for 5 hours to simulate a steady flow condition before gradually decreasing flow again.

To ensure the HEC-RAS model does not start from dry conditions, an initial condition of 1 hour was used for all models. The initial streamflow within the hydrograph was adjusted to provide enough

flow during the HEC-RAS initial conditions time to wet the main channels before HEC-RAS analyzed the storm event hydrographs.

6.8 Additional Parameters

Each flood simulation was run with the SWE-ELM equation set (full momentum) for a period of 24 hours. The program was set to allow for adjustment to the computational time step as needed to produce Courant numbers of about one or less in each cell within the mesh. This minimizes the potential for flow to move through more than one cell at each time step which increases model stability and accuracy.

7. FEMA Riverine Hydraulic Model Results

7.1 Duplicate Effective Model

The effective model is a 1D HEC-RAS model used by the 2012 LOMR.

7.2 Corrected Effective Model and Pre-Project Model

As described in Section 6.5, there have been no modifications to the floodplain or channel within the study area since the 2012 LOMR; therefore, the Corrected Effective model is the same as the Pre-project model. This 2D HEC-RAS model only updates the terrain within the study area with the most recent survey, bathymetry, and publicly available LiDAR information.

To meet FEMA requirements when using a different model program than the currently effective model program, the Corrected Effective Model must tie-in to the Duplicate Effective BFEs within 0.5 ft. The 2012 LOMR 1D cross section locations were geolocated and imported as profile lines into the 2D HEC-RAS model to ensure the results of the 1D and 2D models can be directly compared. Appendix F includes Table 3 showing compliance with this 0.5 ft difference when comparing the maximum WSE between the Corrected Effective Model and the Duplicate Effective Model for the 10-, 50-, 100-, and 500-year storm events for each of the cross sections included in the 2012 LOMR.

Note the Duplicate Effective Model and the Pre-Project Model have computed 100-year water surface elevations between FEMA cross sections A and D that are different than those reflected in the 2025 LOMR FIRM. For example, at cross section C, the 2025 LOMR FIRM depicts a water surface elevation of 9.3 ft while the Duplicate Effective Model has a computed 100-year water surface elevation of 9.6 ft. These differences are being addressed in the appeal LOMR as described in Section 3. While the appeal LOMR is processing, Hoyle Tanner is referencing the 2012 LOMR 1D HEC-RAS model as the effective riverine model.

A cross section location and inundation map for the FEMA Pre-Project 100-year and 500-year storm events is included in Appendix D (FE-1 and FE-2). The Pre-Project model shows the dual culvert near Dodge Avenue does not overtop; however, the northern end of the runway has a low area that acts as a weir for overtopping floodwaters during the 10-year storm event and greater. These overtopping waters re-enter Tuttle Brook just downstream of the dual culvert near Dodge Avenue.

7.3 Post-Project Model

The Post-Project hydraulic analysis used a terrain that incorporated the proposed runway grading within the study area and a proposed land cover map while all other modeling parameters were maintained. The Post-Project model shows the dual culvert near Dodge Avenue still does not overtop and the proposed grading at the northern end of the runway still facilitates floodwaters overtopping the runway and re-entering Tuttle Brook just downstream of the dual culvert. The Post-Project model shows there will be no adverse effect to the riverine backwater effect on the existing floodway, and therefore the riverine BFEs, by the proposed projects. The overall volume accounting error as a percentage for the HEC-RAS runs ranged from 0.005 to 0.020 which shows model stability and that the results are within the margin of error for the riverine model. Cross section location and inundation maps for the FEMA Post-Project 100-year and 500-year storm events are included in Appendix D (FE-1 and FE-2). Inundation maps comparing Pre-Project and Post-Project 100-year and 500-year water surface elevations are also included in Appendix D (FE-3 and FE-4). A summary table comparing the Corrected Effective/Pre-Project Model to the Post-Project Model WSEs is included below in Table 4.

Table 4: FEMA Corrected Effective/Pre-Project Comparison to Post-Project Water Surface Elevations

Cross Section	Model	Maximum Water Surface Elevation for Storm Event (ft, NAVD88)			
		10 year	50 year	100 year	500 year
XS 127+34	Corrected Effective/Pre-Project	6.90	7.47	7.79	8.36
	Post-Project	6.78	7.32	7.64	8.20
	Difference (Post-Project - Pre-Project)	-0.12	-0.16	-0.15	-0.16
XS 131+00	Corrected Effective/Pre-Project	7.17	7.77	8.07	8.63
	Post-Project	7.10	7.67	7.95	8.50
	Difference (Post-Project - Pre-Project)	-0.07	-0.10	-0.11	-0.13
XS 136+50	Corrected Effective/Pre-Project	7.26	7.88	8.18	8.75
	Post-Project	7.20	7.78	8.08	8.65
	Difference (Post-Project - Pre-Project)	-0.07	-0.09	-0.10	-0.10
XS 139+10	Corrected Effective/Pre-Project	7.49	8.09	8.39	8.94
	Post-Project	7.43	8.02	8.31	8.85
	Difference (Post-Project - Pre-Project)	-0.06	-0.07	-0.08	-0.09
XS 145+15	Corrected Effective/Pre-Project	8.28	9.10	9.47	10.15
	Post-Project	8.23	9.06	9.43	10.09
	Difference (Post-Project - Pre-Project)	-0.05	-0.04	-0.04	-0.06

XS 145+55	**Corrected Effective/Pre-Project**	8.28	9.10	9.47	10.15
	Post-Project	8.23	9.06	9.43	10.09
	Difference (Post-Project - Pre-Project)	-0.05	-0.04	-0.04	-0.06
XS 146+55	**Corrected Effective/Pre-Project**	8.35	9.18	9.54	10.20
	Post-Project	8.30	9.12	9.50	10.14
	Difference (Post-Project - Pre-Project)	-0.04	-0.06	-0.04	-0.06
XS 147+50	**Corrected Effective/Pre-Project**	8.41	9.20	9.56	10.22
	Post-Project	8.37	9.17	9.52	10.16
	Difference (Post-Project - Pre-Project)	-0.04	-0.03	-0.04	-0.05
XS 153+80	**Corrected Effective/Pre-Project**	8.92	9.64	9.97	10.60
	Post-Project	8.89	9.62	9.95	10.57
	Difference (Post-Project - Pre-Project)	-0.03	-0.02	-0.02	-0.03

8. FEMA Conclusion

Both the coastal analysis and the riverine analyses show the proposed development will not have an adverse effect on the BFEs and the project will meet NFIP minimum requirements as well as local floodplain requirements. A CLOMR will be pursued for this project in order to ensure the results of the coastal analysis and the riverine analysis are acceptable to FEMA before construction begins and to allow the municipalities of New Haven and East Haven to review the analyses before construction. The 2D HEC-RAS models and WHAFIS models are being submitted separately from this report.

9. Hydraulic Models for Inundation Maps

CTDEEP Land and Water Resource Division (LWRD) applications require existing and proposed inundation maps for the 2-, 10-, 25-, 50-, and 100-year discharges carried to convergence. The HEC-RAS 2D model created for FEMA regulations (as outlined in the section "FEMA Riverine Model" was extended to encompass the entire airport property, the tide gate, and surrounding area with a downstream limit approximately 1,290 ft downstream of the existing tide gate. The inundation maps for the 2-, 10-, 25-, and 50- year storm events included in Appendix I are results from the riverine analysis only and reflect the modeling parameters as outlined in Section 9.1-9.9. The 100-year floodplain is regulated by FEMA as well as state and local regulations; therefore, the coastal analysis results, as outlined in Sections 3 and 5, were used to depict the 100-year inundation map included in Appendix I.

9.1 Hydrology

Since the FEMA FIS hydrology does not extend beyond the Tuttle Brook floodway limit, peak riverine flows for this hydrologic study of Tuttle Brook and Morris Creek were computed for the 2-, 10-, 25-, 50-, 100-, and 500-year floods utilizing approved methods outlined in the ConnDOT Drainage Manual (Chapter 6 Hydrology). Methods include the USGS web application StreamStats, the USGS three-variable "Urban" Regional Regression Equations, the USGS seven-variable "Urban" Regional Regression Equations, and HydroCAD (which utilizes the TR-55 and TR-20 methods).

Drainage areas for Tuttle Brook (to the Tide Gate) and Morris Creek (to the confluence with Tuttle Brook) were delineated using existing contour information obtained from Connecticut Statewide LiDAR (2016) as well as project specific LiDAR and bathymetry data that was obtained from surveying the project site and adjacent stream channels. Land cover was determined using the City of New Haven, Connecticut Zoning Maps (effective date March 21, 2007, latest revision of November 16, 2012), the Zoning Map of the Town of East Haven Connecticut (dated November 15, 1998), and aerial imagery (Bing Maps, Microsoft. Retrieved April 10, 2024). Hydrologic soil types were delineated using the USDA Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS). A watershed map is included in Appendix A. Zoning maps and a HSG map are included in Appendix G. Weighted runoff curve numbers were determined based on this land cover and hydrologic soil group (HSG) information. Table 5 below summarizes the curve numbers used for the various land covers and HSG.

Table 5: Land Cover Curve Numbers based on Hydrologic Soil Group

Land Cover (Good Condition)	HSG A	HSG B	HSG C	HSG D
Impervious	98	98	98	98
Commercial	89	92	94	95
Industrial	81	88	91	93
Park (Open Space)	39	61	74	80
Residential ¼ Acre	61	75	83	87
Residential ½ Acre	54	70	80	85
Water	98	98	98	98

The 24-hour (Type III) precipitation frequency datasets from NOAA's National Weather Service (NWS) Atlas 14 (New Haven Tweed AP, Site ID 06-5273) and Northeast Regional Climate Center (NRCC) were obtained and compared. As shown in Table 6 below, NRCC and Atlas 14 data were similar for the majority of the storm events therefore the Atlas 14 data was utilized in order to match the explanatory variables used in the USGS Regression Equations.

Table 6: 24-hour (Type III) Precipitation Frequency Estimates

	Return Frequency	2 Year Event	10 Year Event	25 Year Event	50 Year Event	100 Year Event	500 Year Event
NOAA NWS Atlas 14	24 hours	3.42 inches	5.22 inches	6.34 inches	7.17 inches	8.07 inches	10.8 inches
NRCC	24 hours	3.28 inches	4.82 inches	6.02 inches	7.12 inches	8.43 inches	12.51 inches

StreamStats: StreamStats is a web application developed by the USGS and which utilizes an assortment of Geographic Information Systems (GIS) analytical tools to delineate drainage areas based on user selected stream points and determine peak flows based on the basin characteristics determined from the available GIS data. Although StreamStats utilizes USGS Regression Equations to determine peak flows, the values returned by StreamStats were much lower than other methods. This could be due to the mean basin elevation for the project site being

below the minimum limit of 168 ft required by the USGS equations. This parameter is used for estimating flood flows in urban basins therefore the subcatchment results obtained from the USGS Regression Equations were extrapolated with unknown errors. StreamStats flows will not be utilized for this hydraulic analysis.

USGS "Urban" Regional Regression Equations: Both the 3-Variable and 7-Variable regression equation methods were analyzed. For both methods, the Nonurban ("Rural") flows were determined for the 2-, 10-, 25-, 50-, 100-, and 500-year storm events using equations outlined by the USGS publication by Ahearn and Hodgkins[1]. Those results were used to determine the "Urban" flows for each storm event using the equations outlined by the USGS publication by Ahearn[2]. These are the most recent updates and publications to the approved ConnDOT U.S.G.S Regression Equation method previously developed by L.A. Weiss.

All subcatchments analyzed have hydrologic characteristics that fall within the range of maximum and minimum values for the regional regression equations for estimating the "rural" flood discharges in Connecticut.

NRCS WSS was used to compute the percentage of drainage area classified as HSG C, C/D, and D for use in the USGS Regression Equation. Due to the project site having a close proximity to the coast and tidal influences, soil classifications of A/D and B/D were also conservatively included in this percentage. The computed percentage of 48% matches the value given in the StreamStat report for Dodge Avenue and was therefore considered a reasonable assumption.

The average percent impervious values from TR-55 were used to determine the impervious cover of the watershed land covers. The NRCS WSS classification of water was used to determine the Drainage-basin storage variable. LiDAR contours were used to determine main channel slope. The Basin Development Factor (BDF) for the USGS "Urban Regional Regression Equations was determined for each third of the drainage area.

The USGS 7-Variable "Urban" Regression Equation results will be utilized for the hydraulic analysis. The USGS 3-Variable "Urban" Regression Equations computed the highest flows of the three methods. The 7-Variable "Urban" Regression Equation results appear to better represent the contributing watershed and amount of wetland storage available and will therefore be utilized for the analysis. Since land cover was determined via zoning maps, the same peak flows are used for both the Pre-Project and Post-Project inundation analysis. Table 7 below summarizes the results from all hydrologic methods. Supporting computations are included in Appendix H.

Table 7: Summary of Hydrologic Method Results

Hydrologic Method	Subcatchment	2 Year Event (cfs)	10 Year Event (cfs)	25 Year Event (cfs)	50 Year Event (cfs)	100 Year Event (cfs)	500 Year Event (cfs)
StreamStats	Tuttle Brook at Tide Gate	147	348	484	598	727	1090
StreamStats	Morris Creek at confluence with Tuttle Brook	55	132	184	228	277	412
USGS 3-Variable "Urban" Regional Regression Equations	Tuttle Brook at Tide Gate	459	651	796	929	1118	1512
USGS 3-Variable "Urban" Regional Regression Equations	Morris Creek at confluence with Tuttle Brook	146	222	277	325	389	537
USGS 7-Variable "Urban" Regional Regression Equations	Tuttle Brook at Tide Gate	378	593	715	834	995	1413
USGS 7-Variable "Urban" Regional Regression Equations	Morris Creek at confluence with Tuttle Brook	129	207	250	294	349	504

9.2 Hydraulic Model Development

A 2D HEC-RAS model was chosen for the analysis of the proposed runway and East Terminal modifications because the floodplain in this area is very wide and flat with several channels and/or culverts overtopped during the base flood event. This creates extensive overland flow which is better represented in a 2D versus 1D HEC-RAS model. The site also has tidal influences from Long Island Sound and tidal fluctuations can be modeled with a 2D HEC-RAS model. The extensive survey and bathymetry obtained for this project as well as the supplemental 2016 LiDAR information makes for a very robust and comprehensive terrain input for the 2D model.

9.3 Hydraulic Study Area

The study area has the same upstream limits as the FEMA model described in Section 6, extending approximately 80 ft upstream of FEMA Section C-C (XS 153+80). The downstream limits of the study extend approximately 1,270 ft downstream of the existing tide gate. The study area consists of approximately 1,100 acres. See the CTDEEP Inundation and Cross Section Maps in Appendix I for the study limits.

9.4 Flood Events

The study included analyses of the 2-, 10-, 25-, and 50-year peak flood events computed using the USGS 7-Variable "Urban" Regional Regression Equations results listed in Table 7. Separate HEC-RAS 2D flow models were created for each of those events. As noted in Section 9 above, the 100-year inundation map reflects the FEMA coastal modeling results.

9.5 Geometry

Pre-Project (Natural Conditions) model geometry was developed with a combination of field survey data, field bathymetry data, and publicly available LiDAR data. Field survey and bathymetry were completed by Langan. All field survey, bathymetry, and LiDAR data are relative to NAD83 (2011) CT State Plane coordinates and NAVD88 elevations. Field survey and bathymetry data were merged with LiDAR data to produce a comprehensive Pre-Project DEM which covers the entire study area. There is a tide gate located on Tuttle Brook-Morris Creek located approximately 1,900 ft downstream of the end of the existing runway and project site. The tide gate was incorporated into the Pre-Project model geometry (see Section 9.6 for more information on the Tide Gate). The Pre-Project model geometry was copied and modified to create a separate comprehensive DEM representing the Post-Project (Proposed) conditions by replacing the existing terrain with terrain data that reflects the proposed runway grading limits as well as the proposed East Terminal grading limits and proposed causeway geometry. Proposed grading associated with wetland mitigation and creation has also been included as a terrain modification. There are three locations chosen for wetland creation whose final grading elevation will be equal to elevation 2.3 ft that are included in the Post-Project model using a terrain modification. The terminal building is proposed

to be built on piles with the bottom of the lowest horizontal member located at the BFE plus 2 feet; therefore, the terminal building itself has not been put into the Post-Project conditions geometry file since it is outside of the floodplain elevations but all ground grading associated with the proposed terminal building has been depicted in the Post-Project conditions geometry. The proposed East Terminal design may also include a future parking garage and elevator for an above ground walkway. To ensure the model represents all potential future aspects of the airport development, a terrain modification was used to model the potential future elevator shaft and parking garage in the Post-Project model.

A 2D computational mesh covering the hydraulic study area was created for the Pre- and Post-Project comprehensive DEMs. A default 20-ft x 20-ft cell size was specified, however smaller cells were utilized in areas near the existing culverts to better define flow dynamics. Smaller cell sizes were also used where needed in any areas with steep, shallow flow in order to better define rapid changes in terrain and flow dynamics. Breaklines were delineated along high ground and other features like stream banks in order to align cell faces with the terrain breaklines to better reflect overtopping conditions should overtopping occur. The same computational mesh layout and breaklines were used for both the Pre- and Post-Project models except for within the proposed terminal project area where separate breaklines were drawn to follow the high point of the proposed causeway.

Hydraulic structures within the study area were added as 2D flow area connections. Thirteen hydraulic structures were included in the Pre-Project model: three structures were used to define the tide gate (see Section 9.6) and one structure was used to define each of the following existing hydraulic structures for both the Pre- and Post-Project conditions: South End Road bridge, Morris Causeway culverts, Pig Farm Road culverts, access path culvert on the east side of the runway, box culverts near the intersection of Dean Street and Burr Street, bridge by the West Terminal baggage claim, box culverts near the West Terminal baggage claim, box culverts under the West Terminal, box culverts near the West Terminal parking lot, dual culverts near Dodge Avenue. All hydraulic structure information was modeled using data from the field survey with the exception of the tide gate and South End Road bridge. The tide gate was modeled from as-built plans (see Section 9.6) and the South End Road bridge was modeled from the proposed bridge replacement plans from CTDOT Project No. 43-132 dated August 17, 2021. The Post-Project model also includes a hydraulic structure for the proposed East Terminal causeway culverts for a total of fourteen hydraulic structures included in the Post-Project model. The proposed causeway and culvert design used for this analysis is from the 60% design plans.

9.6 Tide Gate

The tide gate located on Tuttle Brook – Morris Creek was constructed in 1934 by the State of Connecticut to replace an earlier structure. It was designed by the Connecticut Agricultural

Experiment Station for mosquito control (Morris Creek Flood Control Study, September 1984). This was also part of a larger program which excavated small "mosquito ditches" to drain the marsh surface and Morris Creek was dredged four feet deeper from Long Island Sound to Uriah Street. The intensive mosquito control programs began in 1912 and subsequent Public Acts of 1015 (Chapter 264) and 1917 (Chapter 402).

The tide gate is owned by the city of New Haven. It is operated by The New HVN LLC on behalf of the TNHAA. While maintaining the existing tide gate infrastructure, the tide gates were replaced in 2009 with three gates that consist of a combination of new motor-operated tide gates and flap gates. The tide gate was modified to maintain an opening of approximately 1.5 ft during "normal" flow conditions to allow the mean high tide to pass through the tide gate to inundate the former salt marsh in and around the airport. Modifications also provided a larger opening to increase the downstream flow through the structure and increased operations for flood control against tidal surges associated with coastal storms but it was not initially and is not currently designed as protection against the 100-year storm event. The tide gate consists of three openings measuring 6 ft by 10 ft. The middle gate has a flap gate to prevent negative flows from entering the riverine channel. As-built plans, which have a vertical datum of NGVD29, are included in Appendix J.

The Tweed New Haven Airport has a Standard Operating Procedures (SOP) Guideline which details the tide gate operation to be expected in anticipation of storm events. In meetings with CTDEEP, it was determined analysis for the inundation maps would be completed based on the assumption the tide gate was not operational since this is the most conservative inundation analysis. Therefore, the geometry model, as described in Section 9.5, was developed to examine inundation limits when all tide gates are completely open (the worst case scenario) with the middle tide gate still operating as a flap gate.

9.7 Roughness

Field survey information, field observations, and orthoimagery were used to determine existing land cover within the hydraulic study area. Polygons of each land cover were created in AutoCAD and GIS and then imported into HEC-RAS. Manning's n-values were then assigned to each land cover type in HEC-RAS. N-values were assigned based on recommended n-values published in the HEC-RAS 2D User's Manual as well as the n-values for Tuttle Brook defined in the FIS and n-values assigned in the 2012 LOMR model. Compared to the 1D model, the 2D land cover polygons have finer details (e.g. runway pavement limits, tree limits, etc.) across the entire terrain incorporated into the 2D model. Table 8 below summarizes the land cover and corresponding n-value. The existing land cover map was then updated to reflect the revised pavement and grass limits within the project site to create the Post-Project land cover map. Occasionally when importing into HEC-RAS, some pixels between land cover boundaries may not receive a land cover designation. For any pixels that did not import with a land cover association, an n-value of 0.03

was used. Pre-Project and Post-Project land cover maps for the CTDEEP riverine models are included in Appendix K.

Table 8: Land Cover Roughness Coefficients

Land Cover	Manning's n-value
Grass	0.035
Gravel	0.03
Industrial	0.14
Pavement	0.025
Stream	0.035
Suburban	0.06
Trees	0.1
Herbaceous Wetland	0.05
Woody Wetland	0.14
No Data	0.03

9.8 Boundary Conditions

External boundary conditions were defined for the upstream and downstream study limits. Unlike 1D modeling, which requires peak flood discharges, 2D modeling requires modeling flow over time therefore four synthetic 24-hour hydrographs were developed the 2-, 10-, 25-, and 50-year peak flows (listed in Section 9.1) to be used as the upstream boundary conditions in the hydraulic analysis. The hydrograph gradually increases flow until the peak discharge value is reached. In order to allow water surface elevations, depths, velocities and other parameters to stabilize, the peak flow was held for 5 hours to simulate a steady flow condition before gradually decreasing flow again.

In order to ensure the HEC-RAS model does not start from dry conditions, an initial condition of 7 hours was used for all models. The initial streamflow within the hydrograph was adjusted to provide enough flow during the HEC-RAS initial conditions time to wet the main channels before HEC-RAS analyzed the storm event hydrographs.

The project site is located within the tidally affected zone of Long Island Sound; however, the site sees decreased tidal impacts due to the presence of the tide gate. There is a tide gage located

west of the project site within Long Island Sound. A stage hydrograph for normal tide was downloaded from NOAA's Tides and Currents gage page for New Haven, CT - Station ID: 8465705.[3] This normal tide stage hydrograph, conservatively assuming the peak high tide is coincidental with the peak riverine hydrograph, is used as the HEC-RAS downstream boundary condition.

9.9 Additional Parameters

Each flood simulation was run with the SWE-ELM equation set (full momentum) for a period of 24 hours. The program was set to allow for adjustment to the computational time step as needed to produce Courant numbers of about one or less in each cell within the mesh. This minimizes the potential for flow to move through more than one cell at each time step which increases model stability and accuracy.

10. Hydraulic Models for Inundation Maps Results

The riverine floodplain analysis using a normal tide boundary condition for the 2-, 10-, and 25-year storm event shows there is a maximum 0.1 ft increase in WSE between Pre-Project and Post-Project conditions. The 50-year storm event shows a maximum of 0.1-0.2 ft increase in WSE between Pre-Project and Post-Project conditions. From approximately Sta. 127+35 to the upstream limits of the model, there is no change between Pre-Project and Post-Project WSEs for the 2-, 10-, 25-, or 50-year storm event. The 100-year storm event is regulated by FEMA and the NFIP; therefore, the results of the coastal analysis, as described in Section 5, were used to determine the 100-year inundation limits. As stated in Section 5, the 100-year WSE has no change between Pre-Project and Post-Project conditions; therefore, the currently effective (2025 LOMR) FEMA 100-year inundation limits are depicted on the 100-year inundation map. Inundation maps for the 2-, 10-, 25-, 50-, and 100-year storm events are included in Appendix I. Note that due to the rendering limitations of the HEC-RAS program, some areas with very shallow flow are shown to be dry; therefore, several areas on the 2-, 10-, 25-, and 50-year storm event inundation maps, especially near the fringe of the floodplain, show as isolated wet pockets.

Unlike a 1D model which gives a single maximum WSE result, the 2D HEC-RAS model computes a WSE for each cell; therefore, the results need to be analyzed closely for local areas within the floodplain that may have a greater increase (or decrease) in WSE between Pre-Project and Post-Project conditions. These local increases can be due to several reasons, most notably the land cover roughness coefficient or the existing/proposed grading impacting local flow patterns. Cross section locations of the 1D HEC-RAS 2012 LOMR and inundation mapping model were geolocated in the 2D HEC-RAS model and input as profile lines. A cross section map is included in Appendix I. Those profile lines, as well as the inundation limits, were used to analyze inundation impacts.

Generally, localized increases are contained within an existing wetland area or within the limits of the TNHAA property limits which does not impact existing private property or structures. A summary table is included in Appendix I. In general, for the 0.1-0.2 ft increase in the maximum WSE for the 2-, 10-, 25- and 50-year storm events, the Post-Project inundation limits impact the same existing structures as the Pre-Project inundation limits. There are a couple areas with increased potential for inundation limits to note. For the 2-year storm event, the area between Alfred Street and Nelson Street shows an increased inundation limit in the Post-Project condition in a wooded area behind residential houses. Based on Connecticut GIS and aerial imagery, there may be uninsurable building impacts (e.g. sheds). In the Pre-Project condition, these buildings and properties are currently impacted by the 10-, 25-, 50-, and 100-year storm events. Similarly, for the 2-year storm event, the area near Kirkham Street/Concord Street/Townsend Avenue shows an increased inundation limit in the Post-Project condition in a low grassed/wooded area behind residential houses. The same insurable structures in this area appear to be impacted in both Pre-Project and Post-Project conditions and they are also currently impacted by the 10-, 25-, 50-, and 100-year storm events in the Pre-Project condition. As detailed in Section 5, the proposed development will not have an adverse effect on the BFEs therefore there are no new properties impacted by the regulatory floodplain limits.

11. Inundation Map Conclusion

Although the site survey is quite robust, there are some limitations to getting accurate ground elevations via LiDAR in areas that have extremely dense phragmites. It has been noted in field visits the surveyed elevations are estimated to be up to 0.9 ft higher than actual ground elevations in areas where phragmites is too dense to navigate or survey on foot. Therefore, the HEC-RAS 2D inundation models are utilizing a conservatively higher ground elevation for computing water surface elevations and inundation extents for the 2-, 10-, 25-, and 50-year storm events. The 2D model is also conservatively assuming worst case scenario tide gate conditions where the tide gate is not functioning (tide gates are in their largest possible opening during a storm event). The storm event also conservatively assumes riverine peak flows are coincidental with peak high tide. These inundation results show there are no new properties impacted by the regulatory 100-year floodplain limits and there is a minimal increase in WSE with property impacts similar to existing conditions for the lower storm events when analyzing the project using these conservative assumptions; therefore it is Hoyle Tanner's professional opinion the project will have minimal to no impact on the Tuttle Brook-Morris Creek floodplain for lower storm events and no impact on the regulatory 100-year floodplain. Because the project is located within a coastal flood hazard area, flood storage compensation is not required.

References

[1] *Ahearn, E.A., and Hodgkins, G.A., 2020, Estimating flood magnitude and frequency on streams and rivers in Connecticut, based on data through water year 2015: U.S. Geological Survey Scientific Investigations Report 2020–5054, 42 p., https://doi.org/10.3133/sir20205054*

[2] *Ahearn, E.A., 2004, Regression equations for estimating flood flows for the 2-, 10-, 25-, 50-, 100-, and 500-year recurrence intervals in Connecticut: U.S. Geological Survey Scientific Investigations Report 2004–5160, 68 p., https://doi.org/ 10.3133/sir20045160*

[3] *Station Home Page – NOAA Tides and Currents. New Haven, CT - Station ID: 8465705.* https://tidesandcurrents.noaa.gov/stationhome.html?id=8465705

Appendix A: Watershed Map

LONG ISLAND SOUND

TUTTLE BROOK SUBCATCHMENT DOWNSTREAM OF FEMA RIVERINE ANALYSIS

EXISTING AIRPORT TERMINAL

TUTTLE BROOK SUBCATCHMENT TO LIMIT OF FEMA RIVERINE ANALYSIS

DRAINAGE AREA (TYP.)

TIME OF CONCENTRATION (TYP.)

MORRIS CREEK SUBCATCHMENT

LIMIT OF FEMA RIVERINE ANALYSIS

TUTTLE BROOK MORRIS CREEK

LIGHTHOUSE RD

TOWNSEND AVE

DEAN ST

SOUTH END RD

SILVER SANDS RD

BURR ST

CITY OF NEW HAVEN

TOWN OF EAST HAVEN

DODGE AVE

FENCH AVE

THOMPSON AVE

HEMINGWAY AVE

GERRISH AVE

MAIN STREET

OAK STREET

ROUTE 95

HUNTINGTON ROAD

0 800 1600

ENGINEER'S SEAL

HOYLE TANNER

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PROJECT DESIGNER

DESIGNED BY: JC
DRAWN BY: JLC
CHECKED BY: RMF
DATE: NOVEMBER, 2024

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

WATER SHED LIMITS

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1			
2			
3			
4			NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

DRAWING NO.

WS-1

1 OF 1

HTA 12/20/2024 10:10:20 AM - H:\1_PROJECTS\Tweed\22_063201_00-Tweed-Runway-Extension\2-CADD\3-Exhibit\EX-WATERSHED LIMITS.dwg

Appendix B: FEMA FIRMs

- Currently Effective 2025 LOMR FIRM: (Map Number 09009C0444J, effective date January 10, 2025)
- Previously Effective FIRM: (Map Number 09009C0444J, effective date July 8, 2013)
- 2012 LOMR FIRM: (Map Number 09009C0444H, effective date December 17, 2010, CLOMR effective date October 5, 2012)

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION DETERMINATION DOCUMENT

COMMUNITY AND REVISION INFORMATION		PROJECT DESCRIPTION	BASIS OF REQUEST
COMMUNITY	City of New Haven New Haven County Connecticut	NO PROJECT	UPDATE
	COMMUNITY NO.: 090084		
IDENTIFIER	Tweed New Haven Airport: Safety Improvements (11-01-2488P)	APPROXIMATE LATITUDE AND LONGITUDE: 41.274, -72.887 SOURCE: Other DATUM: NAD 83	

ANNOTATED MAPPING ENCLOSURE	ANNOTATED STUDY ENCLOSURES
TYPE: FIRM* NO.: 09009C0444J DATE: July 8, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY May 16, 2017 PROFILE: 408P FLOODWAY DATA TABLE: 14

Enclosures reflect changes to flooding sources affected by this revision.
* FIRM - Flood Insurance Rate Map

FLOODING SOURCE AND REVISED REACH

Tuttle Brook - from approximately 1,750 feet downstream of Dodge Avenue to approximately 708 feet upstream of Forest Street

SUMMARY OF REVISIONS

Flooding Source	Effective Flooding	Revised Flooding	Increases	Decreases
Tuttle Brook	Zone AE	Zone AE	YES	NONE
	BFEs*	BFEs	YES	NONE
	Floodway	No Floodway	NONE	YES

* BFEs - Base Flood Elevations

DETERMINATION

This document provides the determination from the Department of Homeland Security's Federal Emergency Management Agency (FEMA) regarding a request for a Letter of Map Revision (LOMR) for the area described above. Using the information submitted, we have determined that a revision to the flood hazards depicted in the Flood Insurance Study (FIS) report and/or National Flood Insurance Program (NFIP) map is warranted. This document revises the effective NFIP map, as indicated in the attached documentation. Please use the enclosed annotated map panel revised by this LOMR for floodplain management purposes and for all flood insurance policies and renewals in your community.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 18773362627 (1877FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 223046426. Additional Information about the NFIP is available on our website at https://www.fema.gov/floodinsurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

OTHER COMMUNITIES AFFECTED BY THIS REVISION

CID Number: 090076 **Name:** Town of East Haven, Connecticut

AFFECTED MAP PANEL	AFFECTED PORTIONS OF THE FLOOD INSURANCE STUDY REPORT
TYPE: FIRM NO.: 09009C0444J DATE: July 8, 2013	DATE OF EFFECTIVE FLOOD INSURANCE STUDY: May 16, 2017 PROFILE: 408P FLOODWAY DATA TABLE: 14

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 18773362627 (1877FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 223046426. Additional Information about the NFIP is available on our website at https://www.fema.gov/floodinsurance.

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Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

COMMUNITY INFORMATION

APPLICABLE NFIP REGULATIONS/COMMUNITY OBLIGATION

We have made this determination pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (P.L. 93-234) and in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, P.L. 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed NFIP criteria. These criteria, including adoption of the FIS report and FIRM, and the modifications made by this LOMR, are the minimum requirements for continued NFIP participation and do not supersede more stringent State/Commonwealth or local requirements to which the regulations apply.

We provide the floodway designation to your community as a tool to regulate floodplain development. Therefore, the floodway revision we have described in this letter, while acceptable to us, must also be acceptable to your community and adopted by appropriate community action, as specified in Paragraph 60.3(d) of the NFIP regulations.

NFIP regulations Subparagraph 60.3(b)(7) requires communities to ensure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management ordinances; therefore, responsibility for maintenance of the altered or relocated watercourse, including any related appurtenances such as bridges, culverts, and other drainage structures, rests with your community. We may request that your community submit a description and schedule of maintenance activities necessary to ensure this requirement.

COMMUNITY REMINDERS

We based this determination on the 1-percent-annual-chance discharges and stillwater elevations computed in the FIS for your community. A comprehensive restudy of your community's flood hazards could establish greater flood hazards in this area.

Your community must regulate all proposed floodplain development and ensure that permits required by Federal and/or State/Commonwealth law have been obtained. State/Commonwealth or community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction or may limit development in floodplain areas. If your State/Commonwealth or community has adopted more restrictive or comprehensive floodplain management criteria, those criteria take precedence over the minimum NFIP requirements.

We will not print and distribute this LOMR to primary users, such as local insurance agents or mortgage lenders; instead, the community will serve as a repository for the new data. We encourage you to disseminate the information in this LOMR by preparing a news release for publication in your community's newspaper that describes the revision and explains how your community will provide the data and help interpret the NFIP maps. In that way, interested persons, such as property owners, insurance agents, and mortgage lenders, can benefit from the information.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 18773362627 (1877FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 223046426. Additional Information about the NFIP is available on our website at https://www.fema.gov/floodinsurance.

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Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

We have designated a Consultation Coordination Officer (CCO) to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Kerry Bogdan
Chief, Risk Analysis Branch
U.S. Department of Homeland Security
Federal Emergency Management Agency, Region I, 99 High Street
Boston, MA 02110
(617)956-7576

STATUS OF THE COMMUNITY NFIP MAPS

We will not physically revise and republish the FIRM and FIS report for your community to reflect the modifications made by this LOMR at this time. When changes to the previously cited FIRM panel and FIS report warrant physical revision and republication in the future, we will incorporate the modifications made by this LOMR at that time.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

Federal Emergency Management Agency
Washington, D.C. 20472

LETTER OF MAP REVISION
DETERMINATION DOCUMENT (CONTINUED)

PUBLIC NOTIFICATION OF REVISION

A notice of changes will be published in the *Federal Register*. This information also will be published in your local newspaper on or about the dates listed below, and through FEMA's Flood Hazard Mapping website at https://www.floodmaps.fema.gov/fhm/bfe_status/bfe_main.asp

LOCAL NEWSPAPER

Name: *The New Haven Register*
Dates: September 5, 2024 and September 12, 2024

Within 90 days of the second publication in the local newspaper, any interested party may request that we reconsider this determination. Any request for reconsideration must be based on scientific or technical data. Therefore, this letter will be effective only after the 90day appeal period has elapsed and we have resolved any appeals that we receive during this appeal period. Until this LOMR is effective, the revised flood hazard determination presented in this LOMR may be changed.

This determination is based on the flood data presently available. The enclosed documents provide additional information regarding this determination. If you have any questions about this document, please contact the FEMA Mapping and Insurance eXchange toll free at 1-877-336-2627 (1-877-FEMA MAP) or by letter addressed to the LOMC Clearinghouse, 3601 Eisenhower Avenue, Suite 500, Alexandria, VA 22304-6426. Additional Information about the NFIP is available on our website at https://www.fema.gov/flood-insurance.

Patrick "Rick" F. Sacbibit, P.E., Branch Chief
Engineering Services Branch
Federal Insurance and Mitigation Administration

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD88)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A-D[3]	~~0~~	~~108~~	~~597~~	~~2.3~~	~~9.7~~	~~8.2[2]~~	~~9.2~~	~~1.0~~
	~~850~~	~~63~~	~~413~~	~~3.3~~	~~9.7~~	~~8.7[2]~~	~~9.7~~	~~1.0~~
	~~1,480~~	~~55~~	~~365~~	~~3.1~~	~~9.7~~	~~9.3[2]~~	~~10.3~~	~~1.0~~
	~~1,718~~	~~158~~	~~805~~	~~1.4~~	~~9.7~~	~~9.7~~	~~10.5~~	~~0.8~~
E	2,705	44	284	3.4	10.9	10.9	11.8	0.9
F	2,938	49	335	2.9	11.7	11.7	12.6	0.9
G	3,170	55	367	2.4	12.0	12.0	12.9	0.9
H	3,550	94	492	1.8	12.2	12.2	13.1	0.9
I	4,210	107	400	2.2	12.6	12.6	13.4	0.8
J	4,545	40	255	3.4	12.9	12.9	13.8	0.9
K	4,735	90	426	2.0	14.9	14.9	15.7	0.8
L	5,120	155	707	1.2	15.1	15.1	16.0	0.9
M	5,695	141	512	1.7	15.1	15.1	16.1	1.0
N	5,965	163	445	1.9	16.5	16.5	17.4	0.9

Revised Data

[1]Feet above Dodge Avenue

[2]Computed without consideration of storm surge effects from Long Island Sound

[3]See Flood Insurance Rate Map for regulatory base flood elevation. Floodway not computed for areas affected by Long Island Sound.

TABLE 24

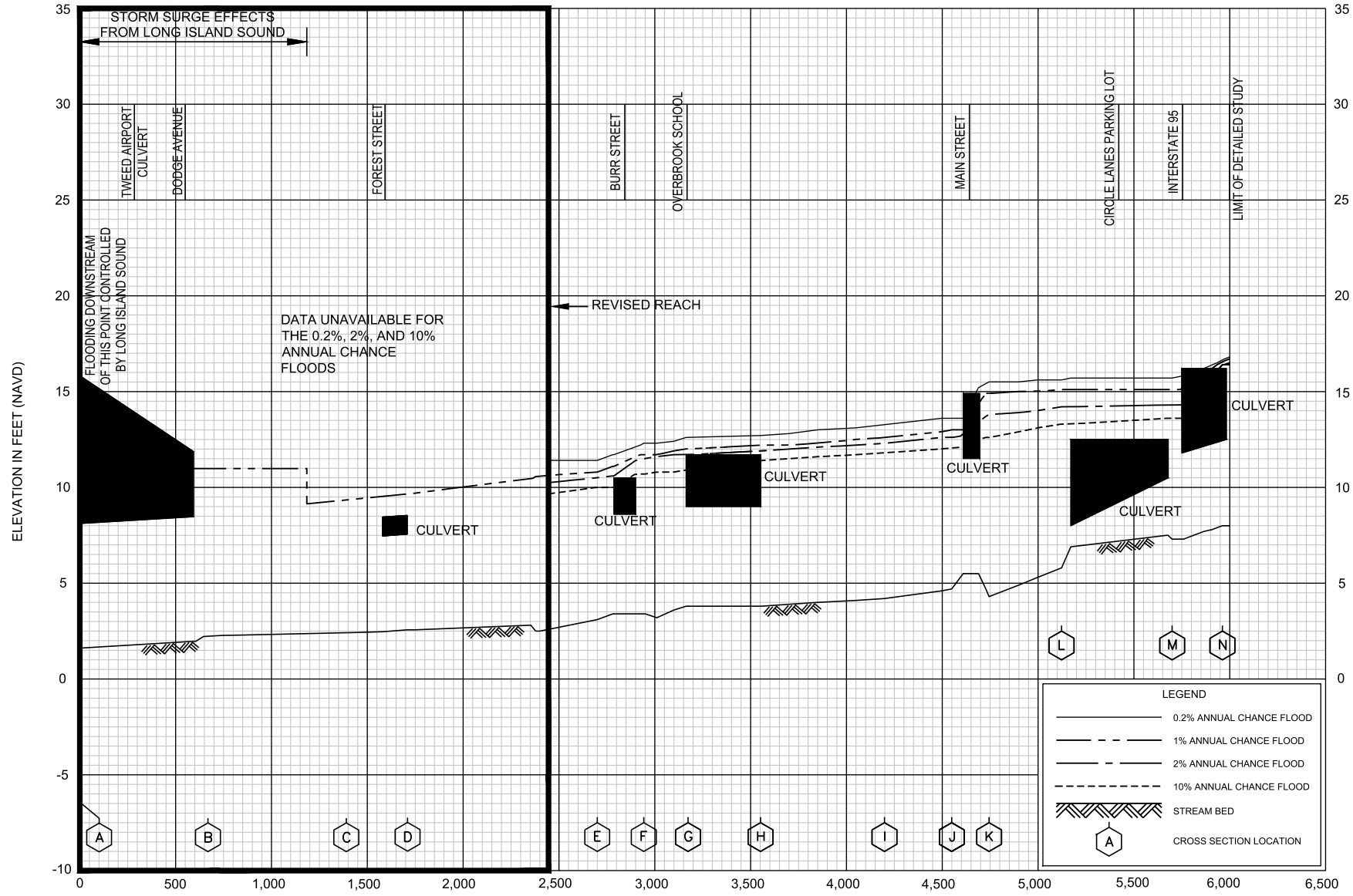
FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CONNECTICUT

(ALL JURISDICTIONS)

FLOODWAY DATA REVISED TO REFLECT LOMR EFFECTIVE: January 10, 2025

FLOODING SOURCE: TUTTLE BROOK



FLOOD PROFILES

REVISED TO REFLECT LOMR EFFECTIVE: January 10, 2025

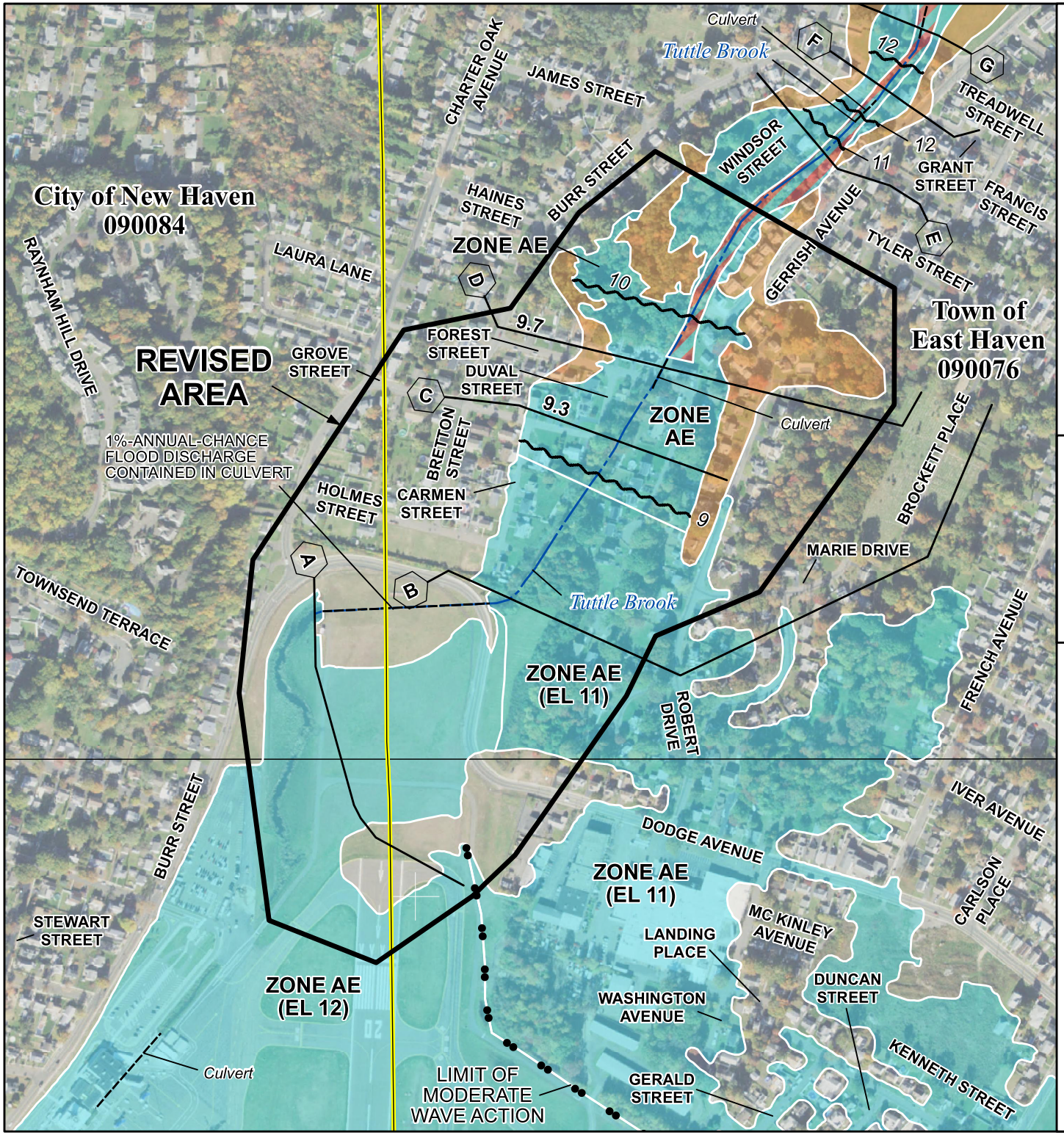
TUTTLE BROOK

FEDERAL EMERGENCY MANAGEMENT AGENCY

NEW HAVEN COUNTY, CT

(ALL JURISDICTIONS)

408P



Limit of Moderate Wave Action coincident with Zone Break

Limit of Moderate Wave Action

SPECIAL FLOOD HAZARD AREAS

Without Base Flood Elevation (BFE) *Zone A,V, A99*

With BFE or Depth *Zone AE, AO, AH, VE, AR*

Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD

0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*

Future Conditions 1% Annual Chance Flood Hazard *Zone X*

Area with Reduced Flood Risk due to Levee See Notes. *Zone X*

SCALE

NOTE: BASEMAP IMAGERY WAS OBTAINED FROM NAIP IN 2021.

Map Projection:
NAD 1983 StatePlane Connecticut FIPS 0600 Feet;
Western Hemisphere; Vertical Datum: NAVD 88

1 inch = 500 feet 1:6,000

0 250 500 1,000 Feet

0 75 150 300 Meters

FEMA

National Flood Insurance Program

NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT

(All Jurisdictions)

PANEL 444 OF 635

Panel Contains:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HAVEN, TOWN OF	090076	0444	J
NEW HAVEN, CITY OF	090084	0444	J

REVISED TO REFLECT LOMR EFFECTIVE: January 10, 2025

VERSION NUMBER
2.1.3.0

MAP NUMBER
09009C0444J

MAP REVISED
JULY 8, 2013

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) Report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS Report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study Report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study Report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study Report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Connecticut State Plane Zone (FIPS zone 0600). The **horizontal datum** was NAD 83, GRS 1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713- 3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on FIRM panels produced for this coastal study revision was derived from United State Geological Survey 2008 High Resolution Orthophotography produced from 1 foot pixel cells from photography dated April 2008. The projection used in the preparation of this map was Connecticut State Plane Feet, FIPS Zone 0600. The horizontal datum used was North American Datum of 1983 (NAD 83).

The AE Zone category has been divided by a **Limit of Moderate Wave Action (LiMWA)**.The LiMWA represents the approximate landward limit of the 1.5 foot breaking wave.The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areaswhere VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

The **profile baselines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile baseline**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables for multiple streams in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

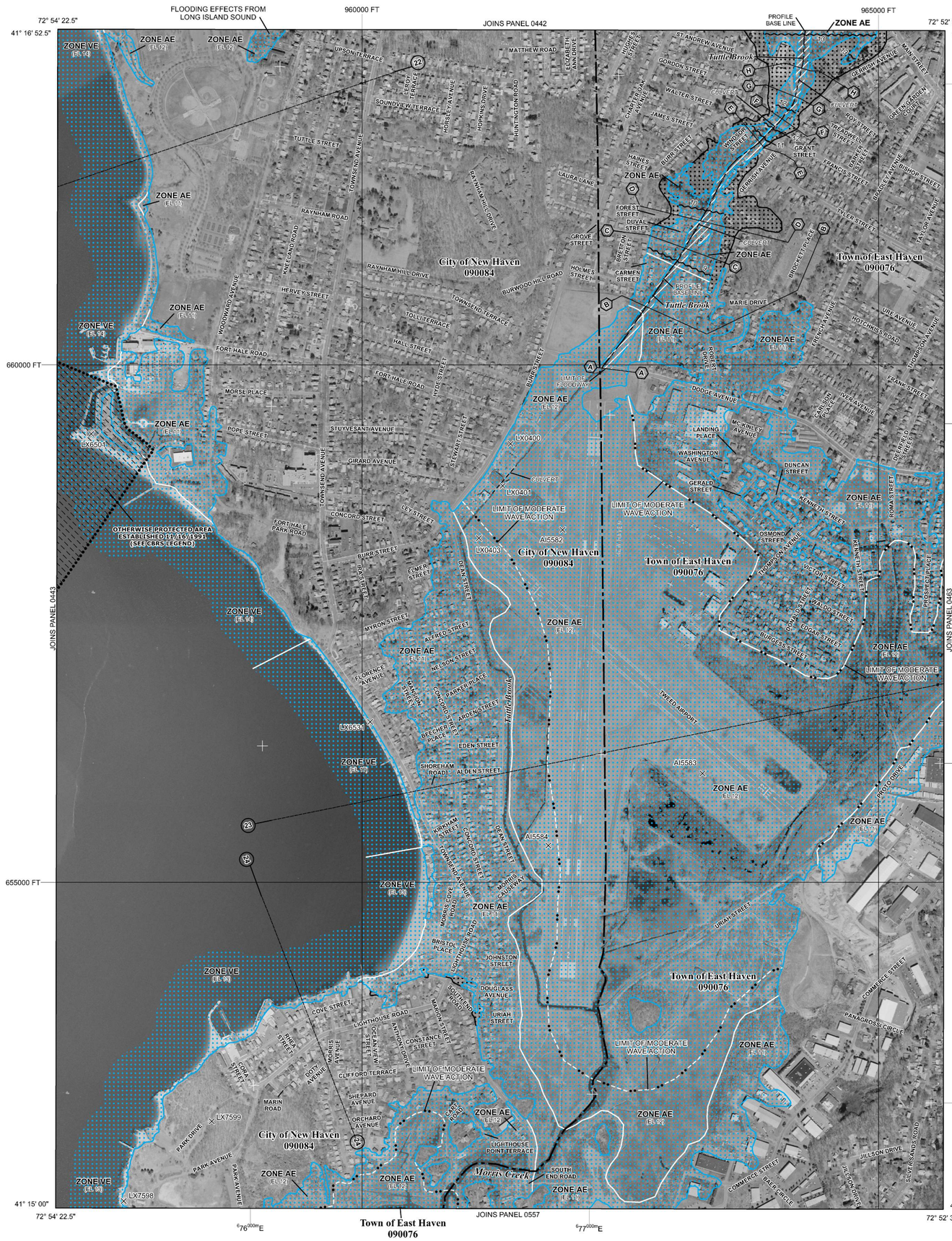
If you have **questions about this map,** how to order products, or the National Flood Insurance Program in general, please call the **FEMA Map Information eXchange (FMIX)** at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND

11-16-1991 Otherwise Protected Area (OPA)
FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMBER 16, 1991 IN DESIGNATED OPAs WITHIN THE CBRS.

Boundaries of the John H. Chafee Coastal Barrier Resources System (CBRS) shown on this FIRM were transferred from the official CBRS source map(s) for this area and are depicted on this FIRM for informational purposes only. The official CBRS maps are enacted by Congress via the Coastal Barrier Resources Act, as amended, and maintained by the U.S. Fish and Wildlife Service (FWS). The official CBRS maps used to determine whether or not an area is located within the CBRS are available for download at http://www.fws.gov. For an official determination of whether or not an area is located within the CBRS, or for any questions regarding the CBRS, please contact the FWS field office for this area at 603-223-2541.

Only coastal structures that are certified to provide protection from the 1 percent annual chance flood are shown on this panel. However, all structures taken into consideration for the purpose of coastal flood hazard analysis and mapping are present in the FIRM database in S_Gen_Struct.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% Annual Chance Floodplain Boundary
- 0.2% Annual Chance Floodplain Boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
- Limit of Moderate Wave Action
- Limit of Moderate Wave Action coincident with Zone Break
- 513 — Base Flood Elevation line and value; elevation in feet*
- (EL 987) — Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- A — A — Cross section line
- 23 — 23 — Transect line
- Culvert
- Bridge
- 45° 02' 08", 93° 02' 12" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
- 3100000 FT — 5000-foot grid: Connecticut State Plane Feet Zone (FIPS Zone 0600), Lambert Conformal Conic projection
- 45 89 000m N — 1000-meter Universal Transverse Mercator grid values, zone 18N
- DX5510 × — Bench mark (see explanation in Notes to Users section of this FIRM panel)

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
December 17, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
July 8, 2013 - to change Base Flood Elevations and Special Flood Hazard Areas, to change zone designations, to update the effects of wave action, to update corporate limits, to add roads and road names, to incorporate previously issued Letters of Map Revision and to modify Coastal Barrier Resources System units.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0444J

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT (ALL JURISDICTIONS)

PANEL 444 OF 635
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HAVEN, TOWN OF	090076	0444	J
NEW HAVEN, CITY OF	090084	0444	J

NOTE:
THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
09009C0444J
MAP REVISED
JULY 8, 2013

Federal Emergency Management Agency

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures.** Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Connecticut State Plane (FIPSZONE 0600). The **horizontal datum** was NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum.** For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 20910-3282

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242,** or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was provided in digital format by the Connecticut Department of Environmental Protection. This information was derived from digital orthophotos produced at a scale of 1:12,000 from aerial photography flown in 2004 supplemented with aerial photography from 2000.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables *in the Flood Insurance Study report (which contains authoritative hydraulic data)* may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, *a Flood Insurance Study report,* and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND

10-01-1983 CBRS Area

FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER OCTOBER 1, 1983, IN DESIGNATED CBRS AREAS.

11-16-1990 CBRS Area

FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMBER 16, 1990, IN DESIGNATED CBRS AREAS.

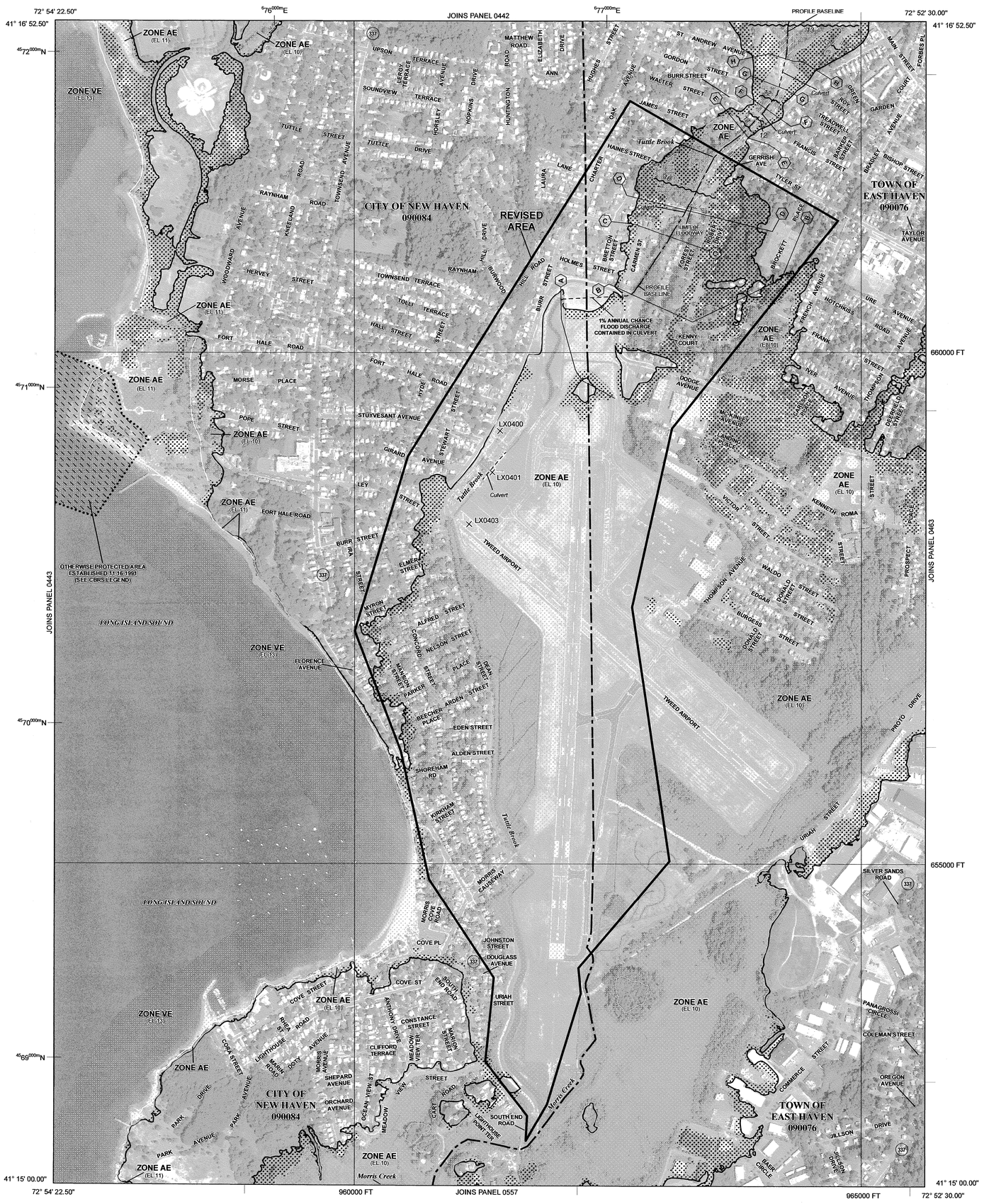
11-16-1991 Otherwise Protected Area (OPA)

FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMBER 16, 1991, IN DESIGNATED OPAs WITHIN THE CBRS.

11-16-1993 CBRS Area

FLOOD INSURANCE IS NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMEBER 15, 1993, IN DESIGNATED CBRS AREAS.

Boundaries of the John H. Chafee Coastal Barrier Resources System (CBRS) shown on this FIRM were transferred from the official CBRS source map(s) for this area and are depicted on this FIRM for informational purposes only. The official CBRS maps are enacted by Congress via the Coastal Barrier Resources Act, as amended, and maintained by the U.S. Fish and Wildlife (FWS). The official CBRS maps used to determine whether or not an area is located within the CBRS are available for download at http://www.fws.gov. For an official determination of whether or not an area is located within the CBRS, or for any questions regarding the CBRS, please contact the FWS field office for this area at (603) 223-2541.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Areas formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% Annual Chance Floodplain Boundary
	0.2% Annual Chance Floodplain Boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
45° 02' 08", 93° 02' 12"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83) Western Hemisphere
4989000mN	1000-meter Universal Transverse Mercator grid values, zone 18
6000000 FT	5000-foot grid values: Connecticut State Plane coordinate system, (FIPSZONE 0600), Lambert Conformal Conic
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORIES
Refer to Map Repositories list on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
December 17, 2010
EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET
150 0 150 300 METERS

NFIP NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0444H

FIRM

FLOOD INSURANCE RATE MAP

NEW HAVEN COUNTY, CONNECTICUT (ALL JURISDICTIONS)

PANEL 444 OF 635
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
EAST HAVEN, TOWN OF	090076	0444	H
NEW HAVEN, CITY OF	090084	0444	H

REVISED TO REFLECT LOMR EFFECTIVE OCTOBER 5, 2012

-NOTE-
THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

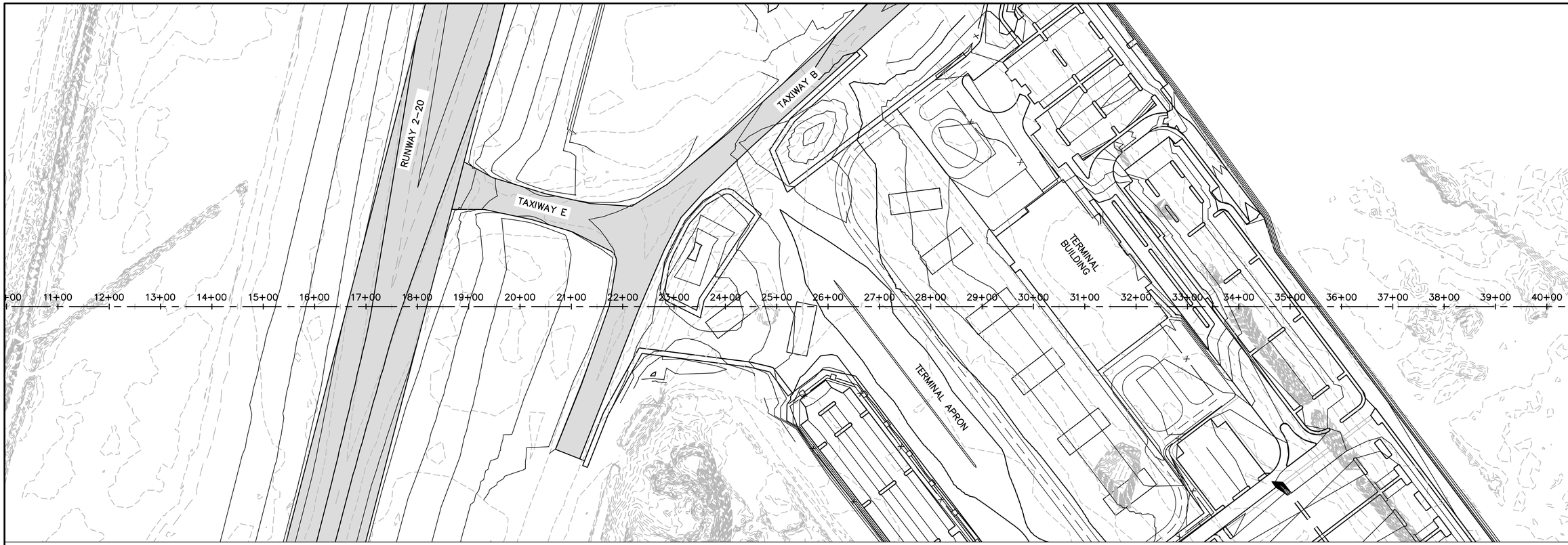
MAP NUMBER
09009C0444H

EFFECTIVE DATE
DECEMBER 17, 2010

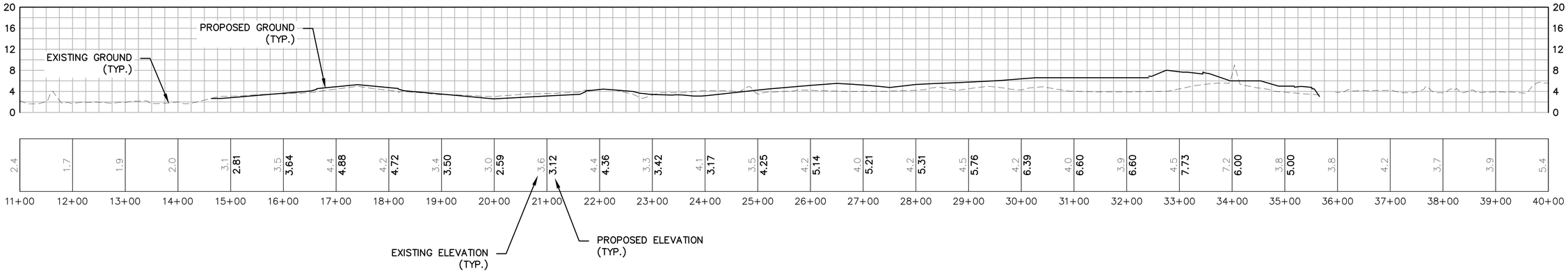
Federal Emergency Management Agency

Appendix C: WHAFIS Cross Section and Report

- WHAFIS Cross Section at Tweed New Haven Airport project site
- WHAFIS Report



WHAFIS PROFILE



ENGINEER'S SEAL

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DRAWN BY: ###
CHECKED BY: RMF
DESIGNED BY: NEG
DATE: DECEMBER, 2024

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY 2-20 REHABILITATION AND EXTENSION

WHAFIS SECTION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
	12/11/24	PROGRESS PLOT FOR REVIEW ONLY	NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

DRAWING NO.

WH1.1

SHEET 1 OF ##

MEMO

To: Robert Furey and Jenae Carraway, Hoyle Tanner
From: Thomas P. Ballestero, Streamworks
Subject: WHAFIS Analysis of Tweed New Haven Airport Expansion
Date: 17 December 2024

Introduction

The planned expansion of the Tweed New Haven Airport in New Haven, CT includes expanding a runway and terminal construction. These concepts include fill in coastal areas presently inundated by extreme water levels. As a result, the effect of the proposed expansion on coastal flooding due to wave action was requested to be analyzed. This memo explains the methodology for the wave height analysis, the scenarios modeled, and the results.

Wave Height Analysis

Wind-generated waves are created when wind blows over open distances (fetch) of water. Energy from the wind is transferred to the water via the shear stress between the two fluids (air and water). In deep water settings, the wave height is limited by either the strength of the wind, the length of the fetch, or the duration of the wind. In shallow water areas, in addition to wave height limitations of deep water, waves are limited by the water depth and friction on the bottom, vegetation, or infrastructure.

The methods to generate wave heights from wind were described in the Shore Protection Manual (USACOE, 1964) and subsequently packaged in 1980 into a program called WHAFIS – wave height analysis for flood insurance studies. WHAFIS was developed to, "…*predict wave heights associated with hurricane coastal storm surge*." Waves may come in from offshore and grow or decay, or waves may be generated on inland fetches. In WHAFIS, when waves reach a location where the land surface exceeds the still water level, the wave height is set to to zero.

A note must be mentioned about the wave height. Waves of all sizes are created by the wind, and therefore the waves moving shoreward have a probability distribution describing the wave heights and their frequencies (probabilities). The wave height developed within WHAFIS is the "zero-moment wave height", which represents the zero frequency

moment of the wave energy spectral density. The zero moment wave height can be related to the root mean square wave height or any other wave height through the use of the commonly used Rayleigh distribution that describes wave height. Some notable wave heights of interest when looking at extremes are: the significant wave height (which is the average height of the largest 1/3 of all waves); and for flood insurance studies the controlling wave height (which is the average wave height of the largest 1% of all waves). In deep water, the zero moment wave height is the significant wave height, but in shallower water, the significant wave height is greater than the zero moment wave height.

Waves break when (approximately) the wave height is greater than 0.78 times the water depth. Thus, as inland water depth decreases, the WHAFIS predicted wave heights will also decrease.

The total water surface elevation from WHAFIS is the Stillwater elevation plus that portion of the wave crest above the still water level. Since in shallow waters waves are not symmetric about the still water level, the fraction of the wave height above the still water level is 0.7 times the wave height (although in reality this value varies between 0.5 and 1.0 due to site specific conditions).

WHAFIS does not compute wave set up. Set up is included in the still water elevation. For flood insurance studies, the still water elevation includes high tide, surge, and wave set-up.

WHAFIS uses a constant wind speed of 60 miles per hour for the Connecticut coastline.

The WHAFIS model (version 4.0, August, 2007) was run inside a shell program, the Coastal Hazard Analysis Modeling Program - CHAMP (version 2.0 April, 2007). CHAMP is a Windows interface program that organizes input data into an ACCESS database, runs various coastal programs, organizes program output, all with graphical interface.

Existing WHAFIS model (Duplicate Effective Model)

The input files for the existing Tweed New Haven Airport transect (Transect 23 in the Long Island FIS) were made available by the FEMA Engineering Library Team. The file information was for the Long Island Sound Coastal data from study 10-01-0665S with CHAMP, nearshore, offshore and still water modeling; wind & wave; production runs and spatial files.

WHAFIS Model Boundary Conditions

The boundary condition (open water) wave information of the existing FIS model was kept the same for all model simulations. These conditions included:

- 1% Still water elevation of 10.546 feet NAVD 88
- Initial wave height = 13.2 feet
- Initial wave period = 5.39 seconds

It should be noted that because the land elevation soon after the shoreline rises to well above the still water elevation (for all simulations), this open water wave is not transmitted to the inland salt marsh at the Tweed New Haven Airport.

WHAFIS Simulations

Three WHAFIS simulations were conducted (*plot identifiers follow each*):

- The existing conditions of the 2011 FIS: *Original FIS* (Duplicate Effective Model)
- The updated topography/bathymetry that included 2016 CT LiDAR and 2024 survey information in the vicinity of the airport: *2024 Topography* (Corrected Effective and Pre-Project Model)
- The updated topography/bathymetry with the proposed Tweed New Haven Airport modifications. *Proposed Airport Modifications*. Note: runway modifications are from horizontal location 2239 to 3039 and terminal modifications are from horizontal location 3039 to 3254. (Post-Project Model)

A graph of the Duplicate Effective 2011 FIS topography/bathymetry compared to Corrected Effective/Pre-Project Model (2016 CT LiDAR and 2024 airport data) may be found in Figure 1. A close-up of the Figure 1 plot in the vicinity of the airport may be found in Figure 2. The proposed airport modifications Post-Project are compared to the Corrected Effective/Pre-Project Model 2024 topographic data to create Figure 3.

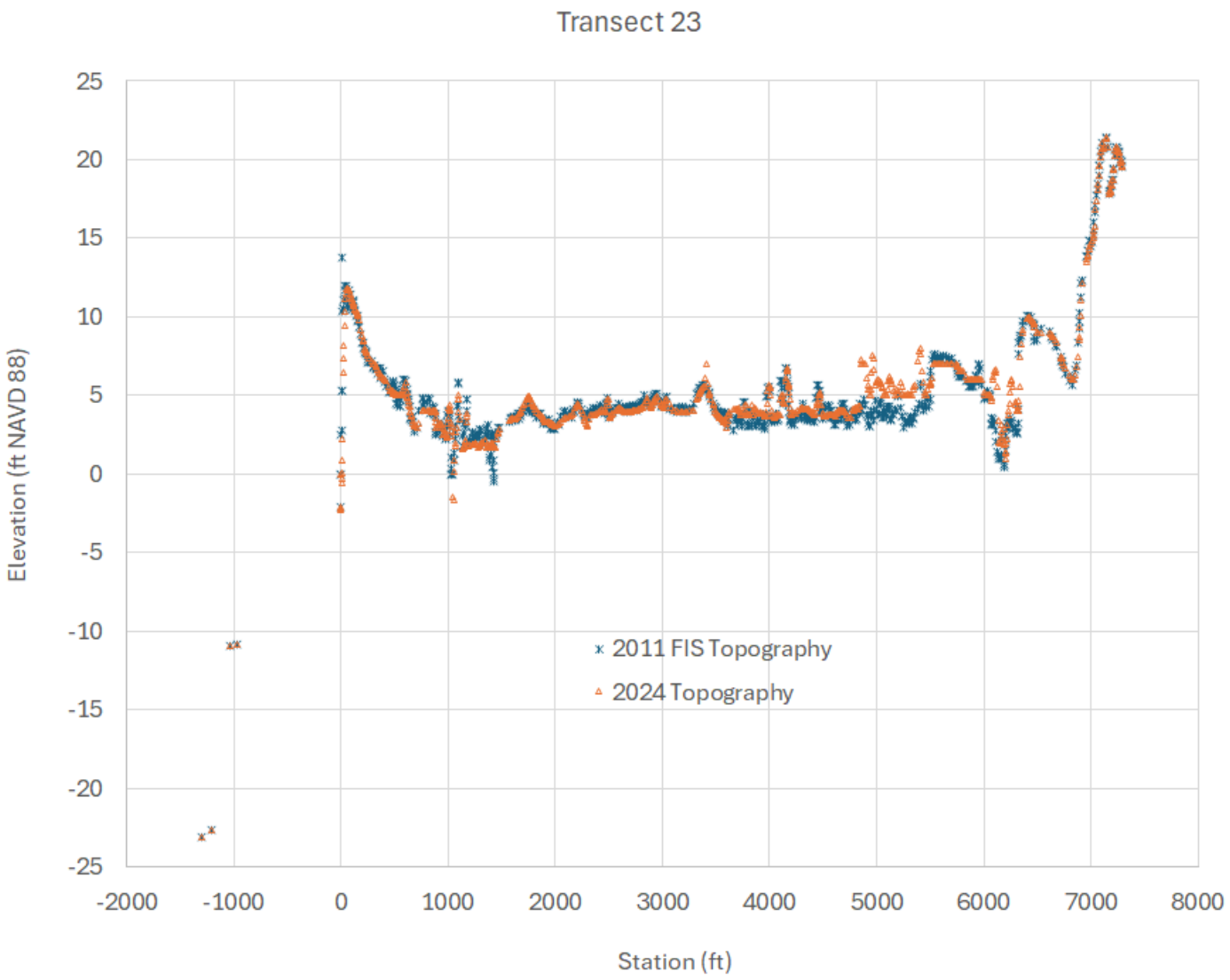

Figure 1. Comparison between Duplicate Effective 2011 FIS topography to Corrected Effective/Pre-Project Model 2024 topography

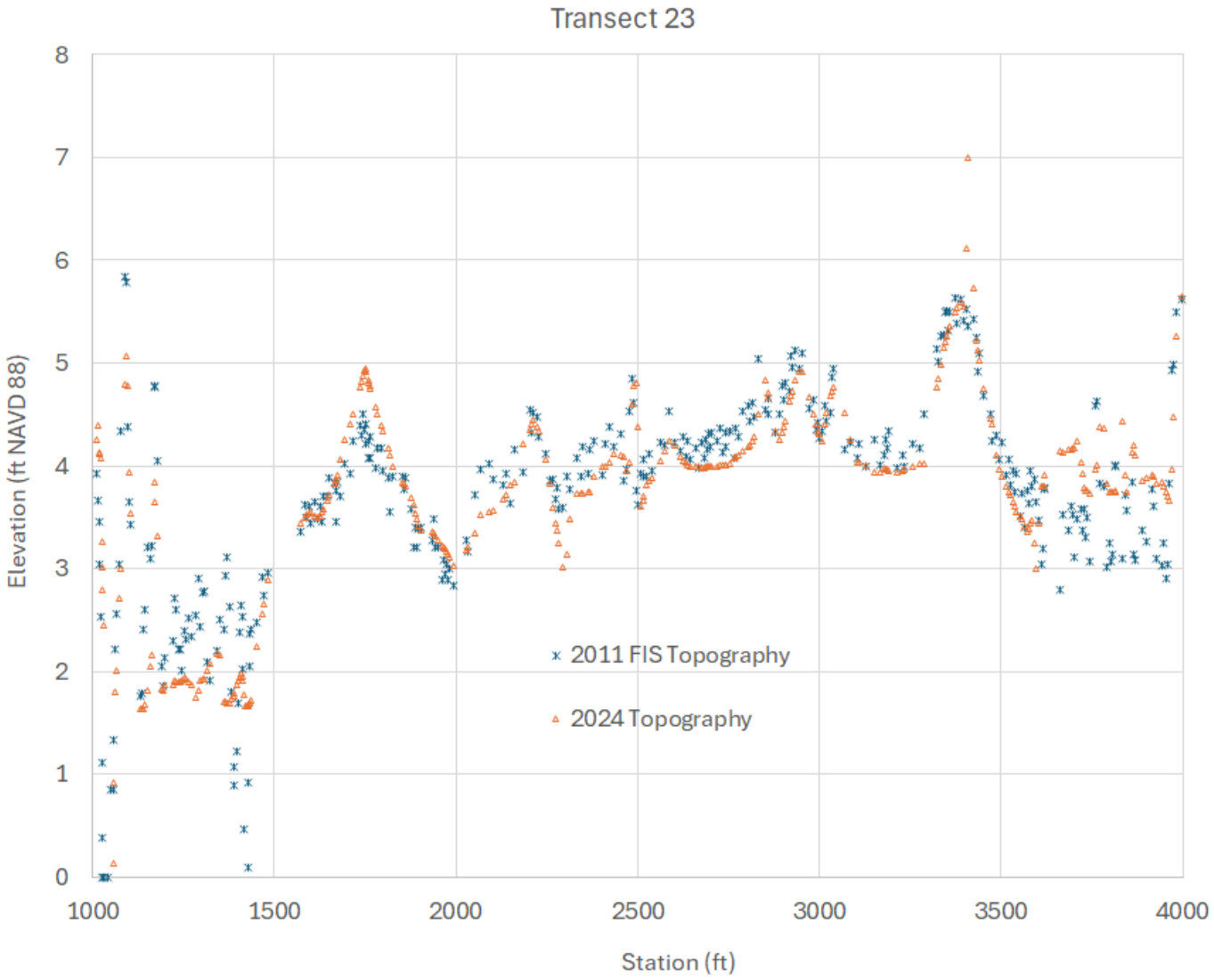

Figure 2. Comparison between Duplicate Effective 2011 FIS topography to Corrected Effective/Pre-Project Model 2024 topography in the vicinity of Tweed Airport

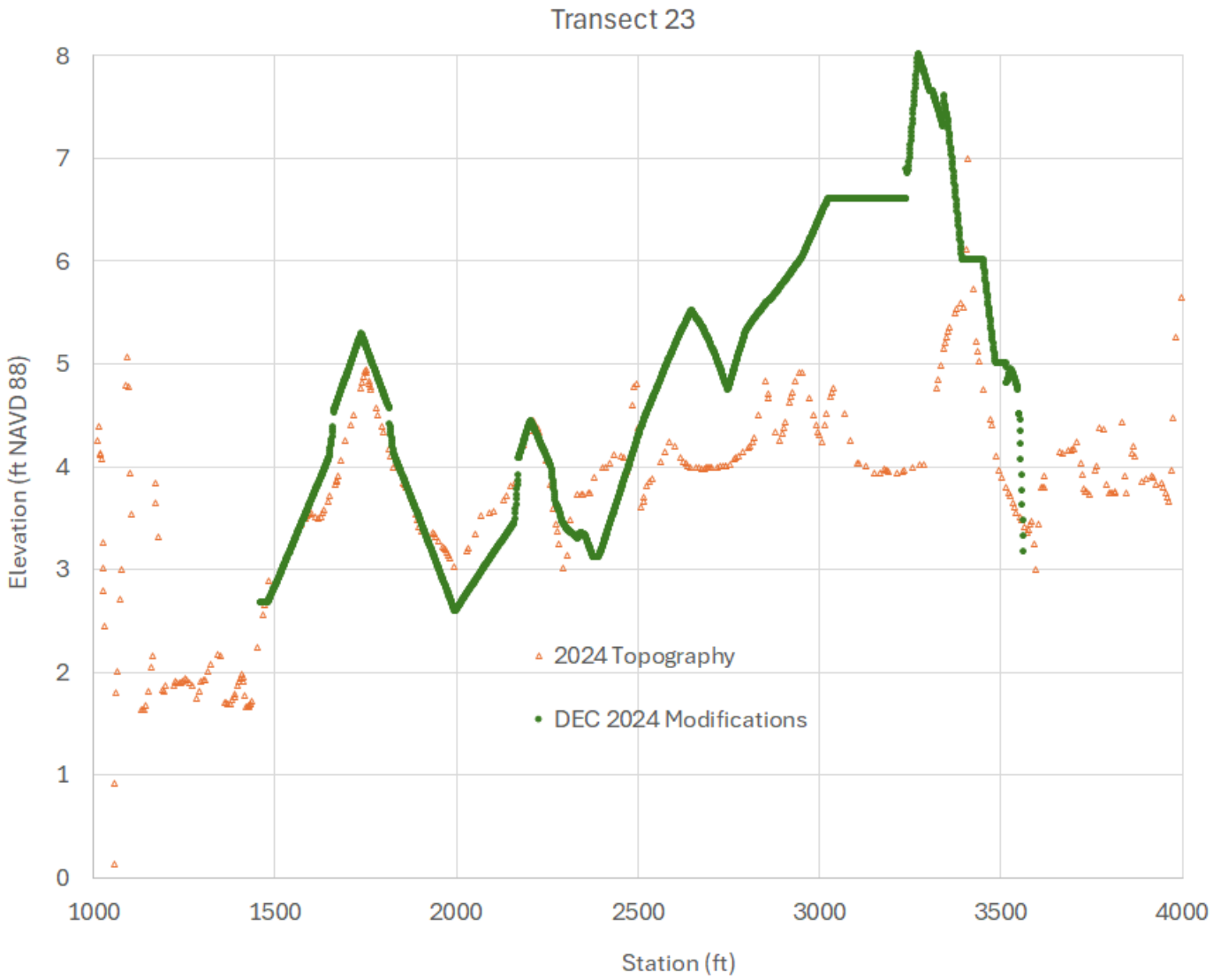

Figure 3. Comparison between Corrected Effective/Pre-Project Model 2024 topography to Post-Project 2024 topography with airport modifications

WHAFIS Model Results

There were some small differences in flood characterization between the Duplicate Effective Model from the FIS and the Corrected Effective/Pre-Project topography/bathymetry of today (2024) as seen in Tables 1 and 2.

Table 1. Duplicate Effective FIS Flood Hazard Factors (FHF) and Designations

Station (ft)	Elevation (ft NAVD 88)	Topography Zone	Topography Designation	FHF
121	10.55			
		A22	EL=11	120
1832	11.5			
		A22	EL=12	120
3945	12.5			
		A22	EL=13	120
3963	12.5			
		A22	EL=12	120
6285	11.5			
		A22	EL=11	120
6867	10.55			

Table 2. Corrected Effective/Pre-Project2024 Topography Flood Hazard Factors (FHF) and Designations Without Airport Modifications

Station (ft)	Elevation (ft NAVD 88)	Topography Zone	Topography Designation	FHF
121	10.55			
		A22	EL=11	120
1832	11.5			
		A22	EL=12	120
6284	11.5			
		A22	EL=11	120
6867	10.55			

The more detailed WHAFIS results between the Duplicate Effective Model and the Corrected Effective/Pre-Project Model topography of today may be seen in Figure 3.

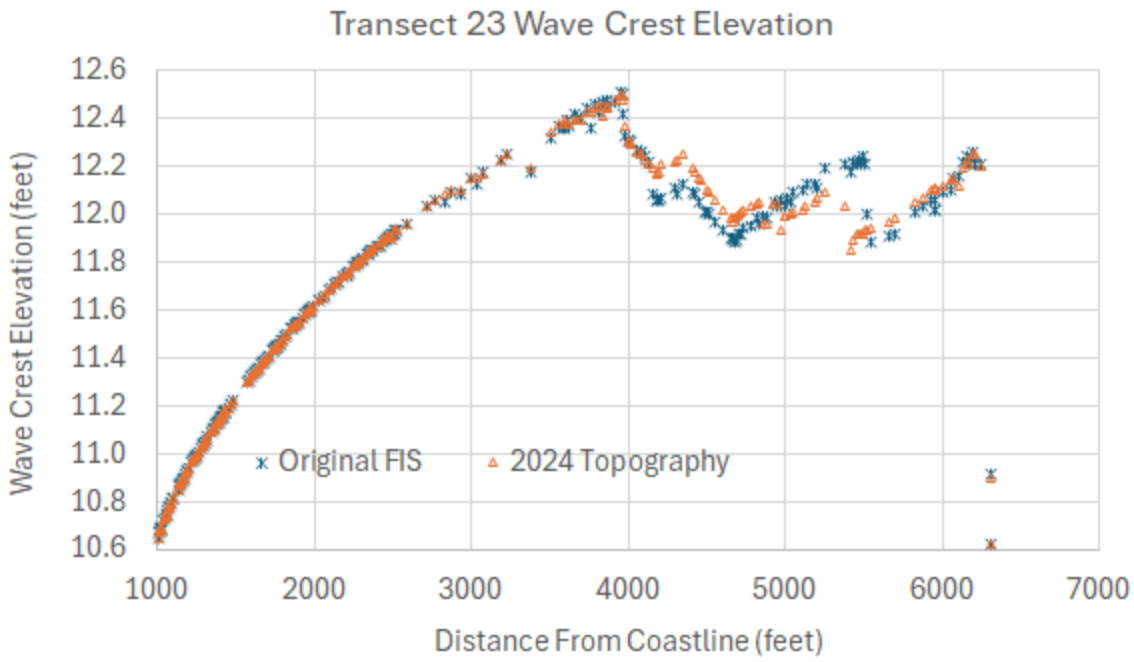

Figure 3. WHAFIS Elevation Comparisons between Duplicate Effective Model and Corrected Effective/Pre-Project Model

WHAFIS Modeling Note: The terminal building itself is planned to be above the Base Flood Elevation. It is supported by piles. To model the pile system in WHAFIS, two methods were employed: as Buildings (BU Cards) and as permanent vegetation (VE Cards). The VE method resulted with higher wave crest elevations than the Building method, and therefore the VE results are presented herein.

Comparison of the wave crest elevations at the location of the runway modifications and terminal modifications may be seen in Figure 4 and Table 3. The runway modifications do not significantly affect the wave crest elevations until about station 2800, where significant decreases in wave crest elevations are exhibited. There is a more significant drop in the wave crest elevation at the proposed terminal (station 3039 to 3254) which then results in significantly lower wave crest elevations landward. The WHAFIS results from which Figures 3, 4, and 5 were developed may be found in the Appendices.

The WHAFIS output information (output file, Part 1 file, Part 2 file, Part 3 File, and Part 6 file) for each of the modeled scenarios may be found in Appendices 1, 2, and 3.

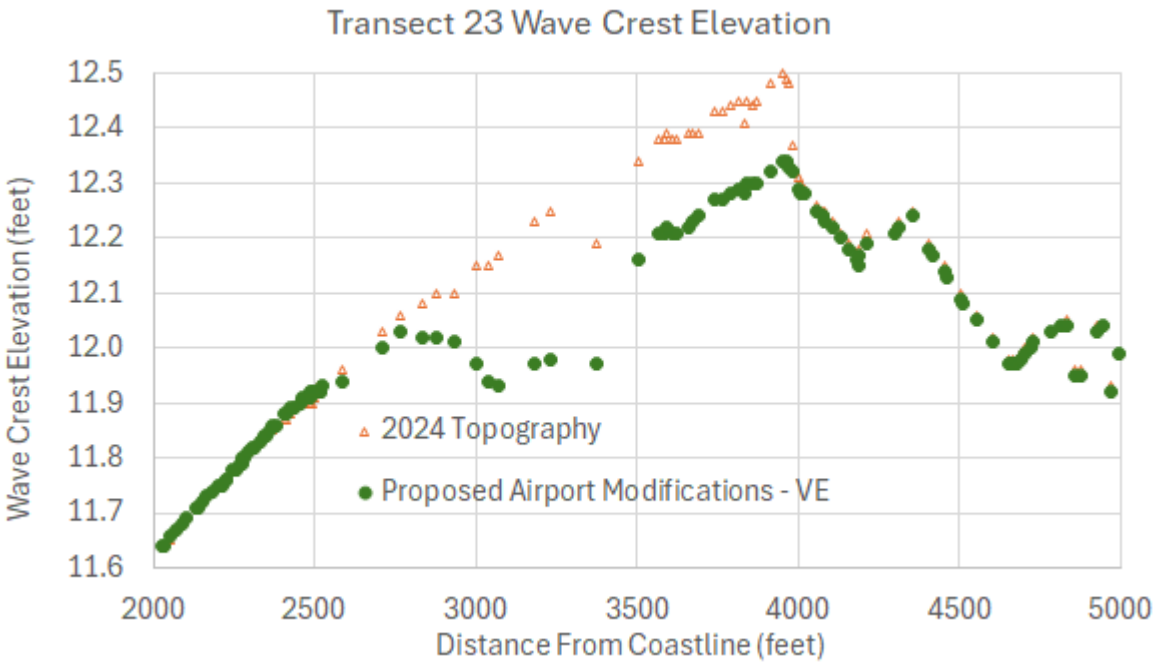

Figure 4. WHAFIS Elevation Comparisons between Corrected Effective/Pre-Project Model and Post-Project Model

Table 3. Post-Project 2024 Topography Flood Hazard Factors (FHF) and Designations With Airport Modifications

Station (ft)	Elevation (ft NAVD 88)	Topography Zone	Topography Designation	FHF
121	10.55			
		A22	EL=11	120
1832	11.5			
		A22	EL=12	120
6285	11.5			
		A22	EL=11	120
6867	10.55			

Conclusion

As witnessed by the comparison of Tables 2 and 3, the proposed Tweed Airport modifications do not change flood hazards due to wind-generated waves.

Appendix 1

WHAFIS Results for Existing FIS (2011)

Duplicate Effective Model

Streamworks, PLLC 45 Evans Road, Madbury, NH 03823 ph: 603.767.4975 e-mail: StreamworksPLLC@gmail.com

WHAFIS Input File - Transect: NH-23 Date: 12/11/2024

Original FIS

IE 0.00 0.00 0.00 0.0010.54584 13.2 5.39 0.00 0.00 0.00

IF 1 2.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 7 2.77 0.00 0.00 0.00 0.00 0.00 0.00 0.00

DU 8 5.27 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 10 5.27 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 11 10.33 1 0.00 0.00 0.00 0.00 0.00 0.00

AS 14 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 23 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 25 10.51 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 27 10.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 31 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 35 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 41 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 47 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 53 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 59 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 65 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 67 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 71 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 75 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 87 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 95 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 99 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 105 10.46 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 109 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 113 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 117 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS	121	10.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BU	129	10.39	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	135	10.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	143	10.12	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	149	10.12	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	153	9.70	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	157	9.79	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	163	9.38	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	183	8.90	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	195	8.36	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	203	8.33	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	207	8.04	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	221	7.71	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	227	7.91	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	231	7.74	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	235	7.80	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	241	7.61	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	249	7.13	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	253	7.27	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	265	7.11	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	283	7.22	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	295	6.83	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	307	6.78	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	315	6.94	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	323	6.62	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	329	6.78	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	341	6.35	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	353	6.75	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	357	6.53	0.15	10	0.00	0.00	0.00	0.00	0.00

BU	361	6.73	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	373	6.11	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	379	6.32	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	385	6.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	391	6.57	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	407	5.86	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	413	5.99	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	425	5.55	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	449	5.17	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	457	5.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	461	5.57	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	467	5.35	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	473	5.33	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	477	5.66	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	481	5.53	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	485	5.88	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	487	5.90	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	489	5.74	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	503	5.66	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	507	5.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	513	5.39	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	515	5.22	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	519	4.53	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	521	4.40	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	527	4.84	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	541	4.97	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	547	4.67	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	553	4.76	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	557	4.35	0.15	10	0.00	0.00	0.00	0.00	0.00

BU	559	4.34	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	565	5.11	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	569	5.15	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	573	5.59	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	577	5.43	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	583	6.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	587	6.06	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	599	5.91	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	615	5.37	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	621	5.01	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	623	5.08	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	629	4.74	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	635	4.60	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	639	4.35	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	647	3.48	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	649	3.63	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	653	3.41	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	657	3.60	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	667	3.65	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	675	3.29	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	679	2.90	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	685	2.73	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	705	2.99	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	725	4.05	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	759	4.81	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	765	4.72	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	769	4.37	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	777	4.19	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	783	4.62	0.15	10	0.00	0.00	0.00	0.00	0.00

BU 805 4.60 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 823 4.90 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 829 4.77 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 837 3.87 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 845 3.98 0.15 10 0.00 0.00 0.00 0.00 0.00

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BU 883 2.71 0.15 10 0.00 0.00 0.00 0.00 0.00

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BU 901 2.57 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 907 3.21 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 913 3.23 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 917 3.18 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 923 2.75 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 935 2.99 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 945 2.39 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 953 2.87 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 957 2.65 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 965 2.69 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 975 2.21 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 977 2.26 0.15 10 0.00 0.00 0.00 0.00 0.00

VH 983 3.09 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 985 3.33 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 991 3.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 997 4.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1009 3.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1015 3.66 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1017 3.46 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1019 3.05 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1021 2.54 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1025 1.11 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1026 0.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1027 0.38 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1029 0.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1042 0.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1049 0.85 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1057 1.34 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1059 0.85 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1063 2.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1065 2.56 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1073 3.04 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1077 4.34 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1089 5.85 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1091 5.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1097 4.39 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1101 3.64 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1103 3.43 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1133 1.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1135 1.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1141 2.41 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1145 2.60 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1151 3.21 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1159 3.09 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1161 3.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1169 4.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1171 4.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1177 4.05 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1189 2.05 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1193 1.85 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1199 2.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1221 2.30 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1227 2.71 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1231 2.60 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1235 2.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1239 2.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1243 2.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1251 2.40 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1257 2.32 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1265 2.52 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1273 2.34 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1285 2.55 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1291 2.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1297 2.44 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1303 2.77 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1307 2.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1315 2.09 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1321 1.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1343 2.20 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1351 2.51 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1361 2.41 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1365 2.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1369 3.11 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1377 2.62 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1383 1.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1387 1.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1389 0.89 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1397 1.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1401 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1405 2.38 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1409 2.64 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1411 2.54 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1413 2.02 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1417 0.46 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1421 -0.32 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1423 -0.45 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1427 0.09 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1429 0.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1431 2.05 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1433 2.37 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

IF 1437 2.41 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1453 2.48 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1467 2.92 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1471 2.73 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1481 2.96 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1571 3.36 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1585 3.62 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1589 3.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1595 3.61 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1599 3.44 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1611 3.65 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1619 3.49 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1627 3.61 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1631 3.45 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1635 3.70 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1645 3.71 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1651 3.88 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1665 3.84 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1669 3.46 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1671 3.75 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1673 3.84 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF	1681	3.70	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1695	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1707	3.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1715	4.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1735	4.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1739	4.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1743	4.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1747	4.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1751	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1753	4.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1759	4.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1761	4.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1763	4.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1765	4.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1777	3.98	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1783	4.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1793	4.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1797	3.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1813	3.88	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1819	3.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1827	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1853	3.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1855	3.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1861	3.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1877	3.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1883	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1889	3.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1893	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1897	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 1905	3.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1933	3.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1937	3.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1943	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1951	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1961	2.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1965	3.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1969	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1973	3.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1977	2.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1981	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1995	2.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2027	3.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2031	3.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2051	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2069	3.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2091	4.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2101	3.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2131	3.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2137	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2151	3.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2163	4.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2183	3.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2203	4.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2209	4.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2213	4.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2223	4.47	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2227	4.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2247	4.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF	2257	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2267	3.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2273	3.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2277	3.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2283	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2295	3.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2305	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2315	3.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2331	4.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2343	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2347	4.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2363	3.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2367	4.15	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2379	4.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2403	3.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2409	4.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2423	4.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2435	4.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2453	4.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2463	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2471	3.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2477	4.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2485	4.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2489	4.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2495	3.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2501	3.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2509	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2515	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2517	4.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 2523 3.90 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2587 4.54 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2765 4.07 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2833 5.04 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2877 4.32 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2935 5.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3001 4.27 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3037 4.95 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3071 4.16 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3233 3.99 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3375 5.64 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3565 3.39 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VH 3585 3.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3591 3.88 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3613 3.05 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3621 3.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3663 2.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3671 3.52 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3693 3.61 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3743 3.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3763 4.63 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3793 3.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3815 4.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3833 3.10 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3841 3.71 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3861 3.84 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3869 3.08 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3917 3.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3955 2.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VE 3963 3.83 1 25 10 0.00 0.00 0.00 0.00

VE 3971 4.93 1 25 10 0.00 0.00 0.00 0.00

VE 3983 5.50 1 25 10 0.00 0.00 0.00 0.00

VE 3999 5.62 1 25 10 0.00 0.00 0.00 0.00

VE 4009 3.66 1 25 10 0.00 0.00 0.00 0.00

VE 4019 3.30 1 25 10 0.00 0.00 0.00 0.00

VE 4059 3.85 1 25 10 0.00 0.00 0.00 0.00

VE 4077 3.37 1 25 10 0.00 0.00 0.00 0.00

VE 4085 3.55 1 25 10 0.00 0.00 0.00 0.00

VE 4105 5.93 1 25 10 0.00 0.00 0.00 0.00

VE 4131 4.49 1 25 10 0.00 0.00 0.00 0.00

VE 4159 6.74 1 25 10 0.00 0.00 0.00 0.00

VE 4179 5.54 1 25 10 0.00 0.00 0.00 0.00

VE 4189 3.51 1 25 10 0.00 0.00 0.00 0.00

VH 4191 3.42 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4211 3.15 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4297 3.50 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4313 4.50 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4353 3.37 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VE 4407 3.62 1 20 8 0.00 0.00 0.00 0.00

VE 4419 3.31 1 20 8 0.00 0.00 0.00 0.00

VE 4453 5.65 1 20 8 0.00 0.00 0.00 0.00

VE 4495 3.51 1 20 8 0.00 0.00 0.00 0.00

VE 4505 4.29 1 20 8 0.00 0.00 0.00 0.00

VE 4511 3.65 1 20 8 0.00 0.00 0.00 0.00

VE 4553 4.36 1 20 8 0.00 0.00 0.00 0.00

VE 4603 3.14 1 20 8 0.00 0.00 0.00 0.00

VE 4657 4.02 1 20 8 0.00 0.00 0.00 0.00

VE 4663 3.52 1 20 8 0.00 0.00 0.00 0.00

VH 4665 3.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4679 4.52 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4693 4.46 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4703 3.49 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4721 3.98 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4729 3.04 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4787 4.03 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4815 3.53 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4835 4.50 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4861 4.03 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4879 4.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4935 3.05 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4945 4.08 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4969 3.40 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4993 4.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5015 3.75 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5037 4.65 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5051 3.58 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5115 4.30 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5133 3.42 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5185 4.02 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5205 5.02 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5251 3.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5383 4.11 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5413 5.74 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5431 4.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5457 5.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5467 4.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5479 4.89 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5495 4.29 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

IF 5503 5.80 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5515 7.29 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5549 7.63 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5705 7.35 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5873 5.54 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5931 6.31 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5949 5.88 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5957 7.01 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VH 5959 6.96 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6001 4.82 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6053 5.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6069 3.12 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6103 3.33 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6135 0.95 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6161 0.97 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6171 2.44 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6193 0.46 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6213 3.25 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6251 3.57 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

BU 6313 2.61 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6315 2.68 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6319 3.21 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6327 8.33 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6369 9.70 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6449 10.02 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6465 9.56 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6475 8.45 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6537 9.27 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6613 9.13 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6821 5.69 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6867 6.96 0.6 6 0.00 0.00 0.00 0.00 0.00

AS 6909 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 6987 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7015 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7031 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7101 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7147 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7177 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7207 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7235 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 7297 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

ET

WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08_2007)

Executed on: Wed Dec 11 09:33:11 2024

Input file: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Original FIS\New_Haven_Intact\wNH-23.dat

Output file: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Original FIS\New_Haven_Intact\wNH-23.out

Original FIS

- Transect: NH-23 Date: 12/11/2024

THIS IS A 100-YEAR CASE

PART1 INPUT

IE	0.000	0.000	0.000	0.000	10.546	13.200	5.390	0.000	2.500	0.000
IF	1.000	2.500	0.000	10.546	0.000	0.000	0.000	0.000	0.396	0.000
IF	7.000	2.770	0.000	10.546	0.000	0.000	0.000	0.000	0.396	0.000
DU	8.000	5.270	1.000	0.000	10.546	0.000	0.000	0.000	0.833	0.000
DU	10.000	5.270	1.000	0.000	10.546	0.000	0.000	0.000	1.687	0.000
DU	11.000	10.330	1.000	0.000	10.546	0.000	0.000	0.000	5.060	0.000
AS	14.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	5.060	0.000
AS	23.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.025	0.000
IF	25.000	10.510	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	27.000	10.500	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	31.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	35.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	41.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	47.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	53.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

AS	59.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	65.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	67.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	71.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	75.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	87.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	95.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
AS	99.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
IF	105.000	10.460	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
AS	109.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
AS	113.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
AS	117.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
AS	121.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.021	0.000
BU	129.000	10.390	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000
BU	135.000	10.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.019	0.000
BU	143.000	10.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.021	0.000
BU	149.000	10.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.042	0.000
BU	153.000	9.700	0.150	10.000	0.000	10.546	0.000	0.000	-0.041	0.000
BU	157.000	9.790	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	163.000	9.380	0.150	10.000	0.000	10.546	0.000	0.000	-0.034	0.000
BU	183.000	8.900	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	195.000	8.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.029	0.000
BU	203.000	8.330	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000
BU	207.000	8.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.034	0.000
BU	221.000	7.710	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	227.000	7.910	0.150	10.000	0.000	10.546	0.000	0.000	0.003	0.000
BU	231.000	7.740	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	235.000	7.800	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	241.000	7.610	0.150	10.000	0.000	10.546	0.000	0.000	-0.048	0.000

BU	249.000	7.130	0.150	10.000	0.000	10.546	0.000	0.000	-0.028	0.000
BU	253.000	7.270	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000
BU	265.000	7.110	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000
BU	283.000	7.220	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000
BU	295.000	6.830	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000
BU	307.000	6.780	0.150	10.000	0.000	10.546	0.000	0.000	0.005	0.000
BU	315.000	6.940	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000
BU	323.000	6.620	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	329.000	6.780	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	341.000	6.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000
BU	353.000	6.750	0.150	10.000	0.000	10.546	0.000	0.000	0.011	0.000
BU	357.000	6.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000
BU	361.000	6.730	0.150	10.000	0.000	10.546	0.000	0.000	-0.026	0.000
BU	373.000	6.110	0.150	10.000	0.000	10.546	0.000	0.000	-0.023	0.000
BU	379.000	6.320	0.150	10.000	0.000	10.546	0.000	0.000	0.011	0.000
BU	385.000	6.240	0.150	10.000	0.000	10.546	0.000	0.000	0.021	0.000
BU	391.000	6.570	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000
BU	407.000	5.860	0.150	10.000	0.000	10.546	0.000	0.000	-0.026	0.000
BU	413.000	5.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000
BU	425.000	5.550	0.150	10.000	0.000	10.546	0.000	0.000	-0.023	0.000
BU	449.000	5.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000
BU	457.000	5.240	0.150	10.000	0.000	10.546	0.000	0.000	0.033	0.000
BU	461.000	5.570	0.150	10.000	0.000	10.546	0.000	0.000	0.011	0.000
BU	467.000	5.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.020	0.000
BU	473.000	5.330	0.150	10.000	0.000	10.546	0.000	0.000	0.031	0.000
BU	477.000	5.660	0.150	10.000	0.000	10.546	0.000	0.000	0.025	0.000
BU	481.000	5.530	0.150	10.000	0.000	10.546	0.000	0.000	0.027	0.000
BU	485.000	5.880	0.150	10.000	0.000	10.546	0.000	0.000	0.062	0.000
BU	487.000	5.900	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000

BU	489.000	5.740	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	503.000	5.660	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000
BU	507.000	5.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000
BU	513.000	5.390	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000
BU	515.000	5.220	0.150	10.000	0.000	10.546	0.000	0.000	-0.143	0.000
BU	519.000	4.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.137	0.000
BU	521.000	4.400	0.150	10.000	0.000	10.546	0.000	0.000	0.039	0.000
BU	527.000	4.840	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000
BU	541.000	4.970	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000
BU	547.000	4.670	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000
BU	553.000	4.760	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	557.000	4.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.070	0.000
BU	559.000	4.340	0.150	10.000	0.000	10.546	0.000	0.000	0.095	0.000
BU	565.000	5.110	0.150	10.000	0.000	10.546	0.000	0.000	0.081	0.000
BU	569.000	5.150	0.150	10.000	0.000	10.546	0.000	0.000	0.060	0.000
BU	573.000	5.590	0.150	10.000	0.000	10.546	0.000	0.000	0.035	0.000
BU	577.000	5.430	0.150	10.000	0.000	10.546	0.000	0.000	0.041	0.000
BU	583.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000	0.063	0.000
BU	587.000	6.060	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	599.000	5.910	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000
BU	615.000	5.370	0.150	10.000	0.000	10.546	0.000	0.000	-0.041	0.000
BU	621.000	5.010	0.150	10.000	0.000	10.546	0.000	0.000	-0.036	0.000
BU	623.000	5.080	0.150	10.000	0.000	10.546	0.000	0.000	-0.034	0.000
BU	629.000	4.740	0.150	10.000	0.000	10.546	0.000	0.000	-0.040	0.000
BU	635.000	4.600	0.150	10.000	0.000	10.546	0.000	0.000	-0.039	0.000
BU	639.000	4.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.093	0.000
BU	647.000	3.480	0.150	10.000	0.000	10.546	0.000	0.000	-0.072	0.000
BU	649.000	3.630	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	653.000	3.410	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000

BU	657.000	3.600	0.150	10.000	0.000	10.546	0.000	0.000	0.017	0.000
BU	667.000	3.650	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000
BU	675.000	3.290	0.150	10.000	0.000	10.546	0.000	0.000	-0.063	0.000
BU	679.000	2.900	0.150	10.000	0.000	10.546	0.000	0.000	-0.056	0.000
BU	685.000	2.730	0.150	10.000	0.000	10.546	0.000	0.000	0.004	0.000
BU	705.000	2.990	0.150	10.000	0.000	10.546	0.000	0.000	0.033	0.000
BU	725.000	4.050	0.150	10.000	0.000	10.546	0.000	0.000	0.034	0.000
BU	759.000	4.810	0.150	10.000	0.000	10.546	0.000	0.000	0.017	0.000
BU	765.000	4.720	0.150	10.000	0.000	10.546	0.000	0.000	-0.044	0.000
BU	769.000	4.370	0.150	10.000	0.000	10.546	0.000	0.000	-0.044	0.000
BU	777.000	4.190	0.150	10.000	0.000	10.546	0.000	0.000	0.018	0.000
BU	783.000	4.620	0.150	10.000	0.000	10.546	0.000	0.000	0.015	0.000
BU	805.000	4.600	0.150	10.000	0.000	10.546	0.000	0.000	0.007	0.000
BU	823.000	4.900	0.150	10.000	0.000	10.546	0.000	0.000	0.007	0.000
BU	829.000	4.770	0.150	10.000	0.000	10.546	0.000	0.000	-0.074	0.000
BU	837.000	3.870	0.150	10.000	0.000	10.546	0.000	0.000	-0.049	0.000
BU	845.000	3.980	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000
BU	851.000	4.280	0.150	10.000	0.000	10.546	0.000	0.000	0.009	0.000
BU	861.000	4.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000
BU	865.000	4.250	0.150	10.000	0.000	10.546	0.000	0.000	-0.026	0.000
BU	873.000	3.810	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000
BU	877.000	3.830	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000
BU	879.000	3.650	0.150	10.000	0.000	10.546	0.000	0.000	-0.187	0.000
BU	883.000	2.710	0.150	10.000	0.000	10.546	0.000	0.000	-0.195	0.000
BU	885.000	2.480	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	889.000	2.670	0.150	10.000	0.000	10.546	0.000	0.000	0.006	0.000
BU	901.000	2.570	0.150	10.000	0.000	10.546	0.000	0.000	0.030	0.000
BU	907.000	3.210	0.150	10.000	0.000	10.546	0.000	0.000	0.055	0.000
BU	913.000	3.230	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000

BU 917.000 3.180 0.150 10.000 0.000 10.546 0.000 0.000 -0.048 0.000

BU 923.000 2.750 0.150 10.000 0.000 10.546 0.000 0.000 -0.011 0.000

BU 935.000 2.990 0.150 10.000 0.000 10.546 0.000 0.000 -0.016 0.000

BU 945.000 2.390 0.150 10.000 0.000 10.546 0.000 0.000 -0.007 0.000

BU 953.000 2.870 0.150 10.000 0.000 10.546 0.000 0.000 0.022 0.000

BU 957.000 2.650 0.150 10.000 0.000 10.546 0.000 0.000 -0.015 0.000

BU 965.000 2.690 0.150 10.000 0.000 10.546 0.000 0.000 -0.024 0.000

BU 975.000 2.210 0.150 10.000 0.000 10.546 0.000 0.000 -0.036 0.000

BU 977.000 2.260 0.150 10.000 0.000 10.546 0.000 0.000 0.110 0.000

VH 983.000 3.090 2.000 1.000 0.000 1.000 0.000 10.546 0.134 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 985.000 3.330 2.000 1.000 0.000 1.000 0.000 10.546 0.089 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 991.000 3.800 2.000 1.000 0.000 1.000 0.000 10.546 0.056 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 997.000 4.000 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1009.000 3.920 2.000 1.000 0.000 1.000 0.000 10.546 -0.019 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1015.000 3.660 2.000 1.000 0.000 1.000 0.000 10.546 -0.058 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1017.000 3.460 2.000 1.000 0.000 1.000 0.000 10.546 -0.153 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1019.000 3.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.230 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1021.000 2.540 2.000 1.000 0.000 1.000 0.000 10.546 -0.323 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1025.000 1.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.508 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1026.000 0.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.365 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1027.000 0.380 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1029.000 0.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1042.000 0.000 2.000 1.000 0.000 1.000 0.000 10.546 0.043 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1049.000 0.850 2.000 1.000 0.000 1.000 0.000 10.546 0.089 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1057.000 1.340 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1059.000 0.850 2.000 1.000 0.000 1.000 0.000 10.546 0.147 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1063.000 2.220 2.000 1.000 0.000 1.000 0.000 10.546 0.285 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1065.000 2.560 2.000 1.000 0.000 1.000 0.000 10.546 0.082 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1073.000 3.040 2.000 1.000 0.000 1.000 0.000 10.546 0.148 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1077.000 4.340 2.000 1.000 0.000 1.000 0.000 10.546 0.176 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1089.000 5.850 2.000 1.000 0.000 1.000 0.000 10.546 0.104 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1091.000 5.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.183 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1097.000 4.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.215 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1101.000 3.640 2.000 1.000 0.000 1.000 0.000 10.546 -0.160 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1103.000 3.430 2.000 1.000 0.000 1.000 0.000 10.546 -0.059 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1133.000 1.760 2.000 1.000 0.000 1.000 0.000 10.546 -0.051 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1135.000 1.790 2.000 1.000 0.000 1.000 0.000 10.546 0.081 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1141.000 2.410 2.000 1.000 0.000 1.000 0.000 10.546 0.081 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1145.000 2.600 2.000 1.000 0.000 1.000 0.000 10.546 0.080 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1151.000 3.210 2.000 1.000 0.000 1.000 0.000 10.546 0.035 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1159.000 3.090 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1161.000 3.220 2.000 1.000 0.000 1.000 0.000 10.546 0.169 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1169.000 4.780 2.000 1.000 0.000 1.000 0.000 10.546 0.154 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1171.000 4.760 2.000 1.000 0.000 1.000 0.000 10.546 -0.091 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1177.000 4.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.151 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1189.000 2.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.138 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1193.000 1.850 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1199.000 2.130 2.000 1.000 0.000 1.000 0.000 10.546 0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1221.000 2.300 2.000 1.000 0.000 1.000 0.000 10.546 0.021 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1227.000 2.710 2.000 1.000 0.000 1.000 0.000 10.546 0.030 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1231.000 2.600 2.000 1.000 0.000 1.000 0.000 10.546 -0.061 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1235.000 2.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.047 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1239.000 2.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.026 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1243.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1251.000 2.400 2.000 1.000 0.000 1.000 0.000 10.546 0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1257.000 2.320 2.000 1.000 0.000 1.000 0.000 10.546 0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1265.000 2.520 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1273.000 2.340 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1285.000 2.550 2.000 1.000 0.000 1.000 0.000 10.546 0.031 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1291.000 2.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1297.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1303.000 2.770 2.000 1.000 0.000 1.000 0.000 10.546 0.035 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1307.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.057 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1315.000 2.090 2.000 1.000 0.000 1.000 0.000 10.546 -0.062 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1321.000 1.920 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1343.000 2.200 2.000 1.000 0.000 1.000 0.000 10.546 0.020 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1351.000 2.510 2.000 1.000 0.000 1.000 0.000 10.546 0.012 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1361.000 2.410 2.000 1.000 0.000 1.000 0.000 10.546 0.030 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1365.000 2.930 2.000 1.000 0.000 1.000 0.000 10.546 0.087 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1369.000 3.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.026 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1377.000 2.620 2.000 1.000 0.000 1.000 0.000 10.546 -0.094 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1383.000 1.800 2.000 1.000 0.000 1.000 0.000 10.546 -0.155 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1387.000 1.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.152 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1389.000 0.890 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1397.000 1.220 2.000 1.000 0.000 1.000 0.000 10.546 0.067 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1401.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.145 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1405.000 2.380 2.000 1.000 0.000 1.000 0.000 10.546 0.119 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1409.000 2.640 2.000 1.000 0.000 1.000 0.000 10.546 0.027 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1411.000 2.540 2.000 1.000 0.000 1.000 0.000 10.546 -0.155 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1413.000 2.020 2.000 1.000 0.000 1.000 0.000 10.546 -0.347 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1417.000 0.460 2.000 1.000 0.000 1.000 0.000 10.546 -0.292 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1421.000 -0.320 2.000 1.000 0.000 1.000 0.000 10.546 -0.152 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1423.000 -0.450 2.000 1.000 0.000 1.000 0.000 10.546 0.068 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1427.000 0.090 2.000 1.000 0.000 1.000 0.000 10.546 0.227 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1429.000 0.910 2.000 1.000 0.000 1.000 0.000 10.546 0.490 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1431.000 2.050 2.000 1.000 0.000 1.000 0.000 10.546 0.365 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1433.000 2.370 2.000 1.000 0.000 1.000 0.000 10.546 0.060 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

IF 1437.000 2.410 0.000 10.546 0.000 0.000 0.000 0.000 0.005 0.000

IF 1453.000 2.480 0.000 10.546 0.000 0.000 0.000 0.000 0.017 0.000

IF 1467.000 2.920 0.000 10.546 0.000 0.000 0.000 0.000 0.014 0.000

IF 1471.000 2.730 0.000 10.546 0.000 0.000 0.000 0.000 0.003 0.000

IF 1481.000 2.960 0.000 10.546 0.000 0.000 0.000 0.000 0.006 0.000

IF 1571.000 3.360 0.000 10.546 0.000 0.000 0.000 0.000 0.006 0.000

IF 1585.000 3.620 0.000 10.546 0.000 0.000 0.000 0.000 0.008 0.000

IF 1589.000 3.500 0.000 10.546 0.000 0.000 0.000 0.000 -0.001 0.000

IF 1595.000 3.610 0.000 10.546 0.000 0.000 0.000 0.000 -0.006 0.000

IF	1599.000	3.440	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	1611.000	3.650	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	1619.000	3.490	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000
IF	1627.000	3.610	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000
IF	1631.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000
IF	1635.000	3.700	0.000	10.546	0.000	0.000	0.000	0.000	0.019	0.000
IF	1645.000	3.710	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000
IF	1651.000	3.880	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	1665.000	3.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.023	0.000
IF	1669.000	3.460	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	1671.000	3.750	0.000	10.546	0.000	0.000	0.000	0.000	0.095	0.000
IF	1673.000	3.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1681.000	3.700	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1695.000	4.030	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1707.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1715.000	4.240	0.000	10.546	0.000	0.000	0.000	0.000	0.017	0.000
IF	1735.000	4.390	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	1739.000	4.290	0.000	10.546	0.000	0.000	0.000	0.000	0.015	0.000
IF	1743.000	4.510	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	1747.000	4.350	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000
IF	1751.000	4.410	0.000	10.546	0.000	0.000	0.000	0.000	-0.022	0.000
IF	1753.000	4.220	0.000	10.546	0.000	0.000	0.000	0.000	-0.021	0.000
IF	1759.000	4.240	0.000	10.546	0.000	0.000	0.000	0.000	-0.019	0.000
IF	1761.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	-0.043	0.000
IF	1763.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	0.055	0.000
IF	1765.000	4.290	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	1777.000	3.980	0.000	10.546	0.000	0.000	0.000	0.000	-0.007	0.000
IF	1783.000	4.170	0.000	10.546	0.000	0.000	0.000	0.000	0.012	0.000
IF	1793.000	4.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.016	0.000

IF	1797.000	3.950	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1813.000	3.880	0.000	10.546	0.000	0.000	0.000	0.000	-0.018	0.000
IF	1819.000	3.560	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000
IF	1827.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1853.000	3.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	1855.000	3.780	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000
IF	1861.000	3.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1877.000	3.580	0.000	10.546	0.000	0.000	0.000	0.000	-0.031	0.000
IF	1883.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	1889.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000
IF	1893.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000
IF	1897.000	3.380	0.000	10.546	0.000	0.000	0.000	0.000	0.016	0.000
IF	1905.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000
IF	1933.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	1937.000	3.480	0.000	10.546	0.000	0.000	0.000	0.000	-0.007	0.000
IF	1943.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.020	0.000
IF	1951.000	3.200	0.000	10.546	0.000	0.000	0.000	0.000	-0.018	0.000
IF	1961.000	2.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1965.000	3.080	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000
IF	1969.000	2.940	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1973.000	3.040	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	1977.000	2.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1981.000	3.000	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000
IF	1995.000	2.830	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000
IF	2027.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	2031.000	3.160	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000
IF	2051.000	3.720	0.000	10.546	0.000	0.000	0.000	0.000	0.021	0.000
IF	2069.000	3.970	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	2091.000	4.020	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000

IF	2101.000	3.870	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	2131.000	3.810	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	2137.000	3.930	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	2151.000	3.630	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	2163.000	4.150	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	2183.000	3.940	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	2203.000	4.550	0.000	10.546	0.000	0.000	0.000	0.000	0.015	0.000
IF	2209.000	4.330	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000
IF	2213.000	4.520	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	2223.000	4.470	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
IF	2227.000	4.280	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	2247.000	4.120	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	2257.000	3.850	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000
IF	2267.000	3.870	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	2273.000	3.670	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	2277.000	3.790	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	2283.000	3.570	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	2295.000	3.590	0.000	10.546	0.000	0.000	0.000	0.000	0.015	0.000
IF	2305.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	2315.000	3.770	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	2331.000	4.080	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2343.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000
IF	2347.000	4.180	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000
IF	2363.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000
IF	2367.000	4.150	0.000	10.546	0.000	0.000	0.000	0.000	0.020	0.000
IF	2379.000	4.240	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	2403.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000
IF	2409.000	4.210	0.000	10.546	0.000	0.000	0.000	0.000	0.023	0.000
IF	2423.000	4.370	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

IF 2435.000 4.180 0.000 10.546 0.000 0.000 0.000 0.000 -0.002 0.000

IF 2453.000 4.310 0.000 10.546 0.000 0.000 0.000 0.000 -0.012 0.000

IF 2463.000 3.850 0.000 10.546 0.000 0.000 0.000 0.000 -0.019 0.000

IF 2471.000 3.970 0.000 10.546 0.000 0.000 0.000 0.000 0.049 0.000

IF 2477.000 4.530 0.000 10.546 0.000 0.000 0.000 0.000 0.063 0.000

IF 2485.000 4.850 0.000 10.546 0.000 0.000 0.000 0.000 0.007 0.000

IF 2489.000 4.610 0.000 10.546 0.000 0.000 0.000 0.000 -0.109 0.000

IF 2495.000 3.760 0.000 10.546 0.000 0.000 0.000 0.000 -0.083 0.000

IF 2501.000 3.620 0.000 10.546 0.000 0.000 0.000 0.000 0.012 0.000

IF 2509.000 3.930 0.000 10.546 0.000 0.000 0.000 0.000 0.020 0.000

IF 2515.000 3.900 0.000 10.546 0.000 0.000 0.000 0.000 0.016 0.000

IF 2517.000 4.060 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 2523.000 3.900 0.000 10.546 0.000 0.000 0.000 0.000 0.007 0.000

IF 2587.000 4.540 0.000 10.546 0.000 0.000 0.000 0.000 0.001 0.000

IF 2765.000 4.070 0.000 10.546 0.000 0.000 0.000 0.000 0.002 0.000

IF 2833.000 5.040 0.000 10.546 0.000 0.000 0.000 0.000 0.002 0.000

IF 2877.000 4.320 0.000 10.546 0.000 0.000 0.000 0.000 0.001 0.000

IF 2935.000 5.130 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 3001.000 4.270 0.000 10.546 0.000 0.000 0.000 0.000 -0.002 0.000

IF 3037.000 4.950 0.000 10.546 0.000 0.000 0.000 0.000 -0.002 0.000

IF 3071.000 4.160 0.000 10.546 0.000 0.000 0.000 0.000 -0.005 0.000

IF 3233.000 3.990 0.000 10.546 0.000 0.000 0.000 0.000 0.005 0.000

IF 3375.000 5.640 0.000 10.546 0.000 0.000 0.000 0.000 -0.002 0.000

IF 3565.000 3.390 0.000 10.546 0.000 0.000 0.000 0.000 -0.009 0.000

VH 3585.000 3.800 2.000 1.000 0.000 1.000 0.000 10.546 0.019 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3591.000 3.880 2.000 1.000 0.000 1.000 0.000 10.546 -0.027 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3613.000 3.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3621.000 3.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3663.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3671.000 3.520 2.000 1.000 0.000 1.000 0.000 10.546 0.027 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3693.000 3.610 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3743.000 3.070 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3763.000 4.630 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3793.000 3.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.012 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3815.000 4.000 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3833.000 3.100 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3841.000 3.710 2.000 1.000 0.000 1.000 0.000 10.546 0.026 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3861.000 3.840 2.000 1.000 0.000 1.000 0.000 10.546 -0.023 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3869.000 3.080 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3917.000 3.780 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3955.000 2.900 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VE 3963.000 3.830 1.000 25.000 10.000 0.000 0.000 10.546 0.127 0.000

VE 3971.000 4.930 1.000 25.000 10.000 0.000 0.000 10.546 0.083 0.000

VE 3983.000 5.500 1.000 25.000 10.000 0.000 0.000 10.546 0.025 0.000

VE 3999.000 5.620 1.000 25.000 10.000 0.000 0.000 10.546 -0.071 0.000

VE 4009.000 3.660 1.000 25.000 10.000 0.000 0.000 10.546 -0.116 0.000

VE 4019.000 3.300 1.000 25.000 10.000 0.000 0.000 10.546 0.004 0.000

VE 4059.000 3.850 1.000 25.000 10.000 0.000 0.000 10.546 0.001 0.000

VE 4077.000 3.370 1.000 25.000 10.000 0.000 0.000 10.546 -0.012 0.000

VE 4085.000 3.550 1.000 25.000 10.000 0.000 0.000 10.546 0.091 0.000

VE 4105.000 5.930 1.000 25.000 10.000 0.000 0.000 10.546 0.020 0.000

VE 4131.000 4.490 1.000 25.000 10.000 0.000 0.000 10.546 0.015 0.000

VE 4159.000 6.740 1.000 25.000 10.000 0.000 0.000 10.546 0.022 0.000

VE 4179.000 5.540 1.000 25.000 10.000 0.000 0.000 10.546 -0.108 0.000

VE 4189.000 3.510 1.000 25.000 10.000 0.000 0.000 10.546 -0.177 0.000

VH 4191.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4211.000 3.150 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4297.000 3.500 2.000 1.000 0.000 1.000 0.000 10.546 0.013 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4313.000 4.500 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4353.000 3.370 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VE 4407.000 3.620 1.000 20.000 8.000 0.000 0.000 10.546 -0.001 0.000

VE 4419.000 3.310 1.000 20.000 8.000 0.000 0.000 10.546 0.044 0.000

VE 4453.000 5.650 1.000 20.000 8.000 0.000 0.000 10.546 0.003 0.000

VE 4495.000 3.510 1.000 20.000 8.000 0.000 0.000 10.546 -0.026 0.000

VE 4505.000 4.290 1.000 20.000 8.000 0.000 0.000 10.546 0.009 0.000

VE 4511.000 3.650 1.000 20.000 8.000 0.000 0.000 10.546 0.002 0.000

VE 4553.000 4.360 1.000 20.000 8.000 0.000 0.000 10.546 -0.005 0.000

VE 4603.000 3.140 1.000 20.000 8.000 0.000 0.000 10.546 -0.003 0.000

VE 4657.000 4.020 1.000 20.000 8.000 0.000 0.000 10.546 0.006 0.000

VE 4663.000 3.520 1.000 20.000 8.000 0.000 0.000 10.546 -0.043 0.000

VH 4665.000 3.680 2.000 1.000 0.000 1.000 0.000 10.546 0.063 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4679.000 4.520 2.000 1.000 0.000 1.000 0.000 10.546 0.028 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4693.000 4.460 2.000 1.000 0.000 1.000 0.000 10.546 -0.043 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4703.000 3.490 2.000 1.000 0.000 1.000 0.000 10.546 -0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4721.000 3.980 2.000 1.000 0.000 1.000 0.000 10.546 -0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4729.000 3.040 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4787.000 4.030 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4815.000 3.530 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4835.000 4.500 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4861.000 4.030 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4879.000 4.780 2.000 1.000 0.000 1.000 0.000 10.546 -0.013 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4935.000 3.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4945.000 4.080 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4969.000 3.400 2.000 1.000 0.000 1.000 0.000 10.546 0.013 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4993.000 4.690 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5015.000 3.750 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5037.000 4.650 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5051.000 3.580 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5115.000 4.300 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5133.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5185.000 4.020 2.000 1.000 0.000 1.000 0.000 10.546 0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5205.000 5.020 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5251.000 3.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5383.000 4.110 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5413.000 5.740 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5431.000 4.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5457.000 5.070 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5467.000 4.180 2.000 1.000 0.000 1.000 0.000 10.546 -0.008 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5479.000 4.890 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5495.000 4.290 2.000 1.000 0.000 1.000 0.000 10.546 0.038 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

IF 5503.000 5.800 0.000 10.546 0.000 0.000 0.000 0.000 0.150 0.000

IF 5515.000 7.290 0.000 10.546 0.000 0.000 0.000 0.000 0.040 0.000

IF 5549.000 7.630 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 5705.000 7.350 0.000 10.546 0.000 0.000 0.000 0.000 -0.007 0.000

IF 5873.000 5.540 0.000 10.546 0.000 0.000 0.000 0.000 -0.005 0.000

IF 5931.000 6.310 0.000 10.546 0.000 0.000 0.000 0.000 0.004 0.000

IF 5949.000 5.880 0.000 10.546 0.000 0.000 0.000 0.000 0.027 0.000

IF 5957.000 7.010 0.000 10.546 0.000 0.000 0.000 0.000 0.108 0.000

VH 5959.000 6.960 2.000 1.000 0.000 1.000 0.000 10.546 -0.050 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6001.000 4.820 2.000 1.000 0.000 1.000 0.000 10.546 -0.020 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6053.000 5.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6069.000 3.120 2.000 1.000 0.000 1.000 0.000 10.546 -0.035 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6103.000 3.330 2.000 1.000 0.000 1.000 0.000 10.546 -0.033 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6135.000 0.950 2.000 1.000 0.000 1.000 0.000 10.546 -0.041 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6161.000 0.970 2.000 1.000 0.000 1.000 0.000 10.546 0.041 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6171.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6193.000 0.460 2.000 1.000 0.000 1.000 0.000 10.546 0.019 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6213.000 3.250 2.000 1.000 0.000 1.000 0.000 10.546 0.054 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6251.000 3.570 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

BU 6313.000 2.610 0.600 6.000 0.000 10.546 0.000 0.000 -0.014 0.000

BU 6315.000 2.680 0.600 6.000 0.000 10.546 0.000 0.000 0.100 0.000

BU 6319.000 3.210 0.600 6.000 0.000 10.546 0.000 0.000 0.471 0.000

BU 6327.000 8.330 0.600 6.000 0.000 10.546 0.000 0.000 0.130 0.000

BU 6369.000 9.700 0.600 6.000 0.000 10.546 0.000 0.000 0.014 0.000

BU 6449.000 10.020 0.600 6.000 0.000 10.546 0.000 0.000 -0.002 0.000

BU 6465.000 9.560 0.600 6.000 0.000 10.546 0.000 0.000 -0.060 0.000

BU 6475.000 8.450 0.600 6.000 0.000 10.546 0.000 0.000 -0.004 0.000

BU 6537.000 9.270 0.600 6.000 0.000 10.546 0.000 0.000 0.005 0.000

BU 6613.000 9.130 0.600 6.000 0.000 10.546 0.000 0.000 -0.013 0.000

BU 6821.000 5.690 0.600 6.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 6867.000 6.960 0.600 6.000 0.000 10.546 0.000 0.000 0.028 0.000

AS 6909.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 6987.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7015.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7031.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7101.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7147.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7177.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7207.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7235.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

AS 7297.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

ET 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

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END END FETCH SURGE ELEV SURGE ELEV INITIAL INITIAL BOTTOM AVERAGE

STATION ELEVATION LENGTH 10-YEAR 100-YEAR WAVE HEIGHT W. PERIOD SLOPE A-ZONES

IE 0.000 0.000 0.000 0.000 10.546 13.200 5.390 0.000 2.500 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 1.000 2.500 0.000 10.546 0.000 0.000 0.000 0.000 0.396 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 7.000 2.770 0.000 10.546 0.000 0.000 0.000 0.000 0.396 0.000

DUNE CREST DUNE CREST DUNE OR NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION SEAWALL 10-YEAR 100-YEAR SLOPE A-ZONES

DU 8.000 5.270 1.000 0.000 10.546 0.000 0.000 0.000 0.833 0.000

DUNE CREST DUNE CREST DUNE OR NEW SURGE NEW SURGE BOTTOM AVERAGE

	STATION	ELEVATION	SEAWALL	10-YEAR	100-YEAR				SLOPE	A-ZONES
DU	10.000	5.270	1.000	0.000	10.546	0.000	0.000	0.000	1.687	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
DU	11.000	10.330	1.000	0.000	10.546	0.000	0.000	0.000	5.060	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
AS	14.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	5.060	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
AS	23.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.025	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	25.000	10.510	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	27.000	10.500	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	31.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	35.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	41.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	47.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	53.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	59.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	65.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	67.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	71.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	75.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	87.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

AS	95.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	99.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	105.000	10.460	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	109.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	113.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	117.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
AS	121.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.021	0.000

	END STATION	END OPEN SPACE ELEVATION	RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	129.000	10.390	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000

	END STATION	END OPEN SPACE ELEVATION	RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	135.000	10.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.019	0.000

	END STATION	END OPEN SPACE ELEVATION	RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	143.000	10.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.021	0.000

	END STATION	END OPEN SPACE ELEVATION	RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	149.000	10.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.042	0.000

	END STATION	END OPEN SPACE ELEVATION	RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	153.000	9.700	0.150	10.000	0.000	10.546	0.000	0.000	-0.041	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	157.000	9.790	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	163.000	9.380	0.150	10.000	0.000	10.546	0.000	0.000	-0.034	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	183.000	8.900	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	195.000	8.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.029	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	203.000	8.330	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	207.000	8.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.034	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	221.000	7.710	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	227.000	7.910	0.150	10.000	0.000	10.546	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	231.000	7.740	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	235.000	7.800	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	241.000	7.610	0.150	10.000	0.000	10.546	0.000	0.000	-0.048	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	249.000	7.130	0.150	10.000	0.000	10.546	0.000	0.000	-0.028	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	253.000	7.270	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	265.000	7.110	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	283.000	7.220	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	295.000	6.830	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	307.000	6.780	0.150	10.000	0.000	10.546	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	315.000	6.940	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	323.000	6.620	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	329.000	6.780	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES
BU	341.000	6.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES
BU	353.000	6.750	0.150	10.000	0.000	10.546	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES
BU	357.000	6.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES
BU	361.000	6.730	0.150	10.000	0.000	10.546	0.000	0.000	-0.026	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	373.000	6.110	0.150	10.000	0.000	10.546	0.000	0.000	-0.023	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	379.000	6.320	0.150	10.000	0.000	10.546	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	385.000	6.240	0.150	10.000	0.000	10.546	0.000	0.000	0.021	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	391.000	6.570	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	407.000	5.860	0.150	10.000	0.000	10.546	0.000	0.000	-0.026	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	413.000	5.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	425.000	5.550	0.150	10.000	0.000	10.546	0.000	0.000	-0.023	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	449.000	5.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	457.000	5.240	0.150	10.000	0.000	10.546	0.000	0.000	0.033	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	461.000	5.570	0.150	10.000	0.000	10.546	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	467.000	5.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	473.000	5.330	0.150	10.000	0.000	10.546	0.000	0.000	0.031	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	477.000	5.660	0.150	10.000	0.000	10.546	0.000	0.000	0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	481.000	5.530	0.150	10.000	0.000	10.546	0.000	0.000	0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	485.000	5.880	0.150	10.000	0.000	10.546	0.000	0.000	0.062	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	487.000	5.900	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	489.000	5.740	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	503.000	5.660	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	507.000	5.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	513.000	5.390	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM		AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	515.000	5.220	0.150	10.000	0.000	10.546	0.000	0.000	-0.143	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	519.000	4.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.137	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	521.000	4.400	0.150	10.000	0.000	10.546	0.000	0.000	0.039	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	527.000	4.840	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	541.000	4.970	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	547.000	4.670	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	553.000	4.760	0.150	10.000	0.000	10.546	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	557.000	4.350	0.150	10.000	0.000	10.546	0.000	-0.070	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	559.000	4.340	0.150	10.000	0.000	10.546	0.000	0.095	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	565.000	5.110	0.150	10.000	0.000	10.546	0.000	0.081	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	569.000	5.150	0.150	10.000	0.000	10.546	0.000	0.060	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	573.000	5.590	0.150	10.000	0.000	10.546	0.000	0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	577.000	5.430	0.150	10.000	0.000	10.546	0.000	0.041	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	583.000	6.000	0.150	10.000	0.000	10.546	0.000	0.063	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	587.000	6.060	0.150	10.000	0.000	10.546	0.000	-0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	599.000	5.910	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	615.000	5.370	0.150	10.000	0.000	10.546	0.000	0.000	-0.041	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	621.000	5.010	0.150	10.000	0.000	10.546	0.000	0.000	-0.036	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	623.000	5.080	0.150	10.000	0.000	10.546	0.000	0.000	-0.034	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES
BU	629.000	4.740	0.150	10.000	0.000	10.546	0.000	0.000	-0.040	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM	SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	635.000	4.600	0.150	10.000	0.000	10.546	0.000	0.000	-0.039	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	639.000	4.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.093	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	647.000	3.480	0.150	10.000	0.000	10.546	0.000	0.000	-0.072	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	649.000	3.630	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	653.000	3.410	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	657.000	3.600	0.150	10.000	0.000	10.546	0.000	0.000	0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	667.000	3.650	0.150	10.000	0.000	10.546	0.000	-0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	675.000	3.290	0.150	10.000	0.000	10.546	0.000	-0.063	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	679.000	2.900	0.150	10.000	0.000	10.546	0.000	-0.056	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	685.000	2.730	0.150	10.000	0.000	10.546	0.000	0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	705.000	2.990	0.150	10.000	0.000	10.546	0.000	0.033	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	725.000	4.050	0.150	10.000	0.000	10.546	0.000	0.034	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	759.000	4.810	0.150	10.000	0.000	10.546	0.000	0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	765.000	4.720	0.150	10.000	0.000	10.546	0.000	-0.044	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	769.000	4.370	0.150	10.000	0.000	10.546	0.000	-0.044	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	777.000	4.190	0.150	10.000	0.000	10.546	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	783.000	4.620	0.150	10.000	0.000	10.546	0.000	0.000	0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	805.000	4.600	0.150	10.000	0.000	10.546	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	823.000	4.900	0.150	10.000	0.000	10.546	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	829.000	4.770	0.150	10.000	0.000	10.546	0.000	0.000	-0.074	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	837.000	3.870	0.150	10.000	0.000	10.546	0.000	0.000	-0.049	0.000

STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	845.000	3.980	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000

STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	851.000	4.280	0.150	10.000	0.000	10.546	0.000	0.000	0.009	0.000

STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	861.000	4.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000

STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	865.000	4.250	0.150	10.000	0.000	10.546	0.000	0.000	-0.026	0.000

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	873.000	3.810	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	877.000	3.830	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	879.000	3.650	0.150	10.000	0.000	10.546	0.000	0.000	-0.187	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	883.000	2.710	0.150	10.000	0.000	10.546	0.000	0.000	-0.195	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	885.000	2.480	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	889.000	2.670	0.150	10.000	0.000	10.546	0.000	0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	901.000	2.570	0.150	10.000	0.000	10.546	0.000	0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	907.000	3.210	0.150	10.000	0.000	10.546	0.000	0.055	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	913.000	3.230	0.150	10.000	0.000	10.546	0.000	-0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	917.000	3.180	0.150	10.000	0.000	10.546	0.000	-0.048	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR			SLOPE	A-ZONES
BU	923.000	2.750	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	935.000	2.990	0.150	10.000	0.000	10.546	0.000	-0.016	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	945.000	2.390	0.150	10.000	0.000	10.546	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	953.000	2.870	0.150	10.000	0.000	10.546	0.000	0.022	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	957.000	2.650	0.150	10.000	0.000	10.546	0.000	-0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

STATION	ELEVATION	RATIO	ROWS	10-YEAR	100-YEAR		SLOPE	A-ZONES
BU	965.000	2.690	0.150	10.000	0.000	10.546	0.000	0.000	-0.024	0.000

END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	975.000	2.210	0.150	10.000	0.000	10.546	0.000	0.000	-0.036	0.000

END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	977.000	2.260	0.150	10.000	0.000	10.546	0.000	0.000	0.110	0.000

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	983.000	3.090	2.000	1.000	0.000	1.000	0.000	10.546	0.134	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1	REGION 1 WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	985.000	3.330	2.000	1.000	0.000	1.000	0.000	10.546	0.089	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 991.000 3.800 2.000 1.000 0.000 1.000 0.000 10.546 0.056 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 997.000 4.000 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1009.000 3.920 2.000 1.000 0.000 1.000 0.000 10.546 -0.019 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1015.000 3.660 2.000 1.000 0.000 1.000 0.000 10.546 -0.058 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1017.000 3.460 2.000 1.000 0.000 1.000 0.000 10.546 -0.153 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1019.000 3.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.230 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1021.000	2.540	2.000	1.000	0.000	1.000	0.000	10.546	-0.323	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1025.000 1.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.508 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1026.000	0.000	2.000	1.000	0.000	1.000	0.000	10.546	-0.365	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1027.000 0.380 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1029.000 0.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1042.000 0.000 2.000 1.000 0.000 1.000 0.000 10.546 0.043 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1049.000 0.850 2.000 1.000 0.000 1.000 0.000 10.546 0.089 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1057.000 1.340 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1059.000	0.850	2.000	1.000	0.000	1.000	0.000	10.546	0.147	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1063.000 2.220 2.000 1.000 0.000 1.000 0.000 10.546 0.285 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1065.000 2.560 2.000 1.000 0.000 1.000 0.000 10.546 0.082 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1073.000 3.040 2.000 1.000 0.000 1.000 0.000 10.546 0.148 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1077.000 4.340 2.000 1.000 0.000 1.000 0.000 10.546 0.176 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1089.000 5.850 2.000 1.000 0.000 1.000 0.000 10.546 0.104 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1091.000 5.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.183 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1097.000	4.390	2.000	1.000	0.000	1.000	0.000	10.546	-0.215	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1101.000 3.640 2.000 1.000 0.000 1.000 0.000 10.546 -0.160 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1103.000	3.430	2.000	1.000	0.000	1.000	0.000	10.546	-0.059	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1133.000 1.760 2.000 1.000 0.000 1.000 0.000 10.546 -0.051 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1135.000 1.790 2.000 1.000 0.000 1.000 0.000 10.546 0.081 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1141.000 2.410 2.000 1.000 0.000 1.000 0.000 10.546 0.081 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1145.000 2.600 2.000 1.000 0.000 1.000 0.000 10.546 0.080 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1151.000	3.210	2.000	1.000	0.000	1.000	0.000	10.546	0.035	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1159.000	3.090	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1161.000 3.220 2.000 1.000 0.000 1.000 0.000 10.546 0.169 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1169.000 4.780 2.000 1.000 0.000 1.000 0.000 10.546 0.154 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1171.000 4.760 2.000 1.000 0.000 1.000 0.000 10.546 -0.091 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1177.000 4.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.151 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1189.000 2.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.138 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1193.000 1.850 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1199.000	2.130	2.000	1.000	0.000	1.000	0.000	10.546	0.016	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1221.000 2.300 2.000 1.000 0.000 1.000 0.000 10.546 0.021 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1227.000	2.710	2.000	1.000	0.000	1.000	0.000	10.546	0.030	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1231.000 2.600 2.000 1.000 0.000 1.000 0.000 10.546 -0.061 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1235.000 2.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.047 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1239.000 2.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.026 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1243.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1251.000	2.400	2.000	1.000	0.000	1.000	0.000	10.546	0.022	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1257.000	2.320	2.000	1.000	0.000	1.000	0.000	10.546	0.009	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1265.000 2.520 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1273.000 2.340 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1285.000 2.550 2.000 1.000 0.000 1.000 0.000 10.546 0.031 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1291.000 2.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1297.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1303.000 2.770 2.000 1.000 0.000 1.000 0.000 10.546 0.035 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1307.000	2.790	2.000	1.000	0.000	1.000	0.000	10.546	-0.057	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1315.000 2.090 2.000 1.000 0.000 1.000 0.000 10.546 -0.062 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1321.000	1.920	2.000	1.000	0.000	1.000	0.000	10.546	0.004	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1343.000 2.200 2.000 1.000 0.000 1.000 0.000 10.546 0.020 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1351.000 2.510 2.000 1.000 0.000 1.000 0.000 10.546 0.012 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1361.000 2.410 2.000 1.000 0.000 1.000 0.000 10.546 0.030 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1365.000 2.930 2.000 1.000 0.000 1.000 0.000 10.546 0.087 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 1369.000	3.110	2.000	1.000	0.000	1.000	0.000	10.546	-0.026	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1377.000	2.620	2.000	1.000	0.000	1.000	0.000	10.546	-0.094	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1383.000 1.800 2.000 1.000 0.000 1.000 0.000 10.546 -0.155 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1387.000 1.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.152 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1389.000 0.890 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1397.000 1.220 2.000 1.000 0.000 1.000 0.000 10.546 0.067 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1401.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.145 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1405.000 2.380 2.000 1.000 0.000 1.000 0.000 10.546 0.119 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1409.000	2.640	2.000	1.000	0.000	1.000	0.000	10.546	0.027	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1411.000 2.540 2.000 1.000 0.000 1.000 0.000 10.546 -0.155 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1413.000	2.020	2.000	1.000	0.000	1.000	0.000	10.546	-0.347	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1417.000 0.460 2.000 1.000 0.000 1.000 0.000 10.546 -0.292 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1421.000 -0.320 2.000 1.000 0.000 1.000 0.000 10.546 -0.152 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1423.000 -0.450 2.000 1.000 0.000 1.000 0.000 10.546 0.068 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1427.000 0.090 2.000 1.000 0.000 1.000 0.000 10.546 0.227 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1429.000	0.910	2.000	1.000	0.000	1.000	0.000	10.546	0.490	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1431.000	2.050	2.000	1.000	0.000	1.000	0.000	10.546	0.365	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1433.000	2.370	2.000	1.000	0.000	1.000	0.000	10.546	0.060	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1437.000	2.410	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1453.000	2.480	0.000	10.546	0.000	0.000	0.000	0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1467.000	2.920	0.000	10.546	0.000	0.000	0.000	0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1471.000	2.730	0.000	10.546	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1481.000	2.960	0.000	10.546	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1571.000	3.360	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1585.000	3.620	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1589.000	3.500	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1595.000	3.610	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1599.000	3.440	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1611.000	3.650	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1619.000	3.490	0.000	10.546	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1627.000	3.610	0.000	10.546	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1631.000	3.450	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1635.000	3.700	0.000	10.546	0.000	0.000	0.000	0.019	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1645.000	3.710	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	1651.000	3.880	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1665.000	3.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1669.000	3.460	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1671.000	3.750	0.000	10.546	0.000	0.000	0.000	0.000	0.095	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1673.000	3.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1681.000	3.700	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	1695.000	4.030	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1707.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1715.000	4.240	0.000	10.546	0.000	0.000	0.000	0.000	0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1735.000	4.390	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1739.000	4.290	0.000	10.546	0.000	0.000	0.000	0.000	0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1743.000	4.510	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1747.000	4.350	0.000	10.546	0.000	0.000	0.000	-0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1751.000	4.410	0.000	10.546	0.000	0.000	0.000	-0.022	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1753.000	4.220	0.000	10.546	0.000	0.000	0.000	-0.021	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1759.000	4.240	0.000	10.546	0.000	0.000	0.000	-0.019	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1761.000	4.070	0.000	10.546	0.000	0.000	0.000	-0.043	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1763.000	4.070	0.000	10.546	0.000	0.000	0.000	0.055	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1765.000	4.290	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1777.000	3.980	0.000	10.546	0.000	0.000	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1783.000	4.170	0.000	10.546	0.000	0.000	0.000	0.000	0.012	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1793.000	4.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.016	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1797.000	3.950	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1813.000	3.880	0.000	10.546	0.000	0.000	0.000	0.000	-0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1819.000	3.560	0.000	10.546	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1827.000	3.900	0.000	10.546	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1853.000	3.890	0.000	10.546	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1855.000	3.780	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1861.000	3.890	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	1877.000	3.580	0.000	10.546	0.000	0.000	0.000	0.000	-0.031	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1883.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1889.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1893.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1897.000	3.380	0.000	10.546	0.000	0.000	0.000	0.000	0.016	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1905.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	1933.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1937.000	3.480	0.000	10.546	0.000	0.000	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1943.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1951.000	3.200	0.000	10.546	0.000	0.000	0.000	0.000	-0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1961.000	2.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1965.000	3.080	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1969.000	2.940	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1973.000	3.040	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1977.000	2.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1981.000	3.000	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1995.000	2.830	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2027.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2031.000	3.160	0.000	10.546	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2051.000	3.720	0.000	10.546	0.000	0.000	0.000	0.021	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2069.000	3.970	0.000	10.546	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2091.000	4.020	0.000	10.546	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2101.000	3.870	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2131.000	3.810	0.000	10.546	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2137.000	3.930	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2151.000	3.630	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2163.000	4.150	0.000	10.546	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2183.000	3.940	0.000	10.546	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2203.000	4.550	0.000	10.546	0.000	0.000	0.000	0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	2209.000	4.330	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2213.000	4.520	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2223.000	4.470	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2227.000	4.280	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2247.000	4.120	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2257.000	3.850	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	2267.000	3.870	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2273.000	3.670	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2277.000	3.790	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2283.000	3.570	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2295.000	3.590	0.000	10.546	0.000	0.000	0.000	0.000	0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2305.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2315.000	3.770	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2331.000	4.080	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2343.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2347.000	4.180	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2363.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2367.000	4.150	0.000	10.546	0.000	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2379.000	4.240	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2403.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2409.000	4.210	0.000	10.546	0.000	0.000	0.000	0.000	0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2423.000	4.370	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2435.000	4.180	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2453.000	4.310	0.000	10.546	0.000	0.000	0.000	0.000	-0.012	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2463.000	3.850	0.000	10.546	0.000	0.000	0.000	-0.019	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2471.000	3.970	0.000	10.546	0.000	0.000	0.000	0.049	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2477.000	4.530	0.000	10.546	0.000	0.000	0.000	0.063	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2485.000	4.850	0.000	10.546	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2489.000	4.610	0.000	10.546	0.000	0.000	0.000	-0.109	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	2495.000	3.760	0.000	10.546	0.000	0.000	0.000	0.000	-0.083	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2501.000	3.620	0.000	10.546	0.000	0.000	0.000	0.000	0.012	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2509.000	3.930	0.000	10.546	0.000	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2515.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.016	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2517.000	4.060	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2523.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	2587.000	4.540	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2765.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2833.000	5.040	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2877.000	4.320	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2935.000	5.130	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	3001.000	4.270	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3037.000	4.950	0.000	10.546	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3071.000	4.160	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3233.000	3.990	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3375.000	5.640	0.000	10.546	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3565.000	3.390	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE	BOTTOM SLOPE	AVERAGE A-ZONES

VH 3585.000 3.800 2.000 1.000 0.000 1.000 0.000 10.546 0.019 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3591.000 3.880 2.000 1.000 0.000 1.000 0.000 10.546 -0.027 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3613.000 3.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3621.000	3.790	2.000	1.000	0.000	1.000	0.000	10.546	-0.005	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3663.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3671.000	3.520	2.000	1.000	0.000	1.000	0.000	10.546	0.027	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3693.000 3.610 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3743.000 3.070 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3763.000 4.630 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3793.000 3.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.012 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	3815.000	4.000	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	3833.000	3.100	2.000	1.000	0.000	1.000	0.000	10.546	-0.011	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3841.000 3.710 2.000 1.000 0.000 1.000 0.000 10.546 0.026 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3861.000 3.840 2.000 1.000 0.000 1.000 0.000 10.546 -0.023 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3869.000 3.080 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3917.000 3.780 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3955.000 2.900 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 3963.000 3.830 1.000 25.000 10.000 0.000 0.000 10.546 0.127 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 3971.000 4.930 1.000 25.000 10.000 0.000 0.000 10.546 0.083 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 3983.000 5.500 1.000 25.000 10.000 0.000 0.000 10.546 0.025 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 3999.000 5.620 1.000 25.000 10.000 0.000 0.000 10.546 -0.071 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 4009.000 3.660 1.000 25.000 10.000 0.000 0.000 10.546 -0.116 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 4019.000 3.300 1.000 25.000 10.000 0.000 0.000 10.546 0.004 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE	4059.000	3.850	1.000	25.000	10.000	0.000	0.000	10.546	0.001	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE	4077.000	3.370	1.000	25.000	10.000	0.000	0.000	10.546	-0.012	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE	4085.000	3.550	1.000	25.000	10.000	0.000	0.000	10.546	0.091	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE	4105.000	5.930	1.000	25.000	10.000	0.000	0.000	10.546	0.020	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE	4131.000	4.490	1.000	25.000	10.000	0.000	0.000	10.546	0.015	0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4159.000 6.740 1.000 25.000 10.000 0.000 0.000 10.546 0.022 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4179.000 5.540 1.000 25.000 10.000 0.000 0.000 10.546 -0.108 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4189.000 3.510 1.000 25.000 10.000 0.000 0.000 10.546 -0.177 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4191.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4211.000 3.150 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	4297.000	3.500	2.000	1.000	0.000	1.000	0.000	10.546	0.013	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO	
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH 4313.000	4.500	2.000	1.000	0.000	1.000	0.000	10.546	-0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4353.000 3.370 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4407.000 3.620 1.000 20.000 8.000 0.000 0.000 10.546 -0.001 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4419.000 3.310 1.000 20.000 8.000 0.000 0.000 10.546 0.044 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4453.000 5.650 1.000 20.000 8.000 0.000 0.000 10.546 0.003 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4495.000 3.510 1.000 20.000 8.000 0.000 0.000 10.546 -0.026 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4505.000 4.290 1.000 20.000 8.000 0.000 0.000 10.546 0.009 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4511.000 3.650 1.000 20.000 8.000 0.000 0.000 10.546 0.002 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4553.000 4.360 1.000 20.000 8.000 0.000 0.000 10.546 -0.005 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4603.000 3.140 1.000 20.000 8.000 0.000 0.000 10.546 -0.003 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4657.000 4.020 1.000 20.000 8.000 0.000 0.000 10.546 0.006 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4663.000 3.520 1.000 20.000 8.000 0.000 0.000 10.546 -0.043 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4665.000 3.680 2.000 1.000 0.000 1.000 0.000 10.546 0.063 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4679.000 4.520 2.000 1.000 0.000 1.000 0.000 10.546 0.028 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4693.000 4.460 2.000 1.000 0.000 1.000 0.000 10.546 -0.043 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4703.000 3.490 2.000 1.000 0.000 1.000 0.000 10.546 -0.017 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4721.000 3.980 2.000 1.000 0.000 1.000 0.000 10.546 -0.017 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4729.000	3.040	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	4787.000	4.030	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4815.000 3.530 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4835.000 4.500 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4861.000 4.030 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4879.000 4.780 2.000 1.000 0.000 1.000 0.000 10.546 -0.013 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4935.000 3.050 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4945.000 4.080 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	4969.000	3.400	2.000	1.000	0.000	1.000	0.000	10.546	0.013	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4993.000 4.690 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	5015.000	3.750	2.000	1.000	0.000	1.000	0.000	10.546	-0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5037.000 4.650 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5051.000 3.580 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5115.000 4.300 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5133.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5185.000	4.020	2.000	1.000	0.000	1.000	0.000	10.546	0.022	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5205.000	5.020	2.000	1.000	0.000	1.000	0.000	10.546	-0.015	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	5251.000	3.010	2.000	1.000	0.000	1.000	0.000	10.546	-0.005	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5383.000 4.110 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5413.000 5.740 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5431.000 4.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5457.000 5.070 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5467.000 4.180 2.000 1.000 0.000 1.000 0.000 10.546 -0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5479.000	4.890	2.000	1.000	0.000	1.000	0.000	10.546	0.004	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5495.000 4.290 2.000 1.000 0.000 1.000 0.000 10.546 0.038 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5503.000	5.800	0.000	10.546	0.000	0.000	0.000	0.150	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5515.000	7.290	0.000	10.546	0.000	0.000	0.000	0.040	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5549.000	7.630	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5705.000	7.350	0.000	10.546	0.000	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

IF 5873.000 5.540 0.000 10.546 0.000 0.000 0.000 0.000 -0.005 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 5931.000 6.310 0.000 10.546 0.000 0.000 0.000 0.000 0.004 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 5949.000 5.880 0.000 10.546 0.000 0.000 0.000 0.000 0.027 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 5957.000 7.010 0.000 10.546 0.000 0.000 0.000 0.000 0.108 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5959.000 6.960 2.000 1.000 0.000 1.000 0.000 10.546 -0.050 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 6001.000	4.820	2.000	1.000	0.000	1.000	0.000	10.546	-0.020	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6053.000 5.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6069.000 3.120 2.000 1.000 0.000 1.000 0.000 10.546 -0.035 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6103.000 3.330 2.000 1.000 0.000 1.000 0.000 10.546 -0.033 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6135.000 0.950 2.000 1.000 0.000 1.000 0.000 10.546 -0.041 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6161.000 0.970 2.000 1.000 0.000 1.000 0.000 10.546 0.041 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6171.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6193.000 0.460 2.000 1.000 0.000 1.000 0.000 10.546 0.019 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1	REGION 1 WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	6213.000	3.250	2.000	1.000	0.000	1.000	0.000	10.546	0.054	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6251.000 3.570 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6313.000	2.610	0.600	6.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6315.000	2.680	0.600	6.000	0.000	10.546	0.000	0.000 0.100	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6319.000	3.210	0.600	6.000	0.000	10.546	0.000	0.000 0.471	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6327.000	8.330	0.600	6.000	0.000	10.546	0.000	0.000 0.130	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6369.000	9.700	0.600	6.000	0.000	10.546	0.000	0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6449.000	10.020	0.600	6.000	0.000	10.546	0.000	-0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6465.000	9.560	0.600	6.000	0.000	10.546	0.000	-0.060	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6475.000	8.450	0.600	6.000	0.000	10.546	0.000	-0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6537.000	9.270	0.600	6.000	0.000	10.546	0.000	0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6613.000	9.130	0.600	6.000	0.000	10.546	0.000	-0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6821.000	5.690	0.600	6.000	0.000	10.546	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6867.000	6.960	0.600	6.000	0.000	10.546	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
AS	6909.000	10.560	0.000	10.546	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
AS	6987.000	10.560	0.000	10.546	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES

AS	7015.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7031.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7101.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7147.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7177.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7207.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
AS	7235.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7297.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

----------END OF TRANSECT----------

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

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PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

LOCATION	CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	7.37	5.39	15.70
IF	1.00	5.77	5.39	14.59

IF	7.00	5.59	5.39	14.46
DU	8.00	4.75	5.39	13.87
DU	10.00	4.32	5.39	13.57
DU	11.00	2.24	5.39	12.12
AS	14.00	0.00	0.00	10.56
AS	23.00	0.00	0.00	10.56
IF	25.00	0.02	0.19	10.56
IF	27.00	0.03	0.23	10.57
AS	31.00	0.00	0.00	10.56
AS	35.00	0.00	0.00	10.56
AS	41.00	0.00	0.00	10.56
AS	47.00	0.00	0.00	10.56
AS	53.00	0.00	0.00	10.56
AS	59.00	0.00	0.00	10.56
AS	65.00	0.00	0.00	10.56

AS	67.00	0.00	0.00	10.56
AS	71.00	0.00	0.00	10.56
AS	75.00	0.00	0.00	10.56
AS	87.00	0.00	0.00	10.56
AS	95.00	0.00	0.00	10.56
AS	99.00	0.00	0.00	10.56
IF	105.00	0.04	0.27	10.58
AS	109.00	0.00	0.00	10.56
AS	113.00	0.00	0.00	10.56
AS	117.00	0.00	0.00	10.56
AS	121.00	0.00	0.00	10.56
BU	129.00	0.00	0.00	10.55
BU	135.00	0.00	0.00	10.55
BU	143.00	0.00	0.00	10.55

BU	149.00	0.00	0.00	10.55
BU	153.00	0.00	0.00	10.55
BU	157.00	0.00	0.00	10.55
BU	163.00	0.00	0.00	10.55
BU	183.00	0.00	0.00	10.55
BU	195.00	0.00	0.00	10.55
BU	203.00	0.00	0.00	10.55
BU	207.00	0.00	0.00	10.55
BU	221.00	0.00	0.00	10.55
BU	227.00	0.00	0.00	10.55
BU	231.00	0.00	0.00	10.55
BU	235.00	0.00	0.00	10.55
BU	241.00	0.00	0.00	10.55
BU	249.00	0.00	0.00	10.55
BU	253.00	0.00	0.00	10.55

BU	265.00	0.00	0.00	10.55
BU	283.00	0.00	0.00	10.55
BU	295.00	0.00	0.00	10.55
BU	307.00	0.00	0.00	10.55
BU	315.00	0.00	0.00	10.55
BU	323.00	0.00	0.00	10.55
BU	329.00	0.00	0.00	10.55
BU	341.00	0.00	0.00	10.55
BU	353.00	0.00	0.00	10.55
BU	357.00	0.00	0.00	10.55
BU	361.00	0.00	0.00	10.55
BU	373.00	0.00	0.00	10.55
BU	379.00	0.00	0.00	10.55
BU	385.00	0.00	0.00	10.55

BU	391.00	0.00	0.00	10.55
BU	407.00	0.00	0.00	10.55
BU	413.00	0.00	0.00	10.55
BU	425.00	0.00	0.00	10.55
BU	449.00	0.00	0.00	10.55
BU	457.00	0.00	0.00	10.55
BU	461.00	0.00	0.00	10.55
BU	467.00	0.00	0.00	10.55
BU	473.00	0.00	0.00	10.55
BU	477.00	0.00	0.00	10.55
BU	481.00	0.00	0.00	10.55
BU	485.00	0.00	0.00	10.55
BU	487.00	0.00	0.00	10.55
BU	489.00	0.00	0.00	10.55
BU	503.00	0.00	0.00	10.55

BU	507.00	0.00	0.00	10.55
BU	513.00	0.00	0.00	10.55
BU	515.00	0.00	0.00	10.55
BU	519.00	0.00	0.00	10.55
BU	521.00	0.00	0.00	10.55
BU	527.00	0.00	0.00	10.55
BU	541.00	0.00	0.00	10.55
BU	547.00	0.00	0.00	10.55
BU	553.00	0.00	0.00	10.55
BU	557.00	0.00	0.00	10.55
BU	559.00	0.00	0.00	10.55
BU	565.00	0.00	0.00	10.55
BU	569.00	0.00	0.00	10.55
BU	573.00	0.00	0.00	10.55

BU	577.00	0.00	0.00	10.55
BU	583.00	0.00	0.00	10.55
BU	587.00	0.00	0.00	10.55
BU	599.00	0.00	0.00	10.55
BU	615.00	0.00	0.00	10.55
BU	621.00	0.00	0.00	10.55
BU	623.00	0.00	0.00	10.55
BU	629.00	0.00	0.00	10.55
BU	635.00	0.00	0.00	10.55
BU	639.00	0.00	0.00	10.55
BU	647.00	0.00	0.00	10.55
BU	649.00	0.00	0.00	10.55
BU	653.00	0.00	0.00	10.55
BU	657.00	0.00	0.00	10.55
BU	667.00	0.00	0.00	10.55

BU	675.00	0.00	0.00	10.55
BU	679.00	0.00	0.00	10.55
BU	685.00	0.00	0.00	10.55
BU	705.00	0.00	0.00	10.55
BU	725.00	0.00	0.00	10.55
BU	759.00	0.00	0.00	10.55
BU	765.00	0.00	0.00	10.55
BU	769.00	0.00	0.00	10.55
BU	777.00	0.00	0.00	10.55
BU	783.00	0.00	0.00	10.55
BU	805.00	0.00	0.00	10.55
BU	823.00	0.00	0.00	10.55
BU	829.00	0.00	0.00	10.55
BU	837.00	0.00	0.00	10.55

BU	845.00	0.00	0.00	10.55
BU	851.00	0.00	0.00	10.55
BU	861.00	0.00	0.00	10.55
BU	865.00	0.00	0.00	10.55
BU	873.00	0.00	0.00	10.55
BU	877.00	0.00	0.00	10.55
BU	879.00	0.00	0.00	10.55
BU	883.00	0.00	0.00	10.55
BU	885.00	0.00	0.00	10.55
BU	889.00	0.00	0.00	10.55
BU	901.00	0.00	0.00	10.55
BU	907.00	0.00	0.00	10.55
BU	913.00	0.00	0.00	10.55
BU	917.00	0.00	0.00	10.55
BU	923.00	0.00	0.00	10.55

BU	935.00	0.00	0.00	10.55
BU	945.00	0.00	0.00	10.55
BU	953.00	0.00	0.00	10.55
BU	957.00	0.00	0.00	10.55
BU	965.00	0.00	0.00	10.55
BU	975.00	0.00	0.00	10.55
BU	977.00	0.00	0.00	10.55
VH	983.00	0.05	0.27	10.58
VH	985.00	0.06	0.29	10.59
VH	991.00	0.09	0.35	10.61
VH	997.00	0.11	0.39	10.63
VH	1009.00	0.15	0.46	10.65
VH	1015.00	0.17	0.49	10.67
VH	1017.00	0.18	0.49	10.67

VH	1019.00	0.18	0.50	10.68
VH	1021.00	0.19	0.51	10.68
VH	1025.00	0.20	0.52	10.69
VH	1026.00	0.20	0.53	10.69
VH	1027.00	0.21	0.53	10.69
VH	1029.00	0.21	0.54	10.69
VH	1042.00	0.25	0.58	10.72
VH	1049.00	0.26	0.60	10.73
VH	1057.00	0.28	0.62	10.74
VH	1059.00	0.29	0.63	10.75
VH	1063.00	0.30	0.64	10.75
VH	1065.00	0.30	0.64	10.76
VH	1073.00	0.32	0.66	10.77
VH	1077.00	0.33	0.67	10.78
VH	1089.00	0.35	0.70	10.79

VH	1091.00	0.36	0.70	10.80
VH	1097.00	0.37	0.71	10.81
VH	1101.00	0.38	0.72	10.81
VH	1103.00	0.38	0.72	10.81
VH	1133.00	0.44	0.78	10.85
VH	1135.00	0.44	0.78	10.86
VH	1141.00	0.46	0.79	10.87
VH	1145.00	0.46	0.80	10.87
VH	1151.00	0.47	0.80	10.88
VH	1159.00	0.49	0.82	10.89
VH	1161.00	0.49	0.82	10.89
VH	1169.00	0.51	0.83	10.90
VH	1171.00	0.51	0.83	10.90
VH	1177.00	0.52	0.84	10.91

VH	1189.00	0.54	0.86	10.92
VH	1193.00	0.55	0.86	10.93
VH	1199.00	0.56	0.87	10.94
VH	1221.00	0.59	0.90	10.96
VH	1227.00	0.60	0.91	10.97
VH	1231.00	0.61	0.91	10.97
VH	1235.00	0.62	0.92	10.98
VH	1239.00	0.62	0.92	10.98
VH	1243.00	0.63	0.93	10.99
VH	1251.00	0.64	0.94	10.99
VH	1257.00	0.65	0.94	11.00
VH	1265.00	0.66	0.95	11.01
VH	1273.00	0.68	0.96	11.02
VH	1285.00	0.69	0.97	11.03
VH	1291.00	0.70	0.98	11.04

VH	1297.00	0.71	0.99	11.04
VH	1303.00	0.72	0.99	11.05
VH	1307.00	0.73	1.00	11.05
VH	1315.00	0.74	1.00	11.06
VH	1321.00	0.75	1.01	11.07
VH	1343.00	0.78	1.03	11.09
VH	1351.00	0.79	1.04	11.10
VH	1361.00	0.80	1.05	11.11
VH	1365.00	0.81	1.05	11.11
VH	1369.00	0.81	1.05	11.12
VH	1377.00	0.82	1.06	11.12
VH	1383.00	0.83	1.07	11.13
VH	1387.00	0.84	1.07	11.13
VH	1389.00	0.84	1.07	11.13

VH	1397.00	0.85	1.08	11.14
VH	1401.00	0.86	1.08	11.15
VH	1405.00	0.86	1.09	11.15
VH	1409.00	0.87	1.09	11.15
VH	1411.00	0.87	1.09	11.16
VH	1413.00	0.87	1.09	11.16
VH	1417.00	0.88	1.10	11.16
VH	1421.00	0.88	1.10	11.16
VH	1423.00	0.89	1.10	11.17
VH	1427.00	0.89	1.10	11.17
VH	1429.00	0.89	1.11	11.17
VH	1431.00	0.90	1.11	11.17
VH	1433.00	0.90	1.11	11.18
IF	1437.00	0.91	1.11	11.18
IF	1453.00	0.93	1.12	11.19

IF	1467.00	0.94	1.14	11.21
IF	1471.00	0.95	1.14	11.21
IF	1481.00	0.96	1.15	11.22
IF	1571.00	1.07	1.21	11.30
IF	1585.00	1.09	1.22	11.31
IF	1589.00	1.09	1.22	11.31
IF	1595.00	1.10	1.23	11.32
IF	1599.00	1.11	1.23	11.32
IF	1611.00	1.12	1.24	11.33
IF	1619.00	1.13	1.24	11.34
IF	1627.00	1.14	1.25	11.34
IF	1631.00	1.14	1.25	11.35
IF	1635.00	1.15	1.25	11.35
IF	1645.00	1.16	1.26	11.36

IF	1651.00	1.17	1.26	11.36
IF	1665.00	1.18	1.27	11.37
IF	1669.00	1.19	1.27	11.38
IF	1671.00	1.19	1.27	11.38
IF	1673.00	1.19	1.28	11.38
IF	1681.00	1.20	1.28	11.39
IF	1695.00	1.22	1.29	11.40
IF	1707.00	1.23	1.30	11.41
IF	1715.00	1.24	1.30	11.41
IF	1735.00	1.26	1.31	11.43
IF	1739.00	1.26	1.31	11.43
IF	1743.00	1.27	1.32	11.43
IF	1747.00	1.27	1.32	11.44
IF	1751.00	1.28	1.32	11.44
IF	1753.00	1.28	1.32	11.44

IF	1759.00	1.29	1.33	11.45
IF	1761.00	1.29	1.33	11.45
IF	1763.00	1.29	1.33	11.45
IF	1765.00	1.29	1.33	11.45
IF	1777.00	1.30	1.34	11.46
IF	1783.00	1.31	1.34	11.46
IF	1793.00	1.32	1.34	11.47
IF	1797.00	1.33	1.35	11.47
IF	1813.00	1.34	1.36	11.49
IF	1819.00	1.35	1.36	11.49
IF	1827.00	1.36	1.36	11.50
IF	1853.00	1.39	1.38	11.52
IF	1855.00	1.39	1.38	11.52
IF	1861.00	1.39	1.38	11.52

IF	1877.00	1.41	1.39	11.53
IF	1883.00	1.42	1.39	11.54
IF	1889.00	1.42	1.39	11.54
IF	1893.00	1.43	1.40	11.55
IF	1897.00	1.43	1.40	11.55
IF	1905.00	1.44	1.40	11.55
IF	1933.00	1.47	1.42	11.57
IF	1937.00	1.47	1.42	11.58
IF	1943.00	1.48	1.42	11.58
IF	1951.00	1.49	1.43	11.59
IF	1961.00	1.50	1.43	11.59
IF	1965.00	1.50	1.43	11.60
IF	1969.00	1.50	1.43	11.60
IF	1973.00	1.51	1.44	11.60
IF	1977.00	1.51	1.44	11.60

IF	1981.00	1.52	1.44	11.61
IF	1995.00	1.53	1.45	11.62
IF	2027.00	1.56	1.46	11.64
IF	2031.00	1.57	1.46	11.64
IF	2051.00	1.58	1.47	11.65
IF	2069.00	1.60	1.48	11.66
IF	2091.00	1.62	1.49	11.68
IF	2101.00	1.63	1.49	11.69
IF	2131.00	1.66	1.51	11.71
IF	2137.00	1.66	1.51	11.71
IF	2151.00	1.68	1.52	11.72
IF	2163.00	1.68	1.52	11.72
IF	2183.00	1.70	1.53	11.74
IF	2203.00	1.71	1.54	11.74

IF	2209.00	1.72	1.54	11.75
IF	2213.00	1.72	1.54	11.75
IF	2223.00	1.73	1.55	11.76
IF	2227.00	1.74	1.55	11.76
IF	2247.00	1.76	1.56	11.78
IF	2257.00	1.77	1.56	11.78
IF	2267.00	1.78	1.56	11.79
IF	2273.00	1.78	1.57	11.80
IF	2277.00	1.79	1.57	11.80
IF	2283.00	1.79	1.57	11.80
IF	2295.00	1.80	1.57	11.81
IF	2305.00	1.81	1.58	11.81
IF	2315.00	1.82	1.58	11.82
IF	2331.00	1.83	1.59	11.83
IF	2343.00	1.84	1.59	11.84

IF	2347.00	1.84	1.60	11.83
IF	2363.00	1.86	1.60	11.85
IF	2367.00	1.86	1.60	11.85
IF	2379.00	1.87	1.61	11.85
IF	2403.00	1.89	1.62	11.87
IF	2409.00	1.89	1.62	11.87
IF	2423.00	1.90	1.62	11.87
IF	2435.00	1.91	1.63	11.88
IF	2453.00	1.92	1.63	11.89
IF	2463.00	1.94	1.64	11.90
IF	2471.00	1.94	1.64	11.91
IF	2477.00	1.94	1.64	11.90
IF	2485.00	1.93	1.65	11.90
IF	2489.00	1.94	1.65	11.90

IF	2495.00	1.96	1.65	11.92
IF	2501.00	1.97	1.65	11.92
IF	2509.00	1.97	1.65	11.92
IF	2515.00	1.97	1.66	11.93
IF	2517.00	1.97	1.66	11.93
IF	2523.00	1.98	1.66	11.93
IF	2587.00	2.02	1.68	11.96
	2711.60	2.11	1.72	12.03
IF	2765.00	2.16	1.74	12.06
IF	2833.00	2.15	1.76	12.05
IF	2877.00	2.20	1.77	12.09
IF	2935.00	2.20	1.79	12.08
IF	3001.00	2.29	1.81	12.15
IF	3037.00	2.27	1.82	12.13
IF	3071.00	2.34	1.83	12.18

	3184.40	2.41	1.86	12.23
IF	3233.00	2.44	1.88	12.25
IF	3375.00	2.33	1.91	12.18
	3508.00	2.54	1.95	12.32
IF	3565.00	2.60	1.96	12.37
VH	3585.00	2.59	1.97	12.36
VH	3591.00	2.59	1.97	12.36
VH	3613.00	2.64	1.97	12.39
VH	3621.00	2.61	1.98	12.37
VH	3663.00	2.67	1.99	12.42
VH	3671.00	2.65	1.99	12.40
VH	3693.00	2.65	1.99	12.40
VH	3743.00	2.70	2.00	12.44
VH	3763.00	2.60	2.01	12.36

VH	3793.00	2.73	2.02	12.46
VH	3815.00	2.69	2.02	12.43
VH	3833.00	2.74	2.03	12.47
VH	3841.00	2.72	2.03	12.45
VH	3861.00	2.72	2.03	12.45
VH	3869.00	2.76	2.03	12.48
VH	3917.00	2.75	2.04	12.47
VH	3955.00	2.81	2.05	12.51
VE	3963.00	2.80	2.05	12.50
VE	3971.00	2.67	2.05	12.42
VE	3983.00	2.55	2.05	12.33
VE	3999.00	2.53	2.05	12.31
VE	4009.00	2.51	2.05	12.31
VE	4019.00	2.50	2.05	12.30
VE	4059.00	2.47	2.05	12.27

VE	4077.00	2.45	2.05	12.26
VE	4085.00	2.44	2.05	12.26
VE	4105.00	2.42	2.05	12.24
VE	4131.00	2.39	2.05	12.22
VE	4159.00	2.19	2.05	12.08
VE	4179.00	2.16	2.05	12.06
VE	4189.00	2.16	2.05	12.06
VH	4191.00	2.16	2.05	12.06
VH	4211.00	2.18	2.06	12.07
VH	4297.00	2.23	2.08	12.11
VH	4313.00	2.20	2.08	12.08
VH	4353.00	2.27	2.09	12.13
VE	4407.00	2.21	2.09	12.09
VE	4419.00	2.19	2.09	12.08

VE	4453.00	2.15	2.09	12.05
VE	4495.00	2.10	2.09	12.01
VE	4505.00	2.08	2.09	12.01
VE	4511.00	2.08	2.09	12.00
VE	4553.00	2.03	2.09	11.97
VE	4603.00	1.98	2.09	11.93
VE	4657.00	1.93	2.09	11.90
VE	4663.00	1.93	2.09	11.90
VH	4665.00	1.93	2.09	11.89
VH	4679.00	1.91	2.09	11.88
VH	4693.00	1.92	2.10	11.89
VH	4703.00	1.96	2.10	11.92
VH	4721.00	1.96	2.10	11.92
VH	4729.00	2.00	2.10	11.94
VH	4787.00	2.01	2.12	11.95

VH	4815.00	2.05	2.12	11.98
VH	4835.00	2.02	2.13	11.96
VH	4861.00	2.06	2.13	11.99
VH	4879.00	2.04	2.14	11.98
VH	4935.00	2.15	2.15	12.05
VH	4945.00	2.12	2.15	12.03
VH	4969.00	2.16	2.16	12.06
VH	4993.00	2.12	2.16	12.03
VH	5015.00	2.17	2.17	12.07
VH	5037.00	2.15	2.17	12.05
VH	5051.00	2.20	2.17	12.09
VH	5115.00	2.21	2.19	12.10
VH	5133.00	2.26	2.19	12.13
VH	5185.00	2.27	2.20	12.13

VH	5205.00	2.24	2.20	12.11
VH	5251.00	2.34	2.21	12.19
VH	5383.00	2.37	2.24	12.21
VH	5413.00	2.34	2.24	12.18
VH	5431.00	2.40	2.25	12.22
VH	5457.00	2.37	2.25	12.21
VH	5467.00	2.41	2.25	12.23
VH	5479.00	2.39	2.26	12.22
VH	5495.00	2.42	2.26	12.24
IF	5503.00	2.38	2.26	12.21
IF	5515.00	2.07	2.26	12.00
IF	5549.00	1.90	2.27	11.88
	5658.20	1.94	2.29	11.91
IF	5705.00	1.96	2.30	11.92
	5822.60	2.09	2.32	12.01

IF	5873.00	2.12	2.33	12.03
IF	5931.00	2.16	2.34	12.06
IF	5949.00	2.17	2.34	12.06
IF	5957.00	2.10	2.34	12.02
VH	5959.00	2.11	2.34	12.02
VH	6001.00	2.20	2.35	12.09
VH	6053.00	2.22	2.36	12.10
VH	6069.00	2.29	2.36	12.15
VH	6103.00	2.30	2.37	12.16
VH	6135.00	2.40	2.37	12.22
VH	6161.00	2.41	2.38	12.24
VH	6171.00	2.37	2.38	12.21
VH	6193.00	2.45	2.38	12.26
VH	6213.00	2.37	2.38	12.21

VH	6251.00	2.38	2.39	12.21
BU	6313.00	0.51	2.39	10.91
BU	6315.00	0.11	2.39	10.62
BU	6319.00	0.02	2.39	10.56
BU	6327.00	0.01	2.39	10.55
BU	6369.00	0.00	2.39	10.55
BU	6449.00	0.00	2.39	10.55
BU	6465.00	0.00	2.39	10.55
BU	6475.00	0.00	2.39	10.55
BU	6537.00	0.00	2.39	10.55
BU	6613.00	0.00	2.39	10.55
BU	6821.00	0.00	2.39	10.55
BU	6867.00	0.00	2.39	10.55
AS	6909.00	0.00	0.00	10.56
AS	6987.00	0.00	0.00	10.56

AS 7015.00 0.00 0.00 10.56

AS 7031.00 0.00 0.00 10.56

AS 7101.00 0.00 0.00 10.56

AS 7147.00 0.00 0.00 10.56

AS 7177.00 0.00 0.00 10.56

AS 7207.00 0.00 0.00 10.56

AS 7235.00 0.00 0.00 10.56

AS 7297.00 0.00 0.00 10.56

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

BETWEEN 11.00 AND 14.00

BETWEEN 14.00 AND 23.00

BETWEEN 27.00 AND 31.00

BETWEEN 31.00 AND 35.00

BETWEEN 35.00 AND 41.00

BETWEEN 41.00 AND 47.00

BETWEEN 47.00 AND 53.00

BETWEEN 53.00 AND 59.00

BETWEEN 59.00 AND 65.00

BETWEEN 65.00 AND 67.00

BETWEEN 67.00 AND 71.00

BETWEEN 71.00 AND 75.00

BETWEEN 75.00 AND 87.00

BETWEEN 87.00 AND 95.00

BETWEEN 95.00 AND 99.00

BETWEEN 105.00 AND 109.00

BETWEEN 109.00 AND 113.00

BETWEEN 113.00 AND 117.00

BETWEEN 117.00 AND 121.00

BETWEEN 6867.00 AND 6909.00

BETWEEN 6909.00 AND 6987.00

BETWEEN 6987.00 AND 7015.00

BETWEEN 7015.00 AND 7031.00

BETWEEN 7031.00 AND 7101.00

BETWEEN 7101.00 AND 7147.00

BETWEEN 7147.00 AND 7177.00

BETWEEN 7177.00 AND 7207.00

BETWEEN 7207.00 AND 7235.00

BETWEEN 7235.00 AND 7297.00

PART4 LOCATION OF SURGE CHANGES

STATION 10-YEAR SURGE 100-YEAR SURGE

NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

STATION OF GUTTER LOCATION OF ZONE

10.64 WINDWARD

PART6 NUMBERED A ZONES AND V ZONES

STATION OF GUTTER ELEVATION ZONE DESIGNATION FHF

0.00 15.70

V26 EL=16 160

0.18 15.50

V26 EL=15 160

5.18 14.50

V26 EL=14 160

10.05 13.50

V26 EL=13 160

10.64 12.65

A22 EL=13 120

10.74 12.50

A22 EL=12 120

11.00 12.12

14.00 10.56

23.00 10.55

A22 EL=11 120

27.00 10.57

31.00 10.56

35.00 10.56

41.00	10.56
47.00	10.56
53.00	10.56
59.00	10.56
65.00	10.56
67.00	10.56
71.00	10.56
75.00	10.56
87.00	10.56
95.00	10.56

99.00 10.55

A22 EL=11 120

105.00 10.58

109.00 10.56

113.00 10.56

117.00 10.56

121.00 10.55

A22 EL=11 120

1831.63 11.50

A22 EL=12 120

3945.38 12.50

A22 EL=13 120

3963.32 12.50

A22 EL=12 120

6284.82 11.50

A22 EL=11 120

6867.00 10.55

6909.00 10.56

6987.00 10.56

7015.00 10.56

7031.00 10.56

7101.00 10.56

7147.00 10.56

7177.00 10.56

7207.00 10.56

7235.00 10.56

7297.00 10.56

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

Project: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Original FIS\New_Haven_Intact.mdb Transect#: NH-23 T

WHAFIS CARD	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	FIELD 10
IE	0	0	0	0	10.546	13.2	5.39	0	2.5	0
IF	1	2.5	0	10.546	0	0	0	0	0.396	0
IF	7	2.77	0	10.546	0	0	0	0	0.396	0
DU	8	5.27	1	0	10.546	0	0	0	0.833	0
DU	10	5.27	1	0	10.546	0	0	0	1.687	0
DU	11	10.33	1	0	10.546	0	0	0	5.06	0
AS	14	10.56	0	10.546	0	0	0	0	5.06	0
AS	23	10.56	0	10.546	0	0	0	0	-0.025	0
IF	25	10.51	0	10.546	0	0	0	0	-0.015	0
IF	27	10.5	0	10.546	0	0	0	0	-0.005	0
AS	31	10.56	0	10.546	0	0	0	0	-0.005	0
AS	35	10.56	0	10.546	0	0	0	0	-0.005	0
AS	41	10.56	0	10.546	0	0	0	0	-0.005	0
AS	47	10.56	0	10.546	0	0	0	0	-0.005	0
AS	53	10.56	0	10.546	0	0	0	0	-0.005	0
AS	59	10.56	0	10.546	0	0	0	0	-0.005	0
AS	65	10.56	0	10.546	0	0	0	0	-0.005	0
AS	67	10.56	0	10.546	0	0	0	0	-0.005	0
AS	71	10.56	0	10.546	0	0	0	0	-0.005	0
AS	75	10.56	0	10.546	0	0	0	0	-0.005	0
AS	87	10.56	0	10.546	0	0	0	0	-0.005	0
AS	95	10.56	0	10.546	0	0	0	0	-0.005	0
AS	99	10.56	0	10.546	0	0	0	0	-0.017	0
IF	105	10.46	0	10.546	0	0	0	0	-0.017	0
AS	109	10.56	0	10.546	0	0	0	0	-0.017	0
AS	113	10.56	0	10.546	0	0	0	0	-0.017	0
AS	117	10.56	0	10.546	0	0	0	0	-0.017	0
AS	121	10.56	0	10.546	0	0	0	0	-0.021	0
BU	129	10.39	0.15	10	0	10.546	0	0	-0.01	0
BU	135	10.42	0.15	10	0	10.546	0	0	-0.019	0
BU	143	10.12	0.15	10	0	10.546	0	0	-0.021	0
BU	149	10.12	0.15	10	0	10.546	0	0	-0.042	0
BU	153	9.7	0.15	10	0	10.546	0	0	-0.041	0
BU	157	9.79	0.15	10	0	10.546	0	0	-0.032	0
BU	163	9.38	0.15	10	0	10.546	0	0	-0.034	0
BU	183	8.9	0.15	10	0	10.546	0	0	-0.032	0
BU	195	8.36	0.15	10	0	10.546	0	0	-0.029	0
BU	203	8.33	0.15	10	0	10.546	0	0	-0.027	0
BU	207	8.04	0.15	10	0	10.546	0	0	-0.034	0
BU	221	7.71	0.15	10	0	10.546	0	0	-0.007	0
BU	227	7.91	0.15	10	0	10.546	0	0	0.003	0
BU	231	7.74	0.15	10	0	10.546	0	0	-0.014	0
BU	235	7.8	0.15	10	0	10.546	0	0	-0.013	0
BU	241	7.61	0.15	10	0	10.546	0	0	-0.048	0
BU	249	7.13	0.15	10	0	10.546	0	0	-0.028	0
BU	253	7.27	0.15	10	0	10.546	0	0	-0.001	0
BU	265	7.11	0.15	10	0	10.546	0	0	-0.002	0
BU	283	7.22	0.15	10	0	10.546	0	0	-0.009	0
BU	295	6.83	0.15	10	0	10.546	0	0	-0.018	0
BU	307	6.78	0.15	10	0	10.546	0	0	0.005	0

BU	315	6.94	0.15	10	0	10.546	0	0	-0.01	0
BU	323	6.62	0.15	10	0	10.546	0	0	-0.011	0
BU	329	6.78	0.15	10	0	10.546	0	0	-0.015	0
BU	341	6.35	0.15	10	0	10.546	0	0	-0.001	0
BU	353	6.75	0.15	10	0	10.546	0	0	0.011	0
BU	357	6.53	0.15	10	0	10.546	0	0	-0.002	0
BU	361	6.73	0.15	10	0	10.546	0	0	-0.026	0
BU	547	4.67	0.15	10	0	10.546	0	0	-0.018	0
BU	553	4.76	0.15	10	0	10.546	0	0	-0.032	0
BU	557	4.35	0.15	10	0	10.546	0	0	-0.07	0
BU	559	4.34	0.15	10	0	10.546	0	0	0.095	0
BU	565	5.11	0.15	10	0	10.546	0	0	0.081	0
BU	569	5.15	0.15	10	0	10.546	0	0	0.06	0
BU	573	5.59	0.15	10	0	10.546	0	0	0.035	0
BU	577	5.43	0.15	10	0	10.546	0	0	0.041	0
BU	583	6	0.15	10	0	10.546	0	0	0.063	0
BU	587	6.06	0.15	10	0	10.546	0	0	-0.006	0
BU	599	5.91	0.15	10	0	10.546	0	0	-0.025	0
BU	615	5.37	0.15	10	0	10.546	0	0	-0.041	0
BU	621	5.01	0.15	10	0	10.546	0	0	-0.036	0
BU	623	5.08	0.15	10	0	10.546	0	0	-0.034	0
BU	629	4.74	0.15	10	0	10.546	0	0	-0.04	0
BU	635	4.6	0.15	10	0	10.546	0	0	-0.039	0
BU	639	4.35	0.15	10	0	10.546	0	0	-0.093	0
BU	647	3.48	0.15	10	0	10.546	0	0	-0.072	0
BU	649	3.63	0.15	10	0	10.546	0	0	-0.012	0
BU	653	3.41	0.15	10	0	10.546	0	0	-0.004	0
BU	657	3.6	0.15	10	0	10.546	0	0	0.017	0
BU	667	3.65	0.15	10	0	10.546	0	0	-0.017	0
BU	675	3.29	0.15	10	0	10.546	0	0	-0.063	0
BU	679	2.9	0.15	10	0	10.546	0	0	-0.056	0
BU	685	2.73	0.15	10	0	10.546	0	0	0.004	0
BU	705	2.99	0.15	10	0	10.546	0	0	0.033	0
BU	725	4.05	0.15	10	0	10.546	0	0	0.034	0
BU	759	4.81	0.15	10	0	10.546	0	0	0.017	0
BU	765	4.72	0.15	10	0	10.546	0	0	-0.044	0
BU	769	4.37	0.15	10	0	10.546	0	0	-0.044	0
BU	777	4.19	0.15	10	0	10.546	0	0	0.018	0
BU	783	4.62	0.15	10	0	10.546	0	0	0.015	0
BU	805	4.6	0.15	10	0	10.546	0	0	0.007	0
BU	823	4.9	0.15	10	0	10.546	0	0	0.007	0
BU	829	4.77	0.15	10	0	10.546	0	0	-0.074	0
BU	837	3.87	0.15	10	0	10.546	0	0	-0.049	0
BU	845	3.98	0.15	10	0	10.546	0	0	0.029	0
BU	851	4.28	0.15	10	0	10.546	0	0	0.009	0
BU	861	4.12	0.15	10	0	10.546	0	0	-0.002	0
BU	865	4.25	0.15	10	0	10.546	0	0	-0.026	0
BU	873	3.81	0.15	10	0	10.546	0	0	-0.035	0
BU	877	3.83	0.15	10	0	10.546	0	0	-0.027	0
BU	879	3.65	0.15	10	0	10.546	0	0	-0.187	0
BU	883	2.71	0.15	10	0	10.546	0	0	-0.195	0
BU	885	2.48	0.15	10	0	10.546	0	0	-0.007	0
BU	889	2.67	0.15	10	0	10.546	0	0	0.006	0

BU	901	2.57	0.15	10	0	10.546	0	0	0.03	0
BU	907	3.21	0.15	10	0	10.546	0	0	0.055	0
BU	913	3.23	0.15	10	0	10.546	0	0	-0.003	0
BU	917	3.18	0.15	10	0	10.546	0	0	-0.048	0
BU	923	2.75	0.15	10	0	10.546	0	0	-0.011	0
BU	935	2.99	0.15	10	0	10.546	0	0	-0.016	0
BU	945	2.39	0.15	10	0	10.546	0	0	-0.007	0
BU	953	2.87	0.15	10	0	10.546	0	0	0.022	0
BU	957	2.65	0.15	10	0	10.546	0	0	-0.015	0
BU	965	2.69	0.15	10	0	10.546	0	0	-0.024	0
BU	975	2.21	0.15	10	0	10.546	0	0	-0.036	0
BU	977	2.26	0.15	10	0	10.546	0	0	0.11	0
VH	983	3.09	2	1	0	1	0	10.546	0.134	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	985	3.33	2	1	0	1	0	10.546	0.089	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	991	3.8	2	1	0	1	0	10.546	0.056	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	997	4	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1009	3.92	2	1	0	1	0	10.546	-0.019	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1015	3.66	2	1	0	1	0	10.546	-0.058	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1017	3.46	2	1	0	1	0	10.546	-0.153	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1019	3.05	2	1	0	1	0	10.546	-0.23	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1021	2.54	2	1	0	1	0	10.546	-0.323	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1025	1.11	2	1	0	1	0	10.546	-0.508	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1026	0	2	1	0	1	0	10.546	-0.365	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1027	0.38	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1029	0	2	1	0	1	0	10.546	-0.025	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1042	0	2	1	0	1	0	10.546	0.043	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1049	0.85	2	1	0	1	0	10.546	0.089	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1057	1.34	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1059	0.85	2	1	0	1	0	10.546	0.147	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1063	2.22	2	1	0	1	0	10.546	0.285	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1065	2.56	2	1	0	1	0	10.546	0.082	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1073	3.04	2	1	0	1	0	10.546	0.148	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1077	4.34	2	1	0	1	0	10.546	0.176	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	1089	5.85	2	1	0	1	0	10.546	0.104	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1091	5.79	2	1	0	1	0	10.546	-0.183	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1097	4.39	2	1	0	1	0	10.546	-0.215	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1101	3.64	2	1	0	1	0	10.546	-0.16	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1103	3.43	2	1	0	1	0	10.546	-0.059	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1133	1.76	2	1	0	1	0	10.546	-0.051	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1135	1.79	2	1	0	1	0	10.546	0.081	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1141	2.41	2	1	0	1	0	10.546	0.081	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1145	2.6	2	1	0	1	0	10.546	0.08	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1151	3.21	2	1	0	1	0	10.546	0.035	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1159	3.09	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1161	3.22	2	1	0	1	0	10.546	0.169	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1169	4.78	2	1	0	1	0	10.546	0.154	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1171	4.76	2	1	0	1	0	10.546	-0.091	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1177	4.05	2	1	0	1	0	10.546	-0.151	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1189	2.05	2	1	0	1	0	10.546	-0.138	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1193	1.85	2	1	0	1	0	10.546	0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1199	2.13	2	1	0	1	0	10.546	0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1221	2.3	2	1	0	1	0	10.546	0.021	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1227	2.71	2	1	0	1	0	10.546	0.03	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1231	2.6	2	1	0	1	0	10.546	-0.061	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1235	2.22	2	1	0	1	0	10.546	-0.047	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1239	2.22	2	1	0	1	0	10.546	-0.026	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1243	2.01	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1251	2.4	2	1	0	1	0	10.546	0.022	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1257	2.32	2	1	0	1	0	10.546	0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0

VH	1265	2.52	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1273	2.34	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1285	2.55	2	1	0	1	0	10.546	0.031	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1291	2.9	2	1	0	1	0	10.546	-0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1297	2.44	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1303	2.77	2	1	0	1	0	10.546	0.035	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1307	2.79	2	1	0	1	0	10.546	-0.057	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1315	2.09	2	1	0	1	0	10.546	-0.062	0
MG	0	0	0	0.85	327	0	0	0	0	0
BU	373	6.11	0.15	10	0	10.546	0	0	-0.023	0
BU	379	6.32	0.15	10	0	10.546	0	0	0.011	0
BU	385	6.24	0.15	10	0	10.546	0	0	0.021	0
BU	391	6.57	0.15	10	0	10.546	0	0	-0.017	0
VH	1321	1.92	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1343	2.2	2	1	0	1	0	10.546	0.02	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1351	2.51	2	1	0	1	0	10.546	0.012	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1361	2.41	2	1	0	1	0	10.546	0.03	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1365	2.93	2	1	0	1	0	10.546	0.087	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1369	3.11	2	1	0	1	0	10.546	-0.026	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1377	2.62	2	1	0	1	0	10.546	-0.094	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1383	1.8	2	1	0	1	0	10.546	-0.155	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1387	1.07	2	1	0	1	0	10.546	-0.152	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1389	0.89	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1397	1.22	2	1	0	1	0	10.546	0.067	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1401	1.69	2	1	0	1	0	10.546	0.145	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1405	2.38	2	1	0	1	0	10.546	0.119	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1409	2.64	2	1	0	1	0	10.546	0.027	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1411	2.54	2	1	0	1	0	10.546	-0.155	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1413	2.02	2	1	0	1	0	10.546	-0.347	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1417	0.46	2	1	0	1	0	10.546	-0.292	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	1421	-0.32	2	1	0	1	0	10.546	-0.152	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1423	-0.45	2	1	0	1	0	10.546	0.068	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1427	0.09	2	1	0	1	0	10.546	0.227	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1429	0.91	2	1	0	1	0	10.546	0.49	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1431	2.05	2	1	0	1	0	10.546	0.365	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1433	2.37	2	1	0	1	0	10.546	0.06	0
MG	0	0	0	0.85	327	0	0	0	0	0
IF	1437	2.41	0	10.546	0	0	0	0	0.005	0
IF	1453	2.48	0	10.546	0	0	0	0	0.017	0
IF	1467	2.92	0	10.546	0	0	0	0	0.014	0
IF	1471	2.73	0	10.546	0	0	0	0	0.003	0
IF	1481	2.96	0	10.546	0	0	0	0	0.006	0
IF	1571	3.36	0	10.546	0	0	0	0	0.006	0
IF	1585	3.62	0	10.546	0	0	0	0	0.008	0
IF	1589	3.5	0	10.546	0	0	0	0	-0.001	0
IF	1595	3.61	0	10.546	0	0	0	0	-0.006	0
IF	1599	3.44	0	10.546	0	0	0	0	0.002	0
IF	1611	3.65	0	10.546	0	0	0	0	0.002	0
IF	1619	3.49	0	10.546	0	0	0	0	-0.002	0
IF	1627	3.61	0	10.546	0	0	0	0	-0.003	0
IF	1631	3.45	0	10.546	0	0	0	0	0.011	0
IF	1635	3.7	0	10.546	0	0	0	0	0.019	0
IF	1645	3.71	0	10.546	0	0	0	0	0.011	0
IF	1651	3.88	0	10.546	0	0	0	0	0.007	0
IF	1665	3.84	0	10.546	0	0	0	0	-0.023	0
IF	1669	3.46	0	10.546	0	0	0	0	-0.015	0
IF	1671	3.75	0	10.546	0	0	0	0	0.095	0
IF	1673	3.84	0	10.546	0	0	0	0	-0.005	0
IF	1681	3.7	0	10.546	0	0	0	0	0.009	0
IF	1695	4.03	0	10.546	0	0	0	0	0.009	0
IF	1707	3.92	0	10.546	0	0	0	0	0.01	0
IF	1715	4.24	0	10.546	0	0	0	0	0.017	0
IF	1735	4.39	0	10.546	0	0	0	0	0.002	0
IF	1739	4.29	0	10.546	0	0	0	0	0.015	0
IF	1743	4.51	0	10.546	0	0	0	0	0.007	0
IF	1747	4.35	0	10.546	0	0	0	0	-0.013	0
IF	1751	4.41	0	10.546	0	0	0	0	-0.022	0
IF	1753	4.22	0	10.546	0	0	0	0	-0.021	0
IF	1759	4.24	0	10.546	0	0	0	0	-0.019	0
IF	1761	4.07	0	10.546	0	0	0	0	-0.043	0
IF	1763	4.07	0	10.546	0	0	0	0	0.055	0
IF	1765	4.29	0	10.546	0	0	0	0	-0.006	0
IF	1777	3.98	0	10.546	0	0	0	0	-0.007	0
IF	1783	4.17	0	10.546	0	0	0	0	0.012	0
IF	1793	4.17	0	10.546	0	0	0	0	-0.016	0
IF	1797	3.95	0	10.546	0	0	0	0	-0.014	0
IF	1813	3.88	0	10.546	0	0	0	0	-0.018	0

IF	1819	3.56	0	10.546	0	0	0	0	0.001	0
IF	1827	3.9	0	10.546	0	0	0	0	0.01	0
IF	1853	3.89	0	10.546	0	0	0	0	-0.004	0
IF	1855	3.78	0	10.546	0	0	0	0	0	0
IF	1861	3.89	0	10.546	0	0	0	0	-0.009	0
IF	1877	3.58	0	10.546	0	0	0	0	-0.031	0
IF	1883	3.21	0	10.546	0	0	0	0	-0.015	0
IF	1889	3.4	0	10.546	0	0	0	0	0	0
IF	1893	3.21	0	10.546	0	0	0	0	-0.002	0
IF	1897	3.38	0	10.546	0	0	0	0	0.016	0
IF	1905	3.4	0	10.546	0	0	0	0	-0.003	0
IF	1933	3.28	0	10.546	0	0	0	0	0.002	0
IF	1937	3.48	0	10.546	0	0	0	0	-0.007	0
IF	1943	3.21	0	10.546	0	0	0	0	-0.02	0
IF	1951	3.2	0	10.546	0	0	0	0	-0.018	0
IF	1961	2.89	0	10.546	0	0	0	0	-0.009	0
IF	1965	3.08	0	10.546	0	0	0	0	0.006	0
IF	1969	2.94	0	10.546	0	0	0	0	-0.005	0
IF	1973	3.04	0	10.546	0	0	0	0	-0.006	0
IF	1977	2.89	0	10.546	0	0	0	0	-0.005	0
IF	1981	3	0	10.546	0	0	0	0	-0.003	0
IF	1995	2.83	0	10.546	0	0	0	0	0.006	0
IF	2027	3.28	0	10.546	0	0	0	0	0.009	0
IF	2031	3.16	0	10.546	0	0	0	0	0.018	0
IF	2051	3.72	0	10.546	0	0	0	0	0.021	0
IF	2069	3.97	0	10.546	0	0	0	0	0.007	0
BU	407	5.86	0.15	10	0	10.546	0	0	-0.026	0
BU	413	5.99	0.15	10	0	10.546	0	0	-0.017	0
BU	425	5.55	0.15	10	0	10.546	0	0	-0.023	0
BU	449	5.17	0.15	10	0	10.546	0	0	-0.01	0
BU	457	5.24	0.15	10	0	10.546	0	0	0.033	0
BU	461	5.57	0.15	10	0	10.546	0	0	0.011	0
BU	467	5.35	0.15	10	0	10.546	0	0	-0.02	0
BU	473	5.33	0.15	10	0	10.546	0	0	0.031	0
BU	477	5.66	0.15	10	0	10.546	0	0	0.025	0
IF	2091	4.02	0	10.546	0	0	0	0	-0.003	0
IF	2101	3.87	0	10.546	0	0	0	0	-0.005	0
IF	2131	3.81	0	10.546	0	0	0	0	0.002	0
IF	2137	3.93	0	10.546	0	0	0	0	-0.009	0
IF	2151	3.63	0	10.546	0	0	0	0	0.009	0
IF	2163	4.15	0	10.546	0	0	0	0	0.01	0
IF	2183	3.94	0	10.546	0	0	0	0	0.01	0
IF	2203	4.55	0	10.546	0	0	0	0	0.015	0
IF	2209	4.33	0	10.546	0	0	0	0	-0.003	0
IF	2213	4.52	0	10.546	0	0	0	0	0.01	0
IF	2223	4.47	0	10.546	0	0	0	0	-0.017	0
IF	2227	4.28	0	10.546	0	0	0	0	-0.015	0
IF	2247	4.12	0	10.546	0	0	0	0	-0.014	0
IF	2257	3.85	0	10.546	0	0	0	0	-0.013	0
IF	2267	3.87	0	10.546	0	0	0	0	-0.011	0
IF	2273	3.67	0	10.546	0	0	0	0	-0.008	0
IF	2277	3.79	0	10.546	0	0	0	0	-0.01	0
IF	2283	3.57	0	10.546	0	0	0	0	-0.011	0

IF	2295	3.59	0	10.546	0	0	0	0	0.015	0
IF	2305	3.9	0	10.546	0	0	0	0	0.009	0
IF	2315	3.77	0	10.546	0	0	0	0	0.007	0
IF	2331	4.08	0	10.546	0	0	0	0	0.005	0
IF	2343	3.9	0	10.546	0	0	0	0	0.006	0
IF	2347	4.18	0	10.546	0	0	0	0	0.001	0
IF	2363	3.92	0	10.546	0	0	0	0	-0.002	0
IF	2367	4.15	0	10.546	0	0	0	0	0.02	0
IF	2379	4.24	0	10.546	0	0	0	0	-0.006	0
IF	2403	3.92	0	10.546	0	0	0	0	-0.001	0
IF	2409	4.21	0	10.546	0	0	0	0	0.023	0
IF	2423	4.37	0	10.546	0	0	0	0	-0.001	0
IF	2435	4.18	0	10.546	0	0	0	0	-0.002	0
IF	2453	4.31	0	10.546	0	0	0	0	-0.012	0
IF	2463	3.85	0	10.546	0	0	0	0	-0.019	0
IF	2471	3.97	0	10.546	0	0	0	0	0.049	0
IF	2477	4.53	0	10.546	0	0	0	0	0.063	0
IF	2485	4.85	0	10.546	0	0	0	0	0.007	0
IF	2489	4.61	0	10.546	0	0	0	0	-0.109	0
IF	2495	3.76	0	10.546	0	0	0	0	-0.083	0
IF	2501	3.62	0	10.546	0	0	0	0	0.012	0
IF	2509	3.93	0	10.546	0	0	0	0	0.02	0
IF	2515	3.9	0	10.546	0	0	0	0	0.016	0
IF	2517	4.06	0	10.546	0	0	0	0	0	0
IF	2523	3.9	0	10.546	0	0	0	0	0.007	0
IF	2587	4.54	0	10.546	0	0	0	0	0.001	0
IF	2765	4.07	0	10.546	0	0	0	0	0.002	0
IF	2833	5.04	0	10.546	0	0	0	0	0.002	0
IF	2877	4.32	0	10.546	0	0	0	0	0.001	0
IF	2935	5.13	0	10.546	0	0	0	0	0	0
IF	3001	4.27	0	10.546	0	0	0	0	-0.002	0
IF	3037	4.95	0	10.546	0	0	0	0	-0.002	0
IF	3071	4.16	0	10.546	0	0	0	0	-0.005	0
IF	3233	3.99	0	10.546	0	0	0	0	0.005	0
IF	3375	5.64	0	10.546	0	0	0	0	-0.002	0
IF	3565	3.39	0	10.546	0	0	0	0	-0.009	0
VH	3585	3.8	2	1	0	1	0	10.546	0.019	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3591	3.88	2	1	0	1	0	10.546	-0.027	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3613	3.05	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3621	3.79	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3663	2.79	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3671	3.52	2	1	0	1	0	10.546	0.027	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3693	3.61	2	1	0	1	0	10.546	-0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3743	3.07	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3763	4.63	2	1	0	1	0	10.546	-0.001	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	3793	3.01	2	1	0	1	0	10.546	-0.012	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3815	4	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3833	3.1	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3841	3.71	2	1	0	1	0	10.546	0.026	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3861	3.84	2	1	0	1	0	10.546	-0.023	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3869	3.08	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3917	3.78	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3955	2.9	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VE	3963	3.83	1	25	10	0	0	10.546	0.127	0
VE	3971	4.93	1	25	10	0	0	10.546	0.083	0
VE	3983	5.5	1	25	10	0	0	10.546	0.025	0
VE	3999	5.62	1	25	10	0	0	10.546	-0.071	0
VE	4009	3.66	1	25	10	0	0	10.546	-0.116	0
VE	4019	3.3	1	25	10	0	0	10.546	0.004	0
VE	4059	3.85	1	25	10	0	0	10.546	0.001	0
VE	4077	3.37	1	25	10	0	0	10.546	-0.012	0
VE	4085	3.55	1	25	10	0	0	10.546	0.091	0
VE	4105	5.93	1	25	10	0	0	10.546	0.02	0
VE	4131	4.49	1	25	10	0	0	10.546	0.015	0
VE	4159	6.74	1	25	10	0	0	10.546	0.022	0
VE	4179	5.54	1	25	10	0	0	10.546	-0.108	0
VE	4189	3.51	1	25	10	0	0	10.546	-0.177	0
VH	4191	3.42	2	1	0	1	0	10.546	-0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4211	3.15	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4297	3.5	2	1	0	1	0	10.546	0.013	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4313	4.5	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4353	3.37	2	1	0	1	0	10.546	-0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0
VE	4407	3.62	1	20	8	0	0	10.546	-0.001	0
VE	4419	3.31	1	20	8	0	0	10.546	0.044	0
VE	4453	5.65	1	20	8	0	0	10.546	0.003	0
VE	4495	3.51	1	20	8	0	0	10.546	-0.026	0
VE	4505	4.29	1	20	8	0	0	10.546	0.009	0
VE	4511	3.65	1	20	8	0	0	10.546	0.002	0
VE	4553	4.36	1	20	8	0	0	10.546	-0.005	0
VE	4603	3.14	1	20	8	0	0	10.546	-0.003	0
VE	4657	4.02	1	20	8	0	0	10.546	0.006	0
VE	4663	3.52	1	20	8	0	0	10.546	-0.043	0
VH	4665	3.68	2	1	0	1	0	10.546	0.063	0
MG	0	0	0	0.85	327	0	0	0	0	0

VH	4679	4.52	2	1	0	1	0	10.546	0.028	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4693	4.46	2	1	0	1	0	10.546	-0.043	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4703	3.49	2	1	0	1	0	10.546	-0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4721	3.98	2	1	0	1	0	10.546	-0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4729	3.04	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4787	4.03	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4815	3.53	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4835	4.5	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4861	4.03	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4879	4.78	2	1	0	1	0	10.546	-0.013	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4935	3.05	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4945	4.08	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4969	3.4	2	1	0	1	0	10.546	0.013	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4993	4.69	2	1	0	1	0	10.546	0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5015	3.75	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5037	4.65	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5051	3.58	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5115	4.3	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5133	3.42	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5185	4.02	2	1	0	1	0	10.546	0.022	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5205	5.02	2	1	0	1	0	10.546	-0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5251	3.01	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
BU	481	5.53	0.15	10	0	10.546	0	0	0.027	0
BU	485	5.88	0.15	10	0	10.546	0	0	0.062	0
BU	487	5.9	0.15	10	0	10.546	0	0	-0.035	0
BU	489	5.74	0.15	10	0	10.546	0	0	-0.015	0
BU	503	5.66	0.15	10	0	10.546	0	0	-0.018	0
BU	507	5.42	0.15	10	0	10.546	0	0	-0.027	0
BU	513	5.39	0.15	10	0	10.546	0	0	-0.025	0
BU	515	5.22	0.15	10	0	10.546	0	0	-0.143	0
BU	519	4.53	0.15	10	0	10.546	0	0	-0.137	0

BU	521	4.4	0.15	10	0	10.546	0	0	0.039	0
BU	527	4.84	0.15	10	0	10.546	0	0	0.029	0
BU	541	4.97	0.15	10	0	10.546	0	0	-0.009	0
VH	5383	4.11	2	1	0	1	0	10.546	0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5413	5.74	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5431	4.01	2	1	0	1	0	10.546	-0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5457	5.07	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5467	4.18	2	1	0	1	0	10.546	-0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5479	4.89	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5495	4.29	2	1	0	1	0	10.546	0.038	0
MG	0	0	0	0.85	327	0	0	0	0	0
IF	5503	5.8	0	10.546	0	0	0	0	0.15	0
IF	5515	7.29	0	10.546	0	0	0	0	0.04	0
IF	5549	7.63	0	10.546	0	0	0	0	0	0
IF	5705	7.35	0	10.546	0	0	0	0	-0.007	0
IF	5873	5.54	0	10.546	0	0	0	0	-0.005	0
IF	5931	6.31	0	10.546	0	0	0	0	0.004	0
IF	5949	5.88	0	10.546	0	0	0	0	0.027	0
IF	5957	7.01	0	10.546	0	0	0	0	0.108	0
VH	5959	6.96	2	1	0	1	0	10.546	-0.05	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6001	4.82	2	1	0	1	0	10.546	-0.02	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6053	5.07	2	1	0	1	0	10.546	-0.025	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6069	3.12	2	1	0	1	0	10.546	-0.035	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6103	3.33	2	1	0	1	0	10.546	-0.033	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6135	0.95	2	1	0	1	0	10.546	-0.041	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6161	0.97	2	1	0	1	0	10.546	0.041	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6171	2.44	2	1	0	1	0	10.546	-0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6193	0.46	2	1	0	1	0	10.546	0.019	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6213	3.25	2	1	0	1	0	10.546	0.054	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6251	3.57	2	1	0	1	0	10.546	-0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
BU	6313	2.61	0.6	6	0	10.546	0	0	-0.014	0
BU	6315	2.68	0.6	6	0	10.546	0	0	0.1	0
BU	6319	3.21	0.6	6	0	10.546	0	0	0.471	0
BU	6327	8.33	0.6	6	0	10.546	0	0	0.13	0
BU	6369	9.7	0.6	6	0	10.546	0	0	0.014	0
BU	6449	10.02	0.6	6	0	10.546	0	0	-0.002	0

BU	6465	9.56	0.6	6	0	10.546	0	0	-0.06	0
BU	6475	8.45	0.6	6	0	10.546	0	0	-0.004	0
BU	6537	9.27	0.6	6	0	10.546	0	0	0.005	0
BU	6613	9.13	0.6	6	0	10.546	0	0	-0.013	0
BU	6821	5.69	0.6	6	0	10.546	0	0	-0.009	0
BU	6867	6.96	0.6	6	0	10.546	0	0	0.028	0
AS	6909	10.56	0	10.546	0	0	0	0	0.028	0
AS	6987	10.56	0	10.546	0	0	0	0	0.028	0
AS	7015	10.56	0	10.546	0	0	0	0	0.028	0
AS	7031	10.56	0	10.546	0	0	0	0	0.028	0
AS	7101	10.56	0	10.546	0	0	0	0	0.028	0
AS	7147	10.56	0	10.546	0	0	0	0	0.028	0
AS	7177	10.56	0	10.546	0	0	0	0	0.028	0
AS	7207	10.56	0	10.546	0	0	0	0	0.028	0
AS	7235	10.56	0	10.546	0	0	0	0	0.028	0
AS	7297	10.56	0	10.546	0	0	0	0	0.028	0

Project: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Original FIS\New_Haven_Intact.mdb Transect#: NH-23 T

WHAFIS CARD	STATION	WAVE HEIGHT	WAVE PERIOD	WAVE CREST .EVATION
IE	0	7.37	5.39	15.7
IF	1	5.77	5.39	14.59
IF	7	5.59	5.39	14.46
DU	8	4.75	5.39	13.87
DU	10	4.32	5.39	13.57
DU	11	2.24	5.39	12.12
AS	14	0	0	10.56
AS	23	0	0	10.56
IF	25	0.02	0.19	10.56
IF	27	0.03	0.23	10.57
AS	31	0	0	10.56
AS	35	0	0	10.56
AS	41	0	0	10.56
AS	47	0	0	10.56
AS	53	0	0	10.56
AS	59	0	0	10.56
AS	65	0	0	10.56
AS	67	0	0	10.56
AS	71	0	0	10.56
AS	75	0	0	10.56
AS	87	0	0	10.56
AS	95	0	0	10.56
AS	99	0	0	10.56
IF	105	0.04	0.27	10.58
AS	109	0	0	10.56
AS	113	0	0	10.56
AS	117	0	0	10.56
AS	121	0	0	10.56
BU	129	0	0	10.55
BU	135	0	0	10.55
BU	143	0	0	10.55
BU	149	0	0	10.55
BU	153	0	0	10.55
BU	157	0	0	10.55
BU	163	0	0	10.55
BU	183	0	0	10.55
BU	195	0	0	10.55
BU	203	0	0	10.55
BU	207	0	0	10.55
BU	221	0	0	10.55
BU	227	0	0	10.55
BU	231	0	0	10.55
BU	235	0	0	10.55
BU	241	0	0	10.55
BU	249	0	0	10.55
BU	253	0	0	10.55
BU	265	0	0	10.55
BU	283	0	0	10.55
BU	295	0	0	10.55
BU	307	0	0	10.55

BU	315	0	0	10.55
BU	323	0	0	10.55
BU	329	0	0	10.55
BU	341	0	0	10.55
BU	353	0	0	10.55
BU	357	0	0	10.55
BU	361	0	0	10.55
BU	373	0	0	10.55
BU	379	0	0	10.55
BU	385	0	0	10.55
BU	391	0	0	10.55
BU	407	0	0	10.55
BU	413	0	0	10.55
BU	425	0	0	10.55
BU	449	0	0	10.55
BU	457	0	0	10.55
BU	461	0	0	10.55
BU	467	0	0	10.55
BU	473	0	0	10.55
BU	477	0	0	10.55
BU	481	0	0	10.55
BU	485	0	0	10.55
BU	487	0	0	10.55
BU	489	0	0	10.55
BU	503	0	0	10.55
BU	507	0	0	10.55
BU	513	0	0	10.55
BU	515	0	0	10.55
BU	519	0	0	10.55
BU	521	0	0	10.55
BU	527	0	0	10.55
BU	541	0	0	10.55
BU	547	0	0	10.55
BU	553	0	0	10.55
BU	557	0	0	10.55
BU	559	0	0	10.55
BU	565	0	0	10.55
BU	569	0	0	10.55
BU	573	0	0	10.55
BU	577	0	0	10.55
BU	583	0	0	10.55
BU	587	0	0	10.55
BU	599	0	0	10.55
BU	615	0	0	10.55
BU	621	0	0	10.55
BU	623	0	0	10.55
BU	629	0	0	10.55
BU	635	0	0	10.55
BU	639	0	0	10.55
BU	647	0	0	10.55
BU	649	0	0	10.55
BU	653	0	0	10.55
BU	657	0	0	10.55

BU	667	0	0	10.55
BU	675	0	0	10.55
BU	679	0	0	10.55
BU	685	0	0	10.55
BU	705	0	0	10.55
BU	725	0	0	10.55
BU	759	0	0	10.55
BU	765	0	0	10.55
BU	769	0	0	10.55
BU	777	0	0	10.55
BU	783	0	0	10.55
BU	805	0	0	10.55
BU	823	0	0	10.55
BU	829	0	0	10.55
BU	837	0	0	10.55
BU	845	0	0	10.55
BU	851	0	0	10.55
BU	861	0	0	10.55
BU	865	0	0	10.55
BU	873	0	0	10.55
BU	877	0	0	10.55
BU	879	0	0	10.55
BU	883	0	0	10.55
BU	885	0	0	10.55
BU	889	0	0	10.55
BU	901	0	0	10.55
BU	907	0	0	10.55
BU	913	0	0	10.55
BU	917	0	0	10.55
BU	923	0	0	10.55
BU	935	0	0	10.55
BU	945	0	0	10.55
BU	953	0	0	10.55
BU	957	0	0	10.55
BU	965	0	0	10.55
BU	975	0	0	10.55
BU	977	0	0	10.55
VH	983	0.05	0.27	10.58
VH	985	0.06	0.29	10.59
VH	991	0.09	0.35	10.61
VH	997	0.11	0.39	10.63
VH	1009	0.15	0.46	10.65
VH	1015	0.17	0.49	10.67
VH	1017	0.18	0.49	10.67
VH	1019	0.18	0.5	10.68
VH	1021	0.19	0.51	10.68
VH	1025	0.2	0.52	10.69
VH	1026	0.2	0.53	10.69
VH	1027	0.21	0.53	10.69
VH	1029	0.21	0.54	10.69
VH	1042	0.25	0.58	10.72
VH	1049	0.26	0.6	10.73
VH	1057	0.28	0.62	10.74

VH	1059	0.29	0.63	10.75
VH	1063	0.3	0.64	10.75
VH	1065	0.3	0.64	10.76
VH	1073	0.32	0.66	10.77
VH	1077	0.33	0.67	10.78
VH	1089	0.35	0.7	10.79
VH	1091	0.36	0.7	10.8
VH	1097	0.37	0.71	10.81
VH	1101	0.38	0.72	10.81
VH	1103	0.38	0.72	10.81
VH	1133	0.44	0.78	10.85
VH	1135	0.44	0.78	10.86
VH	1141	0.46	0.79	10.87
VH	1145	0.46	0.8	10.87
VH	1151	0.47	0.8	10.88
VH	1159	0.49	0.82	10.89
VH	1161	0.49	0.82	10.89
VH	1169	0.51	0.83	10.9
VH	1171	0.51	0.83	10.9
VH	1177	0.52	0.84	10.91
VH	1189	0.54	0.86	10.92
VH	1193	0.55	0.86	10.93
VH	1199	0.56	0.87	10.94
VH	1221	0.59	0.9	10.96
VH	1227	0.6	0.91	10.97
VH	1231	0.61	0.91	10.97
VH	1235	0.62	0.92	10.98
VH	1239	0.62	0.92	10.98
VH	1243	0.63	0.93	10.99
VH	1251	0.64	0.94	10.99
VH	1257	0.65	0.94	11
VH	1265	0.66	0.95	11.01
VH	1273	0.68	0.96	11.02
VH	1285	0.69	0.97	11.03
VH	1291	0.7	0.98	11.04
VH	1297	0.71	0.99	11.04
VH	1303	0.72	0.99	11.05
VH	1307	0.73	1	11.05
VH	1315	0.74	1	11.06
VH	1321	0.75	1.01	11.07
VH	1343	0.78	1.03	11.09
VH	1351	0.79	1.04	11.1
VH	1361	0.8	1.05	11.11
VH	1365	0.81	1.05	11.11
VH	1369	0.81	1.05	11.12
VH	1377	0.82	1.06	11.12
VH	1383	0.83	1.07	11.13
VH	1387	0.84	1.07	11.13
VH	1389	0.84	1.07	11.13
VH	1397	0.85	1.08	11.14
VH	1401	0.86	1.08	11.15
VH	1405	0.86	1.09	11.15
VH	1409	0.87	1.09	11.15

VH	1411	0.87	1.09	11.16
VH	1413	0.87	1.09	11.16
VH	1417	0.88	1.1	11.16
VH	1421	0.88	1.1	11.16
VH	1423	0.89	1.1	11.17
VH	1427	0.89	1.1	11.17
VH	1429	0.89	1.11	11.17
VH	1431	0.9	1.11	11.17
VH	1433	0.9	1.11	11.18
IF	1437	0.91	1.11	11.18
IF	1453	0.93	1.12	11.19
IF	1467	0.94	1.14	11.21
IF	1471	0.95	1.14	11.21
IF	1481	0.96	1.15	11.22
IF	1571	1.07	1.21	11.3
IF	1585	1.09	1.22	11.31
IF	1589	1.09	1.22	11.31
IF	1595	1.1	1.23	11.32
IF	1599	1.11	1.23	11.32
IF	1611	1.12	1.24	11.33
IF	1619	1.13	1.24	11.34
IF	1627	1.14	1.25	11.34
IF	1631	1.14	1.25	11.35
IF	1635	1.15	1.25	11.35
IF	1645	1.16	1.26	11.36
IF	1651	1.17	1.26	11.36
IF	1665	1.18	1.27	11.37
IF	1669	1.19	1.27	11.38
IF	1671	1.19	1.27	11.38
IF	1673	1.19	1.28	11.38
IF	1681	1.2	1.28	11.39
IF	1695	1.22	1.29	11.4
IF	1707	1.23	1.3	11.41
IF	1715	1.24	1.3	11.41
IF	1735	1.26	1.31	11.43
IF	1739	1.26	1.31	11.43
IF	1743	1.27	1.32	11.43
IF	1747	1.27	1.32	11.44
IF	1751	1.28	1.32	11.44
IF	1753	1.28	1.32	11.44
IF	1759	1.29	1.33	11.45
IF	1761	1.29	1.33	11.45
IF	1763	1.29	1.33	11.45
IF	1765	1.29	1.33	11.45
IF	1777	1.3	1.34	11.46
IF	1783	1.31	1.34	11.46
IF	1793	1.32	1.34	11.47
IF	1797	1.33	1.35	11.47
IF	1813	1.34	1.36	11.49
IF	1819	1.35	1.36	11.49
IF	1827	1.36	1.36	11.5
IF	1853	1.39	1.38	11.52
IF	1855	1.39	1.38	11.52

IF	1861	1.39	1.38	11.52
IF	1877	1.41	1.39	11.53
IF	1883	1.42	1.39	11.54
IF	1889	1.42	1.39	11.54
IF	1893	1.43	1.4	11.55
IF	1897	1.43	1.4	11.55
IF	1905	1.44	1.4	11.55
IF	1933	1.47	1.42	11.57
IF	1937	1.47	1.42	11.58
IF	1943	1.48	1.42	11.58
IF	1951	1.49	1.43	11.59
IF	1961	1.5	1.43	11.59
IF	1965	1.5	1.43	11.6
IF	1969	1.5	1.43	11.6
IF	1973	1.51	1.44	11.6
IF	1977	1.51	1.44	11.6
IF	1981	1.52	1.44	11.61
IF	1995	1.53	1.45	11.62
IF	2027	1.56	1.46	11.64
IF	2031	1.57	1.46	11.64
IF	2051	1.58	1.47	11.65
IF	2069	1.6	1.48	11.66
IF	2091	1.62	1.49	11.68
IF	2101	1.63	1.49	11.69
IF	2131	1.66	1.51	11.71
IF	2137	1.66	1.51	11.71
IF	2151	1.68	1.52	11.72
IF	2163	1.68	1.52	11.72
IF	2183	1.7	1.53	11.74
IF	2203	1.71	1.54	11.74
IF	2209	1.72	1.54	11.75
IF	2213	1.72	1.54	11.75
IF	2223	1.73	1.55	11.76
IF	2227	1.74	1.55	11.76
IF	2247	1.76	1.56	11.78
IF	2257	1.77	1.56	11.78
IF	2267	1.78	1.56	11.79
IF	2273	1.78	1.57	11.8
IF	2277	1.79	1.57	11.8
IF	2283	1.79	1.57	11.8
IF	2295	1.8	1.57	11.81
IF	2305	1.81	1.58	11.81
IF	2315	1.82	1.58	11.82
IF	2331	1.83	1.59	11.83
IF	2343	1.84	1.59	11.84
IF	2347	1.84	1.6	11.83
IF	2363	1.86	1.6	11.85
IF	2367	1.86	1.6	11.85
IF	2379	1.87	1.61	11.85
IF	2403	1.89	1.62	11.87
IF	2409	1.89	1.62	11.87
IF	2423	1.9	1.62	11.87
IF	2435	1.91	1.63	11.88

IF	2453	1.92	1.63	11.89
IF	2463	1.94	1.64	11.9
IF	2471	1.94	1.64	11.91
IF	2477	1.94	1.64	11.9
IF	2485	1.93	1.65	11.9
IF	2489	1.94	1.65	11.9
IF	2495	1.96	1.65	11.92
IF	2501	1.97	1.65	11.92
IF	2509	1.97	1.65	11.92
IF	2515	1.97	1.66	11.93
IF	2517	1.97	1.66	11.93
IF	2523	1.98	1.66	11.93
IF	2587	2.02	1.68	11.96
	2712	2.11	1.72	12.03
IF	2765	2.16	1.74	12.06
IF	2833	2.15	1.76	12.05
IF	2877	2.2	1.77	12.09
IF	2935	2.2	1.79	12.08
IF	3001	2.29	1.81	12.15
IF	3037	2.27	1.82	12.13
IF	3071	2.34	1.83	12.18
	3184	2.41	1.86	12.23
IF	3233	2.44	1.88	12.25
IF	3375	2.33	1.91	12.18
	3508	2.54	1.95	12.32
IF	3565	2.6	1.96	12.37
VH	3585	2.59	1.97	12.36
VH	3591	2.59	1.97	12.36
VH	3613	2.64	1.97	12.39
VH	3621	2.61	1.98	12.37
VH	3663	2.67	1.99	12.42
VH	3671	2.65	1.99	12.4
VH	3693	2.65	1.99	12.4
VH	3743	2.7	2	12.44
VH	3763	2.6	2.01	12.36
VH	3793	2.73	2.02	12.46
VH	3815	2.69	2.02	12.43
VH	3833	2.74	2.03	12.47
VH	3841	2.72	2.03	12.45
VH	3861	2.72	2.03	12.45
VH	3869	2.76	2.03	12.48
VH	3917	2.75	2.04	12.47
VH	3955	2.81	2.05	12.51
VE	3963	2.8	2.05	12.5
VE	3971	2.67	2.05	12.42
VE	3983	2.55	2.05	12.33
VE	3999	2.53	2.05	12.31
VE	4009	2.51	2.05	12.31
VE	4019	2.5	2.05	12.3
VE	4059	2.47	2.05	12.27
VE	4077	2.45	2.05	12.26
VE	4085	2.44	2.05	12.26
VE	4105	2.42	2.05	12.24

VE	4131	2.39	2.05	12.22
VE	4159	2.19	2.05	12.08
VE	4179	2.16	2.05	12.06
VE	4189	2.16	2.05	12.06
VH	4191	2.16	2.05	12.06
VH	4211	2.18	2.06	12.07
VH	4297	2.23	2.08	12.11
VH	4313	2.2	2.08	12.08
VH	4353	2.27	2.09	12.13
VE	4407	2.21	2.09	12.09
VE	4419	2.19	2.09	12.08
VE	4453	2.15	2.09	12.05
VE	4495	2.1	2.09	12.01
VE	4505	2.08	2.09	12.01
VE	4511	2.08	2.09	12
VE	4553	2.03	2.09	11.97
VE	4603	1.98	2.09	11.93
VE	4657	1.93	2.09	11.9
VE	4663	1.93	2.09	11.9
VH	4665	1.93	2.09	11.89
VH	4679	1.91	2.09	11.88
VH	4693	1.92	2.1	11.89
VH	4703	1.96	2.1	11.92
VH	4721	1.96	2.1	11.92
VH	4729	2	2.1	11.94
VH	4787	2.01	2.12	11.95
VH	4815	2.05	2.12	11.98
VH	4835	2.02	2.13	11.96
VH	4861	2.06	2.13	11.99
VH	4879	2.04	2.14	11.98
VH	4935	2.15	2.15	12.05
VH	4945	2.12	2.15	12.03
VH	4969	2.16	2.16	12.06
VH	4993	2.12	2.16	12.03
VH	5015	2.17	2.17	12.07
VH	5037	2.15	2.17	12.05
VH	5051	2.2	2.17	12.09
VH	5115	2.21	2.19	12.1
VH	5133	2.26	2.19	12.13
VH	5185	2.27	2.2	12.13
VH	5205	2.24	2.2	12.11
VH	5251	2.34	2.21	12.19
VH	5383	2.37	2.24	12.21
VH	5413	2.34	2.24	12.18
VH	5431	2.4	2.25	12.22
VH	5457	2.37	2.25	12.21
VH	5467	2.41	2.25	12.23
VH	5479	2.39	2.26	12.22
VH	5495	2.42	2.26	12.24
IF	5503	2.38	2.26	12.21
IF	5515	2.07	2.26	12
IF	5549	1.9	2.27	11.88
	5658	1.94	2.29	11.91

IF	5705	1.96	2.3	11.92
	5823	2.09	2.32	12.01
IF	5873	2.12	2.33	12.03
IF	5931	2.16	2.34	12.06
IF	5949	2.17	2.34	12.06
IF	5957	2.1	2.34	12.02
VH	5959	2.11	2.34	12.02
VH	6001	2.2	2.35	12.09
VH	6053	2.22	2.36	12.1
VH	6069	2.29	2.36	12.15
VH	6103	2.3	2.37	12.16
VH	6135	2.4	2.37	12.22
VH	6161	2.41	2.38	12.24
VH	6171	2.37	2.38	12.21
VH	6193	2.45	2.38	12.26
VH	6213	2.37	2.38	12.21
VH	6251	2.38	2.39	12.21
BU	6313	0.51	2.39	10.91
BU	6315	0.11	2.39	10.62
BU	6319	0.02	2.39	10.56
BU	6327	0.01	2.39	10.55
BU	6369	0	2.39	10.55
BU	6449	0	2.39	10.55
BU	6465	0	2.39	10.55
BU	6475	0	2.39	10.55
BU	6537	0	2.39	10.55
BU	6613	0	2.39	10.55
BU	6821	0	2.39	10.55
BU	6867	0	2.39	10.55
AS	6909	0	0	10.56
AS	6987	0	0	10.56
AS	7015	0	0	10.56
AS	7031	0	0	10.56
AS	7101	0	0	10.56
AS	7147	0	0	10.56
AS	7177	0	0	10.56
AS	7207	0	0	10.56
AS	7235	0	0	10.56
AS	7297	0	0	10.56

Project: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Original FIS\New_Haven_Intact.mdb Transect#: NH-23 T

STATION BEGIN	STATION END
11	14
14	23
27	31
31	35
35	41
41	47
47	53
53	59
59	65
65	67
67	71
71	75
75	87
87	95
95	99
105	109
109	113
113	117
117	121
6867	6909
6909	6987
6987	7015
7015	7031
7031	7101
7101	7147
7147	7177
7177	7207
7207	7235
7235	7297

STATION	Location
11	WIND

Project: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Original FIS\New_Haven_Intact.mdb Transect#: NH-23 T

STATION BEGIN	.EVATION BEGIN	STATION END	.EVATION END	ZONE	ZONE .EVATION	FHF
0	15.5	5	14.5	V26	15	160
0	15.7	0	15.5	V26	16	160
5	14.5	10	13.5	V26	14	160
10	13.5	11	12.65	V26	13	160
11	12.65	11	12.5	A22	13	120
11	12.5	11	12.12	A22	12	120
11	12.12	14	10.56	X	12	120
14	10.56	23	10.55	X	12	120
23	10.55	27	10.57	A22	11	120
27	10.57	31	10.56	X	11	120
31	10.56	35	10.56	X	11	120
35	10.56	41	10.56	X	11	120
41	10.56	47	10.56	X	11	120
47	10.56	53	10.56	X	11	120
53	10.56	59	10.56	X	11	120
59	10.56	65	10.56	X	11	120
65	10.56	67	10.56	X	11	120
67	10.56	71	10.56	X	11	120
71	10.56	75	10.56	X	11	120
75	10.56	87	10.56	X	11	120
87	10.56	95	10.56	X	11	120
95	10.56	99	10.55	X	11	120
99	10.55	105	10.58	A22	11	120
105	10.58	109	10.56	X	11	120
109	10.56	113	10.56	X	11	120
113	10.56	117	10.56	X	11	120
117	10.56	121	10.55	X	11	120
121	10.55	1832	11.5	A22	11	120
1832	11.5	3945	12.5	A22	12	120
3945	12.5	3963	12.5	A22	13	120
3963	12.5	6285	11.5	A22	12	120
6285	11.5	6867	10.55	A22	11	120
6867	10.55	6909	10.56	X	11	120
6909	10.56	6987	10.56	X	11	120
6987	10.56	7015	10.56	X	11	120
7015	10.56	7031	10.56	X	11	120
7031	10.56	7101	10.56	X	11	120
7101	10.56	7147	10.56	X	11	120
7147	10.56	7177	10.56	X	11	120
7177	10.56	7207	10.56	X	11	120
7207	10.56	7235	10.56	X	11	120
7235	10.56	7297	10.56	X	11	120

Appendix 2

WHAFIS Results for Present Day Site (2016 CT LiDAR and 2024 Airport Survey)

Corrected Effective/Post-Project Model

Streamworks, PLLC 45 Evans Road, Madbury, NH 03823 ph: 603.767.4975 e-mail: StreamworksPLLC@gmail.com

WHAFIS Input file - Transect: NH-23 Date: 12/12/2024

2024 Topography

IE 0.00 -2.295 0.00 0.0010.54584 13.2 5.39 0.00 0.00 0.00

IF 1 -2.14 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 7 -0.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 8 -0.26 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 9 0.11 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 11 0.93 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 14 2.21 0.00 0.00 0.00 0.00 0.00 0.00 0.00

DU 23 6.46 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 25 7.35 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 27 8.15 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 31 9.41 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 35 10.31 1 0.00 0.00 0.00 0.00 0.00 0.00

AS 41 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 47 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 53 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 59 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 65 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 67 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 71 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 75 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 87 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 95 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 99 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 105 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 109 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 113 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 117 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS	121	10.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BU	129	10.53	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	135	10.41	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	143	10.36	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	149	10.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	153	10.15	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	157	10.04	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	163	9.80	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	183	9.20	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	195	8.78	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	203	8.54	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	207	8.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	221	7.99	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	227	7.91	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	231	7.85	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	235	7.79	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	241	7.70	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	249	7.58	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	253	7.52	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	265	7.38	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	283	7.17	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	295	7.04	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	307	7.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	315	7.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	323	6.92	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	329	6.84	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	341	6.67	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	353	6.50	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	357	6.45	0.15	10	0.00	0.00	0.00	0.00	0.00

BU	361	6.39	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	373	6.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	379	6.19	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	385	6.19	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	391	6.14	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	407	6.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	413	6.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	425	5.94	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	449	5.54	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	457	5.38	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	461	5.34	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	467	5.35	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	473	5.33	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	477	5.28	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	481	5.29	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	485	5.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	487	5.21	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	489	5.17	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	503	5.12	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	507	5.12	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	513	5.09	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	515	5.06	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	519	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	521	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	527	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	541	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	547	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	553	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	557	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00

BU	559	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	565	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	569	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	573	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	577	5.08	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	583	5.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	587	5.61	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	599	5.88	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	615	5.25	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	621	4.96	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	623	4.89	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	629	4.66	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	635	4.44	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	639	4.28	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	647	3.99	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	649	3.93	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	653	3.81	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	657	3.70	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	667	3.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	675	3.26	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	679	3.18	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	685	3.06	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	705	3.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	725	3.20	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	759	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	765	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	769	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	777	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	783	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00

BU 805 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 823 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 829 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 837 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 845 3.91 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 851 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 861 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 865 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 873 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 877 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 879 3.95 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 883 3.56 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 885 3.36 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 889 3.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 901 3.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 907 3.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 913 3.10 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 917 3.20 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 923 3.17 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 935 3.20 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 945 2.97 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 953 2.49 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 957 2.61 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 965 2.86 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 975 2.60 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 977 2.53 0.15 10 0.00 0.00 0.00 0.00 0.00

VH 983 2.38 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 985 2.36 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 991 3.20 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 997 3.56 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1009 4.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1015 4.39 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1017 4.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1019 4.11 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1021 4.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1025 3.27 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1026 3.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1027 2.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1029 2.44 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1042 -1.44 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1049 -1.65 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1057 0.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1059 0.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1063 1.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1065 2.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1073 2.71 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1077 3.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1089 4.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1091 5.06 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1097 4.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1101 3.94 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1103 3.53 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1133 1.63 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1135 1.63 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1141 1.64 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1145 1.67 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1151 1.82 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1159 2.04 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1161 2.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1169 3.64 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1171 3.84 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1177 3.32 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1189 1.83 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1193 1.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1199 1.86 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1221 1.87 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1227 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1231 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1235 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1239 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1243 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1251 1.94 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1257 1.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1265 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1273 1.87 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1285 1.75 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1291 1.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1297 1.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1303 1.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1307 1.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1315 2.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1321 2.08 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1343 2.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1351 2.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1361 1.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1365 1.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1369 1.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1377 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1383 1.73 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1387 1.77 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1389 1.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1397 1.87 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1401 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1405 1.95 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1409 1.97 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1411 1.96 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1413 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1417 1.77 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1421 1.66 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1423 1.66 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1427 1.67 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1429 1.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1431 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1433 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

IF 1437 1.73 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1453 2.24 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1467 2.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1471 2.66 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1481 2.88 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1571 3.44 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1585 3.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1589 3.52 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1595 3.54 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1599 3.55 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1611 3.52 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1619 3.49 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1627 3.51 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1631 3.55 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1635 3.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1645 3.66 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1651 3.72 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1665 3.83 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1669 3.86 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1671 3.87 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1673 3.91 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF	1681	4.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1695	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1707	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1715	4.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1735	4.77	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1739	4.82	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1743	4.87	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1747	4.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1751	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1753	4.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1759	4.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1761	4.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1763	4.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1765	4.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1777	4.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1783	4.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1793	4.39	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1797	4.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1813	4.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1819	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1827	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1853	3.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1855	3.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1861	3.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1877	3.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1883	3.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1889	3.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1893	3.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1897	3.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF	1905	3.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1933	3.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1937	3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1943	3.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1951	3.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1961	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1965	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1969	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1973	3.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1977	3.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1981	3.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1995	3.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2027	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2031	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2051	3.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2069	3.52	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2091	3.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2101	3.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2131	3.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2137	3.72	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2151	3.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2163	3.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2183	4.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2203	4.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2209	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2213	4.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2223	4.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2227	4.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	2247	4.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 2257	3.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2267	3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2273	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2277	3.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2283	3.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2295	3.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2305	3.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2315	3.49	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2331	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2343	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2347	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2363	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2367	3.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2379	3.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2403	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2409	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2423	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2435	4.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2453	4.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2463	4.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2471	3.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2477	4.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2485	4.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2489	4.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2495	4.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2501	4.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2509	3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2515	3.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2517	3.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 2523 3.82 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2587 4.25 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2765 4.08 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2833 4.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2877 4.34 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2935 4.84 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3001 4.31 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3037 4.77 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3071 4.52 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3233 3.96 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3375 5.50 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3565 3.41 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VH 3585 3.47 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3591 3.25 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3613 3.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3621 3.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3663 4.14 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3671 4.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3693 4.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3743 3.73 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3763 4.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3793 3.82 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3815 3.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3833 4.43 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3841 3.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3861 4.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3869 4.10 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3917 3.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3955 3.74 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VE 3963 3.66 1 25 10 0.00 0.00 0.00 0.00

VE 3971 3.97 1 25 10 0.00 0.00 0.00 0.00

VE 3983 5.26 1 25 10 0.00 0.00 0.00 0.00

VE 3999 5.65 1 25 10 0.00 0.00 0.00 0.00

VE 4009 5.48 1 25 10 0.00 0.00 0.00 0.00

VE 4019 3.75 1 25 10 0.00 0.00 0.00 0.00

VE 4059 3.67 1 25 10 0.00 0.00 0.00 0.00

VE 4077 3.77 1 25 10 0.00 0.00 0.00 0.00

VE 4085 3.74 1 25 10 0.00 0.00 0.00 0.00

VE 4105 4.78 1 25 10 0.00 0.00 0.00 0.00

VE 4131 4.58 1 25 10 0.00 0.00 0.00 0.00

VE 4159 6.10 1 25 10 0.00 0.00 0.00 0.00

VE 4179 5.73 1 25 10 0.00 0.00 0.00 0.00

VE 4189 4.74 1 25 10 0.00 0.00 0.00 0.00

VH 4191 4.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4211 3.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4297 4.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4313 4.17 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4353 4.14 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VE 4407 3.87 1 20 8 0.00 0.00 0.00 0.00

VE 4419 3.79 1 20 8 0.00 0.00 0.00 0.00

VE 4453 4.52 1 20 8 0.00 0.00 0.00 0.00

VE 4459 5.00 1 20 8 0.00 0.00 0.00 0.00

VE 4505 3.78 1 20 8 0.00 0.00 0.00 0.00

VE 4511 3.72 1 20 8 0.00 0.00 0.00 0.00

VE 4553 3.80 1 20 8 0.00 0.00 0.00 0.00

VE 4603 3.76 1 20 8 0.00 0.00 0.00 0.00

VE 4657 4.07 1 20 8 0.00 0.00 0.00 0.00

VE 4663 4.07 1 20 8 0.00 0.00 0.00 0.00

VH 4665 4.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4679 4.06 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4693 4.06 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4703 3.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4721 3.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4729 3.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4787 4.09 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4815 4.23 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4835 4.34 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4861 7.02 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4879 7.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4928 5.39 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4945 5.36 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4969 7.40 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4993 5.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5002 5.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5037 5.83 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5051 5.59 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5115 6.19 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5129 5.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5185 5.42 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5205 5.14 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5251 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5383 7.17 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5413 7.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5431 5.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5457 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5467 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5479 5.38 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5495 5.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

IF 5503 5.74 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5515 6.08 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5549 7.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5705 7.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5873 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5931 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5949 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5957 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VH 5959 6.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6001 5.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6053 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6069 4.71 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6103 6.59 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6135 3.42 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6161 2.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6171 3.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6193 2.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6213 2.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6251 5.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

BU 6313 4.00 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6315 4.00 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6319 4.00 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6327 4.65 0.6 6 0.00 0.00 0.00 0.00 0.00

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BU 6369  9.22  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6449  9.82  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6465  9.65  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6475  9.34  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6537  9.00  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6613  9.00  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6821  6.00  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6867  6.81  0.6   6  0.00  0.00  0.00  0.00  0.00
AS 6909 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 6987 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7015 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7031 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7101 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7147 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7177 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7207 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7235 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7297 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
ET
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WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08_2007)

Executed on: Thu Dec 12 08:57:35 2024

Input file: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Orignal FIS With Updated 2024 Topography\New_Haven_T

Output file: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Orignal FIS With Updated 2024 Topography\New_Haven_T

2024 Topography

- Transect: NH-23 Date: 12/12/2024

THIS IS A 100-YEAR CASE

PART1 INPUT

IE	0.000	-2.295	0.000	0.000	10.546	13.200	5.390	0.000	0.155	0.000
IF	1.000	-2.140	0.000	10.546	0.000	0.000	0.000	0.000	0.245	0.000
IF	7.000	-0.580	0.000	10.546	0.000	0.000	0.000	0.000	0.269	0.000
IF	8.000	-0.260	0.000	10.546	0.000	0.000	0.000	0.000	0.345	0.000
IF	9.000	0.110	0.000	10.546	0.000	0.000	0.000	0.000	0.397	0.000
IF	11.000	0.930	0.000	10.546	0.000	0.000	0.000	0.000	0.420	0.000
IF	14.000	2.210	0.000	10.546	0.000	0.000	0.000	0.000	0.461	0.000
DU	23.000	6.460	1.000	0.000	10.546	0.000	0.000	0.000	0.467	0.000
DU	25.000	7.350	1.000	0.000	10.546	0.000	0.000	0.000	0.423	0.000
DU	27.000	8.150	1.000	0.000	10.546	0.000	0.000	0.000	0.343	0.000
DU	31.000	9.410	1.000	0.000	10.546	0.000	0.000	0.000	0.270	0.000
DU	35.000	10.310	1.000	0.000	10.546	0.000	0.000	0.000	0.225	0.000
AS	41.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	47.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	53.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

AS	59.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	65.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	67.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	71.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	75.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	87.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	95.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	99.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	105.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	109.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	113.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	117.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	121.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
BU	129.000	10.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	135.000	10.410	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	143.000	10.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	149.000	10.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.021	0.000
BU	153.000	10.150	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000
BU	157.000	10.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000
BU	163.000	9.800	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	183.000	9.200	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	195.000	8.780	0.150	10.000	0.000	10.546	0.000	0.000	-0.033	0.000
BU	203.000	8.540	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000
BU	207.000	8.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.031	0.000
BU	221.000	7.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000
BU	227.000	7.910	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	231.000	7.850	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	235.000	7.790	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	241.000	7.700	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000

BU	249.000	7.580	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	253.000	7.520	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	265.000	7.380	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	283.000	7.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	295.000	7.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	307.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000
BU	315.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000
BU	323.000	6.920	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	329.000	6.840	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	341.000	6.670	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	353.000	6.500	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	357.000	6.450	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	361.000	6.390	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	373.000	6.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	379.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000
BU	385.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000
BU	391.000	6.140	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000
BU	407.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	413.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	425.000	5.940	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	449.000	5.540	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000
BU	457.000	5.380	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000
BU	461.000	5.340	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	467.000	5.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000
BU	473.000	5.330	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	477.000	5.280	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000
BU	481.000	5.290	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000
BU	485.000	5.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	487.000	5.210	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000

BU	489.000	5.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	503.000	5.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	507.000	5.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	513.000	5.090	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	515.000	5.060	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	519.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000
BU	521.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	527.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	541.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	547.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	553.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	557.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	559.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	565.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	569.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	573.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.010	0.000
BU	577.000	5.080	0.150	10.000	0.000	10.546	0.000	0.000	0.042	0.000
BU	583.000	5.420	0.150	10.000	0.000	10.546	0.000	0.000	0.053	0.000
BU	587.000	5.610	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000
BU	599.000	5.880	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	615.000	5.250	0.150	10.000	0.000	10.546	0.000	0.000	-0.042	0.000
BU	621.000	4.960	0.150	10.000	0.000	10.546	0.000	0.000	-0.045	0.000
BU	623.000	4.890	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	629.000	4.660	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	635.000	4.440	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	639.000	4.280	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	647.000	3.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000
BU	649.000	3.930	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000
BU	653.000	3.810	0.150	10.000	0.000	10.546	0.000	0.000	-0.029	0.000

BU	657.000	3.700	0.150	10.000	0.000	10.546	0.000	0.000	-0.028	0.000
BU	667.000	3.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.024	0.000
BU	675.000	3.260	0.150	10.000	0.000	10.546	0.000	0.000	-0.020	0.000
BU	679.000	3.180	0.150	10.000	0.000	10.546	0.000	0.000	-0.020	0.000
BU	685.000	3.060	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	705.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	0.004	0.000
BU	725.000	3.200	0.150	10.000	0.000	10.546	0.000	0.000	0.019	0.000
BU	759.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.020	0.000
BU	765.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	769.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	777.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	783.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	805.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	823.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	829.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	837.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	845.000	3.910	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	851.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.006	0.000
BU	861.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	865.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	873.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	877.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.008	0.000
BU	879.000	3.950	0.150	10.000	0.000	10.546	0.000	0.000	-0.073	0.000
BU	883.000	3.560	0.150	10.000	0.000	10.546	0.000	0.000	-0.098	0.000
BU	885.000	3.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.093	0.000
BU	889.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.023	0.000
BU	901.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	907.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	0.008	0.000
BU	913.000	3.100	0.150	10.000	0.000	10.546	0.000	0.000	0.020	0.000

BU 917.000 3.200 0.150 10.000 0.000 10.546 0.000 0.000 0.007 0.000

BU 923.000 3.170 0.150 10.000 0.000 10.546 0.000 0.000 0.000 0.000

BU 935.000 3.200 0.150 10.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 945.000 2.970 0.150 10.000 0.000 10.546 0.000 0.000 -0.039 0.000

BU 953.000 2.490 0.150 10.000 0.000 10.546 0.000 0.000 -0.030 0.000

BU 957.000 2.610 0.150 10.000 0.000 10.546 0.000 0.000 0.031 0.000

BU 965.000 2.860 0.150 10.000 0.000 10.546 0.000 0.000 -0.001 0.000

BU 975.000 2.600 0.150 10.000 0.000 10.546 0.000 0.000 -0.027 0.000

BU 977.000 2.530 0.150 10.000 0.000 10.546 0.000 0.000 -0.027 0.000

VH 983.000 2.380 2.000 1.000 0.000 1.000 0.000 10.546 -0.021 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 985.000 2.360 2.000 1.000 0.000 1.000 0.000 10.546 0.102 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 991.000 3.200 2.000 1.000 0.000 1.000 0.000 10.546 0.100 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 997.000 3.560 2.000 1.000 0.000 1.000 0.000 10.546 0.059 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1009.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.046 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1015.000 4.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1017.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 -0.070 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1019.000 4.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1021.000 4.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.140 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1025.000 3.270 2.000 1.000 0.000 1.000 0.000 10.546 -0.212 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1026.000 3.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.240 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1027.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.190 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1029.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.282 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1042.000 -1.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.205 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1049.000 -1.650 2.000 1.000 0.000 1.000 0.000 10.546 0.105 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1057.000 0.130 2.000 1.000 0.000 1.000 0.000 10.546 0.257 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1059.000 0.920 2.000 1.000 0.000 1.000 0.000 10.546 0.280 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1063.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.182 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1065.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.090 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1073.000 2.710 2.000 1.000 0.000 1.000 0.000 10.546 0.083 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1077.000 3.000 2.000 1.000 0.000 1.000 0.000 10.546 0.131 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1089.000 4.800 2.000 1.000 0.000 1.000 0.000 10.546 0.147 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1091.000 5.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1097.000 4.780 2.000 1.000 0.000 1.000 0.000 10.546 -0.112 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1101.000 3.940 2.000 1.000 0.000 1.000 0.000 10.546 -0.208 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1103.000 3.530 2.000 1.000 0.000 1.000 0.000 10.546 -0.072 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1133.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 -0.059 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1135.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1141.000 1.640 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1145.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.018 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1151.000 1.820 2.000 1.000 0.000 1.000 0.000 10.546 0.026 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1159.000 2.040 2.000 1.000 0.000 1.000 0.000 10.546 0.034 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 0.160 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1169.000 3.640 2.000 1.000 0.000 1.000 0.000 10.546 0.168 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1171.000 3.840 2.000 1.000 0.000 1.000 0.000 10.546 -0.040 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1177.000 3.320 2.000 1.000 0.000 1.000 0.000 10.546 -0.112 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1189.000 1.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.094 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1193.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1199.000 1.860 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1221.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1227.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1231.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1235.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1239.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1243.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1251.000 1.940 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1257.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1265.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1273.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1285.000 1.750 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1291.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.014 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1297.000 1.920 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1303.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1307.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1315.000	2.010	2.000	1.000	0.000	1.000	0.000	10.546	0.011	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1321.000	2.080	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1343.000	2.180	2.000	1.000	0.000	1.000	0.000	10.546	0.003	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1351.000	2.160	2.000	1.000	0.000	1.000	0.000	10.546	-0.027	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1361.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.033	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1365.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	0.000	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1369.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.001	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1377.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1383.000	1.730	2.000	1.000	0.000	1.000	0.000	10.546	0.008	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1387.000	1.770	2.000	1.000	0.000	1.000	0.000	10.546	0.008	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1389.000	1.780	2.000	1.000	0.000	1.000	0.000	10.546	0.010	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1397.000	1.870	2.000	1.000	0.000	1.000	0.000	10.546	0.011	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1401.000	1.910	2.000	1.000	0.000	1.000	0.000	10.546	0.010	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1405.000	1.950	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

VH 1409.000 1.970 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1411.000 1.960 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1413.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 -0.032 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1417.000 1.770 2.000 1.000 0.000 1.000 0.000 10.546 -0.031 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1421.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 -0.018 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1423.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1427.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1429.000 1.680 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1431.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1433.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

IF 1437.000 1.730 0.000 10.546 0.000 0.000 0.000 0.000 0.027 0.000

IF 1453.000 2.240 0.000 10.546 0.000 0.000 0.000 0.000 0.028 0.000

IF 1467.000 2.560 0.000 10.546 0.000 0.000 0.000 0.000 0.023 0.000

IF 1471.000 2.660 0.000 10.546 0.000 0.000 0.000 0.000 0.023 0.000

IF 1481.000 2.880 0.000 10.546 0.000 0.000 0.000 0.000 0.008 0.000

IF 1571.000 3.440 0.000 10.546 0.000 0.000 0.000 0.000 0.006 0.000

IF 1585.000 3.500 0.000 10.546 0.000 0.000 0.000 0.000 0.004 0.000

IF 1589.000 3.520 0.000 10.546 0.000 0.000 0.000 0.000 0.004 0.000

IF 1595.000 3.540 0.000 10.546 0.000 0.000 0.000 0.000 0.003 0.000

IF	1599.000	3.550	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000
IF	1611.000	3.520	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000
IF	1619.000	3.490	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000
IF	1627.000	3.510	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	1631.000	3.550	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1635.000	3.580	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000
IF	1645.000	3.660	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1651.000	3.720	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1665.000	3.830	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000
IF	1669.000	3.860	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	1671.000	3.870	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	1673.000	3.910	0.000	10.546	0.000	0.000	0.000	0.000	0.020	0.000
IF	1681.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	0.016	0.000
IF	1695.000	4.260	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	1707.000	4.410	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	1715.000	4.510	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	1735.000	4.770	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	1739.000	4.820	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	1743.000	4.870	0.000	10.546	0.000	0.000	0.000	0.000	0.014	0.000
IF	1747.000	4.930	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1751.000	4.950	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000
IF	1753.000	4.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1759.000	4.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1761.000	4.810	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	1763.000	4.780	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	1765.000	4.750	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	1777.000	4.570	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1783.000	4.500	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	1793.000	4.390	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000

IF	1797.000	4.350	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	1813.000	4.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	1819.000	4.100	0.000	10.546	0.000	0.000	0.000	0.000	-0.012	0.000
IF	1827.000	4.000	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	1853.000	3.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	1855.000	3.830	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1861.000	3.800	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	1877.000	3.690	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	1883.000	3.620	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000
IF	1889.000	3.530	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1893.000	3.480	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1897.000	3.420	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1905.000	3.370	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000
IF	1933.000	3.360	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000
IF	1937.000	3.340	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1943.000	3.310	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	1951.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	1961.000	3.230	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1965.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1969.000	3.190	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	1973.000	3.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	1977.000	3.140	0.000	10.546	0.000	0.000	0.000	0.000	-0.007	0.000
IF	1981.000	3.110	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000
IF	1995.000	3.030	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	2027.000	3.180	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2031.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	2051.000	3.350	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000
IF	2069.000	3.520	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2091.000	3.550	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

IF	2101.000	3.570	0.000	10.546	0.000	0.000	0.000	0.000	0.003	0.000
IF	2131.000	3.680	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000
IF	2137.000	3.720	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	2151.000	3.810	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2163.000	3.840	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	2183.000	4.220	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000
IF	2203.000	4.350	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	2209.000	4.410	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000
IF	2213.000	4.460	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000
IF	2223.000	4.380	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	2227.000	4.340	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000
IF	2247.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000
IF	2257.000	3.830	0.000	10.546	0.000	0.000	0.000	0.000	-0.023	0.000
IF	2267.000	3.600	0.000	10.546	0.000	0.000	0.000	0.000	-0.024	0.000
IF	2273.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	-0.023	0.000
IF	2277.000	3.370	0.000	10.546	0.000	0.000	0.000	0.000	-0.020	0.000
IF	2283.000	3.250	0.000	10.546	0.000	0.000	0.000	0.000	-0.020	0.000
IF	2295.000	3.010	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	2305.000	3.140	0.000	10.546	0.000	0.000	0.000	0.000	0.024	0.000
IF	2315.000	3.490	0.000	10.546	0.000	0.000	0.000	0.000	0.023	0.000
IF	2331.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	2343.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000
IF	2347.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000
IF	2363.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000
IF	2367.000	3.750	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	2379.000	3.890	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	2403.000	4.000	0.000	10.546	0.000	0.000	0.000	0.000	0.003	0.000
IF	2409.000	3.990	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	2423.000	4.030	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

IF 2435.000 4.120 0.000 10.546 0.000 0.000 0.000 0.000 0.002 0.000

IF 2453.000 4.100 0.000 10.546 0.000 0.000 0.000 0.000 -0.001 0.000

IF 2463.000 4.090 0.000 10.546 0.000 0.000 0.000 0.000 -0.008 0.000

IF 2471.000 3.950 0.000 10.546 0.000 0.000 0.000 0.000 -0.004 0.000

IF 2477.000 4.030 0.000 10.546 0.000 0.000 0.000 0.000 0.046 0.000

IF 2485.000 4.600 0.000 10.546 0.000 0.000 0.000 0.000 0.063 0.000

IF 2489.000 4.780 0.000 10.546 0.000 0.000 0.000 0.000 0.020 0.000

IF 2495.000 4.800 0.000 10.546 0.000 0.000 0.000 0.000 -0.033 0.000

IF 2501.000 4.380 0.000 10.546 0.000 0.000 0.000 0.000 -0.086 0.000

IF 2509.000 3.600 0.000 10.546 0.000 0.000 0.000 0.000 -0.051 0.000

IF 2515.000 3.660 0.000 10.546 0.000 0.000 0.000 0.000 0.014 0.000

IF 2517.000 3.710 0.000 10.546 0.000 0.000 0.000 0.000 0.020 0.000

IF 2523.000 3.820 0.000 10.546 0.000 0.000 0.000 0.000 0.008 0.000

IF 2587.000 4.250 0.000 10.546 0.000 0.000 0.000 0.000 0.001 0.000

IF 2765.000 4.080 0.000 10.546 0.000 0.000 0.000 0.000 0.001 0.000

IF 2833.000 4.500 0.000 10.546 0.000 0.000 0.000 0.000 0.002 0.000

IF 2877.000 4.340 0.000 10.546 0.000 0.000 0.000 0.000 0.003 0.000

IF 2935.000 4.840 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 3001.000 4.310 0.000 10.546 0.000 0.000 0.000 0.000 -0.001 0.000

IF 3037.000 4.770 0.000 10.546 0.000 0.000 0.000 0.000 0.003 0.000

IF 3071.000 4.520 0.000 10.546 0.000 0.000 0.000 0.000 -0.004 0.000

IF 3233.000 3.960 0.000 10.546 0.000 0.000 0.000 0.000 0.003 0.000

IF 3375.000 5.500 0.000 10.546 0.000 0.000 0.000 0.000 -0.002 0.000

IF 3565.000 3.410 0.000 10.546 0.000 0.000 0.000 0.000 -0.010 0.000

VH 3585.000 3.470 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3591.000 3.250 2.000 1.000 0.000 1.000 0.000 10.546 0.012 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3613.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3621.000 3.910 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3663.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3671.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3693.000 4.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3743.000 3.730 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3763.000 4.010 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3793.000 3.820 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3815.000 3.760 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3833.000 4.430 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3841.000 3.920 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3861.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3869.000 4.100 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3917.000 3.910 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3955.000 3.740 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VE 3963.000 3.660 1.000 25.000 10.000 0.000 0.000 10.546 0.014 0.000

VE 3971.000 3.970 1.000 25.000 10.000 0.000 0.000 10.546 0.080 0.000

VE 3983.000 5.260 1.000 25.000 10.000 0.000 0.000 10.546 0.060 0.000

VE 3999.000 5.650 1.000 25.000 10.000 0.000 0.000 10.546 0.009 0.000

VE 4009.000 5.480 1.000 25.000 10.000 0.000 0.000 10.546 -0.095 0.000

VE 4019.000 3.750 1.000 25.000 10.000 0.000 0.000 10.546 -0.036 0.000

VE 4059.000 3.670 1.000 25.000 10.000 0.000 0.000 10.546 0.000 0.000

VE 4077.000 3.770 1.000 25.000 10.000 0.000 0.000 10.546 0.003 0.000

VE 4085.000 3.740 1.000 25.000 10.000 0.000 0.000 10.546 0.036 0.000

VE 4105.000 4.780 1.000 25.000 10.000 0.000 0.000 10.546 0.018 0.000

VE 4131.000 4.580 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

VE 4159.000 6.100 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

VE 4179.000 5.730 1.000 25.000 10.000 0.000 0.000 10.546 -0.045 0.000

VE 4189.000 4.740 1.000 25.000 10.000 0.000 0.000 10.546 -0.123 0.000

VH 4191.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 -0.043 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4211.000 3.790 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4297.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4313.000 4.170 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4353.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VE 4407.000 3.870 1.000 20.000 8.000 0.000 0.000 10.546 -0.005 0.000

VE 4419.000 3.790 1.000 20.000 8.000 0.000 0.000 10.546 0.014 0.000

VE 4453.000 4.520 1.000 20.000 8.000 0.000 0.000 10.546 0.030 0.000

VE 4459.000 5.000 1.000 20.000 8.000 0.000 0.000 10.546 -0.014 0.000

VE 4505.000 3.780 1.000 20.000 8.000 0.000 0.000 10.546 -0.025 0.000

VE 4511.000 3.720 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

VE 4553.000 3.800 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

VE 4603.000 3.760 1.000 20.000 8.000 0.000 0.000 10.546 0.003 0.000

VE 4657.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.005 0.000

VE 4663.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

VH 4665.000 4.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4679.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4693.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4703.000 3.930 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4721.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4729.000 3.760 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4787.000 4.090 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4815.000 4.230 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4835.000 4.340 2.000 1.000 0.000 1.000 0.000 10.546 0.061 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4861.000 7.020 2.000 1.000 0.000 1.000 0.000 10.546 0.060 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4879.000 7.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.024 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4928.000 5.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4945.000 5.360 2.000 1.000 0.000 1.000 0.000 10.546 0.049 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4969.000 7.400 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4993.000 5.700 2.000 1.000 0.000 1.000 0.000 10.546 -0.045 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5002.000 5.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5037.000 5.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5051.000 5.590 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5115.000 6.190 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5129.000 5.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5185.000 5.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5205.000 5.140 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5251.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5383.000 7.170 2.000 1.000 0.000 1.000 0.000 10.546 0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5413.000 7.680 2.000 1.000 0.000 1.000 0.000 10.546 -0.029 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5431.000 5.800 2.000 1.000 0.000 1.000 0.000 10.546 -0.061 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5457.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5467.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5479.000 5.380 2.000 1.000 0.000 1.000 0.000 10.546 0.024 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5495.000 5.680 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

IF 5503.000 5.740 0.000 10.546 0.000 0.000 0.000 0.000 0.020 0.000

IF 5515.000 6.080 0.000 10.546 0.000 0.000 0.000 0.000 0.027 0.000

IF 5549.000 7.000 0.000 10.546 0.000 0.000 0.000 0.000 0.005 0.000

IF 5705.000 7.000 0.000 10.546 0.000 0.000 0.000 0.000 -0.003 0.000

IF 5873.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 -0.004 0.000

IF 5931.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 5949.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 5957.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

VH 5959.000 6.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.018 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6001.000 5.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6053.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6069.000 4.710 2.000 1.000 0.000 1.000 0.000 10.546 0.032 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6103.000 6.590 2.000 1.000 0.000 1.000 0.000 10.546 -0.020 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6135.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.076 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6171.000 3.180 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6193.000 2.180 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6213.000 2.260 2.000 1.000 0.000 1.000 0.000 10.546 0.062 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6251.000 5.760 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

BU 6313.000 4.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.027 0.000

BU 6315.000 4.000 0.600 6.000 0.000 10.546 0.000 0.000 0.000 0.000

BU 6319.000 4.000 0.600 6.000 0.000 10.546 0.000 0.000 0.054 0.000

BU 6327.000 4.650 0.600 6.000 0.000 10.546 0.000 0.000 0.104 0.000

BU 6369.000 9.220 0.600 6.000 0.000 10.546 0.000 0.000 0.042 0.000

BU 6449.000 9.820 0.600 6.000 0.000 10.546 0.000 0.000 0.004 0.000

BU 6465.000 9.650 0.600 6.000 0.000 10.546 0.000 0.000 -0.019 0.000

BU 6475.000 9.340 0.600 6.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 6537.000 9.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.002 0.000

BU 6613.000 9.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.011 0.000

BU 6821.000 6.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 6867.000 6.810 0.600 6.000 0.000 10.546 0.000 0.000 0.018 0.000

AS 6909.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 6987.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7015.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7031.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7101.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7147.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7177.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7207.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7235.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7297.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

ET 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

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END END FETCH SURGE ELEV SURGE ELEV INITIAL INITIAL BOTTOM AVERAGE

STATION ELEVATION LENGTH 10-YEAR 100-YEAR WAVE HEIGHT W. PERIOD SLOPE A-ZONES

IE 0.000 -2.295 0.000 0.000 10.546 13.200 5.390 0.000 0.155 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 1.000 -2.140 0.000 10.546 0.000 0.000 0.000 0.000 0.245 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 7.000 -0.580 0.000 10.546 0.000 0.000 0.000 0.000 0.269 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 8.000 -0.260 0.000 10.546 0.000 0.000 0.000 0.000 0.345 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF	9.000	0.110	0.000	10.546	0.000	0.000	0.000	0.000	0.397	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	11.000	0.930	0.000	10.546	0.000	0.000	0.000	0.000	0.420	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	14.000	2.210	0.000	10.546	0.000	0.000	0.000	0.000	0.461	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
DU	23.000	6.460	1.000	0.000	10.546	0.000	0.000	0.000	0.467	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
DU	25.000	7.350	1.000	0.000	10.546	0.000	0.000	0.000	0.423	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
DU	27.000	8.150	1.000	0.000	10.546	0.000	0.000	0.000	0.343	0.000

	STATION	DUNE CREST ELEVATION	DUNE CREST SEAWALL	DUNE OR 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE			BOTTOM SLOPE	AVERAGE A-ZONES
DU	31.000	9.410	1.000	0.000	10.546	0.000	0.000	0.000	0.270	0.000

	STATION	DUNE CREST ELEVATION	DUNE CREST SEAWALL	DUNE OR 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE			BOTTOM SLOPE	AVERAGE A-ZONES
DU	35.000	10.310	1.000	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	41.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	47.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	53.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
AS	59.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	65.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	67.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	71.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	75.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	87.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	95.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	99.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	105.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	109.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	113.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	117.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	121.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	129.000	10.530	0.150	10.000	0.000	10.546	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	135.000	10.410	0.150	10.000	0.000	10.546	0.000	-0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	143.000	10.360	0.150	10.000	0.000	10.546	0.000	-0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	149.000	10.240	0.150	10.000	0.000	10.546	0.000	-0.021	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	153.000	10.150	0.150	10.000	0.000	10.546	0.000	-0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	157.000	10.040	0.150	10.000	0.000	10.546	0.000	-0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	163.000	9.800	0.150	10.000	0.000	10.546	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	183.000	9.200	0.150	10.000	0.000	10.546	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	195.000	8.780	0.150	10.000	0.000	10.546	0.000	-0.033	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	203.000	8.540	0.150	10.000	0.000	10.546	0.000	-0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	207.000	8.420	0.150	10.000	0.000	10.546	0.000	-0.031	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	221.000	7.990	0.150	10.000	0.000	10.546	0.000	-0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	227.000	7.910	0.150	10.000	0.000	10.546	0.000	-0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	231.000	7.850	0.150	10.000	0.000	10.546	0.000	-0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	235.000	7.790	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	241.000	7.700	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	249.000	7.580	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	253.000	7.520	0.150	10.000	0.000	10.546	0.000	0.000 -0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	265.000	7.380	0.150	10.000	0.000	10.546	0.000	0.000 -0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	283.000	7.170	0.150	10.000	0.000	10.546	0.000	0.000 -0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	295.000	7.040	0.150	10.000	0.000	10.546	0.000	0.000 -0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	307.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	315.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	323.000	6.920	0.150	10.000	0.000	10.546	0.000	0.000 -0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	329.000	6.840	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	341.000	6.670	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	353.000	6.500	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	357.000	6.450	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	361.000	6.390	0.150	10.000	0.000	10.546	0.000	0.000 -0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	373.000	6.240	0.150	10.000	0.000	10.546	0.000	0.000 -0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	379.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000 -0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	385.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000 -0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	391.000	6.140	0.150	10.000	0.000	10.546	0.000	0.000 -0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	407.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	413.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	425.000	5.940	0.150	10.000	0.000	10.546	0.000	0.000 -0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	449.000	5.540	0.150	10.000	0.000	10.546	0.000	0.000 -0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	457.000	5.380	0.150	10.000	0.000	10.546	0.000	0.000 -0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	461.000	5.340	0.150	10.000	0.000	10.546	0.000	0.000 -0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	467.000	5.350	0.150	10.000	0.000	10.546	0.000	-0.001	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	473.000	5.330	0.150	10.000	0.000	10.546	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	477.000	5.280	0.150	10.000	0.000	10.546	0.000	-0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	481.000	5.290	0.150	10.000	0.000	10.546	0.000	-0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	485.000	5.240	0.150	10.000	0.000	10.546	0.000	-0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	487.000	5.210	0.150	10.000	0.000	10.546	0.000	-0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	489.000	5.170	0.150	10.000	0.000	10.546	0.000	-0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	503.000	5.120	0.150	10.000	0.000	10.546	0.000	-0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	507.000	5.120	0.150	10.000	0.000	10.546	0.000	-0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	513.000	5.090	0.150	10.000	0.000	10.546	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	515.000	5.060	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	519.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	521.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	527.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	541.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	547.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	553.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	557.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	559.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	565.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	569.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	573.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	577.000	5.080	0.150	10.000	0.000	10.546	0.000	0.000	0.042	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	583.000	5.420	0.150	10.000	0.000	10.546	0.000	0.000	0.053	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	587.000	5.610	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	599.000	5.880	0.150	10.000	0.000	10.546	0.000	-0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	615.000	5.250	0.150	10.000	0.000	10.546	0.000	-0.042	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	621.000	4.960	0.150	10.000	0.000	10.546	0.000	-0.045	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	623.000	4.890	0.150	10.000	0.000	10.546	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	629.000	4.660	0.150	10.000	0.000	10.546	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	635.000	4.440	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	639.000	4.280	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	647.000	3.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	649.000	3.930	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
BU	653.000	3.810	0.150	10.000	0.000	10.546	0.000	0.000	-0.029	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	657.000	3.700	0.150	10.000	0.000	10.546	0.000	-0.028	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	667.000	3.420	0.150	10.000	0.000	10.546	0.000	-0.024	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	675.000	3.260	0.150	10.000	0.000	10.546	0.000	-0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	679.000	3.180	0.150	10.000	0.000	10.546	0.000	-0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	685.000	3.060	0.150	10.000	0.000	10.546	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	705.000	3.000	0.150	10.000	0.000	10.546	0.000	0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	725.000	3.200	0.150	10.000	0.000	10.546	0.000	0.019	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	759.000	4.000	0.150	10.000	0.000	10.546	0.000	0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	765.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	769.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	777.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	783.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	805.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	823.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	829.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	837.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	845.000	3.910	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	851.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000 0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	861.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	865.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	873.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	877.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	879.000	3.950	0.150	10.000	0.000	10.546	0.000	0.000	-0.073	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	883.000	3.560	0.150	10.000	0.000	10.546	0.000	0.000	-0.098	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	885.000	3.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.093	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	889.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.023	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	901.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	907.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000 0.008	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	913.000	3.100	0.150	10.000	0.000	10.546	0.000	0.000 0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	917.000	3.200	0.150	10.000	0.000	10.546	0.000	0.000 0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	923.000	3.170	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	935.000	3.200	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	945.000	2.970	0.150	10.000	0.000	10.546	0.000	0.000	-0.039	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	953.000	2.490	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	957.000	2.610	0.150	10.000	0.000	10.546	0.000	0.000	0.031	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	965.000	2.860	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	975.000	2.600	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	977.000	2.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	983.000	2.380	2.000	1.000	0.000	1.000	0.000	10.546	-0.021	0.000

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	985.000	2.360	2.000	1.000	0.000	1.000	0.000	10.546	0.102	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 991.000 3.200 2.000 1.000 0.000 1.000 0.000 10.546 0.100 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 997.000 3.560 2.000 1.000 0.000 1.000 0.000 10.546 0.059 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1009.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.046 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1015.000 4.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1017.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 -0.070 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1019.000 4.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1021.000	4.070	2.000	1.000	0.000	1.000	0.000	10.546	-0.140	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1025.000 3.270 2.000 1.000 0.000 1.000 0.000 10.546 -0.212 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1026.000	3.010	2.000	1.000	0.000	1.000	0.000	10.546	-0.240	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1027.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.190 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1029.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.282 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1042.000 -1.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.205 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1049.000 -1.650 2.000 1.000 0.000 1.000 0.000 10.546 0.105 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1057.000	0.130	2.000	1.000	0.000	1.000	0.000	10.546	0.257	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM AVERAGE A-ZONES
VH	1059.000	0.920	2.000	1.000	0.000	1.000	0.000	10.546	0.280	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1063.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.182 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1065.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.090 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1073.000 2.710 2.000 1.000 0.000 1.000 0.000 10.546 0.083 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1077.000 3.000 2.000 1.000 0.000 1.000 0.000 10.546 0.131 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1089.000 4.800 2.000 1.000 0.000 1.000 0.000 10.546 0.147 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1091.000 5.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1097.000	4.780	2.000	1.000	0.000	1.000	0.000	10.546	-0.112	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1101.000 3.940 2.000 1.000 0.000 1.000 0.000 10.546 -0.208 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1103.000	3.530	2.000	1.000	0.000	1.000	0.000	10.546	-0.072	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1133.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 -0.059 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1135.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1141.000 1.640 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1145.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.018 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1151.000	1.820	2.000	1.000	0.000	1.000	0.000	10.546	0.026	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH 1159.000	2.040	2.000	1.000	0.000	1.000	0.000	10.546	0.034	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 0.160 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1169.000 3.640 2.000 1.000 0.000 1.000 0.000 10.546 0.168 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1171.000 3.840 2.000 1.000 0.000 1.000 0.000 10.546 -0.040 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1177.000 3.320 2.000 1.000 0.000 1.000 0.000 10.546 -0.112 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1189.000 1.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.094 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1193.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1199.000	1.860	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1221.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1227.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1231.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1235.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1239.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1243.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1251.000	1.940	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1257.000	1.930	2.000	1.000	0.000	1.000	0.000	10.546	-0.003	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1265.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1273.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1285.000 1.750 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1291.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.014 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1297.000 1.920 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1303.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1307.000	1.930	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1315.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1321.000	2.080	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1343.000 2.180 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1351.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.027 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1361.000 1.700 2.000 1.000 0.000 1.000 0.000 10.546 -0.033 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1365.000 1.700 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 1369.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1377.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1383.000 1.730 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1387.000 1.770 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1389.000 1.780 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1397.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1401.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1405.000 1.950 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1409.000	1.970	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1411.000 1.960 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1413.000	1.910	2.000	1.000	0.000	1.000	0.000	10.546	-0.032	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1417.000 1.770 2.000 1.000 0.000 1.000 0.000 10.546 -0.031 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1421.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 -0.018 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1423.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1427.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
	SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 WEIGHT	REGION 1	REGION 2 WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1429.000	1.680	2.000	1.000	0.000	1.000	0.000	10.546	0.005	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM AVERAGE A-ZONES
VH	1431.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1433.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1437.000	1.730	0.000	10.546	0.000	0.000	0.000	0.027	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1453.000	2.240	0.000	10.546	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1467.000	2.560	0.000	10.546	0.000	0.000	0.000	0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1471.000	2.660	0.000	10.546	0.000	0.000	0.000	0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1481.000	2.880	0.000	10.546	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1571.000	3.440	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1585.000	3.500	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1589.000	3.520	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1595.000	3.540	0.000	10.546	0.000	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1599.000	3.550	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1611.000	3.520	0.000	10.546	0.000	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1619.000	3.490	0.000	10.546	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1627.000	3.510	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1631.000	3.550	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1635.000	3.580	0.000	10.546	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1645.000	3.660	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	1651.000	3.720	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1665.000	3.830	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1669.000	3.860	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1671.000	3.870	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1673.000	3.910	0.000	10.546	0.000	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1681.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	0.016	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	1695.000	4.260	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1707.000	4.410	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1715.000	4.510	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1735.000	4.770	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1739.000	4.820	0.000	10.546	0.000	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1743.000	4.870	0.000	10.546	0.000	0.000	0.000	0.000	0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1747.000	4.930	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1751.000	4.950	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1753.000	4.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1759.000	4.840	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1761.000	4.810	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1763.000	4.780	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1765.000	4.750	0.000	10.546	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1777.000	4.570	0.000	10.546	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1783.000	4.500	0.000	10.546	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1793.000	4.390	0.000	10.546	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1797.000	4.350	0.000	10.546	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1813.000	4.170	0.000	10.546	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1819.000	4.100	0.000	10.546	0.000	0.000	0.000	-0.012	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1827.000	4.000	0.000	10.546	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1853.000	3.840	0.000	10.546	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1855.000	3.830	0.000	10.546	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1861.000	3.800	0.000	10.546	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	1877.000	3.690	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1883.000	3.620	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1889.000	3.530	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1893.000	3.480	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1897.000	3.420	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1905.000	3.370	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	1933.000	3.360	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1937.000	3.340	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1943.000	3.310	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1951.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1961.000	3.230	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1965.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1969.000	3.190	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1973.000	3.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1977.000	3.140	0.000	10.546	0.000	0.000	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1981.000	3.110	0.000	10.546	0.000	0.000	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1995.000	3.030	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2027.000	3.180	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2031.000	3.210	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2051.000	3.350	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2069.000	3.520	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2091.000	3.550	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2101.000	3.570	0.000	10.546	0.000	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2131.000	3.680	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2137.000	3.720	0.000	10.546	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2151.000	3.810	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2163.000	3.840	0.000	10.546	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2183.000	4.220	0.000	10.546	0.000	0.000	0.000	0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2203.000	4.350	0.000	10.546	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	2209.000	4.410	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2213.000	4.460	0.000	10.546	0.000	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2223.000	4.380	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2227.000	4.340	0.000	10.546	0.000	0.000	0.000	0.000	-0.013	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2247.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	-0.017	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2257.000	3.830	0.000	10.546	0.000	0.000	0.000	0.000	-0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	2267.000	3.600	0.000	10.546	0.000	0.000	0.000	0.000	-0.024	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2273.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	-0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2277.000	3.370	0.000	10.546	0.000	0.000	0.000	0.000	-0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2283.000	3.250	0.000	10.546	0.000	0.000	0.000	0.000	-0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2295.000	3.010	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2305.000	3.140	0.000	10.546	0.000	0.000	0.000	0.000	0.024	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2315.000	3.490	0.000	10.546	0.000	0.000	0.000	0.023	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2331.000	3.740	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2343.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2347.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2363.000	3.740	0.000	10.546	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2367.000	3.750	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2379.000	3.890	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2403.000	4.000	0.000	10.546	0.000	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2409.000	3.990	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2423.000	4.030	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2435.000	4.120	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2453.000	4.100	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2463.000	4.090	0.000	10.546	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2471.000	3.950	0.000	10.546	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2477.000	4.030	0.000	10.546	0.000	0.000	0.000	0.046	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2485.000	4.600	0.000	10.546	0.000	0.000	0.000	0.063	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2489.000	4.780	0.000	10.546	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	2495.000	4.800	0.000	10.546	0.000	0.000	0.000	0.000	-0.033	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2501.000	4.380	0.000	10.546	0.000	0.000	0.000	0.000	-0.086	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2509.000	3.600	0.000	10.546	0.000	0.000	0.000	0.000	-0.051	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2515.000	3.660	0.000	10.546	0.000	0.000	0.000	0.000	0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2517.000	3.710	0.000	10.546	0.000	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2523.000	3.820	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	2587.000	4.250	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2765.000	4.080	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2833.000	4.500	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2877.000	4.340	0.000	10.546	0.000	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2935.000	4.840	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	3001.000	4.310	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3037.000	4.770	0.000	10.546	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3071.000	4.520	0.000	10.546	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3233.000	3.960	0.000	10.546	0.000	0.000	0.000	0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3375.000	5.500	0.000	10.546	0.000	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3565.000	3.410	0.000	10.546	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

VH 3585.000 3.470 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3591.000 3.250 2.000 1.000 0.000 1.000 0.000 10.546 0.012 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3613.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 0.022 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3621.000	3.910	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3663.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3671.000	4.130	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION | END ELEVATION | REGION 1 REGION 1 | NO. OF REGION 1 WEIGHT | NEW SURGE REGION 2 | NEW SURGE PLANT TYPES | BOTTOM 10-YEAR | AVERAGE 100-YEAR | SLOPE | A-ZONES

VH	3693.000	4.160	2.000	1.000	0.000	1.000	0.000	10.546	-0.006	0.000

PLANT TYPE | DRAG COEFF. | COVERAGE RATIO | AVG. STEM HEIGHT | NUMBER DENSITY | BASE STEM DIAMETER | MID STEM DIAMETER | TOP STEM DIAMETER | LEAF-STEM AREA RATIO

MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE | DRAG COEFF. | COVERAGE RATIO | AVG. STEM HEIGHT | NUMBER DENSITY | BASE STEM DIAMETER | MID STEM DIAMETER | TOP STEM DIAMETER | LEAF-STEM AREA RATIO

SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3743.000 3.730 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3763.000 4.010 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3793.000 3.820 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	3815.000	3.760	2.000	1.000	0.000	1.000	0.000	10.546	0.015	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH 3833.000	4.430	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3841.000 3.920 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3861.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3869.000 4.100 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3917.000 3.910 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3955.000 3.740 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 3963.000 3.660 1.000 25.000 10.000 0.000 0.000 10.546 0.014 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 3971.000 3.970 1.000 25.000 10.000 0.000 0.000 10.546 0.080 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 3983.000 5.260 1.000 25.000 10.000 0.000 0.000 10.546 0.060 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 3999.000 5.650 1.000 25.000 10.000 0.000 0.000 10.546 0.009 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 4009.000 5.480 1.000 25.000 10.000 0.000 0.000 10.546 -0.095 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR
SLOPE A-ZONES

VE 4019.000 3.750 1.000 25.000 10.000 0.000 0.000 10.546 -0.036 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE
BOTTOM AVERAGE

STATION		ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE	4059.000	3.670	1.000	25.000	10.000	0.000	0.000	10.546	0.000	0.000

STATION		END ELEVATION	END DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	AVERAGE COEFF.	DRAG 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE BOTTOM SLOPE	AVERAGE A-ZONES
VE	4077.000	3.770	1.000	25.000	10.000	0.000	0.000	10.546	0.003	0.000

STATION		END ELEVATION	END DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	AVERAGE COEFF.	DRAG 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE BOTTOM SLOPE	AVERAGE A-ZONES
VE	4085.000	3.740	1.000	25.000	10.000	0.000	0.000	10.546	0.036	0.000

STATION		END ELEVATION	END DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	AVERAGE COEFF.	DRAG 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE BOTTOM SLOPE	AVERAGE A-ZONES
VE	4105.000	4.780	1.000	25.000	10.000	0.000	0.000	10.546	0.018	0.000

STATION		END ELEVATION	END DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	AVERAGE COEFF.	DRAG 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE BOTTOM SLOPE	AVERAGE A-ZONES
VE	4131.000	4.580	1.000	25.000	10.000	0.000	0.000	10.546	0.024	0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4159.000 6.100 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4179.000 5.730 1.000 25.000 10.000 0.000 0.000 10.546 -0.045 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4189.000 4.740 1.000 25.000 10.000 0.000 0.000 10.546 -0.123 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4191.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 -0.043 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4211.000 3.790 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	4297.000	4.260	2.000	1.000	0.000	1.000	0.000	10.546	0.004	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4313.000 4.170 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4353.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4407.000	3.870	1.000	20.000	8.000	0.000	0.000	10.546	-0.005	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4419.000	3.790	1.000	20.000	8.000	0.000	0.000	10.546	0.014	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4453.000	4.520	1.000	20.000	8.000	0.000	0.000	10.546	0.030	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4459.000	5.000	1.000	20.000	8.000	0.000	0.000	10.546	-0.014	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4505.000	3.780	1.000	20.000	8.000	0.000	0.000	10.546	-0.025	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4511.000	3.720	1.000	20.000	8.000	0.000	0.000	10.546	0.000	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4553.000	3.800	1.000	20.000	8.000	0.000	0.000	10.546	0.000	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4603.000	3.760	1.000	20.000	8.000	0.000	0.000	10.546	0.003	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4657.000	4.070	1.000	20.000	8.000	0.000	0.000	10.546	0.005	0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4663.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4665.000 4.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4679.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4693.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4703.000 3.930 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4721.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4729.000	3.760	2.000	1.000	0.000	1.000	0.000	10.546	0.004	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4787.000	4.090	2.000	1.000	0.000	1.000	0.000	10.546	0.005	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4815.000 4.230 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4835.000 4.340 2.000 1.000 0.000 1.000 0.000 10.546 0.061 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4861.000 7.020 2.000 1.000 0.000 1.000 0.000 10.546 0.060 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4879.000 7.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.024 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4928.000 5.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	4945.000	5.360	2.000	1.000	0.000	1.000	0.000	10.546	0.049	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	4969.000	7.400	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4993.000 5.700 2.000 1.000 0.000 1.000 0.000 10.546 -0.045 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	5002.000	5.910	2.000	1.000	0.000	1.000	0.000	10.546	0.003	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5037.000 5.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	5051.000	5.590	2.000	1.000	0.000	1.000	0.000	10.546	0.005	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	5115.000	6.190	2.000	1.000	0.000	1.000	0.000	10.546	0.003	0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5129.000 5.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 5185.000	5.420	2.000	1.000	0.000	1.000	0.000	10.546	-0.009	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5205.000	5.140	2.000	1.000	0.000	1.000	0.000	10.546	-0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5251.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5383.000 7.170 2.000 1.000 0.000 1.000 0.000 10.546 0.016 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5413.000 7.680 2.000 1.000 0.000 1.000 0.000 10.546 -0.029 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5431.000 5.800 2.000 1.000 0.000 1.000 0.000 10.546 -0.061 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5457.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5467.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	5479.000	5.380	2.000	1.000	0.000	1.000	0.000	10.546	0.024	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5495.000 5.680 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5503.000	5.740	0.000	10.546	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5515.000	6.080	0.000	10.546	0.000	0.000	0.000	0.027	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5549.000	7.000	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5705.000	7.000	0.000	10.546	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

IF	5873.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5931.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5949.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5957.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5959.000	6.000	2.000	1.000	0.000	1.000	0.000	10.546	-0.018	0.000

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1 WEIGHT	REGION 1 PLANT TYPES	REGION 2 WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR A-ZONES	NEW SURGE 100-YEAR A-ZONES	NEW SURGE BOTTOM SLOPE	BOTTOM AVERAGE
VH	6001.000	5.220	2.000	1.000	0.000	1.000	0.000	10.546	-0.011	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6053.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6069.000 4.710 2.000 1.000 0.000 1.000 0.000 10.546 0.032 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6103.000 6.590 2.000 1.000 0.000 1.000 0.000 10.546 -0.020 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6135.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.076 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1 WEIGHT	REGION 1 REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	6171.000	3.180	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6193.000 2.180 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1	REGION 1 WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	6213.000	2.260	2.000	1.000	0.000	1.000	0.000	10.546	0.062	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6251.000 5.760 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6313.000	4.000	0.600	6.000	0.000	10.546	0.000	0.000 -0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6315.000	4.000	0.600	6.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6319.000	4.000	0.600	6.000	0.000	10.546	0.000	0.000 0.054	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6327.000	4.650	0.600	6.000	0.000	10.546	0.000	0.000 0.104	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6369.000	9.220	0.600	6.000	0.000	10.546	0.000	0.042	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6449.000	9.820	0.600	6.000	0.000	10.546	0.000	0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6465.000	9.650	0.600	6.000	0.000	10.546	0.000	-0.019	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6475.000	9.340	0.600	6.000	0.000	10.546	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6537.000	9.000	0.600	6.000	0.000	10.546	0.000	-0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6613.000	9.000	0.600	6.000	0.000	10.546	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6821.000	6.000	0.600	6.000	0.000	10.546	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6867.000	6.810	0.600	6.000	0.000	10.546	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
AS	6909.000	10.560	0.000	10.546	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
AS	6987.000	10.560	0.000	10.546	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

AS	7015.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7031.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7101.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7147.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7177.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	7207.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
AS	7235.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7297.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

----------END OF TRANSECT----------

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

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PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

LOCATION	CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	8.75	5.39	16.67
IF	1.00	8.66	5.39	16.60

IF	7.00	7.72	5.39	15.95
IF	8.00	7.53	5.39	15.82
IF	9.00	7.30	5.39	15.66
IF	11.00	6.79	5.39	15.30
IF	14.00	5.96	5.39	14.72
DU	23.00	4.51	5.39	13.70
DU	25.00	3.46	5.39	12.97
DU	27.00	2.64	5.39	12.39
DU	31.00	1.76	5.39	11.78
DU	35.00	0.97	5.39	11.23
AS	41.00	0.00	0.00	10.56
AS	47.00	0.00	0.00	10.56
AS	53.00	0.00	0.00	10.56
AS	59.00	0.00	0.00	10.56
AS	65.00	0.00	0.00	10.56

AS	67.00	0.00	0.00	10.56
AS	71.00	0.00	0.00	10.56
AS	75.00	0.00	0.00	10.56
AS	87.00	0.00	0.00	10.56
AS	95.00	0.00	0.00	10.56
AS	99.00	0.00	0.00	10.56
AS	105.00	0.00	0.00	10.56
AS	109.00	0.00	0.00	10.56
AS	113.00	0.00	0.00	10.56
AS	117.00	0.00	0.00	10.56
AS	121.00	0.00	0.00	10.56
BU	129.00	0.00	0.00	10.55
BU	135.00	0.00	0.00	10.55
BU	143.00	0.00	0.00	10.55

BU	149.00	0.00	0.00	10.55
BU	153.00	0.00	0.00	10.55
BU	157.00	0.00	0.00	10.55
BU	163.00	0.00	0.00	10.55
BU	183.00	0.00	0.00	10.55
BU	195.00	0.00	0.00	10.55
BU	203.00	0.00	0.00	10.55
BU	207.00	0.00	0.00	10.55
BU	221.00	0.00	0.00	10.55
BU	227.00	0.00	0.00	10.55
BU	231.00	0.00	0.00	10.55
BU	235.00	0.00	0.00	10.55
BU	241.00	0.00	0.00	10.55
BU	249.00	0.00	0.00	10.55
BU	253.00	0.00	0.00	10.55

BU	265.00	0.00	0.00	10.55
BU	283.00	0.00	0.00	10.55
BU	295.00	0.00	0.00	10.55
BU	307.00	0.00	0.00	10.55
BU	315.00	0.00	0.00	10.55
BU	323.00	0.00	0.00	10.55
BU	329.00	0.00	0.00	10.55
BU	341.00	0.00	0.00	10.55
BU	353.00	0.00	0.00	10.55
BU	357.00	0.00	0.00	10.55
BU	361.00	0.00	0.00	10.55
BU	373.00	0.00	0.00	10.55
BU	379.00	0.00	0.00	10.55
BU	385.00	0.00	0.00	10.55

BU	391.00	0.00	0.00	10.55
BU	407.00	0.00	0.00	10.55
BU	413.00	0.00	0.00	10.55
BU	425.00	0.00	0.00	10.55
BU	449.00	0.00	0.00	10.55
BU	457.00	0.00	0.00	10.55
BU	461.00	0.00	0.00	10.55
BU	467.00	0.00	0.00	10.55
BU	473.00	0.00	0.00	10.55
BU	477.00	0.00	0.00	10.55
BU	481.00	0.00	0.00	10.55
BU	485.00	0.00	0.00	10.55
BU	487.00	0.00	0.00	10.55
BU	489.00	0.00	0.00	10.55
BU	503.00	0.00	0.00	10.55

BU	507.00	0.00	0.00	10.55
BU	513.00	0.00	0.00	10.55
BU	515.00	0.00	0.00	10.55
BU	519.00	0.00	0.00	10.55
BU	521.00	0.00	0.00	10.55
BU	527.00	0.00	0.00	10.55
BU	541.00	0.00	0.00	10.55
BU	547.00	0.00	0.00	10.55
BU	553.00	0.00	0.00	10.55
BU	557.00	0.00	0.00	10.55
BU	559.00	0.00	0.00	10.55
BU	565.00	0.00	0.00	10.55
BU	569.00	0.00	0.00	10.55
BU	573.00	0.00	0.00	10.55

BU	577.00	0.00	0.00	10.55
BU	583.00	0.00	0.00	10.55
BU	587.00	0.00	0.00	10.55
BU	599.00	0.00	0.00	10.55
BU	615.00	0.00	0.00	10.55
BU	621.00	0.00	0.00	10.55
BU	623.00	0.00	0.00	10.55
BU	629.00	0.00	0.00	10.55
BU	635.00	0.00	0.00	10.55
BU	639.00	0.00	0.00	10.55
BU	647.00	0.00	0.00	10.55
BU	649.00	0.00	0.00	10.55
BU	653.00	0.00	0.00	10.55
BU	657.00	0.00	0.00	10.55
BU	667.00	0.00	0.00	10.55

BU	675.00	0.00	0.00	10.55
BU	679.00	0.00	0.00	10.55
BU	685.00	0.00	0.00	10.55
BU	705.00	0.00	0.00	10.55
BU	725.00	0.00	0.00	10.55
BU	759.00	0.00	0.00	10.55
BU	765.00	0.00	0.00	10.55
BU	769.00	0.00	0.00	10.55
BU	777.00	0.00	0.00	10.55
BU	783.00	0.00	0.00	10.55
BU	805.00	0.00	0.00	10.55
BU	823.00	0.00	0.00	10.55
BU	829.00	0.00	0.00	10.55
BU	837.00	0.00	0.00	10.55

BU	845.00	0.00	0.00	10.55
BU	851.00	0.00	0.00	10.55
BU	861.00	0.00	0.00	10.55
BU	865.00	0.00	0.00	10.55
BU	873.00	0.00	0.00	10.55
BU	877.00	0.00	0.00	10.55
BU	879.00	0.00	0.00	10.55
BU	883.00	0.00	0.00	10.55
BU	885.00	0.00	0.00	10.55
BU	889.00	0.00	0.00	10.55
BU	901.00	0.00	0.00	10.55
BU	907.00	0.00	0.00	10.55
BU	913.00	0.00	0.00	10.55
BU	917.00	0.00	0.00	10.55
BU	923.00	0.00	0.00	10.55

BU	935.00	0.00	0.00	10.55
BU	945.00	0.00	0.00	10.55
BU	953.00	0.00	0.00	10.55
BU	957.00	0.00	0.00	10.55
BU	965.00	0.00	0.00	10.55
BU	975.00	0.00	0.00	10.55
BU	977.00	0.00	0.00	10.55
VH	983.00	0.05	0.27	10.58
VH	985.00	0.06	0.29	10.59
VH	991.00	0.09	0.35	10.61
VH	997.00	0.11	0.39	10.63
VH	1009.00	0.15	0.46	10.65
VH	1015.00	0.17	0.49	10.67
VH	1017.00	0.18	0.49	10.67

VH	1019.00	0.18	0.50	10.68
VH	1021.00	0.19	0.51	10.68
VH	1025.00	0.20	0.52	10.69
VH	1026.00	0.20	0.53	10.69
VH	1027.00	0.21	0.53	10.69
VH	1029.00	0.21	0.54	10.69
VH	1042.00	0.25	0.58	10.72
VH	1049.00	0.26	0.60	10.73
VH	1057.00	0.28	0.62	10.74
VH	1059.00	0.29	0.63	10.75
VH	1063.00	0.30	0.64	10.75
VH	1065.00	0.30	0.64	10.76
VH	1073.00	0.32	0.66	10.77
VH	1077.00	0.33	0.67	10.78
VH	1089.00	0.35	0.70	10.79

VH	1091.00	0.36	0.70	10.80
VH	1097.00	0.37	0.71	10.81
VH	1101.00	0.38	0.72	10.81
VH	1103.00	0.38	0.72	10.81
VH	1133.00	0.44	0.78	10.85
VH	1135.00	0.44	0.78	10.86
VH	1141.00	0.46	0.79	10.87
VH	1145.00	0.46	0.80	10.87
VH	1151.00	0.47	0.80	10.88
VH	1159.00	0.49	0.82	10.89
VH	1161.00	0.49	0.82	10.89
VH	1169.00	0.51	0.83	10.90
VH	1171.00	0.51	0.83	10.90
VH	1177.00	0.52	0.84	10.91

VH	1189.00	0.54	0.86	10.92
VH	1193.00	0.55	0.86	10.93
VH	1199.00	0.56	0.87	10.94
VH	1221.00	0.59	0.90	10.96
VH	1227.00	0.60	0.91	10.97
VH	1231.00	0.61	0.91	10.97
VH	1235.00	0.62	0.92	10.98
VH	1239.00	0.62	0.92	10.98
VH	1243.00	0.63	0.93	10.99
VH	1251.00	0.64	0.94	10.99
VH	1257.00	0.65	0.94	11.00
VH	1265.00	0.66	0.95	11.01
VH	1273.00	0.68	0.96	11.02
VH	1285.00	0.69	0.97	11.03
VH	1291.00	0.70	0.98	11.04

VH	1297.00	0.71	0.99	11.04
VH	1303.00	0.72	0.99	11.05
VH	1307.00	0.73	1.00	11.05
VH	1315.00	0.74	1.00	11.06
VH	1321.00	0.75	1.01	11.07
VH	1343.00	0.78	1.03	11.09
VH	1351.00	0.79	1.04	11.10
VH	1361.00	0.80	1.05	11.11
VH	1365.00	0.81	1.05	11.11
VH	1369.00	0.81	1.05	11.12
VH	1377.00	0.82	1.06	11.12
VH	1383.00	0.83	1.07	11.13
VH	1387.00	0.84	1.07	11.13
VH	1389.00	0.84	1.07	11.13

VH	1397.00	0.85	1.08	11.14
VH	1401.00	0.86	1.08	11.15
VH	1405.00	0.86	1.09	11.15
VH	1409.00	0.87	1.09	11.15
VH	1411.00	0.87	1.09	11.16
VH	1413.00	0.87	1.09	11.16
VH	1417.00	0.88	1.10	11.16
VH	1421.00	0.88	1.10	11.16
VH	1423.00	0.89	1.10	11.17
VH	1427.00	0.89	1.10	11.17
VH	1429.00	0.89	1.11	11.17
VH	1431.00	0.90	1.11	11.17
VH	1433.00	0.90	1.11	11.18
IF	1437.00	0.91	1.11	11.18
IF	1453.00	0.93	1.12	11.19

IF	1467.00	0.94	1.14	11.21
IF	1471.00	0.95	1.14	11.21
IF	1481.00	0.96	1.15	11.22
IF	1571.00	1.07	1.21	11.30
IF	1585.00	1.09	1.22	11.31
IF	1589.00	1.09	1.22	11.31
IF	1595.00	1.10	1.23	11.32
IF	1599.00	1.11	1.23	11.32
IF	1611.00	1.12	1.24	11.33
IF	1619.00	1.13	1.24	11.34
IF	1627.00	1.14	1.25	11.34
IF	1631.00	1.14	1.25	11.35
IF	1635.00	1.15	1.25	11.35
IF	1645.00	1.16	1.26	11.36

IF	1651.00	1.17	1.26	11.36
IF	1665.00	1.18	1.27	11.37
IF	1669.00	1.19	1.27	11.38
IF	1671.00	1.19	1.27	11.38
IF	1673.00	1.19	1.28	11.38
IF	1681.00	1.20	1.28	11.39
IF	1695.00	1.22	1.29	11.40
IF	1707.00	1.23	1.30	11.41
IF	1715.00	1.24	1.30	11.41
IF	1735.00	1.26	1.31	11.43
IF	1739.00	1.26	1.31	11.43
IF	1743.00	1.27	1.32	11.43
IF	1747.00	1.27	1.32	11.44
IF	1751.00	1.27	1.32	11.44
IF	1753.00	1.28	1.32	11.44

IF	1759.00	1.28	1.33	11.44
IF	1761.00	1.29	1.33	11.45
IF	1763.00	1.29	1.33	11.45
IF	1765.00	1.29	1.33	11.45
IF	1777.00	1.30	1.34	11.46
IF	1783.00	1.31	1.34	11.46
IF	1793.00	1.32	1.34	11.47
IF	1797.00	1.33	1.35	11.47
IF	1813.00	1.34	1.36	11.49
IF	1819.00	1.35	1.36	11.49
IF	1827.00	1.36	1.36	11.50
IF	1853.00	1.39	1.38	11.52
IF	1855.00	1.39	1.38	11.52
IF	1861.00	1.39	1.38	11.52

IF	1877.00	1.41	1.39	11.53
IF	1883.00	1.42	1.39	11.54
IF	1889.00	1.42	1.39	11.54
IF	1893.00	1.43	1.40	11.54
IF	1897.00	1.43	1.40	11.55
IF	1905.00	1.44	1.40	11.55
IF	1933.00	1.47	1.42	11.57
IF	1937.00	1.47	1.42	11.58
IF	1943.00	1.48	1.42	11.58
IF	1951.00	1.49	1.43	11.59
IF	1961.00	1.50	1.43	11.59
IF	1965.00	1.50	1.43	11.60
IF	1969.00	1.50	1.43	11.60
IF	1973.00	1.51	1.44	11.60
IF	1977.00	1.51	1.44	11.60

IF	1981.00	1.52	1.44	11.61
IF	1995.00	1.53	1.45	11.62
IF	2027.00	1.56	1.46	11.64
IF	2031.00	1.56	1.46	11.64
IF	2051.00	1.58	1.47	11.65
IF	2069.00	1.60	1.48	11.67
IF	2091.00	1.62	1.49	11.68
IF	2101.00	1.63	1.49	11.69
IF	2131.00	1.66	1.51	11.71
IF	2137.00	1.66	1.51	11.71
IF	2151.00	1.68	1.52	11.72
IF	2163.00	1.69	1.52	11.73
IF	2183.00	1.70	1.53	11.74
IF	2203.00	1.72	1.54	11.75

IF	2209.00	1.72	1.54	11.75
IF	2213.00	1.72	1.54	11.75
IF	2223.00	1.73	1.55	11.76
IF	2227.00	1.74	1.55	11.76
IF	2247.00	1.76	1.56	11.78
IF	2257.00	1.77	1.56	11.78
IF	2267.00	1.78	1.56	11.79
IF	2273.00	1.79	1.57	11.80
IF	2277.00	1.79	1.57	11.80
IF	2283.00	1.80	1.57	11.80
IF	2295.00	1.81	1.57	11.81
IF	2305.00	1.82	1.58	11.82
IF	2315.00	1.82	1.58	11.82
IF	2331.00	1.83	1.59	11.83
IF	2343.00	1.84	1.59	11.84

IF	2347.00	1.85	1.60	11.84
IF	2363.00	1.86	1.60	11.85
IF	2367.00	1.86	1.60	11.85
IF	2379.00	1.87	1.61	11.86
IF	2403.00	1.89	1.62	11.87
IF	2409.00	1.90	1.62	11.87
IF	2423.00	1.91	1.62	11.88
IF	2435.00	1.91	1.63	11.89
IF	2453.00	1.93	1.63	11.90
IF	2463.00	1.94	1.64	11.90
IF	2471.00	1.95	1.64	11.91
IF	2477.00	1.95	1.64	11.91
IF	2485.00	1.94	1.65	11.90
IF	2489.00	1.93	1.65	11.90

IF	2495.00	1.94	1.65	11.90
IF	2501.00	1.95	1.65	11.91
IF	2509.00	1.97	1.65	11.93
IF	2515.00	1.98	1.66	11.93
IF	2517.00	1.98	1.66	11.93
IF	2523.00	1.98	1.66	11.93
IF	2587.00	2.02	1.68	11.96
	2711.60	2.12	1.72	12.03
IF	2765.00	2.16	1.74	12.06
IF	2833.00	2.19	1.76	12.08
IF	2877.00	2.22	1.78	12.10
IF	2935.00	2.22	1.79	12.10
IF	3001.00	2.29	1.81	12.15
IF	3037.00	2.29	1.82	12.15
IF	3071.00	2.32	1.83	12.17

	3184.40	2.40	1.86	12.23
IF	3233.00	2.44	1.88	12.25
IF	3375.00	2.35	1.91	12.19
	3508.00	2.56	1.95	12.34
IF	3565.00	2.62	1.96	12.38
VH	3585.00	2.62	1.97	12.38
VH	3591.00	2.63	1.97	12.39
VH	3613.00	2.62	1.97	12.38
VH	3621.00	2.62	1.98	12.38
VH	3663.00	2.63	1.99	12.39
VH	3671.00	2.63	1.99	12.39
VH	3693.00	2.64	1.99	12.39
VH	3743.00	2.69	2.00	12.43
VH	3763.00	2.69	2.01	12.43

VH	3793.00	2.71	2.02	12.44
VH	3815.00	2.72	2.02	12.45
VH	3833.00	2.66	2.03	12.41
VH	3841.00	2.73	2.03	12.45
VH	3861.00	2.71	2.03	12.44
VH	3869.00	2.72	2.03	12.45
VH	3917.00	2.76	2.04	12.48
VH	3955.00	2.79	2.05	12.50
VE	3963.00	2.78	2.05	12.49
VE	3971.00	2.77	2.05	12.48
VE	3983.00	2.61	2.05	12.37
VE	3999.00	2.52	2.05	12.31
VE	4009.00	2.50	2.05	12.30
VE	4019.00	2.49	2.05	12.29
VE	4059.00	2.45	2.05	12.26

VE	4077.00	2.44	2.05	12.25
VE	4085.00	2.43	2.05	12.25
VE	4105.00	2.41	2.05	12.23
VE	4131.00	2.38	2.05	12.21
VE	4159.00	2.35	2.05	12.19
VE	4179.00	2.33	2.05	12.17
VE	4189.00	2.32	2.05	12.17
VH	4191.00	2.34	2.05	12.18
VH	4211.00	2.37	2.06	12.21
VH	4297.00	2.40	2.08	12.22
VH	4313.00	2.41	2.08	12.23
VH	4353.00	2.43	2.09	12.25
VE	4407.00	2.35	2.09	12.19
VE	4419.00	2.34	2.09	12.18

VE	4453.00	2.29	2.09	12.15
VE	4459.00	2.28	2.09	12.14
VE	4505.00	2.22	2.09	12.10
VE	4511.00	2.21	2.09	12.09
VE	4553.00	2.16	2.09	12.06
VE	4603.00	2.11	2.09	12.02
VE	4657.00	2.05	2.09	11.98
VE	4663.00	2.04	2.09	11.97
VH	4665.00	2.04	2.09	11.98
VH	4679.00	2.05	2.09	11.98
VH	4693.00	2.06	2.10	11.99
VH	4703.00	2.07	2.10	12.00
VH	4721.00	2.09	2.10	12.01
VH	4729.00	2.10	2.10	12.02
VH	4787.00	2.13	2.12	12.03

VH	4815.00	2.14	2.12	12.04
VH	4835.00	2.15	2.13	12.05
VH	4861.00	2.01	2.13	11.96
VH	4879.00	2.01	2.14	11.96
VH	4928.00	2.13	2.15	12.04
VH	4945.00	2.14	2.15	12.04
VH	4969.00	1.97	2.15	11.93
VH	4993.00	2.06	2.16	11.99
VH	5002.00	2.06	2.16	11.99
VH	5037.00	2.08	2.17	12.00
VH	5051.00	2.09	2.17	12.01
VH	5115.00	2.11	2.18	12.02
VH	5129.00	2.12	2.19	12.03
VH	5185.00	2.15	2.20	12.05

VH	5205.00	2.17	2.20	12.07
VH	5251.00	2.20	2.21	12.09
VH	5383.00	2.12	2.24	12.03
VH	5413.00	1.87	2.24	11.85
VH	5431.00	1.93	2.24	11.89
VH	5457.00	1.96	2.25	11.92
VH	5467.00	1.97	2.25	11.92
VH	5479.00	1.96	2.25	11.92
VH	5495.00	1.97	2.26	11.92
IF	5503.00	1.97	2.26	11.93
IF	5515.00	1.98	2.26	11.93
IF	5549.00	1.99	2.27	11.94
	5658.20	2.03	2.29	11.97
IF	5705.00	2.04	2.29	11.98
	5822.60	2.15	2.31	12.05

IF	5873.00	2.18	2.32	12.07
IF	5931.00	2.21	2.33	12.10
IF	5949.00	2.22	2.34	12.10
IF	5957.00	2.23	2.34	12.11
VH	5959.00	2.23	2.34	12.11
VH	6001.00	2.25	2.35	12.12
VH	6053.00	2.27	2.35	12.14
VH	6069.00	2.29	2.36	12.15
VH	6103.00	2.24	2.36	12.12
VH	6135.00	2.35	2.37	12.19
VH	6161.00	2.41	2.37	12.23
VH	6171.00	2.38	2.37	12.21
VH	6193.00	2.43	2.38	12.25
VH	6213.00	2.44	2.38	12.25

VH	6251.00	2.36	2.39	12.20
BU	6313.00	0.51	2.39	10.90
BU	6315.00	0.11	2.39	10.62
BU	6319.00	0.02	2.39	10.56
BU	6327.00	0.01	2.39	10.55
BU	6369.00	0.00	2.39	10.55
BU	6449.00	0.00	2.39	10.55
BU	6465.00	0.00	2.39	10.55
BU	6475.00	0.00	2.39	10.55
BU	6537.00	0.00	2.39	10.55
BU	6613.00	0.00	2.39	10.55
BU	6821.00	0.00	2.39	10.55
BU	6867.00	0.00	2.39	10.55
AS	6909.00	0.00	0.00	10.56
AS	6987.00	0.00	0.00	10.56

AS 7015.00 0.00 0.00 10.56

AS 7031.00 0.00 0.00 10.56

AS 7101.00 0.00 0.00 10.56

AS 7147.00 0.00 0.00 10.56

AS 7177.00 0.00 0.00 10.56

AS 7207.00 0.00 0.00 10.56

AS 7235.00 0.00 0.00 10.56

AS 7297.00 0.00 0.00 10.56

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

BETWEEN 35.00 AND 41.00

BETWEEN 41.00 AND 47.00

BETWEEN 47.00 AND 53.00

BETWEEN 53.00 AND 59.00

BETWEEN 59.00 AND 65.00

BETWEEN 65.00 AND 67.00

BETWEEN 67.00 AND 71.00

BETWEEN 71.00 AND 75.00

BETWEEN 75.00 AND 87.00

BETWEEN 87.00 AND 95.00

BETWEEN 95.00 AND 99.00

BETWEEN 99.00 AND 105.00

BETWEEN 105.00 AND 109.00

BETWEEN 109.00 AND 113.00

BETWEEN 113.00 AND 117.00

BETWEEN 117.00 AND 121.00

BETWEEN 6867.00 AND 6909.00

BETWEEN 6909.00 AND 6987.00

BETWEEN 6987.00 AND 7015.00

BETWEEN 7015.00 AND 7031.00

BETWEEN 7031.00 AND 7101.00

BETWEEN 7101.00 AND 7147.00

BETWEEN 7147.00 AND 7177.00

BETWEEN 7177.00 AND 7207.00

BETWEEN 7207.00 AND 7235.00

BETWEEN 7235.00 AND 7297.00

PART4 LOCATION OF SURGE CHANGES

STATION 10-YEAR SURGE 100-YEAR SURGE

NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

STATION OF GUTTER LOCATION OF ZONE

26.12 WINDWARD

PART6 NUMBERED A ZONES AND V ZONES

STATION OF GUTTER ELEVATION ZONE DESIGNATION FHF

0.00 16.67

V26 EL=17 160

1.96 16.50

V26 EL=16 160

9.86 15.50

V26 EL=15 160

15.94 14.50

V26 EL=14 160

23.55 13.50

V26 EL=13 160

26.12 12.65

A22 EL=13 120

26.63 12.50

A22 EL=12 120

33.01 11.50

A22 EL=11 120

35.00 11.23

41.00 10.56

47.00 10.56

53.00 10.56

59.00 10.56

65.00 10.56

67.00	10.56
71.00	10.56
75.00	10.56
87.00	10.56
95.00	10.56
99.00	10.56
105.00	10.56
109.00	10.56
113.00	10.56
117.00	10.56

121.00 10.55

A22 EL=11 120

1831.85 11.50

A22 EL=12 120

6284.45 11.50

A22 EL=11 120

6867.00 10.55

6909.00 10.56

6987.00 10.56

7015.00 10.56

7031.00 10.56

7101.00 10.56

7147.00 10.56

7177.00 10.56

7207.00 10.56

7235.00 10.56

7297.00 10.56

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

WHAFIS CARD	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	FIELD 10
IE	0	-2.295	0	0	10.546	13.2	5.39	0	0.155	0
IF	1	-2.14	0	10.546	0	0	0	0	0.245	0
IF	7	-0.58	0	10.546	0	0	0	0	0.269	0
IF	8	-0.26	0	10.546	0	0	0	0	0.345	0
IF	9	0.11	0	10.546	0	0	0	0	0.397	0
IF	11	0.93	0	10.546	0	0	0	0	0.42	0
IF	14	2.21	0	10.546	0	0	0	0	0.461	0
DU	23	6.46	1	0	10.546	0	0	0	0.467	0
DU	25	7.35	1	0	10.546	0	0	0	0.423	0
DU	27	8.15	1	0	10.546	0	0	0	0.343	0
DU	31	9.41	1	0	10.546	0	0	0	0.27	0
DU	35	10.31	1	0	10.546	0	0	0	0.225	0
AS	41	10.56	0	10.546	0	0	0	0	0.225	0
AS	47	10.56	0	10.546	0	0	0	0	0.225	0
AS	53	10.56	0	10.546	0	0	0	0	0.225	0
AS	105	10.56	0	10.546	0	0	0	0	0.225	0
AS	109	10.56	0	10.546	0	0	0	0	0.225	0
AS	113	10.56	0	10.546	0	0	0	0	0.225	0
AS	117	10.56	0	10.546	0	0	0	0	0.225	0
AS	121	10.56	0	10.546	0	0	0	0	-0.004	0
BU	129	10.53	0.15	10	0	10.546	0	0	-0.011	0
BU	135	10.41	0.15	10	0	10.546	0	0	-0.012	0
BU	143	10.36	0.15	10	0	10.546	0	0	-0.012	0
BU	149	10.24	0.15	10	0	10.546	0	0	-0.021	0
BU	153	10.15	0.15	10	0	10.546	0	0	-0.025	0
BU	157	10.04	0.15	10	0	10.546	0	0	-0.035	0
BU	163	9.8	0.15	10	0	10.546	0	0	-0.032	0
BU	183	9.2	0.15	10	0	10.546	0	0	-0.032	0
BU	195	8.78	0.15	10	0	10.546	0	0	-0.033	0
BU	203	8.54	0.15	10	0	10.546	0	0	-0.03	0
BU	207	8.42	0.15	10	0	10.546	0	0	-0.031	0
BU	221	7.99	0.15	10	0	10.546	0	0	-0.025	0
BU	227	7.91	0.15	10	0	10.546	0	0	-0.014	0
BU	231	7.85	0.15	10	0	10.546	0	0	-0.015	0
BU	235	7.79	0.15	10	0	10.546	0	0	-0.015	0
BU	241	7.7	0.15	10	0	10.546	0	0	-0.015	0
BU	249	7.58	0.15	10	0	10.546	0	0	-0.015	0
BU	253	7.52	0.15	10	0	10.546	0	0	-0.013	0
BU	265	7.38	0.15	10	0	10.546	0	0	-0.012	0
BU	283	7.17	0.15	10	0	10.546	0	0	-0.011	0
BU	295	7.04	0.15	10	0	10.546	0	0	-0.007	0
BU	307	7	0.15	10	0	10.546	0	0	-0.002	0
BU	315	7	0.15	10	0	10.546	0	0	-0.005	0
BU	323	6.92	0.15	10	0	10.546	0	0	-0.011	0
BU	329	6.84	0.15	10	0	10.546	0	0	-0.014	0
BU	341	6.67	0.15	10	0	10.546	0	0	-0.014	0
BU	353	6.5	0.15	10	0	10.546	0	0	-0.014	0
BU	357	6.45	0.15	10	0	10.546	0	0	-0.014	0
BU	361	6.39	0.15	10	0	10.546	0	0	-0.013	0
BU	373	6.24	0.15	10	0	10.546	0	0	-0.011	0

BU	379	6.19	0.15	10	0	10.546	0	0	-0.004	0
BU	385	6.19	0.15	10	0	10.546	0	0	-0.004	0
BU	391	6.14	0.15	10	0	10.546	0	0	-0.009	0
BU	407	6	0.15	10	0	10.546	0	0	-0.006	0
BU	413	6	0.15	10	0	10.546	0	0	-0.003	0
BU	425	5.94	0.15	10	0	10.546	0	0	-0.013	0
BU	449	5.54	0.15	10	0	10.546	0	0	-0.018	0
BU	457	5.38	0.15	10	0	10.546	0	0	-0.017	0
BU	461	5.34	0.15	10	0	10.546	0	0	-0.003	0
BU	467	5.35	0.15	10	0	10.546	0	0	-0.001	0
BU	473	5.33	0.15	10	0	10.546	0	0	-0.007	0
BU	477	5.28	0.15	10	0	10.546	0	0	-0.005	0
BU	481	5.29	0.15	10	0	10.546	0	0	-0.005	0
BU	485	5.24	0.15	10	0	10.546	0	0	-0.013	0
BU	487	5.21	0.15	10	0	10.546	0	0	-0.018	0
BU	489	5.17	0.15	10	0	10.546	0	0	-0.006	0
BU	503	5.12	0.15	10	0	10.546	0	0	-0.003	0
BU	507	5.12	0.15	10	0	10.546	0	0	-0.003	0
BU	513	5.09	0.15	10	0	10.546	0	0	-0.007	0
BU	515	5.06	0.15	10	0	10.546	0	0	-0.015	0
BU	519	5	0.15	10	0	10.546	0	0	-0.01	0
BU	521	5	0.15	10	0	10.546	0	0	0	0
BU	527	5	0.15	10	0	10.546	0	0	0	0
BU	541	5	0.15	10	0	10.546	0	0	0	0
BU	547	5	0.15	10	0	10.546	0	0	0	0
BU	553	5	0.15	10	0	10.546	0	0	0	0
BU	557	5	0.15	10	0	10.546	0	0	0	0
BU	559	5	0.15	10	0	10.546	0	0	0	0
BU	565	5	0.15	10	0	10.546	0	0	0	0
BU	569	5	0.15	10	0	10.546	0	0	0	0
BU	573	5	0.15	10	0	10.546	0	0	0.01	0
BU	577	5.08	0.15	10	0	10.546	0	0	0.042	0
BU	583	5.42	0.15	10	0	10.546	0	0	0.053	0
BU	587	5.61	0.15	10	0	10.546	0	0	0.029	0
BU	599	5.88	0.15	10	0	10.546	0	0	-0.013	0
BU	615	5.25	0.15	10	0	10.546	0	0	-0.042	0
BU	621	4.96	0.15	10	0	10.546	0	0	-0.045	0
BU	623	4.89	0.15	10	0	10.546	0	0	-0.038	0
BU	629	4.66	0.15	10	0	10.546	0	0	-0.038	0
BU	635	4.44	0.15	10	0	10.546	0	0	-0.038	0
BU	639	4.28	0.15	10	0	10.546	0	0	-0.038	0
BU	647	3.99	0.15	10	0	10.546	0	0	-0.035	0
BU	649	3.93	0.15	10	0	10.546	0	0	-0.03	0
BU	653	3.81	0.15	10	0	10.546	0	0	-0.029	0
BU	657	3.7	0.15	10	0	10.546	0	0	-0.028	0
BU	667	3.42	0.15	10	0	10.546	0	0	-0.024	0
BU	675	3.26	0.15	10	0	10.546	0	0	-0.02	0
BU	679	3.18	0.15	10	0	10.546	0	0	-0.02	0
BU	685	3.06	0.15	10	0	10.546	0	0	-0.007	0
BU	705	3	0.15	10	0	10.546	0	0	0.004	0
BU	725	3.2	0.15	10	0	10.546	0	0	0.019	0
BU	759	4	0.15	10	0	10.546	0	0	0.02	0
BU	765	4	0.15	10	0	10.546	0	0	0	0

BU	769	4	0.15	10	0	10.546	0	0	0	0
BU	777	4	0.15	10	0	10.546	0	0	0	0
BU	783	4	0.15	10	0	10.546	0	0	0	0
BU	805	4	0.15	10	0	10.546	0	0	0	0
BU	823	4	0.15	10	0	10.546	0	0	0	0
BU	829	4	0.15	10	0	10.546	0	0	0	0
BU	837	4	0.15	10	0	10.546	0	0	-0.006	0
BU	845	3.91	0.15	10	0	10.546	0	0	0	0
BU	851	4	0.15	10	0	10.546	0	0	0.006	0
BU	861	4	0.15	10	0	10.546	0	0	0	0
BU	865	4	0.15	10	0	10.546	0	0	0	0
BU	873	4	0.15	10	0	10.546	0	0	0	0
BU	877	4	0.15	10	0	10.546	0	0	-0.008	0
BU	879	3.95	0.15	10	0	10.546	0	0	-0.073	0
BU	883	3.56	0.15	10	0	10.546	0	0	-0.098	0
BU	885	3.36	0.15	10	0	10.546	0	0	-0.093	0
BU	889	3	0.15	10	0	10.546	0	0	-0.023	0
BU	901	3	0.15	10	0	10.546	0	0	0	0
BU	907	3	0.15	10	0	10.546	0	0	0.008	0
BU	913	3.1	0.15	10	0	10.546	0	0	0.02	0
BU	917	3.2	0.15	10	0	10.546	0	0	0.007	0
BU	923	3.17	0.15	10	0	10.546	0	0	0	0
BU	935	3.2	0.15	10	0	10.546	0	0	-0.009	0
BU	945	2.97	0.15	10	0	10.546	0	0	-0.039	0
AS	59	10.56	0	10.546	0	0	0	0	0.225	0
AS	65	10.56	0	10.546	0	0	0	0	0.225	0
AS	67	10.56	0	10.546	0	0	0	0	0.225	0
AS	71	10.56	0	10.546	0	0	0	0	0.225	0
AS	75	10.56	0	10.546	0	0	0	0	0.225	0
AS	87	10.56	0	10.546	0	0	0	0	0.225	0
AS	95	10.56	0	10.546	0	0	0	0	0.225	0
AS	99	10.56	0	10.546	0	0	0	0	0.225	0
BU	953	2.49	0.15	10	0	10.546	0	0	-0.03	0
BU	957	2.61	0.15	10	0	10.546	0	0	0.031	0
BU	965	2.86	0.15	10	0	10.546	0	0	-0.001	0
BU	975	2.6	0.15	10	0	10.546	0	0	-0.027	0
BU	977	2.53	0.15	10	0	10.546	0	0	-0.027	0
VH	983	2.38	2	1	0	1	0	10.546	-0.021	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	985	2.36	2	1	0	1	0	10.546	0.102	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	991	3.2	2	1	0	1	0	10.546	0.1	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	997	3.56	2	1	0	1	0	10.546	0.059	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1009	4.26	2	1	0	1	0	10.546	0.046	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1015	4.39	2	1	0	1	0	10.546	-0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1017	4.13	2	1	0	1	0	10.546	-0.07	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1019	4.11	2	1	0	1	0	10.546	-0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0

VH	1021	4.07	2	1	0	1	0	10.546	-0.14	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1025	3.27	2	1	0	1	0	10.546	-0.212	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1026	3.01	2	1	0	1	0	10.546	-0.24	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1027	2.79	2	1	0	1	0	10.546	-0.19	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1029	2.44	2	1	0	1	0	10.546	-0.282	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1042	-1.44	2	1	0	1	0	10.546	-0.205	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1049	-1.65	2	1	0	1	0	10.546	0.105	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1057	0.13	2	1	0	1	0	10.546	0.257	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1059	0.92	2	1	0	1	0	10.546	0.28	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1063	1.81	2	1	0	1	0	10.546	0.182	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1065	2.01	2	1	0	1	0	10.546	0.09	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1073	2.71	2	1	0	1	0	10.546	0.083	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1077	3	2	1	0	1	0	10.546	0.131	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1089	4.8	2	1	0	1	0	10.546	0.147	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1091	5.06	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1097	4.78	2	1	0	1	0	10.546	-0.112	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1101	3.94	2	1	0	1	0	10.546	-0.208	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1103	3.53	2	1	0	1	0	10.546	-0.072	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1133	1.63	2	1	0	1	0	10.546	-0.059	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1135	1.63	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1141	1.64	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1145	1.67	2	1	0	1	0	10.546	0.018	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1151	1.82	2	1	0	1	0	10.546	0.026	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1159	2.04	2	1	0	1	0	10.546	0.034	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1161	2.16	2	1	0	1	0	10.546	0.16	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1169	3.64	2	1	0	1	0	10.546	0.168	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1171	3.84	2	1	0	1	0	10.546	-0.04	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	1177	3.32	2	1	0	1	0	10.546	-0.112	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1189	1.83	2	1	0	1	0	10.546	-0.094	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1193	1.81	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1199	1.86	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1221	1.87	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1227	1.91	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1231	1.9	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1235	1.9	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1239	1.9	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1243	1.91	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1251	1.94	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1257	1.93	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1265	1.9	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1273	1.87	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1285	1.75	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1291	1.81	2	1	0	1	0	10.546	0.014	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1297	1.92	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1303	1.93	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1307	1.93	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1315	2.01	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1321	2.08	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1343	2.18	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1351	2.16	2	1	0	1	0	10.546	-0.027	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1361	1.7	2	1	0	1	0	10.546	-0.033	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1365	1.7	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1369	1.7	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0

VH	1377	1.69	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1383	1.73	2	1	0	1	0	10.546	0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1387	1.77	2	1	0	1	0	10.546	0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1389	1.78	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1397	1.87	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1401	1.91	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1405	1.95	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1409	1.97	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1411	1.96	2	1	0	1	0	10.546	-0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1413	1.91	2	1	0	1	0	10.546	-0.032	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1417	1.77	2	1	0	1	0	10.546	-0.031	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1421	1.66	2	1	0	1	0	10.546	-0.018	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1423	1.66	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1427	1.67	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1429	1.68	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1431	1.69	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1433	1.69	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
IF	1437	1.73	0	10.546	0	0	0	0	0.027	0
IF	1453	2.24	0	10.546	0	0	0	0	0.028	0
IF	1467	2.56	0	10.546	0	0	0	0	0.023	0
IF	1471	2.66	0	10.546	0	0	0	0	0.023	0
IF	1481	2.88	0	10.546	0	0	0	0	0.008	0
IF	1571	3.44	0	10.546	0	0	0	0	0.006	0
IF	1585	3.5	0	10.546	0	0	0	0	0.004	0
IF	1589	3.52	0	10.546	0	0	0	0	0.004	0
IF	1595	3.54	0	10.546	0	0	0	0	0.003	0
IF	1599	3.55	0	10.546	0	0	0	0	-0.001	0
IF	1611	3.52	0	10.546	0	0	0	0	-0.003	0
IF	1619	3.49	0	10.546	0	0	0	0	-0.001	0
IF	1627	3.51	0	10.546	0	0	0	0	0.005	0
IF	1631	3.55	0	10.546	0	0	0	0	0.009	0
IF	1635	3.58	0	10.546	0	0	0	0	0.008	0
IF	1645	3.66	0	10.546	0	0	0	0	0.009	0
IF	1651	3.72	0	10.546	0	0	0	0	0.009	0
IF	1665	3.83	0	10.546	0	0	0	0	0.008	0
IF	1669	3.86	0	10.546	0	0	0	0	0.007	0

IF	1671	3.87	0	10.546	0	0	0	0	0.013	0
IF	1673	3.91	0	10.546	0	0	0	0	0.02	0
IF	1681	4.07	0	10.546	0	0	0	0	0.016	0
IF	1695	4.26	0	10.546	0	0	0	0	0.013	0
IF	1707	4.41	0	10.546	0	0	0	0	0.013	0
IF	1715	4.51	0	10.546	0	0	0	0	0.013	0
IF	1735	4.77	0	10.546	0	0	0	0	0.013	0
IF	1739	4.82	0	10.546	0	0	0	0	0.013	0
IF	1743	4.87	0	10.546	0	0	0	0	0.014	0
IF	1747	4.93	0	10.546	0	0	0	0	0.01	0
IF	1751	4.95	0	10.546	0	0	0	0	-0.002	0
IF	1753	4.92	0	10.546	0	0	0	0	-0.014	0
IF	1759	4.84	0	10.546	0	0	0	0	-0.014	0
IF	1761	4.81	0	10.546	0	0	0	0	-0.015	0
IF	1763	4.78	0	10.546	0	0	0	0	-0.015	0
IF	1765	4.75	0	10.546	0	0	0	0	-0.015	0
IF	1777	4.57	0	10.546	0	0	0	0	-0.014	0
IF	1783	4.5	0	10.546	0	0	0	0	-0.011	0
IF	1793	4.39	0	10.546	0	0	0	0	-0.011	0
IF	1797	4.35	0	10.546	0	0	0	0	-0.011	0
IF	1813	4.17	0	10.546	0	0	0	0	-0.011	0
IF	1819	4.1	0	10.546	0	0	0	0	-0.012	0
IF	1827	4	0	10.546	0	0	0	0	-0.008	0
IF	1853	3.84	0	10.546	0	0	0	0	-0.006	0
IF	1855	3.83	0	10.546	0	0	0	0	-0.005	0
IF	1861	3.8	0	10.546	0	0	0	0	-0.006	0
IF	1877	3.69	0	10.546	0	0	0	0	-0.008	0
IF	1883	3.62	0	10.546	0	0	0	0	-0.013	0
IF	1889	3.53	0	10.546	0	0	0	0	-0.014	0
IF	1893	3.48	0	10.546	0	0	0	0	-0.014	0
IF	1897	3.42	0	10.546	0	0	0	0	-0.009	0
IF	1905	3.37	0	10.546	0	0	0	0	-0.002	0
IF	1933	3.36	0	10.546	0	0	0	0	-0.001	0
IF	1937	3.34	0	10.546	0	0	0	0	-0.005	0
IF	1943	3.31	0	10.546	0	0	0	0	-0.004	0
IF	1951	3.28	0	10.546	0	0	0	0	-0.004	0
IF	1961	3.23	0	10.546	0	0	0	0	-0.005	0
IF	1965	3.21	0	10.546	0	0	0	0	-0.005	0
IF	1969	3.19	0	10.546	0	0	0	0	-0.005	0
IF	1973	3.17	0	10.546	0	0	0	0	-0.006	0
IF	1977	3.14	0	10.546	0	0	0	0	-0.007	0
IF	1981	3.11	0	10.546	0	0	0	0	-0.006	0
IF	1995	3.03	0	10.546	0	0	0	0	0.002	0
IF	2027	3.18	0	10.546	0	0	0	0	0.005	0
IF	2031	3.21	0	10.546	0	0	0	0	0.007	0
IF	2051	3.35	0	10.546	0	0	0	0	0.008	0
IF	2069	3.52	0	10.546	0	0	0	0	0.005	0
IF	2091	3.55	0	10.546	0	0	0	0	0.002	0
IF	2101	3.57	0	10.546	0	0	0	0	0.003	0
IF	2131	3.68	0	10.546	0	0	0	0	0.004	0
IF	2137	3.72	0	10.546	0	0	0	0	0.007	0
IF	2151	3.81	0	10.546	0	0	0	0	0.005	0
IF	2163	3.84	0	10.546	0	0	0	0	0.013	0

IF	2183	4.22	0	10.546	0	0	0	0	0.013	0
IF	2203	4.35	0	10.546	0	0	0	0	0.007	0
IF	2209	4.41	0	10.546	0	0	0	0	0.011	0
IF	2213	4.46	0	10.546	0	0	0	0	-0.002	0
IF	2223	4.38	0	10.546	0	0	0	0	-0.009	0
IF	2227	4.34	0	10.546	0	0	0	0	-0.013	0
IF	2247	4.07	0	10.546	0	0	0	0	-0.017	0
IF	2257	3.83	0	10.546	0	0	0	0	-0.023	0
IF	2267	3.6	0	10.546	0	0	0	0	-0.024	0
IF	2273	3.45	0	10.546	0	0	0	0	-0.023	0
IF	2277	3.37	0	10.546	0	0	0	0	-0.02	0
IF	2283	3.25	0	10.546	0	0	0	0	-0.02	0
IF	2295	3.01	0	10.546	0	0	0	0	-0.005	0
IF	2305	3.14	0	10.546	0	0	0	0	0.024	0
IF	2315	3.49	0	10.546	0	0	0	0	0.023	0
IF	2331	3.74	0	10.546	0	0	0	0	0.009	0
IF	2343	3.74	0	10.546	0	0	0	0	0	0
IF	2347	3.74	0	10.546	0	0	0	0	0	0
IF	2363	3.74	0	10.546	0	0	0	0	0.001	0
IF	2367	3.75	0	10.546	0	0	0	0	0.009	0
IF	2379	3.89	0	10.546	0	0	0	0	0.007	0
IF	2403	4	0	10.546	0	0	0	0	0.003	0
IF	2409	3.99	0	10.546	0	0	0	0	0.002	0
IF	2423	4.03	0	10.546	0	0	0	0	0.005	0
IF	2435	4.12	0	10.546	0	0	0	0	0.002	0
IF	2453	4.1	0	10.546	0	0	0	0	-0.001	0
IF	2463	4.09	0	10.546	0	0	0	0	-0.008	0
IF	2471	3.95	0	10.546	0	0	0	0	-0.004	0
IF	2477	4.03	0	10.546	0	0	0	0	0.046	0
IF	2485	4.6	0	10.546	0	0	0	0	0.063	0
IF	2489	4.78	0	10.546	0	0	0	0	0.02	0
IF	2495	4.8	0	10.546	0	0	0	0	-0.033	0
IF	2501	4.38	0	10.546	0	0	0	0	-0.086	0
IF	2509	3.6	0	10.546	0	0	0	0	-0.051	0
IF	2515	3.66	0	10.546	0	0	0	0	0.014	0
IF	2517	3.71	0	10.546	0	0	0	0	0.02	0
IF	2523	3.82	0	10.546	0	0	0	0	0.008	0
IF	2587	4.25	0	10.546	0	0	0	0	0.001	0
IF	2765	4.08	0	10.546	0	0	0	0	0.001	0
IF	2833	4.5	0	10.546	0	0	0	0	0.002	0
IF	2877	4.34	0	10.546	0	0	0	0	0.003	0
IF	2935	4.84	0	10.546	0	0	0	0	0	0
IF	3001	4.31	0	10.546	0	0	0	0	-0.001	0
IF	3037	4.77	0	10.546	0	0	0	0	0.003	0
IF	3071	4.52	0	10.546	0	0	0	0	-0.004	0
IF	3233	3.96	0	10.546	0	0	0	0	0.003	0
IF	3375	5.5	0	10.546	0	0	0	0	-0.002	0
IF	3565	3.41	0	10.546	0	0	0	0	-0.01	0
VH	3585	3.47	2	1	0	1	0	10.546	-0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3591	3.25	2	1	0	1	0	10.546	0.012	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3613	3.81	2	1	0	1	0	10.546	0.022	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	3621	3.91	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3663	4.14	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3671	4.13	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3693	4.16	2	1	0	1	0	10.546	-0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3743	3.73	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3763	4.01	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3793	3.82	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3815	3.76	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3833	4.43	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3841	3.92	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3861	4.13	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3869	4.1	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3917	3.91	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3955	3.74	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VE	3963	3.66	1	25	10	0	0	10.546	0.014	0
VE	3971	3.97	1	25	10	0	0	10.546	0.08	0
VE	3983	5.26	1	25	10	0	0	10.546	0.06	0
VE	3999	5.65	1	25	10	0	0	10.546	0.009	0
VE	4009	5.48	1	25	10	0	0	10.546	-0.095	0
VE	4019	3.75	1	25	10	0	0	10.546	-0.036	0
VE	4059	3.67	1	25	10	0	0	10.546	0	0
VE	4077	3.77	1	25	10	0	0	10.546	0.003	0
VE	4085	3.74	1	25	10	0	0	10.546	0.036	0
VE	4105	4.78	1	25	10	0	0	10.546	0.018	0
VE	4131	4.58	1	25	10	0	0	10.546	0.024	0
VE	4159	6.1	1	25	10	0	0	10.546	0.024	0
VE	4179	5.73	1	25	10	0	0	10.546	-0.045	0
VE	4189	4.74	1	25	10	0	0	10.546	-0.123	0
VH	4191	4.26	2	1	0	1	0	10.546	-0.043	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4211	3.79	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4297	4.26	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4313	4.17	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4353	4.14	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0

VE	4407	3.87	1	20	8	0	0	10.546	-0.005	0
VE	4419	3.79	1	20	8	0	0	10.546	0.014	0
VE	4453	4.52	1	20	8	0	0	10.546	0.03	0
VE	4459	5	1	20	8	0	0	10.546	-0.014	0
VE	4505	3.78	1	20	8	0	0	10.546	-0.025	0
VE	4511	3.72	1	20	8	0	0	10.546	0	0
VE	4553	3.8	1	20	8	0	0	10.546	0	0
VE	4603	3.76	1	20	8	0	0	10.546	0.003	0
VE	4657	4.07	1	20	8	0	0	10.546	0.005	0
VE	4663	4.07	1	20	8	0	0	10.546	0	0
VH	4665	4.07	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4679	4.06	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4693	4.06	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4703	3.93	2	1	0	1	0	10.546	-0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4721	3.81	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4729	3.76	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4787	4.09	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4815	4.23	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4835	4.34	2	1	0	1	0	10.546	0.061	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4861	7.02	2	1	0	1	0	10.546	0.06	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4879	7	2	1	0	1	0	10.546	-0.024	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4928	5.39	2	1	0	1	0	10.546	-0.025	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4945	5.36	2	1	0	1	0	10.546	0.049	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4969	7.4	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4993	5.7	2	1	0	1	0	10.546	-0.045	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5002	5.91	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5037	5.83	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5051	5.59	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5115	6.19	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5129	5.79	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5185	5.42	2	1	0	1	0	10.546	-0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5205	5.14	2	1	0	1	0	10.546	-0.006	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	5251	5	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5383	7.17	2	1	0	1	0	10.546	0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5413	7.68	2	1	0	1	0	10.546	-0.029	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5431	5.8	2	1	0	1	0	10.546	-0.061	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5457	5	2	1	0	1	0	10.546	-0.022	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5467	5	2	1	0	1	0	10.546	0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5479	5.38	2	1	0	1	0	10.546	0.024	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5495	5.68	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
IF	5503	5.74	0	10.546	0	0	0	0	0.02	0
IF	5515	6.08	0	10.546	0	0	0	0	0.027	0
IF	5549	7	0	10.546	0	0	0	0	0.005	0
IF	5705	7	0	10.546	0	0	0	0	-0.003	0
IF	5873	6	0	10.546	0	0	0	0	-0.004	0
IF	5931	6	0	10.546	0	0	0	0	0	0
IF	5949	6	0	10.546	0	0	0	0	0	0
IF	5957	6	0	10.546	0	0	0	0	0	0
VH	5959	6	2	1	0	1	0	10.546	-0.018	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6001	5.22	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6053	5	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6069	4.71	2	1	0	1	0	10.546	0.032	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6103	6.59	2	1	0	1	0	10.546	-0.02	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6135	3.42	2	1	0	1	0	10.546	-0.076	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6161	2.16	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6171	3.18	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6193	2.18	2	1	0	1	0	10.546	-0.022	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6213	2.26	2	1	0	1	0	10.546	0.062	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6251	5.76	2	1	0	1	0	10.546	0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
BU	6313	4	0.6	6	0	10.546	0	0	-0.027	0
BU	6315	4	0.6	6	0	10.546	0	0	0	0
BU	6319	4	0.6	6	0	10.546	0	0	0.054	0
BU	6327	4.65	0.6	6	0	10.546	0	0	0.104	0
BU	6369	9.22	0.6	6	0	10.546	0	0	0.042	0
BU	6449	9.82	0.6	6	0	10.546	0	0	0.004	0

BU	6465	9.65	0.6	6	0	10.546	0	0	-0.019	0
BU	6475	9.34	0.6	6	0	10.546	0	0	-0.009	0
BU	6537	9	0.6	6	0	10.546	0	0	-0.002	0
BU	6613	9	0.6	6	0	10.546	0	0	-0.011	0
BU	6821	6	0.6	6	0	10.546	0	0	-0.009	0
BU	6867	6.81	0.6	6	0	10.546	0	0	0.018	0
AS	6909	10.56	0	10.546	0	0	0	0	0.018	0
AS	6987	10.56	0	10.546	0	0	0	0	0.018	0
AS	7015	10.56	0	10.546	0	0	0	0	0.018	0
AS	7031	10.56	0	10.546	0	0	0	0	0.018	0
AS	7101	10.56	0	10.546	0	0	0	0	0.018	0
AS	7147	10.56	0	10.546	0	0	0	0	0.018	0
AS	7177	10.56	0	10.546	0	0	0	0	0.018	0
AS	7207	10.56	0	10.546	0	0	0	0	0.018	0
AS	7235	10.56	0	10.546	0	0	0	0	0.018	0
AS	7297	10.56	0	10.546	0	0	0	0	0.018	0

WHAFIS CARD	STATION	WAVE HEIGHT	WAVE PERIOD	WAVE CREST .EVATION
IE	0	8.75	5.39	16.67
IF	1	8.66	5.39	16.6
IF	7	7.72	5.39	15.95
IF	8	7.53	5.39	15.82
IF	9	7.3	5.39	15.66
IF	11	6.79	5.39	15.3
IF	14	5.96	5.39	14.72
DU	23	4.51	5.39	13.7
DU	25	3.46	5.39	12.97
DU	27	2.64	5.39	12.39
DU	31	1.76	5.39	11.78
DU	35	0.97	5.39	11.23
AS	41	0	0	10.56
AS	47	0	0	10.56
AS	53	0	0	10.56
AS	59	0	0	10.56
AS	65	0	0	10.56
AS	67	0	0	10.56
AS	71	0	0	10.56
AS	75	0	0	10.56
AS	87	0	0	10.56
AS	95	0	0	10.56
AS	99	0	0	10.56
AS	105	0	0	10.56
AS	109	0	0	10.56
AS	113	0	0	10.56
AS	117	0	0	10.56
AS	121	0	0	10.56
BU	129	0	0	10.55
BU	135	0	0	10.55
BU	143	0	0	10.55
BU	149	0	0	10.55
BU	153	0	0	10.55
BU	157	0	0	10.55
BU	163	0	0	10.55
BU	183	0	0	10.55
BU	195	0	0	10.55
BU	203	0	0	10.55
BU	207	0	0	10.55
BU	221	0	0	10.55
BU	227	0	0	10.55
BU	231	0	0	10.55
BU	235	0	0	10.55
BU	241	0	0	10.55
BU	249	0	0	10.55
BU	253	0	0	10.55
BU	265	0	0	10.55
BU	283	0	0	10.55
BU	295	0	0	10.55
BU	307	0	0	10.55

BU	315	0	0	10.55
BU	323	0	0	10.55
BU	329	0	0	10.55
BU	341	0	0	10.55
BU	353	0	0	10.55
BU	357	0	0	10.55
BU	361	0	0	10.55
BU	373	0	0	10.55
BU	379	0	0	10.55
BU	385	0	0	10.55
BU	391	0	0	10.55
BU	407	0	0	10.55
BU	413	0	0	10.55
BU	425	0	0	10.55
BU	449	0	0	10.55
BU	457	0	0	10.55
BU	461	0	0	10.55
BU	467	0	0	10.55
BU	473	0	0	10.55
BU	477	0	0	10.55
BU	481	0	0	10.55
BU	485	0	0	10.55
BU	487	0	0	10.55
BU	489	0	0	10.55
BU	503	0	0	10.55
BU	507	0	0	10.55
BU	513	0	0	10.55
BU	515	0	0	10.55
BU	519	0	0	10.55
BU	521	0	0	10.55
BU	527	0	0	10.55
BU	541	0	0	10.55
BU	547	0	0	10.55
BU	553	0	0	10.55
BU	557	0	0	10.55
BU	559	0	0	10.55
BU	565	0	0	10.55
BU	569	0	0	10.55
BU	573	0	0	10.55
BU	577	0	0	10.55
BU	583	0	0	10.55
BU	587	0	0	10.55
BU	599	0	0	10.55
BU	615	0	0	10.55
BU	621	0	0	10.55
BU	623	0	0	10.55
BU	629	0	0	10.55
BU	635	0	0	10.55
BU	639	0	0	10.55
BU	647	0	0	10.55
BU	649	0	0	10.55
BU	653	0	0	10.55
BU	657	0	0	10.55

BU	667	0	0	10.55
BU	675	0	0	10.55
BU	679	0	0	10.55
BU	685	0	0	10.55
BU	705	0	0	10.55
BU	725	0	0	10.55
BU	759	0	0	10.55
BU	765	0	0	10.55
BU	769	0	0	10.55
BU	777	0	0	10.55
BU	783	0	0	10.55
BU	805	0	0	10.55
BU	823	0	0	10.55
BU	829	0	0	10.55
BU	837	0	0	10.55
BU	845	0	0	10.55
BU	851	0	0	10.55
BU	861	0	0	10.55
BU	865	0	0	10.55
BU	873	0	0	10.55
BU	877	0	0	10.55
BU	879	0	0	10.55
BU	883	0	0	10.55
BU	885	0	0	10.55
BU	889	0	0	10.55
BU	901	0	0	10.55
BU	907	0	0	10.55
BU	913	0	0	10.55
BU	917	0	0	10.55
BU	923	0	0	10.55
BU	935	0	0	10.55
BU	945	0	0	10.55
BU	953	0	0	10.55
BU	957	0	0	10.55
BU	965	0	0	10.55
BU	975	0	0	10.55
BU	977	0	0	10.55
VH	983	0.05	0.27	10.58
VH	985	0.06	0.29	10.59
VH	991	0.09	0.35	10.61
VH	997	0.11	0.39	10.63
VH	1009	0.15	0.46	10.65
VH	1015	0.17	0.49	10.67
VH	1017	0.18	0.49	10.67
VH	1019	0.18	0.5	10.68
VH	1021	0.19	0.51	10.68
VH	1025	0.2	0.52	10.69
VH	1026	0.2	0.53	10.69
VH	1027	0.21	0.53	10.69
VH	1029	0.21	0.54	10.69
VH	1042	0.25	0.58	10.72
VH	1049	0.26	0.6	10.73
VH	1057	0.28	0.62	10.74

VH	1059	0.29	0.63	10.75
VH	1063	0.3	0.64	10.75
VH	1065	0.3	0.64	10.76
VH	1073	0.32	0.66	10.77
VH	1077	0.33	0.67	10.78
VH	1089	0.35	0.7	10.79
VH	1091	0.36	0.7	10.8
VH	1097	0.37	0.71	10.81
VH	1101	0.38	0.72	10.81
VH	1103	0.38	0.72	10.81
VH	1133	0.44	0.78	10.85
VH	1135	0.44	0.78	10.86
VH	1141	0.46	0.79	10.87
VH	1145	0.46	0.8	10.87
VH	1151	0.47	0.8	10.88
VH	1159	0.49	0.82	10.89
VH	1161	0.49	0.82	10.89
VH	1169	0.51	0.83	10.9
VH	1171	0.51	0.83	10.9
VH	1177	0.52	0.84	10.91
VH	1189	0.54	0.86	10.92
VH	1193	0.55	0.86	10.93
VH	1199	0.56	0.87	10.94
VH	1221	0.59	0.9	10.96
VH	1227	0.6	0.91	10.97
VH	1231	0.61	0.91	10.97
VH	1235	0.62	0.92	10.98
VH	1239	0.62	0.92	10.98
VH	1243	0.63	0.93	10.99
VH	1251	0.64	0.94	10.99
VH	1257	0.65	0.94	11
VH	1265	0.66	0.95	11.01
VH	1273	0.68	0.96	11.02
VH	1285	0.69	0.97	11.03
VH	1291	0.7	0.98	11.04
VH	1297	0.71	0.99	11.04
VH	1303	0.72	0.99	11.05
VH	1307	0.73	1	11.05
VH	1315	0.74	1	11.06
VH	1321	0.75	1.01	11.07
VH	1343	0.78	1.03	11.09
VH	1351	0.79	1.04	11.1
VH	1361	0.8	1.05	11.11
VH	1365	0.81	1.05	11.11
VH	1369	0.81	1.05	11.12
VH	1377	0.82	1.06	11.12
VH	1383	0.83	1.07	11.13
VH	1387	0.84	1.07	11.13
VH	1389	0.84	1.07	11.13
VH	1397	0.85	1.08	11.14
VH	1401	0.86	1.08	11.15
VH	1405	0.86	1.09	11.15
VH	1409	0.87	1.09	11.15

VH	1411	0.87	1.09	11.16
VH	1413	0.87	1.09	11.16
VH	1417	0.88	1.1	11.16
VH	1421	0.88	1.1	11.16
VH	1423	0.89	1.1	11.17
VH	1427	0.89	1.1	11.17
VH	1429	0.89	1.11	11.17
VH	1431	0.9	1.11	11.17
VH	1433	0.9	1.11	11.18
IF	1437	0.91	1.11	11.18
IF	1453	0.93	1.12	11.19
IF	1467	0.94	1.14	11.21
IF	1471	0.95	1.14	11.21
IF	1481	0.96	1.15	11.22
IF	1571	1.07	1.21	11.3
IF	1585	1.09	1.22	11.31
IF	1589	1.09	1.22	11.31
IF	1595	1.1	1.23	11.32
IF	1599	1.11	1.23	11.32
IF	1611	1.12	1.24	11.33
IF	1619	1.13	1.24	11.34
IF	1627	1.14	1.25	11.34
IF	1631	1.14	1.25	11.35
IF	1635	1.15	1.25	11.35
IF	1645	1.16	1.26	11.36
IF	1651	1.17	1.26	11.36
IF	1665	1.18	1.27	11.37
IF	1669	1.19	1.27	11.38
IF	1671	1.19	1.27	11.38
IF	1673	1.19	1.28	11.38
IF	1681	1.2	1.28	11.39
IF	1695	1.22	1.29	11.4
IF	1707	1.23	1.3	11.41
IF	1715	1.24	1.3	11.41
IF	1735	1.26	1.31	11.43
IF	1739	1.26	1.31	11.43
IF	1743	1.27	1.32	11.43
IF	1747	1.27	1.32	11.44
IF	1751	1.27	1.32	11.44
IF	1753	1.28	1.32	11.44
IF	1759	1.28	1.33	11.44
IF	1761	1.29	1.33	11.45
IF	1763	1.29	1.33	11.45
IF	1765	1.29	1.33	11.45
IF	1777	1.3	1.34	11.46
IF	1783	1.31	1.34	11.46
IF	1793	1.32	1.34	11.47
IF	1797	1.33	1.35	11.47
IF	1813	1.34	1.36	11.49
IF	1819	1.35	1.36	11.49
IF	1827	1.36	1.36	11.5
IF	1853	1.39	1.38	11.52
IF	1855	1.39	1.38	11.52

IF	1861	1.39	1.38	11.52
IF	1877	1.41	1.39	11.53
IF	1883	1.42	1.39	11.54
IF	1889	1.42	1.39	11.54
IF	1893	1.43	1.4	11.54
IF	1897	1.43	1.4	11.55
IF	1905	1.44	1.4	11.55
IF	1933	1.47	1.42	11.57
IF	1937	1.47	1.42	11.58
IF	1943	1.48	1.42	11.58
IF	1951	1.49	1.43	11.59
IF	1961	1.5	1.43	11.59
IF	1965	1.5	1.43	11.6
IF	1969	1.5	1.43	11.6
IF	1973	1.51	1.44	11.6
IF	1977	1.51	1.44	11.6
IF	1981	1.52	1.44	11.61
IF	1995	1.53	1.45	11.62
IF	2027	1.56	1.46	11.64
IF	2031	1.56	1.46	11.64
IF	2051	1.58	1.47	11.65
IF	2069	1.6	1.48	11.67
IF	2091	1.62	1.49	11.68
IF	2101	1.63	1.49	11.69
IF	2131	1.66	1.51	11.71
IF	2137	1.66	1.51	11.71
IF	2151	1.68	1.52	11.72
IF	2163	1.69	1.52	11.73
IF	2183	1.7	1.53	11.74
IF	2203	1.72	1.54	11.75
IF	2209	1.72	1.54	11.75
IF	2213	1.72	1.54	11.75
IF	2223	1.73	1.55	11.76
IF	2227	1.74	1.55	11.76
IF	2247	1.76	1.56	11.78
IF	2257	1.77	1.56	11.78
IF	2267	1.78	1.56	11.79
IF	2273	1.79	1.57	11.8
IF	2277	1.79	1.57	11.8
IF	2283	1.8	1.57	11.8
IF	2295	1.81	1.57	11.81
IF	2305	1.82	1.58	11.82
IF	2315	1.82	1.58	11.82
IF	2331	1.83	1.59	11.83
IF	2343	1.84	1.59	11.84
IF	2347	1.85	1.6	11.84
IF	2363	1.86	1.6	11.85
IF	2367	1.86	1.6	11.85
IF	2379	1.87	1.61	11.86
IF	2403	1.89	1.62	11.87
IF	2409	1.9	1.62	11.87
IF	2423	1.91	1.62	11.88
IF	2435	1.91	1.63	11.89

IF	2453	1.93	1.63	11.9
IF	2463	1.94	1.64	11.9
IF	2471	1.95	1.64	11.91
IF	2477	1.95	1.64	11.91
IF	2485	1.94	1.65	11.9
IF	2489	1.93	1.65	11.9
IF	2495	1.94	1.65	11.9
IF	2501	1.95	1.65	11.91
IF	2509	1.97	1.65	11.93
IF	2515	1.98	1.66	11.93
IF	2517	1.98	1.66	11.93
IF	2523	1.98	1.66	11.93
IF	2587	2.02	1.68	11.96
	2712	2.12	1.72	12.03
IF	2765	2.16	1.74	12.06
IF	2833	2.19	1.76	12.08
IF	2877	2.22	1.78	12.1
IF	2935	2.22	1.79	12.1
IF	3001	2.29	1.81	12.15
IF	3037	2.29	1.82	12.15
IF	3071	2.32	1.83	12.17
	3184	2.4	1.86	12.23
IF	3233	2.44	1.88	12.25
IF	3375	2.35	1.91	12.19
	3508	2.56	1.95	12.34
IF	3565	2.62	1.96	12.38
VH	3585	2.62	1.97	12.38
VH	3591	2.63	1.97	12.39
VH	3613	2.62	1.97	12.38
VH	3621	2.62	1.98	12.38
VH	3663	2.63	1.99	12.39
VH	3671	2.63	1.99	12.39
VH	3693	2.64	1.99	12.39
VH	3743	2.69	2	12.43
VH	3763	2.69	2.01	12.43
VH	3793	2.71	2.02	12.44
VH	3815	2.72	2.02	12.45
VH	3833	2.66	2.03	12.41
VH	3841	2.73	2.03	12.45
VH	3861	2.71	2.03	12.44
VH	3869	2.72	2.03	12.45
VH	3917	2.76	2.04	12.48
VH	3955	2.79	2.05	12.5
VE	3963	2.78	2.05	12.49
VE	3971	2.77	2.05	12.48
VE	3983	2.61	2.05	12.37
VE	3999	2.52	2.05	12.31
VE	4009	2.5	2.05	12.3
VE	4019	2.49	2.05	12.29
VE	4059	2.45	2.05	12.26
VE	4077	2.44	2.05	12.25
VE	4085	2.43	2.05	12.25
VE	4105	2.41	2.05	12.23

VE	4131	2.38	2.05	12.21
VE	4159	2.35	2.05	12.19
VE	4179	2.33	2.05	12.17
VE	4189	2.32	2.05	12.17
VH	4191	2.34	2.05	12.18
VH	4211	2.37	2.06	12.21
VH	4297	2.4	2.08	12.22
VH	4313	2.41	2.08	12.23
VH	4353	2.43	2.09	12.25
VE	4407	2.35	2.09	12.19
VE	4419	2.34	2.09	12.18
VE	4453	2.29	2.09	12.15
VE	4459	2.28	2.09	12.14
VE	4505	2.22	2.09	12.1
VE	4511	2.21	2.09	12.09
VE	4553	2.16	2.09	12.06
VE	4603	2.11	2.09	12.02
VE	4657	2.05	2.09	11.98
VE	4663	2.04	2.09	11.97
VH	4665	2.04	2.09	11.98
VH	4679	2.05	2.09	11.98
VH	4693	2.06	2.1	11.99
VH	4703	2.07	2.1	12
VH	4721	2.09	2.1	12.01
VH	4729	2.1	2.1	12.02
VH	4787	2.13	2.12	12.03
VH	4815	2.14	2.12	12.04
VH	4835	2.15	2.13	12.05
VH	4861	2.01	2.13	11.96
VH	4879	2.01	2.14	11.96
VH	4928	2.13	2.15	12.04
VH	4945	2.14	2.15	12.04
VH	4969	1.97	2.15	11.93
VH	4993	2.06	2.16	11.99
VH	5002	2.06	2.16	11.99
VH	5037	2.08	2.17	12
VH	5051	2.09	2.17	12.01
VH	5115	2.11	2.18	12.02
VH	5129	2.12	2.19	12.03
VH	5185	2.15	2.2	12.05
VH	5205	2.17	2.2	12.07
VH	5251	2.2	2.21	12.09
VH	5383	2.12	2.24	12.03
VH	5413	1.87	2.24	11.85
VH	5431	1.93	2.24	11.89
VH	5457	1.96	2.25	11.92
VH	5467	1.97	2.25	11.92
VH	5479	1.96	2.25	11.92
VH	5495	1.97	2.26	11.92
IF	5503	1.97	2.26	11.93
IF	5515	1.98	2.26	11.93
IF	5549	1.99	2.27	11.94
	5658	2.03	2.29	11.97

IF	5705	2.04	2.29	11.98
	5823	2.15	2.31	12.05
IF	5873	2.18	2.32	12.07
IF	5931	2.21	2.33	12.1
IF	5949	2.22	2.34	12.1
IF	5957	2.23	2.34	12.11
VH	5959	2.23	2.34	12.11
VH	6001	2.25	2.35	12.12
VH	6053	2.27	2.35	12.14
VH	6069	2.29	2.36	12.15
VH	6103	2.24	2.36	12.12
VH	6135	2.35	2.37	12.19
VH	6161	2.41	2.37	12.23
VH	6171	2.38	2.37	12.21
VH	6193	2.43	2.38	12.25
VH	6213	2.44	2.38	12.25
VH	6251	2.36	2.39	12.2
BU	6313	0.51	2.39	10.9
BU	6315	0.11	2.39	10.62
BU	6319	0.02	2.39	10.56
BU	6327	0.01	2.39	10.55
BU	6369	0	2.39	10.55
BU	6449	0	2.39	10.55
BU	6465	0	2.39	10.55
BU	6475	0	2.39	10.55
BU	6537	0	2.39	10.55
BU	6613	0	2.39	10.55
BU	6821	0	2.39	10.55
BU	6867	0	2.39	10.55
AS	6909	0	0	10.56
AS	6987	0	0	10.56
AS	7015	0	0	10.56
AS	7031	0	0	10.56
AS	7101	0	0	10.56
AS	7147	0	0	10.56
AS	7177	0	0	10.56
AS	7207	0	0	10.56
AS	7235	0	0	10.56
AS	7297	0	0	10.56

STATION BEGIN	STATION END
35	41
41	47
47	53
53	59
59	65
65	67
67	71
71	75
75	87
87	95
95	99
99	105
105	109
109	113
113	117
117	121
6867	6909
6909	6987
6987	7015
7015	7031
7031	7101
7101	7147
7147	7177
7177	7207
7207	7235
7235	7297

STATION	Location
26	WIND

STATION BEGIN	.EVATION BEGIN	STATION END	.EVATION END	ZONE	ZONE .EVATION	FHF
0	16.67	2	16.5	V26	17	160
2	16.5	10	15.5	V26	16	160
10	15.5	16	14.5	V26	15	160
16	14.5	24	13.5	V26	14	160
24	13.5	26	12.65	V26	13	160
26	12.65	27	12.5	A22	13	120
27	12.5	33	11.5	A22	12	120
33	11.5	35	11.23	A22	11	120
35	11.23	41	10.56	X	11	120
41	10.56	47	10.56	X	11	120
47	10.56	53	10.56	X	11	120
53	10.56	59	10.56	X	11	120
59	10.56	65	10.56	X	11	120
65	10.56	67	10.56	X	11	120
67	10.56	71	10.56	X	11	120
71	10.56	75	10.56	X	11	120
75	10.56	87	10.56	X	11	120
87	10.56	95	10.56	X	11	120
95	10.56	99	10.56	X	11	120
99	10.56	105	10.56	X	11	120
105	10.56	109	10.56	X	11	120
109	10.56	113	10.56	X	11	120
113	10.56	117	10.56	X	11	120
117	10.56	121	10.55	X	11	120
121	10.55	1832	11.5	A22	11	120
1832	11.5	6284	11.5	A22	12	120
6284	11.5	6867	10.55	A22	11	120
6867	10.55	6909	10.56	X	11	120
6909	10.56	6987	10.56	X	11	120
6987	10.56	7015	10.56	X	11	120
7015	10.56	7031	10.56	X	11	120
7031	10.56	7101	10.56	X	11	120
7101	10.56	7147	10.56	X	11	120
7147	10.56	7177	10.56	X	11	120
7177	10.56	7207	10.56	X	11	120
7207	10.56	7235	10.56	X	11	120
7235	10.56	7297	10.56	X	11	120

Appendix 3

WHAFIS Results for Present Day Site With Airport Modifications (2016 CT LiDAR and 2024 Airport Survey)

Post-Project Model

Streamworks, PLLC 45 Evans Road, Madbury, NH 03823 ph: 603.767.4975 e-mail: StreamworksPLLC@gmail.com

WHAFIS Input file - Transect: NH-23 Date: 12/12/2024

2024 Topography and Airport Modifications

IE 0.00 -2.295 0.00 0.0010.54584 13.2 5.39 0.00 0.00 0.00

IF 1 -2.14 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 7 -0.58 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 8 -0.26 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 9 0.11 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 11 0.93 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 14 2.21 0.00 0.00 0.00 0.00 0.00 0.00 0.00

DU 23 6.46 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 25 7.35 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 27 8.15 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 31 9.41 1 0.00 0.00 0.00 0.00 0.00 0.00

DU 35 10.31 1 0.00 0.00 0.00 0.00 0.00 0.00

AS 41 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 47 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 53 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 59 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 65 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 67 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 71 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 75 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 87 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 95 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 99 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 105 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 109 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 113 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS 117 10.56 0.00 0.00 0.00 0.00 0.00 0.00 0.00

AS	121	10.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BU	129	10.53	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	135	10.41	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	143	10.36	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	149	10.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	153	10.15	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	157	10.04	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	163	9.80	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	183	9.20	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	195	8.78	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	203	8.54	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	207	8.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	221	7.99	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	227	7.91	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	231	7.85	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	235	7.79	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	241	7.70	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	249	7.58	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	253	7.52	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	265	7.38	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	283	7.17	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	295	7.04	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	307	7.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	315	7.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	323	6.92	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	329	6.84	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	341	6.67	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	353	6.50	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	357	6.45	0.15	10	0.00	0.00	0.00	0.00	0.00

BU	361	6.39	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	373	6.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	379	6.19	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	385	6.19	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	391	6.14	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	407	6.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	413	6.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	425	5.94	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	449	5.54	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	457	5.38	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	461	5.34	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	467	5.35	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	473	5.33	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	477	5.28	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	481	5.29	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	485	5.24	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	487	5.21	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	489	5.17	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	503	5.12	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	507	5.12	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	513	5.09	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	515	5.06	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	519	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	521	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	527	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	541	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	547	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	553	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	557	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00

BU	559	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	565	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	569	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	573	5.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	577	5.08	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	583	5.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	587	5.61	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	599	5.88	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	615	5.25	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	621	4.96	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	623	4.89	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	629	4.66	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	635	4.44	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	639	4.28	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	647	3.99	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	649	3.93	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	653	3.81	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	657	3.70	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	667	3.42	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	675	3.26	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	679	3.18	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	685	3.06	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	705	3.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	725	3.20	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	759	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	765	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	769	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	777	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00
BU	783	4.00	0.15	10	0.00	0.00	0.00	0.00	0.00

BU 805 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 823 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 829 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 837 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 845 3.91 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 851 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 861 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 865 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 873 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 877 4.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 879 3.95 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 883 3.56 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 885 3.36 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 889 3.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 901 3.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 907 3.00 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 913 3.10 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 917 3.20 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 923 3.17 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 935 3.20 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 945 2.97 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 953 2.49 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 957 2.61 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 965 2.86 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 975 2.60 0.15 10 0.00 0.00 0.00 0.00 0.00

BU 977 2.53 0.15 10 0.00 0.00 0.00 0.00 0.00

VH 983 2.38 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 985 2.36 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 991 3.20 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 997 3.56 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1009 4.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1015 4.39 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1017 4.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1019 4.11 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1021 4.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1025 3.27 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1026 3.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1027 2.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1029 2.44 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1042 -1.44 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1049 -1.65 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1057 0.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1059 0.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1063 1.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1065 2.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1073 2.71 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1077 3.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1089 4.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1091 5.06 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1097 4.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1101 3.94 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1103 3.53 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1133 1.63 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1135 1.63 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1141 1.64 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1145 1.67 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1151 1.82 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1159 2.04 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1161 2.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1169 3.64 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1171 3.84 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1177 3.32 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1189 1.83 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1193 1.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1199 1.86 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1221 1.87 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1227 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1231 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1235 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1239 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1243 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1251 1.94 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1257 1.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1265 1.90 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1273 1.87 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1285 1.75 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1291 1.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1297 1.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1303 1.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1307 1.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1315 2.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1321 2.08 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1343 2.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1351 2.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1361 1.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1365 1.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1369 1.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1377 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1383 1.73 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1387 1.77 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1389 1.78 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1397 1.87 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1401 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1405 1.95 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1409 1.97 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1411 1.96 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1413 1.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1417 1.77 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1421 1.66 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1423 1.66 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1427 1.67 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1429 1.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1431 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 1433 1.69 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

IF 1437 1.73 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1453 2.24 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1467 2.67 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1471 2.67 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1481 2.67 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1571 3.40 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1585 3.51 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1589 3.55 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1595 3.60 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1599 3.63 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1611 3.73 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1619 3.80 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1627 3.87 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1631 3.90 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1635 3.93 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1645 4.02 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1651 4.07 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1665 4.53 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1669 4.57 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1671 4.59 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 1673 4.61 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF	1681	4.69	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1695	4.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1707	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1715	5.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1735	5.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1739	5.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1743	5.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1747	5.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1751	5.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1753	5.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1759	5.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1761	5.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1763	5.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1765	5.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1777	4.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1783	4.89	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1793	4.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1797	4.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1813	4.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1819	4.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1827	4.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1853	3.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1855	3.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1861	3.85	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1877	3.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1883	3.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1889	3.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1893	3.56	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF	1897	3.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 1905	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1933	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1937	3.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1943	3.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1951	3.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1961	2.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1965	2.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1969	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1973	2.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1977	2.79	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1981	2.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 1995	2.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2027	2.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2031	2.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2051	2.86	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2069	2.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2091	3.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2101	3.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2131	3.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2137	3.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2151	3.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2163	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2183	4.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2203	4.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2209	4.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2213	4.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2223	4.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2227	4.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2247	4.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 2257	4.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2267	3.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2273	3.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2277	3.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2283	3.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2295	3.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2305	3.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2315	3.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2331	3.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2343	3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2347	3.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2363	3.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2367	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2379	3.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2403	3.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2409	3.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2423	3.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2435	3.53	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2453	3.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2463	3.84	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2471	3.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2477	3.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2485	4.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2489	4.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2495	4.19	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2501	4.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2509	4.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2515	4.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IF 2517	4.42	0.00	0.00	0.00	0.00	0.00	0.00	0.00

IF 2523 4.48 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2587 5.03 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2765 4.90 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2833 5.48 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2877 5.66 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 2935 5.93 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3001 6.39 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VE 3037 6.60 2.5 25 27 0.00 0.00 0.00 0.00

VE 3071 6.60 2.5 25 27 0.00 0.00 0.00 0.00

IF 3233 6.60 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3375 6.76 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 3565 3.17 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VH 3585 3.47 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3591 3.25 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3613 3.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3621 3.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3663 4.14 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3671 4.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3693 4.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3743 3.73 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3763 4.01 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3793 3.82 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3815 3.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3833 4.43 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3841 3.92 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3861 4.13 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3869 4.10 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3917 3.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 3955 3.74 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VE 3963 3.66 1 25 10 0.00 0.00 0.00 0.00

VE 3971 3.97 1 25 10 0.00 0.00 0.00 0.00

VE 3983 5.26 1 25 10 0.00 0.00 0.00 0.00

VE 3999 5.65 1 25 10 0.00 0.00 0.00 0.00

VE 4009 5.48 1 25 10 0.00 0.00 0.00 0.00

VE 4019 4.06 1 25 10 0.00 0.00 0.00 0.00

VE 4059 3.67 1 25 10 0.00 0.00 0.00 0.00

VE 4077 3.77 1 25 10 0.00 0.00 0.00 0.00

VE 4085 3.74 1 25 10 0.00 0.00 0.00 0.00

VE 4105 4.78 1 25 10 0.00 0.00 0.00 0.00

VE 4131 4.58 1 25 10 0.00 0.00 0.00 0.00

VE 4159 6.10 1 25 10 0.00 0.00 0.00 0.00

VE 4179 5.73 1 25 10 0.00 0.00 0.00 0.00

VE 4189 4.74 1 25 10 0.00 0.00 0.00 0.00

VH 4191 4.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4211 3.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4297 4.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4313 4.17 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4353 4.14 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VE 4407 3.87 1 20 8 0.00 0.00 0.00 0.00

VE 4419 3.79 1 20 8 0.00 0.00 0.00 0.00

VE 4453 4.52 1 20 8 0.00 0.00 0.00 0.00

VE 4459 5.00 1 20 8 0.00 0.00 0.00 0.00

VE 4505 3.78 1 20 8 0.00 0.00 0.00 0.00

VE 4511 3.72 1 20 8 0.00 0.00 0.00 0.00

VE 4553 3.80 1 20 8 0.00 0.00 0.00 0.00

VE 4603 3.76 1 20 8 0.00 0.00 0.00 0.00

VE 4657 4.07 1 20 8 0.00 0.00 0.00 0.00

VE 4663 4.07 1 20 8 0.00 0.00 0.00 0.00

VH 4665 4.07 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4679 4.06 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4693 4.06 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4703 3.93 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4721 3.81 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4729 3.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4787 4.09 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4815 4.23 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4835 4.34 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4861 7.02 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4879 7.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4928 5.39 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4945 5.36 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4969 7.40 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 4993 5.70 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5002 5.91 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5037 5.83 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5051 5.59 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5115 6.19 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5129 5.79 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5185 5.42 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5205 5.14 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5251 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5383 7.17 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5413 7.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5431 5.80 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5457 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5467 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5479 5.38 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 5495 5.68 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

IF 5503 5.74 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5515 6.08 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5549 7.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5705 7.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5873 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5931 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5949 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

IF 5957 6.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

VH 5959 6.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6001 5.22 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6053 5.00 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6069 4.71 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6103 6.59 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6135 3.42 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6161 2.16 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6171 3.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6193 2.18 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6213 2.26 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

VH 6251 5.76 2 1 0.00 1 0.00 0.00 0.00

MG SPAT 0.00 0.00 0.85 327 0.0019 0.0019 0.0019 0.00

BU 6313 4.00 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6315 4.00 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6319 4.00 0.6 6 0.00 0.00 0.00 0.00 0.00

BU 6327 4.65 0.6 6 0.00 0.00 0.00 0.00 0.00

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BU 6369  9.22  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6449  9.82  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6465  9.65  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6475  9.34  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6537  9.00  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6613  9.00  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6821  6.00  0.6   6  0.00  0.00  0.00  0.00  0.00
BU 6867  6.81  0.6   6  0.00  0.00  0.00  0.00  0.00
AS 6909 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 6987 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7015 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7031 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7101 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7147 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7177 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7207 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7235 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
AS 7297 10.56  0.00  0.00  0.00  0.00  0.00  0.00  0.00
ET
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WAVE HEIGHT COMPUTATIONS FOR FLOOD INSURANCE STUDIES (WHAFIS VERSION 4.0G, 08_2007)

Executed on: Thu Dec 12 12:31:53 2024

Input file: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Updated Topography and Proposed runway and terminal\

Output file: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Updated Topography and Proposed runway and terminal\

2024 Topography and Airport Modifications

- Transect: NH-23 Date: 12/12/2024

THIS IS A 100-YEAR CASE

PART1 INPUT

IE	0.000	-2.295	0.000	0.000	10.546	13.200	5.390	0.000	0.155	0.000
IF	1.000	-2.140	0.000	10.546	0.000	0.000	0.000	0.000	0.245	0.000
IF	7.000	-0.580	0.000	10.546	0.000	0.000	0.000	0.000	0.269	0.000
IF	8.000	-0.260	0.000	10.546	0.000	0.000	0.000	0.000	0.345	0.000
IF	9.000	0.110	0.000	10.546	0.000	0.000	0.000	0.000	0.397	0.000
IF	11.000	0.930	0.000	10.546	0.000	0.000	0.000	0.000	0.420	0.000
IF	14.000	2.210	0.000	10.546	0.000	0.000	0.000	0.000	0.461	0.000
DU	23.000	6.460	1.000	0.000	10.546	0.000	0.000	0.000	0.467	0.000
DU	25.000	7.350	1.000	0.000	10.546	0.000	0.000	0.000	0.423	0.000
DU	27.000	8.150	1.000	0.000	10.546	0.000	0.000	0.000	0.343	0.000
DU	31.000	9.410	1.000	0.000	10.546	0.000	0.000	0.000	0.270	0.000
DU	35.000	10.310	1.000	0.000	10.546	0.000	0.000	0.000	0.225	0.000
AS	41.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	47.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	53.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

AS	59.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	65.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	67.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	71.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	75.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	87.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	95.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	99.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	105.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	109.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	113.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	117.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000
AS	121.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
BU	129.000	10.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	135.000	10.410	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	143.000	10.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	149.000	10.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.021	0.000
BU	153.000	10.150	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000
BU	157.000	10.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000
BU	163.000	9.800	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	183.000	9.200	0.150	10.000	0.000	10.546	0.000	0.000	-0.032	0.000
BU	195.000	8.780	0.150	10.000	0.000	10.546	0.000	0.000	-0.033	0.000
BU	203.000	8.540	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000
BU	207.000	8.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.031	0.000
BU	221.000	7.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.025	0.000
BU	227.000	7.910	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	231.000	7.850	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	235.000	7.790	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	241.000	7.700	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000

BU	249.000	7.580	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	253.000	7.520	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	265.000	7.380	0.150	10.000	0.000	10.546	0.000	0.000	-0.012	0.000
BU	283.000	7.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	295.000	7.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	307.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000
BU	315.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000
BU	323.000	6.920	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	329.000	6.840	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	341.000	6.670	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	353.000	6.500	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	357.000	6.450	0.150	10.000	0.000	10.546	0.000	0.000	-0.014	0.000
BU	361.000	6.390	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	373.000	6.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000
BU	379.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000
BU	385.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000
BU	391.000	6.140	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000
BU	407.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	413.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	425.000	5.940	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	449.000	5.540	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000
BU	457.000	5.380	0.150	10.000	0.000	10.546	0.000	0.000	-0.017	0.000
BU	461.000	5.340	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	467.000	5.350	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000
BU	473.000	5.330	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	477.000	5.280	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000
BU	481.000	5.290	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000
BU	485.000	5.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	487.000	5.210	0.150	10.000	0.000	10.546	0.000	0.000	-0.018	0.000

BU	489.000	5.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	503.000	5.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	507.000	5.120	0.150	10.000	0.000	10.546	0.000	0.000	-0.003	0.000
BU	513.000	5.090	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	515.000	5.060	0.150	10.000	0.000	10.546	0.000	0.000	-0.015	0.000
BU	519.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.010	0.000
BU	521.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	527.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	541.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	547.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	553.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	557.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	559.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	565.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	569.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	573.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.010	0.000
BU	577.000	5.080	0.150	10.000	0.000	10.546	0.000	0.000	0.042	0.000
BU	583.000	5.420	0.150	10.000	0.000	10.546	0.000	0.000	0.053	0.000
BU	587.000	5.610	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000
BU	599.000	5.880	0.150	10.000	0.000	10.546	0.000	0.000	-0.013	0.000
BU	615.000	5.250	0.150	10.000	0.000	10.546	0.000	0.000	-0.042	0.000
BU	621.000	4.960	0.150	10.000	0.000	10.546	0.000	0.000	-0.045	0.000
BU	623.000	4.890	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	629.000	4.660	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	635.000	4.440	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	639.000	4.280	0.150	10.000	0.000	10.546	0.000	0.000	-0.038	0.000
BU	647.000	3.990	0.150	10.000	0.000	10.546	0.000	0.000	-0.035	0.000
BU	649.000	3.930	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000
BU	653.000	3.810	0.150	10.000	0.000	10.546	0.000	0.000	-0.029	0.000

BU	657.000	3.700	0.150	10.000	0.000	10.546	0.000	0.000	-0.028	0.000
BU	667.000	3.420	0.150	10.000	0.000	10.546	0.000	0.000	-0.024	0.000
BU	675.000	3.260	0.150	10.000	0.000	10.546	0.000	0.000	-0.020	0.000
BU	679.000	3.180	0.150	10.000	0.000	10.546	0.000	0.000	-0.020	0.000
BU	685.000	3.060	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000
BU	705.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	0.004	0.000
BU	725.000	3.200	0.150	10.000	0.000	10.546	0.000	0.000	0.019	0.000
BU	759.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.020	0.000
BU	765.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	769.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	777.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	783.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	805.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	823.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	829.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	837.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000
BU	845.000	3.910	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	851.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.006	0.000
BU	861.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	865.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	873.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	877.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.008	0.000
BU	879.000	3.950	0.150	10.000	0.000	10.546	0.000	0.000	-0.073	0.000
BU	883.000	3.560	0.150	10.000	0.000	10.546	0.000	0.000	-0.098	0.000
BU	885.000	3.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.093	0.000
BU	889.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.023	0.000
BU	901.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000
BU	907.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000	0.008	0.000
BU	913.000	3.100	0.150	10.000	0.000	10.546	0.000	0.000	0.020	0.000

BU 917.000 3.200 0.150 10.000 0.000 10.546 0.000 0.000 0.007 0.000

BU 923.000 3.170 0.150 10.000 0.000 10.546 0.000 0.000 0.000 0.000

BU 935.000 3.200 0.150 10.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 945.000 2.970 0.150 10.000 0.000 10.546 0.000 0.000 -0.039 0.000

BU 953.000 2.490 0.150 10.000 0.000 10.546 0.000 0.000 -0.030 0.000

BU 957.000 2.610 0.150 10.000 0.000 10.546 0.000 0.000 0.031 0.000

BU 965.000 2.860 0.150 10.000 0.000 10.546 0.000 0.000 -0.001 0.000

BU 975.000 2.600 0.150 10.000 0.000 10.546 0.000 0.000 -0.027 0.000

BU 977.000 2.530 0.150 10.000 0.000 10.546 0.000 0.000 -0.027 0.000

VH 983.000 2.380 2.000 1.000 0.000 1.000 0.000 10.546 -0.021 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 985.000 2.360 2.000 1.000 0.000 1.000 0.000 10.546 0.102 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 991.000 3.200 2.000 1.000 0.000 1.000 0.000 10.546 0.100 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 997.000 3.560 2.000 1.000 0.000 1.000 0.000 10.546 0.059 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1009.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.046 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1015.000 4.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1017.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 -0.070 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1019.000 4.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1021.000 4.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.140 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1025.000 3.270 2.000 1.000 0.000 1.000 0.000 10.546 -0.212 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1026.000 3.010 2.000 1.000 0.000 1.000 0.000 10.546 -0.240 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1027.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.190 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1029.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.282 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1042.000 -1.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.205 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1049.000 -1.650 2.000 1.000 0.000 1.000 0.000 10.546 0.105 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1057.000 0.130 2.000 1.000 0.000 1.000 0.000 10.546 0.257 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1059.000 0.920 2.000 1.000 0.000 1.000 0.000 10.546 0.280 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1063.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.182 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1065.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.090 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1073.000 2.710 2.000 1.000 0.000 1.000 0.000 10.546 0.083 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1077.000 3.000 2.000 1.000 0.000 1.000 0.000 10.546 0.131 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1089.000 4.800 2.000 1.000 0.000 1.000 0.000 10.546 0.147 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1091.000 5.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1097.000 4.780 2.000 1.000 0.000 1.000 0.000 10.546 -0.112 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1101.000 3.940 2.000 1.000 0.000 1.000 0.000 10.546 -0.208 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1103.000 3.530 2.000 1.000 0.000 1.000 0.000 10.546 -0.072 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1133.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 -0.059 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1135.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1141.000 1.640 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1145.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.018 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1151.000 1.820 2.000 1.000 0.000 1.000 0.000 10.546 0.026 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1159.000 2.040 2.000 1.000 0.000 1.000 0.000 10.546 0.034 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 0.160 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1169.000 3.640 2.000 1.000 0.000 1.000 0.000 10.546 0.168 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1171.000 3.840 2.000 1.000 0.000 1.000 0.000 10.546 -0.040 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1177.000 3.320 2.000 1.000 0.000 1.000 0.000 10.546 -0.112 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1189.000 1.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.094 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1193.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1199.000 1.860 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1221.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1227.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1231.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1235.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1239.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1243.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1251.000 1.940 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1257.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1265.000 1.900 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1273.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1285.000 1.750 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1291.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.014 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1297.000 1.920 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1303.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1307.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1315.000	2.010	2.000	1.000	0.000	1.000	0.000	10.546	0.011	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1321.000	2.080	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1343.000	2.180	2.000	1.000	0.000	1.000	0.000	10.546	0.003	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1351.000	2.160	2.000	1.000	0.000	1.000	0.000	10.546	-0.027	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1361.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.033	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1365.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	0.000	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1369.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.001	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1377.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1383.000	1.730	2.000	1.000	0.000	1.000	0.000	10.546	0.008	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1387.000	1.770	2.000	1.000	0.000	1.000	0.000	10.546	0.008	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1389.000	1.780	2.000	1.000	0.000	1.000	0.000	10.546	0.010	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1397.000	1.870	2.000	1.000	0.000	1.000	0.000	10.546	0.011	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1401.000	1.910	2.000	1.000	0.000	1.000	0.000	10.546	0.010	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000
VH	1405.000	1.950	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

VH 1409.000 1.970 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1411.000 1.960 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1413.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 -0.032 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1417.000 1.770 2.000 1.000 0.000 1.000 0.000 10.546 -0.031 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1421.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 -0.018 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1423.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1427.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1429.000 1.680 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1431.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 1433.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

IF 1437.000 1.730 0.000 10.546 0.000 0.000 0.000 0.000 0.027 0.000

IF 1453.000 2.240 0.000 10.546 0.000 0.000 0.000 0.000 0.031 0.000

IF 1467.000 2.670 0.000 10.546 0.000 0.000 0.000 0.000 0.024 0.000

IF 1471.000 2.670 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 1481.000 2.670 0.000 10.546 0.000 0.000 0.000 0.000 0.007 0.000

IF 1571.000 3.400 0.000 10.546 0.000 0.000 0.000 0.000 0.008 0.000

IF 1585.000 3.510 0.000 10.546 0.000 0.000 0.000 0.000 0.008 0.000

IF 1589.000 3.550 0.000 10.546 0.000 0.000 0.000 0.000 0.009 0.000

IF 1595.000 3.600 0.000 10.546 0.000 0.000 0.000 0.000 0.008 0.000

IF	1599.000	3.630	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000
IF	1611.000	3.730	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1619.000	3.800	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1627.000	3.870	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000
IF	1631.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000
IF	1635.000	3.930	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1645.000	4.020	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000
IF	1651.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	0.025	0.000
IF	1665.000	4.530	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000
IF	1669.000	4.570	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1671.000	4.590	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1673.000	4.610	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1681.000	4.690	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1695.000	4.830	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1707.000	4.950	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1715.000	5.030	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1735.000	5.230	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	1739.000	5.260	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	1743.000	5.270	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	1747.000	5.230	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1751.000	5.190	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1753.000	5.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1759.000	5.120	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1761.000	5.100	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1763.000	5.080	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1765.000	5.060	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1777.000	4.950	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1783.000	4.890	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1793.000	4.790	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

IF	1797.000	4.760	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1813.000	4.600	0.000	10.546	0.000	0.000	0.000	0.000	-0.016	0.000
IF	1819.000	4.410	0.000	10.546	0.000	0.000	0.000	0.000	-0.030	0.000
IF	1827.000	4.180	0.000	10.546	0.000	0.000	0.000	0.000	-0.014	0.000
IF	1853.000	3.920	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1855.000	3.900	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1861.000	3.850	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1877.000	3.710	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1883.000	3.650	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1889.000	3.600	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1893.000	3.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1897.000	3.530	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1905.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1933.000	3.200	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1937.000	3.160	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1943.000	3.100	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1951.000	3.030	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1961.000	2.940	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1965.000	2.900	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1969.000	2.860	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1973.000	2.830	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1977.000	2.790	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000
IF	1981.000	2.750	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	1995.000	2.620	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000
IF	2027.000	2.730	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000
IF	2031.000	2.760	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2051.000	2.860	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2069.000	2.960	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2091.000	3.080	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

IF	2101.000	3.130	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2131.000	3.280	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2137.000	3.310	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2151.000	3.380	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000
IF	2163.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	0.025	0.000
IF	2183.000	4.170	0.000	10.546	0.000	0.000	0.000	0.000	0.024	0.000
IF	2203.000	4.400	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	2209.000	4.430	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000
IF	2213.000	4.400	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	2223.000	4.320	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	2227.000	4.290	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	2247.000	4.130	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000
IF	2257.000	4.050	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	2267.000	3.910	0.000	10.546	0.000	0.000	0.000	0.000	-0.019	0.000
IF	2273.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	-0.027	0.000
IF	2277.000	3.640	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000
IF	2283.000	3.590	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000
IF	2295.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	2305.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	2315.000	3.360	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	2331.000	3.310	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000
IF	2343.000	3.340	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000
IF	2347.000	3.340	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000
IF	2363.000	3.270	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000
IF	2367.000	3.230	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000
IF	2379.000	3.120	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000
IF	2403.000	3.190	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000
IF	2409.000	3.250	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000
IF	2423.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000

IF 2435.000 3.530 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2453.000 3.730 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2463.000 3.840 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2471.000 3.930 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2477.000 3.990 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2485.000 4.080 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2489.000 4.120 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2495.000 4.190 0.000 10.546 0.000 0.000 0.000 0.000 0.012 0.000

IF 2501.000 4.260 0.000 10.546 0.000 0.000 0.000 0.000 0.011 0.000

IF 2509.000 4.340 0.000 10.546 0.000 0.000 0.000 0.000 0.010 0.000

IF 2515.000 4.400 0.000 10.546 0.000 0.000 0.000 0.000 0.010 0.000

IF 2517.000 4.420 0.000 10.546 0.000 0.000 0.000 0.000 0.010 0.000

IF 2523.000 4.480 0.000 10.546 0.000 0.000 0.000 0.000 0.009 0.000

IF 2587.000 5.030 0.000 10.546 0.000 0.000 0.000 0.000 0.002 0.000

IF 2765.000 4.900 0.000 10.546 0.000 0.000 0.000 0.000 0.002 0.000

IF 2833.000 5.480 0.000 10.546 0.000 0.000 0.000 0.000 0.007 0.000

IF 2877.000 5.660 0.000 10.546 0.000 0.000 0.000 0.000 0.004 0.000

IF 2935.000 5.930 0.000 10.546 0.000 0.000 0.000 0.000 0.006 0.000

IF 3001.000 6.390 0.000 10.546 0.000 0.000 0.000 0.000 0.007 0.000

VE 3037.000 6.600 2.500 25.000 27.000 0.000 0.000 10.546 0.003 0.000

VE 3071.000 6.600 2.500 25.000 27.000 0.000 0.000 10.546 0.000 0.000

IF 3233.000 6.600 0.000 10.546 0.000 0.000 0.000 0.000 0.001 0.000

IF 3375.000 6.760 0.000 10.546 0.000 0.000 0.000 0.000 -0.010 0.000

IF 3565.000 3.170 0.000 10.546 0.000 0.000 0.000 0.000 -0.016 0.000

VH 3585.000 3.470 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3591.000 3.250 2.000 1.000 0.000 1.000 0.000 10.546 0.012 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3613.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3621.000 3.910 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3663.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3671.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3693.000 4.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3743.000 3.730 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3763.000 4.010 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3793.000 3.820 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3815.000 3.760 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3833.000 4.430 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3841.000 3.920 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3861.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3869.000 4.100 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3917.000 3.910 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 3955.000 3.740 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VE 3963.000 3.660 1.000 25.000 10.000 0.000 0.000 10.546 0.014 0.000

VE 3971.000 3.970 1.000 25.000 10.000 0.000 0.000 10.546 0.080 0.000

VE 3983.000 5.260 1.000 25.000 10.000 0.000 0.000 10.546 0.060 0.000

VE 3999.000 5.650 1.000 25.000 10.000 0.000 0.000 10.546 0.009 0.000

VE 4009.000 5.480 1.000 25.000 10.000 0.000 0.000 10.546 -0.079 0.000

VE 4019.000 4.060 1.000 25.000 10.000 0.000 0.000 10.546 -0.036 0.000

VE 4059.000 3.670 1.000 25.000 10.000 0.000 0.000 10.546 -0.005 0.000

VE 4077.000 3.770 1.000 25.000 10.000 0.000 0.000 10.546 0.003 0.000

VE 4085.000 3.740 1.000 25.000 10.000 0.000 0.000 10.546 0.036 0.000

VE 4105.000 4.780 1.000 25.000 10.000 0.000 0.000 10.546 0.018 0.000

VE 4131.000 4.580 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

VE 4159.000 6.100 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

VE 4179.000 5.730 1.000 25.000 10.000 0.000 0.000 10.546 -0.045 0.000

VE 4189.000 4.740 1.000 25.000 10.000 0.000 0.000 10.546 -0.123 0.000

VH 4191.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 -0.043 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4211.000 3.790 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4297.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4313.000 4.170 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4353.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VE 4407.000 3.870 1.000 20.000 8.000 0.000 0.000 10.546 -0.005 0.000

VE 4419.000 3.790 1.000 20.000 8.000 0.000 0.000 10.546 0.014 0.000

VE 4453.000 4.520 1.000 20.000 8.000 0.000 0.000 10.546 0.030 0.000

VE 4459.000 5.000 1.000 20.000 8.000 0.000 0.000 10.546 -0.014 0.000

VE 4505.000 3.780 1.000 20.000 8.000 0.000 0.000 10.546 -0.025 0.000

VE 4511.000 3.720 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

VE 4553.000 3.800 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

VE 4603.000 3.760 1.000 20.000 8.000 0.000 0.000 10.546 0.003 0.000

VE 4657.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.005 0.000

VE 4663.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

VH 4665.000 4.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4679.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4693.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4703.000 3.930 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4721.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4729.000 3.760 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4787.000 4.090 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4815.000 4.230 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4835.000 4.340 2.000 1.000 0.000 1.000 0.000 10.546 0.061 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4861.000 7.020 2.000 1.000 0.000 1.000 0.000 10.546 0.060 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4879.000 7.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.024 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4928.000 5.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4945.000 5.360 2.000 1.000 0.000 1.000 0.000 10.546 0.049 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4969.000 7.400 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 4993.000 5.700 2.000 1.000 0.000 1.000 0.000 10.546 -0.045 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5002.000 5.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5037.000 5.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5051.000 5.590 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5115.000 6.190 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5129.000 5.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5185.000 5.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5205.000 5.140 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5251.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5383.000 7.170 2.000 1.000 0.000 1.000 0.000 10.546 0.016 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5413.000 7.680 2.000 1.000 0.000 1.000 0.000 10.546 -0.029 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5431.000 5.800 2.000 1.000 0.000 1.000 0.000 10.546 -0.061 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5457.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5467.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5479.000 5.380 2.000 1.000 0.000 1.000 0.000 10.546 0.024 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 5495.000 5.680 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

IF 5503.000 5.740 0.000 10.546 0.000 0.000 0.000 0.000 0.020 0.000

IF 5515.000 6.080 0.000 10.546 0.000 0.000 0.000 0.000 0.027 0.000

IF 5549.000 7.000 0.000 10.546 0.000 0.000 0.000 0.000 0.005 0.000

IF 5705.000 7.000 0.000 10.546 0.000 0.000 0.000 0.000 -0.003 0.000

IF 5873.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 -0.004 0.000

IF 5931.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 5949.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

IF 5957.000 6.000 0.000 10.546 0.000 0.000 0.000 0.000 0.000 0.000

VH 5959.000 6.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.018 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6001.000 5.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6053.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6069.000 4.710 2.000 1.000 0.000 1.000 0.000 10.546 0.032 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6103.000 6.590 2.000 1.000 0.000 1.000 0.000 10.546 -0.020 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6135.000 3.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.076 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6171.000 3.180 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6193.000 2.180 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6213.000 2.260 2.000 1.000 0.000 1.000 0.000 10.546 0.062 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

VH 6251.000 5.760 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

BU 6313.000 4.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.027 0.000

BU 6315.000 4.000 0.600 6.000 0.000 10.546 0.000 0.000 0.000 0.000

BU 6319.000 4.000 0.600 6.000 0.000 10.546 0.000 0.000 0.054 0.000

BU 6327.000 4.650 0.600 6.000 0.000 10.546 0.000 0.000 0.104 0.000

BU 6369.000 9.220 0.600 6.000 0.000 10.546 0.000 0.000 0.042 0.000

BU 6449.000 9.820 0.600 6.000 0.000 10.546 0.000 0.000 0.004 0.000

BU 6465.000 9.650 0.600 6.000 0.000 10.546 0.000 0.000 -0.019 0.000

BU 6475.000 9.340 0.600 6.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 6537.000 9.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.002 0.000

BU 6613.000 9.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.011 0.000

BU 6821.000 6.000 0.600 6.000 0.000 10.546 0.000 0.000 -0.009 0.000

BU 6867.000 6.810 0.600 6.000 0.000 10.546 0.000 0.000 0.018 0.000

AS 6909.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 6987.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7015.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7031.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7101.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7147.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7177.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7207.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7235.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

AS 7297.000 10.560 0.000 10.546 0.000 0.000 0.000 0.000 0.018 0.000

ET 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000

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END END FETCH SURGE ELEV SURGE ELEV INITIAL INITIAL BOTTOM AVERAGE

STATION ELEVATION LENGTH 10-YEAR 100-YEAR WAVE HEIGHT W. PERIOD SLOPE A-ZONES

IE 0.000 -2.295 0.000 0.000 10.546 13.200 5.390 0.000 0.155 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 1.000 -2.140 0.000 10.546 0.000 0.000 0.000 0.000 0.245 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 7.000 -0.580 0.000 10.546 0.000 0.000 0.000 0.000 0.269 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF 8.000 -0.260 0.000 10.546 0.000 0.000 0.000 0.000 0.345 0.000

END END NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION 10-YEAR 100-YEAR SLOPE A-ZONES

IF	9.000	0.110	0.000	10.546	0.000	0.000	0.000	0.000	0.397	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	11.000	0.930	0.000	10.546	0.000	0.000	0.000	0.000	0.420	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	14.000	2.210	0.000	10.546	0.000	0.000	0.000	0.000	0.461	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
DU	23.000	6.460	1.000	0.000	10.546	0.000	0.000	0.000	0.467	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
DU	25.000	7.350	1.000	0.000	10.546	0.000	0.000	0.000	0.423	0.000

	DUNE CREST STATION	DUNE CREST ELEVATION	DUNE OR SEAWALL	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR			BOTTOM SLOPE	AVERAGE A-ZONES
DU	27.000	8.150	1.000	0.000	10.546	0.000	0.000	0.000	0.343	0.000

	STATION	DUNE CREST ELEVATION	DUNE CREST SEAWALL	DUNE OR 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE		BOTTOM SLOPE	AVERAGE A-ZONES
DU	31.000	9.410	1.000	0.000	10.546	0.000	0.000	0.270	0.000

	STATION	DUNE CREST ELEVATION	DUNE CREST SEAWALL	DUNE OR 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE		BOTTOM SLOPE	AVERAGE A-ZONES
DU	35.000	10.310	1.000	0.000	10.546	0.000	0.000	0.225	0.000

	STATION	END ELEVATION	END 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE		BOTTOM SLOPE	AVERAGE A-ZONES
AS	41.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	STATION	END ELEVATION	END 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE		BOTTOM SLOPE	AVERAGE A-ZONES
AS	47.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	STATION	END ELEVATION	END 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE		BOTTOM SLOPE	AVERAGE A-ZONES
AS	53.000	10.560	0.000	10.546	0.000	0.000	0.000	0.225	0.000

	STATION	END ELEVATION	END 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE		BOTTOM SLOPE	AVERAGE A-ZONES

	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
AS	59.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	65.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	67.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	71.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	75.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	87.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	95.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	99.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	105.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	109.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	113.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	117.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.225	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	121.000	10.560	0.000	10.546	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	129.000	10.530	0.150	10.000	0.000	10.546	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	135.000	10.410	0.150	10.000	0.000	10.546	0.000	-0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	143.000	10.360	0.150	10.000	0.000	10.546	0.000	-0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	149.000	10.240	0.150	10.000	0.000	10.546	0.000	-0.021	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	153.000	10.150	0.150	10.000	0.000	10.546	0.000	-0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	157.000	10.040	0.150	10.000	0.000	10.546	0.000	-0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	163.000	9.800	0.150	10.000	0.000	10.546	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	183.000	9.200	0.150	10.000	0.000	10.546	0.000	-0.032	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	195.000	8.780	0.150	10.000	0.000	10.546	0.000	-0.033	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	203.000	8.540	0.150	10.000	0.000	10.546	0.000	0.000 -0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	207.000	8.420	0.150	10.000	0.000	10.546	0.000	0.000 -0.031	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	221.000	7.990	0.150	10.000	0.000	10.546	0.000	0.000 -0.025	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	227.000	7.910	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	231.000	7.850	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	235.000	7.790	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	241.000	7.700	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	249.000	7.580	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	253.000	7.520	0.150	10.000	0.000	10.546	0.000	0.000 -0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	265.000	7.380	0.150	10.000	0.000	10.546	0.000	0.000 -0.012	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	283.000	7.170	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	295.000	7.040	0.150	10.000	0.000	10.546	0.000	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	307.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	315.000	7.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	323.000	6.920	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	329.000	6.840	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	341.000	6.670	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	353.000	6.500	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	357.000	6.450	0.150	10.000	0.000	10.546	0.000	0.000 -0.014	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	361.000	6.390	0.150	10.000	0.000	10.546	0.000	0.000 -0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	373.000	6.240	0.150	10.000	0.000	10.546	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	379.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	385.000	6.190	0.150	10.000	0.000	10.546	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	391.000	6.140	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	407.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	413.000	6.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	425.000	5.940	0.150	10.000	0.000	10.546	0.000	0.000 -0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	449.000	5.540	0.150	10.000	0.000	10.546	0.000	0.000 -0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	457.000	5.380	0.150	10.000	0.000	10.546	0.000	0.000 -0.017	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	461.000	5.340	0.150	10.000	0.000	10.546	0.000	0.000 -0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	467.000	5.350	0.150	10.000	0.000	10.546	0.000	-0.001	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	473.000	5.330	0.150	10.000	0.000	10.546	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	477.000	5.280	0.150	10.000	0.000	10.546	0.000	-0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	481.000	5.290	0.150	10.000	0.000	10.546	0.000	-0.005	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	485.000	5.240	0.150	10.000	0.000	10.546	0.000	-0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	487.000	5.210	0.150	10.000	0.000	10.546	0.000	-0.018	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	489.000	5.170	0.150	10.000	0.000	10.546	0.000	-0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	503.000	5.120	0.150	10.000	0.000	10.546	0.000	-0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	507.000	5.120	0.150	10.000	0.000	10.546	0.000	-0.003	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	513.000	5.090	0.150	10.000	0.000	10.546	0.000	-0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	515.000	5.060	0.150	10.000	0.000	10.546	0.000	0.000 -0.015	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	519.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.010	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	521.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	527.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	541.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	547.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	553.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	557.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	559.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	565.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	569.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	573.000	5.000	0.150	10.000	0.000	10.546	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	577.000	5.080	0.150	10.000	0.000	10.546	0.000	0.000	0.042	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	583.000	5.420	0.150	10.000	0.000	10.546	0.000	0.000	0.053	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	587.000	5.610	0.150	10.000	0.000	10.546	0.000	0.000	0.029	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	599.000	5.880	0.150	10.000	0.000	10.546	0.000	-0.013	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	615.000	5.250	0.150	10.000	0.000	10.546	0.000	-0.042	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	621.000	4.960	0.150	10.000	0.000	10.546	0.000	-0.045	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	623.000	4.890	0.150	10.000	0.000	10.546	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	629.000	4.660	0.150	10.000	0.000	10.546	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	635.000	4.440	0.150	10.000	0.000	10.546	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	639.000	4.280	0.150	10.000	0.000	10.546	0.000	-0.038	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	647.000	3.990	0.150	10.000	0.000	10.546	0.000	-0.035	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	649.000	3.930	0.150	10.000	0.000	10.546	0.000	-0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	653.000	3.810	0.150	10.000	0.000	10.546	0.000	-0.029	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	657.000	3.700	0.150	10.000	0.000	10.546	0.000	0.000 -0.028	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	667.000	3.420	0.150	10.000	0.000	10.546	0.000	0.000 -0.024	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	675.000	3.260	0.150	10.000	0.000	10.546	0.000	0.000 -0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	679.000	3.180	0.150	10.000	0.000	10.546	0.000	0.000 -0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	685.000	3.060	0.150	10.000	0.000	10.546	0.000	0.000 -0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	705.000	3.000	0.150	10.000	0.000	10.546	0.000	0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	725.000	3.200	0.150	10.000	0.000	10.546	0.000	0.019	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	759.000	4.000	0.150	10.000	0.000	10.546	0.000	0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	765.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	769.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	777.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	783.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	805.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	823.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE		AVERAGE A-ZONES
BU	829.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	837.000	4.000	0.150	10.000	0.000	10.546	0.000	-0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	845.000	3.910	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	851.000	4.000	0.150	10.000	0.000	10.546	0.000	0.006	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	861.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	865.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	873.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	877.000	4.000	0.150	10.000	0.000	10.546	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	879.000	3.950	0.150	10.000	0.000	10.546	0.000	0.000	-0.073	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	883.000	3.560	0.150	10.000	0.000	10.546	0.000	0.000	-0.098	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	885.000	3.360	0.150	10.000	0.000	10.546	0.000	0.000	-0.093	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	889.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000 -0.023	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	901.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000 0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	907.000	3.000	0.150	10.000	0.000	10.546	0.000	0.000 0.008	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	913.000	3.100	0.150	10.000	0.000	10.546	0.000	0.000 0.020	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	917.000	3.200	0.150	10.000	0.000	10.546	0.000	0.000 0.007	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	923.000	3.170	0.150	10.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	935.000	3.200	0.150	10.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	945.000	2.970	0.150	10.000	0.000	10.546	0.000	0.000	-0.039	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	953.000	2.490	0.150	10.000	0.000	10.546	0.000	0.000	-0.030	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	957.000	2.610	0.150	10.000	0.000	10.546	0.000	0.000	0.031	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
BU	965.000	2.860	0.150	10.000	0.000	10.546	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
BU	975.000	2.600	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
BU	977.000	2.530	0.150	10.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	983.000	2.380	2.000	1.000	0.000	1.000	0.000	10.546	-0.021	0.000

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	985.000	2.360	2.000	1.000	0.000	1.000	0.000	10.546	0.102	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 991.000 3.200 2.000 1.000 0.000 1.000 0.000 10.546 0.100 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 997.000 3.560 2.000 1.000 0.000 1.000 0.000 10.546 0.059 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1009.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.046 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1015.000 4.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.016 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1017.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 -0.070 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1019.000 4.110 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1021.000	4.070	2.000	1.000	0.000	1.000	0.000	10.546	-0.140	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1025.000 3.270 2.000 1.000 0.000 1.000 0.000 10.546 -0.212 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1026.000	3.010	2.000	1.000	0.000	1.000	0.000	10.546	-0.240	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT		0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1027.000 2.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.190 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1029.000 2.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.282 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1042.000 -1.440 2.000 1.000 0.000 1.000 0.000 10.546 -0.205 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1049.000 -1.650 2.000 1.000 0.000 1.000 0.000 10.546 0.105 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1057.000	0.130	2.000	1.000	0.000	1.000	0.000	10.546	0.257	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1059.000	0.920	2.000	1.000	0.000	1.000	0.000	10.546	0.280	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1063.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.182 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1065.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.090 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1073.000 2.710 2.000 1.000 0.000 1.000 0.000 10.546 0.083 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1077.000 3.000 2.000 1.000 0.000 1.000 0.000 10.546 0.131 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1089.000 4.800 2.000 1.000 0.000 1.000 0.000 10.546 0.147 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1091.000 5.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1097.000	4.780	2.000	1.000	0.000	1.000	0.000	10.546	-0.112	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1101.000	3.940	2.000	1.000	0.000	1.000	0.000	10.546	-0.208	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 1103.000	3.530	2.000	1.000	0.000	1.000	0.000	10.546	-0.072	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1133.000 1.630 2.000 1.000 0.000 1.000 0.000 10.546 -0.059 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1135.000	1.630	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1141.000	1.640	2.000	1.000	0.000	1.000	0.000	10.546	0.004	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1145.000	1.670	2.000	1.000	0.000	1.000	0.000	10.546	0.018	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1151.000	1.820	2.000	1.000	0.000	1.000	0.000	10.546	0.026	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1159.000	2.040	2.000	1.000	0.000	1.000	0.000	10.546	0.034	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1161.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 0.160 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1169.000 3.640 2.000 1.000 0.000 1.000 0.000 10.546 0.168 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1171.000	3.840	2.000	1.000	0.000	1.000	0.000	10.546	-0.040	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES

VH 1177.000 3.320 2.000 1.000 0.000 1.000 0.000 10.546 -0.112 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1189.000 1.830 2.000 1.000 0.000 1.000 0.000 10.546 -0.094 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1193.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1199.000	1.860	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1221.000	1.870	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1227.000	1.910	2.000	1.000	0.000	1.000	0.000	10.546	0.003	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 1231.000	1.900	2.000	1.000	0.000	1.000	0.000	10.546	-0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1235.000	1.900	2.000	1.000	0.000	1.000	0.000	10.546	0.000	0.000

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
	SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1239.000	1.900	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1243.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1251.000	1.940	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1257.000	1.930	2.000	1.000	0.000	1.000	0.000	10.546	-0.003	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH	1265.000	1.900	2.000	1.000	0.000	1.000	0.000	10.546	-0.004	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1273.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1285.000 1.750 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1291.000 1.810 2.000 1.000 0.000 1.000 0.000 10.546 0.014 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1297.000 1.920 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1303.000 1.930 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1307.000	1.930	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1315.000 2.010 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1321.000	2.080	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1343.000 2.180 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1351.000 2.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.027 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1361.000 1.700 2.000 1.000 0.000 1.000 0.000 10.546 -0.033 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1365.000 1.700 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1369.000	1.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1377.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1383.000 1.730 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1387.000 1.770 2.000 1.000 0.000 1.000 0.000 10.546 0.008 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1389.000 1.780 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1397.000 1.870 2.000 1.000 0.000 1.000 0.000 10.546 0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1401.000 1.910 2.000 1.000 0.000 1.000 0.000 10.546 0.010 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1405.000 1.950 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1409.000	1.970	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1411.000 1.960 2.000 1.000 0.000 1.000 0.000 10.546 -0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	1413.000	1.910	2.000	1.000	0.000	1.000	0.000	10.546	-0.032	0.000

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 1417.000	1.770	2.000	1.000	0.000	1.000	0.000	10.546	-0.031	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1421.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 -0.018 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1423.000 1.660 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1427.000 1.670 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1429.000	1.680	2.000	1.000	0.000	1.000	0.000	10.546	0.005	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	1431.000	1.690	2.000	1.000	0.000	1.000	0.000	10.546	0.002	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 1433.000 1.690 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1437.000	1.730	0.000	10.546	0.000	0.000	0.000	0.027	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1453.000	2.240	0.000	10.546	0.000	0.000	0.000	0.031	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1467.000	2.670	0.000	10.546	0.000	0.000	0.000	0.024	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1471.000	2.670	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1481.000	2.670	0.000	10.546	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1571.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1585.000	3.510	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1589.000	3.550	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1595.000	3.600	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1599.000	3.630	0.000	10.546	0.000	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1611.000	3.730	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1619.000	3.800	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1627.000	3.870	0.000	10.546	0.000	0.000	0.000	0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1631.000	3.900	0.000	10.546	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1635.000	3.930	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1645.000	4.020	0.000	10.546	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	1651.000	4.070	0.000	10.546	0.000	0.000	0.000	0.000	0.025	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1665.000	4.530	0.000	10.546	0.000	0.000	0.000	0.000	0.028	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1669.000	4.570	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1671.000	4.590	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1673.000	4.610	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1681.000	4.690	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	1695.000	4.830	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1707.000	4.950	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1715.000	5.030	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1735.000	5.230	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1739.000	5.260	0.000	10.546	0.000	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1743.000	5.270	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1747.000	5.230	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1751.000	5.190	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1753.000	5.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1759.000	5.120	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1761.000	5.100	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	1763.000	5.080	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1765.000	5.060	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1777.000	4.950	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1783.000	4.890	0.000	10.546	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1793.000	4.790	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1797.000	4.760	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1813.000	4.600	0.000	10.546	0.000	0.000	0.000	-0.016	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1819.000	4.410	0.000	10.546	0.000	0.000	0.000	-0.030	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1827.000	4.180	0.000	10.546	0.000	0.000	0.000	-0.014	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1853.000	3.920	0.000	10.546	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1855.000	3.900	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1861.000	3.850	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	1877.000	3.710	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1883.000	3.650	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1889.000	3.600	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1893.000	3.560	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1897.000	3.530	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1905.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	1933.000	3.200	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	1937.000	3.160	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	1943.000	3.100	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	1951.000	3.030	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	1961.000	2.940	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	1965.000	2.900	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1969.000	2.860	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1973.000	2.830	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1977.000	2.790	0.000	10.546	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1981.000	2.750	0.000	10.546	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	1995.000	2.620	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2027.000	2.730	0.000	10.546	0.000	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2031.000	2.760	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2051.000	2.860	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2069.000	2.960	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2091.000	3.080	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2101.000	3.130	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2131.000	3.280	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2137.000	3.310	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2151.000	3.380	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2163.000	3.450	0.000	10.546	0.000	0.000	0.000	0.025	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2183.000	4.170	0.000	10.546	0.000	0.000	0.000	0.024	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2203.000	4.400	0.000	10.546	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	2209.000	4.430	0.000	10.546	0.000	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2213.000	4.400	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2223.000	4.320	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2227.000	4.290	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2247.000	4.130	0.000	10.546	0.000	0.000	0.000	0.000	-0.008	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2257.000	4.050	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR					SLOPE	A-ZONES
IF	2267.000	3.910	0.000	10.546	0.000	0.000	0.000	0.000	-0.019	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	2273.000	3.740	0.000	10.546	0.000	0.000	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	2277.000	3.640	0.000	10.546	0.000	0.000	0.000	0.000	-0.015	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	2283.000	3.590	0.000	10.546	0.000	0.000	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	2295.000	3.450	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR					BOTTOM SLOPE	AVERAGE A-ZONES
IF	2305.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2315.000	3.360	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2331.000	3.310	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2343.000	3.340	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2347.000	3.340	0.000	10.546	0.000	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2363.000	3.270	0.000	10.546	0.000	0.000	0.000	0.000	-0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2367.000	3.230	0.000	10.546	0.000	0.000	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2379.000	3.120	0.000	10.546	0.000	0.000	0.000	0.000	-0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2403.000	3.190	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2409.000	3.250	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2423.000	3.400	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2435.000	3.530	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2453.000	3.730	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2463.000	3.840	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2471.000	3.930	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2477.000	3.990	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2485.000	4.080	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2489.000	4.120	0.000	10.546	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES

IF	2495.000	4.190	0.000	10.546	0.000	0.000	0.000	0.000	0.012	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2501.000	4.260	0.000	10.546	0.000	0.000	0.000	0.000	0.011	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2509.000	4.340	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2515.000	4.400	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2517.000	4.420	0.000	10.546	0.000	0.000	0.000	0.000	0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	2523.000	4.480	0.000	10.546	0.000	0.000	0.000	0.000	0.009	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE

	STATION	ELEVATION	10-YEAR	100-YEAR				SLOPE	A-ZONES	
IF	2587.000	5.030	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2765.000	4.900	0.000	10.546	0.000	0.000	0.000	0.000	0.002	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2833.000	5.480	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2877.000	5.660	0.000	10.546	0.000	0.000	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	2935.000	5.930	0.000	10.546	0.000	0.000	0.000	0.000	0.006	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
IF	3001.000	6.390	0.000	10.546	0.000	0.000	0.000	0.000	0.007	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	3037.000	6.600	2.500	25.000	27.000	0.000	0.000	10.546	0.003	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	3071.000	6.600	2.500	25.000	27.000	0.000	0.000	10.546	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3233.000	6.600	0.000	10.546	0.000	0.000	0.000	0.000	0.001	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3375.000	6.760	0.000	10.546	0.000	0.000	0.000	0.000	-0.010	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	3565.000	3.170	0.000	10.546	0.000	0.000	0.000	0.000	-0.016	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3585.000	3.470	2.000	1.000	0.000	1.000	0.000	10.546	0.003	0.000

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

	PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
	SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3591.000	3.250	2.000	1.000	0.000	1.000	0.000	10.546	0.012	0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3613.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 0.022 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	3621.000	3.910	2.000	1.000	0.000	1.000	0.000	10.546	0.007	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2 PLANT TYPES	NO. OF 10-YEAR	NEW SURGE 100-YEAR	NEW SURGE SLOPE	BOTTOM A-ZONES	AVERAGE
VH 3663.000	4.140	2.000	1.000	0.000	1.000	0.000	10.546	0.004	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3671.000 4.130 2.000 1.000 0.000 1.000 0.000 10.546 0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3693.000 4.160 2.000 1.000 0.000 1.000 0.000 10.546 -0.006 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3743.000 3.730 2.000 1.000 0.000 1.000 0.000 10.546 -0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3763.000 4.010 2.000 1.000 0.000 1.000 0.000 10.546 0.002 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3793.000 3.820 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3815.000 3.760 2.000 1.000 0.000 1.000 0.000 10.546 0.015 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	3833.000	4.430	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3841.000 3.920 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	3861.000	4.130	2.000	1.000	0.000	1.000	0.000	10.546	0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3869.000 4.100 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3917.000 3.910 2.000 1.000 0.000 1.000 0.000 10.546 -0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 3955.000 3.740 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 3963.000 3.660 1.000 25.000 10.000 0.000 0.000 10.546 0.014 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 3971.000	3.970	1.000	25.000	10.000	0.000	0.000	10.546	0.080	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 3983.000	5.260	1.000	25.000	10.000	0.000	0.000	10.546	0.060	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 3999.000	5.650	1.000	25.000	10.000	0.000	0.000	10.546	0.009	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4009.000	5.480	1.000	25.000	10.000	0.000	0.000	10.546	-0.079	0.000

STATION	ELEVATION	DIAMETER	HEIGHT	SPACING	COEFF.	10-YEAR	100-YEAR	SLOPE	A-ZONES
VE 4019.000	4.060	1.000	25.000	10.000	0.000	0.000	10.546	-0.036	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4059.000	3.670	1.000	25.000	10.000	0.000	0.000	10.546	-0.005	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4077.000	3.770	1.000	25.000	10.000	0.000	0.000	10.546	0.003	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4085.000	3.740	1.000	25.000	10.000	0.000	0.000	10.546	0.036	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4105.000	4.780	1.000	25.000	10.000	0.000	0.000	10.546	0.018	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4131.000 4.580 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4159.000 6.100 1.000 25.000 10.000 0.000 0.000 10.546 0.024 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4179.000 5.730 1.000 25.000 10.000 0.000 0.000 10.546 -0.045 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4189.000 4.740 1.000 25.000 10.000 0.000 0.000 10.546 -0.123 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4191.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 -0.043 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4211.000 3.790 2.000 1.000 0.000 1.000 0.000 10.546 0.000 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4297.000 4.260 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1	REGION 1 WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4313.000	4.170	2.000	1.000	0.000	1.000	0.000	10.546	-0.002	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4353.000 4.140 2.000 1.000 0.000 1.000 0.000 10.546 -0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4407.000	3.870	1.000	20.000	8.000	0.000	0.000	10.546	-0.005	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4419.000	3.790	1.000	20.000	8.000	0.000	0.000	10.546	0.014	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4453.000	4.520	1.000	20.000	8.000	0.000	0.000	10.546	0.030	0.000

	END STATION	END ELEVATION	AVERAGE DIAMETER	AVERAGE HEIGHT	AVERAGE SPACING	DRAG COEFF.	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VE	4459.000	5.000	1.000	20.000	8.000	0.000	0.000	10.546	-0.014	0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4505.000 3.780 1.000 20.000 8.000 0.000 0.000 10.546 -0.025 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4511.000 3.720 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4553.000 3.800 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4603.000 3.760 1.000 20.000 8.000 0.000 0.000 10.546 0.003 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4657.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.005 0.000

END END AVERAGE AVERAGE AVERAGE DRAG NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION DIAMETER HEIGHT SPACING COEFF. 10-YEAR 100-YEAR SLOPE A-ZONES

VE 4663.000 4.070 1.000 20.000 8.000 0.000 0.000 10.546 0.000 0.000

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4665.000 4.070 2.000 1.000 0.000 1.000 0.000 10.546 -0.001 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	4679.000	4.060	2.000	1.000	0.000	1.000	0.000	10.546	0.000	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4693.000 4.060 2.000 1.000 0.000 1.000 0.000 10.546 -0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4703.000 3.930 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4721.000 3.810 2.000 1.000 0.000 1.000 0.000 10.546 -0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4729.000 3.760 2.000 1.000 0.000 1.000 0.000 10.546 0.004 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4787.000	4.090	2.000	1.000	0.000	1.000	0.000	10.546	0.005	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4815.000	4.230	2.000	1.000	0.000	1.000	0.000	10.546	0.005	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4835.000 4.340 2.000 1.000 0.000 1.000 0.000 10.546 0.061 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END STATION | END ELEVATION | REGION 1 | REGION 1 WEIGHT | NO. OF REGION 2 | NEW SURGE PLANT TYPES | NEW SURGE 10-YEAR | BOTTOM 100-YEAR | AVERAGE SLOPE | A-ZONES

VH 4861.000 7.020 2.000 1.000 0.000 1.000 0.000 10.546 0.060 0.000

PLANT TYPE | DRAG COEFF. | COVERAGE RATIO | AVG. STEM HEIGHT | NUMBER DENSITY | BASE STEM DIAMETER | MID STEM DIAMETER | TOP STEM DIAMETER | LEAF-STEM AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE | DRAG COEFF. | COVERAGE RATIO | AVG. STEM HEIGHT | NUMBER DENSITY | BASE STEM DIAMETER | MID STEM DIAMETER | TOP STEM DIAMETER | LEAF-STEM AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4879.000 7.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.024 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4928.000 5.390 2.000 1.000 0.000 1.000 0.000 10.546 -0.025 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4945.000 5.360 2.000 1.000 0.000 1.000 0.000 10.546 0.049 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 4969.000 7.400 2.000 1.000 0.000 1.000 0.000 10.546 0.007 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	4993.000	5.700	2.000	1.000	0.000	1.000	0.000	10.546	-0.045	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5002.000 5.910 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	5037.000	5.830	2.000	1.000	0.000	1.000	0.000	10.546	-0.007	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5051.000 5.590 2.000 1.000 0.000 1.000 0.000 10.546 0.005 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5115.000 6.190 2.000 1.000 0.000 1.000 0.000 10.546 0.003 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5129.000 5.790 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5185.000 5.420 2.000 1.000 0.000 1.000 0.000 10.546 -0.009 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 5205.000	5.140	2.000	1.000	0.000	1.000	0.000	10.546	-0.006	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	REGION 1	REGION 1 WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5251.000	5.000	2.000	1.000	0.000	1.000	0.000	10.546	0.011	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5383.000 7.170 2.000 1.000 0.000 1.000 0.000 10.546 0.016 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5413.000 7.680 2.000 1.000 0.000 1.000 0.000 10.546 -0.029 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5431.000 5.800 2.000 1.000 0.000 1.000 0.000 10.546 -0.061 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5457.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 -0.022 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5467.000 5.000 2.000 1.000 0.000 1.000 0.000 10.546 0.017 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 5479.000 5.380 2.000 1.000 0.000 1.000 0.000 10.546 0.024 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5495.000	5.680	2.000	1.000	0.000	1.000	0.000	10.546	0.015	0.000

PLANT TYPE		DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5503.000	5.740	0.000	10.546	0.000	0.000	0.000	0.020	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5515.000	6.080	0.000	10.546	0.000	0.000	0.000	0.027	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5549.000	7.000	0.000	10.546	0.000	0.000	0.000	0.005	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5705.000	7.000	0.000	10.546	0.000	0.000	0.000	-0.003	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5873.000	6.000	0.000	10.546	0.000	0.000	0.000	-0.004	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5931.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5949.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
IF	5957.000	6.000	0.000	10.546	0.000	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	5959.000	6.000	2.000	1.000	0.000	1.000	0.000	10.546	-0.018	0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6001.000 5.220 2.000 1.000 0.000 1.000 0.000 10.546 -0.011 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	6053.000	5.000	2.000	1.000	0.000	1.000	0.000	10.546	-0.007	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

SPAT 0.100 1.000 0.850 327.000 0.024 0.012 0.012 1.380

END END REGION 1 NO. OF NEW SURGE NEW SURGE BOTTOM AVERAGE

STATION ELEVATION REGION 1 WEIGHT REGION 2 PLANT TYPES 10-YEAR 100-YEAR SLOPE A-ZONES

VH 6069.000 4.710 2.000 1.000 0.000 1.000 0.000 10.546 0.032 0.000

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE COEFF. RATIO HEIGHT DENSITY DIAMETER DIAMETER DIAMETER AREA RATIO

MG SPAT 0.000 0.000 0.850 327.000 0.000 0.000 0.000 0.000 0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT DRAG COVERAGE AVG. STEM NUMBER BASE STEM MID STEM TOP STEM LEAF-STEM

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	6103.000	6.590	2.000	1.000	0.000	1.000	0.000	10.546	-0.020	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	6135.000	3.420	2.000	1.000	0.000	1.000	0.000	10.546	-0.076	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG	SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	6161.000	2.160	2.000	1.000	0.000	1.000	0.000	10.546	-0.007	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	NO. OF REGION 2	NEW SURGE PLANT TYPES	NEW SURGE 10-YEAR	BOTTOM 100-YEAR	AVERAGE SLOPE	A-ZONES
VH	6171.000	3.180	2.000	1.000	0.000	1.000	0.000	10.546	0.001	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH 6193.000	2.180	2.000	1.000	0.000	1.000	0.000	10.546	-0.022	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO

TYPE	COEFF.	RATIO	HEIGHT	DENSITY	DIAMETER	DIAMETER	DIAMETER	AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

END STATION	END ELEVATION	REGION 1 REGION 1	WEIGHT	REGION 2	NO. OF PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	6213.000	2.260	2.000	1.000	0.000	1.000	0.000	10.546	0.062	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

STATION	END ELEVATION	END REGION 1	REGION 1 WEIGHT	NO. OF REGION 2 PLANT TYPES	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
VH	6251.000	5.760	2.000	1.000	0.000	1.000	0.000	10.546	0.017	0.000

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
MG SPAT	0.000	0.000	0.850	327.000	0.000	0.000	0.000	0.000	0.000

PLANT CHARACTERISTICS INCLUDING VALUES SUPPLIED BY THE PROGRAM

PLANT TYPE	DRAG COEFF.	COVERAGE RATIO	AVG. STEM HEIGHT	NUMBER DENSITY	BASE STEM DIAMETER	MID STEM DIAMETER	TOP STEM DIAMETER	LEAF-STEM AREA RATIO
SPAT	0.100	1.000	0.850	327.000	0.024	0.012	0.012	1.380

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
BU	6313.000	4.000	0.600	6.000	0.000	10.546	0.000	0.000	-0.027	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
BU	6315.000	4.000	0.600	6.000	0.000	10.546	0.000	0.000	0.000	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES
BU	6319.000	4.000	0.600	6.000	0.000	10.546	0.000	0.000	0.054	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR	BOTTOM SLOPE	AVERAGE A-ZONES

BU	6327.000	4.650	0.600	6.000	0.000	10.546	0.000	0.000	0.104	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6369.000	9.220	0.600	6.000	0.000	10.546	0.000	0.000	0.042	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6449.000	9.820	0.600	6.000	0.000	10.546	0.000	0.000	0.004	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6465.000	9.650	0.600	6.000	0.000	10.546	0.000	0.000	-0.019	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6475.000	9.340	0.600	6.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES

BU	6537.000	9.000	0.600	6.000	0.000	10.546	0.000	0.000	-0.002	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6613.000	9.000	0.600	6.000	0.000	10.546	0.000	0.000	-0.011	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6821.000	6.000	0.600	6.000	0.000	10.546	0.000	0.000	-0.009	0.000

	END STATION	END ELEVATION	OPEN SPACE RATIO	NO. OF ROWS	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR		BOTTOM SLOPE	AVERAGE A-ZONES
BU	6867.000	6.810	0.600	6.000	0.000	10.546	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	6909.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES
AS	6987.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7015.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7031.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7101.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7147.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7177.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7207.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7235.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

	END STATION	END ELEVATION	NEW SURGE 10-YEAR	NEW SURGE 100-YEAR				BOTTOM SLOPE	AVERAGE A-ZONES	
AS	7297.000	10.560	0.000	10.546	0.000	0.000	0.000	0.000	0.018	0.000

----------END OF TRANSECT----------

NOTE:

SURGE ELEVATION INCLUDES CONTRIBUTIONS FROM ASTRONOMICAL AND STORM TIDES.

1

PART2: CONTROLLING WAVE HEIGHTS, SPECTRAL
PEAK WAVE PERIOD, AND WAVE CREST ELEVATIONS

LOCATION	CONTROLLING WAVE HEIGHT	SPECTRAL PEAK WAVE PERIOD	WAVE CREST ELEVATION
IE	0.00	8.75	5.39	16.67

IF	1.00	8.66	5.39	16.60
IF	7.00	7.72	5.39	15.95
IF	8.00	7.53	5.39	15.82
IF	9.00	7.30	5.39	15.66
IF	11.00	6.79	5.39	15.30
IF	14.00	5.96	5.39	14.72
DU	23.00	4.51	5.39	13.70
DU	25.00	3.46	5.39	12.97
DU	27.00	2.64	5.39	12.39
DU	31.00	1.76	5.39	11.78
DU	35.00	0.97	5.39	11.23
AS	41.00	0.00	0.00	10.56
AS	47.00	0.00	0.00	10.56
AS	53.00	0.00	0.00	10.56

AS	59.00	0.00	0.00	10.56
AS	65.00	0.00	0.00	10.56
AS	67.00	0.00	0.00	10.56
AS	71.00	0.00	0.00	10.56
AS	75.00	0.00	0.00	10.56
AS	87.00	0.00	0.00	10.56
AS	95.00	0.00	0.00	10.56
AS	99.00	0.00	0.00	10.56
AS	105.00	0.00	0.00	10.56
AS	109.00	0.00	0.00	10.56
AS	113.00	0.00	0.00	10.56
AS	117.00	0.00	0.00	10.56
AS	121.00	0.00	0.00	10.56
BU	129.00	0.00	0.00	10.55
BU	135.00	0.00	0.00	10.55

BU	143.00	0.00	0.00	10.55
BU	149.00	0.00	0.00	10.55
BU	153.00	0.00	0.00	10.55
BU	157.00	0.00	0.00	10.55
BU	163.00	0.00	0.00	10.55
BU	183.00	0.00	0.00	10.55
BU	195.00	0.00	0.00	10.55
BU	203.00	0.00	0.00	10.55
BU	207.00	0.00	0.00	10.55
BU	221.00	0.00	0.00	10.55
BU	227.00	0.00	0.00	10.55
BU	231.00	0.00	0.00	10.55
BU	235.00	0.00	0.00	10.55
BU	241.00	0.00	0.00	10.55

BU	249.00	0.00	0.00	10.55
BU	253.00	0.00	0.00	10.55
BU	265.00	0.00	0.00	10.55
BU	283.00	0.00	0.00	10.55
BU	295.00	0.00	0.00	10.55
BU	307.00	0.00	0.00	10.55
BU	315.00	0.00	0.00	10.55
BU	323.00	0.00	0.00	10.55
BU	329.00	0.00	0.00	10.55
BU	341.00	0.00	0.00	10.55
BU	353.00	0.00	0.00	10.55
BU	357.00	0.00	0.00	10.55
BU	361.00	0.00	0.00	10.55
BU	373.00	0.00	0.00	10.55
BU	379.00	0.00	0.00	10.55

BU	385.00	0.00	0.00	10.55
BU	391.00	0.00	0.00	10.55
BU	407.00	0.00	0.00	10.55
BU	413.00	0.00	0.00	10.55
BU	425.00	0.00	0.00	10.55
BU	449.00	0.00	0.00	10.55
BU	457.00	0.00	0.00	10.55
BU	461.00	0.00	0.00	10.55
BU	467.00	0.00	0.00	10.55
BU	473.00	0.00	0.00	10.55
BU	477.00	0.00	0.00	10.55
BU	481.00	0.00	0.00	10.55
BU	485.00	0.00	0.00	10.55
BU	487.00	0.00	0.00	10.55

BU	489.00	0.00	0.00	10.55
BU	503.00	0.00	0.00	10.55
BU	507.00	0.00	0.00	10.55
BU	513.00	0.00	0.00	10.55
BU	515.00	0.00	0.00	10.55
BU	519.00	0.00	0.00	10.55
BU	521.00	0.00	0.00	10.55
BU	527.00	0.00	0.00	10.55
BU	541.00	0.00	0.00	10.55
BU	547.00	0.00	0.00	10.55
BU	553.00	0.00	0.00	10.55
BU	557.00	0.00	0.00	10.55
BU	559.00	0.00	0.00	10.55
BU	565.00	0.00	0.00	10.55
BU	569.00	0.00	0.00	10.55

BU	573.00	0.00	0.00	10.55
BU	577.00	0.00	0.00	10.55
BU	583.00	0.00	0.00	10.55
BU	587.00	0.00	0.00	10.55
BU	599.00	0.00	0.00	10.55
BU	615.00	0.00	0.00	10.55
BU	621.00	0.00	0.00	10.55
BU	623.00	0.00	0.00	10.55
BU	629.00	0.00	0.00	10.55
BU	635.00	0.00	0.00	10.55
BU	639.00	0.00	0.00	10.55
BU	647.00	0.00	0.00	10.55
BU	649.00	0.00	0.00	10.55
BU	653.00	0.00	0.00	10.55

BU	657.00	0.00	0.00	10.55
BU	667.00	0.00	0.00	10.55
BU	675.00	0.00	0.00	10.55
BU	679.00	0.00	0.00	10.55
BU	685.00	0.00	0.00	10.55
BU	705.00	0.00	0.00	10.55
BU	725.00	0.00	0.00	10.55
BU	759.00	0.00	0.00	10.55
BU	765.00	0.00	0.00	10.55
BU	769.00	0.00	0.00	10.55
BU	777.00	0.00	0.00	10.55
BU	783.00	0.00	0.00	10.55
BU	805.00	0.00	0.00	10.55
BU	823.00	0.00	0.00	10.55
BU	829.00	0.00	0.00	10.55

BU	837.00	0.00	0.00	10.55
BU	845.00	0.00	0.00	10.55
BU	851.00	0.00	0.00	10.55
BU	861.00	0.00	0.00	10.55
BU	865.00	0.00	0.00	10.55
BU	873.00	0.00	0.00	10.55
BU	877.00	0.00	0.00	10.55
BU	879.00	0.00	0.00	10.55
BU	883.00	0.00	0.00	10.55
BU	885.00	0.00	0.00	10.55
BU	889.00	0.00	0.00	10.55
BU	901.00	0.00	0.00	10.55
BU	907.00	0.00	0.00	10.55
BU	913.00	0.00	0.00	10.55

BU	917.00	0.00	0.00	10.55
BU	923.00	0.00	0.00	10.55
BU	935.00	0.00	0.00	10.55
BU	945.00	0.00	0.00	10.55
BU	953.00	0.00	0.00	10.55
BU	957.00	0.00	0.00	10.55
BU	965.00	0.00	0.00	10.55
BU	975.00	0.00	0.00	10.55
BU	977.00	0.00	0.00	10.55
VH	983.00	0.05	0.27	10.58
VH	985.00	0.06	0.29	10.59
VH	991.00	0.09	0.35	10.61
VH	997.00	0.11	0.39	10.63
VH	1009.00	0.15	0.46	10.65
VH	1015.00	0.17	0.49	10.67

VH	1017.00	0.18	0.49	10.67
VH	1019.00	0.18	0.50	10.68
VH	1021.00	0.19	0.51	10.68
VH	1025.00	0.20	0.52	10.69
VH	1026.00	0.20	0.53	10.69
VH	1027.00	0.21	0.53	10.69
VH	1029.00	0.21	0.54	10.69
VH	1042.00	0.25	0.58	10.72
VH	1049.00	0.26	0.60	10.73
VH	1057.00	0.28	0.62	10.74
VH	1059.00	0.29	0.63	10.75
VH	1063.00	0.30	0.64	10.75
VH	1065.00	0.30	0.64	10.76
VH	1073.00	0.32	0.66	10.77

VH	1077.00	0.33	0.67	10.78
VH	1089.00	0.35	0.70	10.79
VH	1091.00	0.36	0.70	10.80
VH	1097.00	0.37	0.71	10.81
VH	1101.00	0.38	0.72	10.81
VH	1103.00	0.38	0.72	10.81
VH	1133.00	0.44	0.78	10.85
VH	1135.00	0.44	0.78	10.86
VH	1141.00	0.46	0.79	10.87
VH	1145.00	0.46	0.80	10.87
VH	1151.00	0.47	0.80	10.88
VH	1159.00	0.49	0.82	10.89
VH	1161.00	0.49	0.82	10.89
VH	1169.00	0.51	0.83	10.90
VH	1171.00	0.51	0.83	10.90

VH	1177.00	0.52	0.84	10.91
VH	1189.00	0.54	0.86	10.92
VH	1193.00	0.55	0.86	10.93
VH	1199.00	0.56	0.87	10.94
VH	1221.00	0.59	0.90	10.96
VH	1227.00	0.60	0.91	10.97
VH	1231.00	0.61	0.91	10.97
VH	1235.00	0.62	0.92	10.98
VH	1239.00	0.62	0.92	10.98
VH	1243.00	0.63	0.93	10.99
VH	1251.00	0.64	0.94	10.99
VH	1257.00	0.65	0.94	11.00
VH	1265.00	0.66	0.95	11.01
VH	1273.00	0.68	0.96	11.02

VH	1285.00	0.69	0.97	11.03
VH	1291.00	0.70	0.98	11.04
VH	1297.00	0.71	0.99	11.04
VH	1303.00	0.72	0.99	11.05
VH	1307.00	0.73	1.00	11.05
VH	1315.00	0.74	1.00	11.06
VH	1321.00	0.75	1.01	11.07
VH	1343.00	0.78	1.03	11.09
VH	1351.00	0.79	1.04	11.10
VH	1361.00	0.80	1.05	11.11
VH	1365.00	0.81	1.05	11.11
VH	1369.00	0.81	1.05	11.12
VH	1377.00	0.82	1.06	11.12
VH	1383.00	0.83	1.07	11.13
VH	1387.00	0.84	1.07	11.13

VH	1389.00	0.84	1.07	11.13
VH	1397.00	0.85	1.08	11.14
VH	1401.00	0.86	1.08	11.15
VH	1405.00	0.86	1.09	11.15
VH	1409.00	0.87	1.09	11.15
VH	1411.00	0.87	1.09	11.16
VH	1413.00	0.87	1.09	11.16
VH	1417.00	0.88	1.10	11.16
VH	1421.00	0.88	1.10	11.16
VH	1423.00	0.89	1.10	11.17
VH	1427.00	0.89	1.10	11.17
VH	1429.00	0.89	1.11	11.17
VH	1431.00	0.90	1.11	11.17
VH	1433.00	0.90	1.11	11.18

IF	1437.00	0.91	1.11	11.18
IF	1453.00	0.93	1.12	11.19
IF	1467.00	0.94	1.14	11.21
IF	1471.00	0.95	1.14	11.21
IF	1481.00	0.96	1.15	11.22
IF	1571.00	1.07	1.21	11.30
IF	1585.00	1.09	1.22	11.31
IF	1589.00	1.09	1.22	11.31
IF	1595.00	1.10	1.23	11.32
IF	1599.00	1.11	1.23	11.32
IF	1611.00	1.12	1.24	11.33
IF	1619.00	1.13	1.24	11.34
IF	1627.00	1.14	1.25	11.34
IF	1631.00	1.14	1.25	11.35
IF	1635.00	1.15	1.25	11.35

IF	1645.00	1.16	1.26	11.36
IF	1651.00	1.17	1.26	11.36
IF	1665.00	1.18	1.27	11.37
IF	1669.00	1.19	1.27	11.38
IF	1671.00	1.19	1.27	11.38
IF	1673.00	1.19	1.28	11.38
IF	1681.00	1.20	1.28	11.39
IF	1695.00	1.21	1.29	11.40
IF	1707.00	1.23	1.30	11.40
IF	1715.00	1.24	1.30	11.41
IF	1735.00	1.26	1.31	11.43
IF	1739.00	1.26	1.31	11.43
IF	1743.00	1.26	1.32	11.43
IF	1747.00	1.27	1.32	11.43

IF	1751.00	1.27	1.32	11.44
IF	1753.00	1.28	1.32	11.44
IF	1759.00	1.28	1.33	11.44
IF	1761.00	1.28	1.33	11.45
IF	1763.00	1.29	1.33	11.45
IF	1765.00	1.29	1.33	11.45
IF	1777.00	1.30	1.34	11.46
IF	1783.00	1.31	1.34	11.46
IF	1793.00	1.32	1.34	11.47
IF	1797.00	1.32	1.35	11.47
IF	1813.00	1.34	1.36	11.48
IF	1819.00	1.35	1.36	11.49
IF	1827.00	1.36	1.36	11.50
IF	1853.00	1.38	1.38	11.52
IF	1855.00	1.39	1.38	11.52

IF	1861.00	1.39	1.38	11.52
IF	1877.00	1.41	1.39	11.53
IF	1883.00	1.42	1.39	11.54
IF	1889.00	1.42	1.39	11.54
IF	1893.00	1.43	1.40	11.54
IF	1897.00	1.43	1.40	11.55
IF	1905.00	1.44	1.40	11.55
IF	1933.00	1.47	1.42	11.57
IF	1937.00	1.47	1.42	11.58
IF	1943.00	1.48	1.42	11.58
IF	1951.00	1.49	1.43	11.59
IF	1961.00	1.50	1.43	11.59
IF	1965.00	1.50	1.43	11.60
IF	1969.00	1.50	1.43	11.60

IF	1973.00	1.51	1.44	11.60
IF	1977.00	1.51	1.44	11.60
IF	1981.00	1.52	1.44	11.61
IF	1995.00	1.53	1.45	11.62
IF	2027.00	1.56	1.46	11.64
IF	2031.00	1.57	1.46	11.64
IF	2051.00	1.58	1.47	11.66
IF	2069.00	1.60	1.48	11.67
IF	2091.00	1.62	1.49	11.68
IF	2101.00	1.63	1.49	11.69
IF	2131.00	1.66	1.51	11.71
IF	2137.00	1.66	1.51	11.71
IF	2151.00	1.68	1.52	11.72
IF	2163.00	1.69	1.52	11.73
IF	2183.00	1.70	1.53	11.74

IF	2203.00	1.72	1.54	11.75
IF	2209.00	1.72	1.54	11.75
IF	2213.00	1.72	1.54	11.75
IF	2223.00	1.73	1.55	11.76
IF	2227.00	1.74	1.55	11.76
IF	2247.00	1.76	1.56	11.78
IF	2257.00	1.77	1.56	11.78
IF	2267.00	1.78	1.56	11.79
IF	2273.00	1.78	1.57	11.79
IF	2277.00	1.79	1.57	11.80
IF	2283.00	1.79	1.57	11.80
IF	2295.00	1.81	1.57	11.81
IF	2305.00	1.82	1.58	11.82
IF	2315.00	1.82	1.58	11.82

IF	2331.00	1.84	1.59	11.83
IF	2343.00	1.85	1.59	11.84
IF	2347.00	1.85	1.60	11.84
IF	2363.00	1.87	1.60	11.85
IF	2367.00	1.87	1.60	11.86
IF	2379.00	1.88	1.61	11.86
IF	2403.00	1.90	1.62	11.88
IF	2409.00	1.91	1.62	11.88
IF	2423.00	1.92	1.62	11.89
IF	2435.00	1.92	1.63	11.89
IF	2453.00	1.94	1.63	11.90
IF	2463.00	1.94	1.64	11.91
IF	2471.00	1.95	1.64	11.91
IF	2477.00	1.95	1.64	11.91
IF	2485.00	1.95	1.65	11.91

IF	2489.00	1.96	1.65	11.92
IF	2495.00	1.96	1.65	11.92
IF	2501.00	1.96	1.65	11.92
IF	2509.00	1.97	1.65	11.92
IF	2515.00	1.97	1.66	11.92
IF	2517.00	1.97	1.66	11.92
IF	2523.00	1.97	1.66	11.93
IF	2587.00	1.99	1.68	11.94
	2711.60	2.08	1.72	12.00
IF	2765.00	2.12	1.74	12.03
IF	2833.00	2.10	1.76	12.02
IF	2877.00	2.10	1.77	12.02
IF	2935.00	2.10	1.79	12.01
IF	3001.00	2.04	1.81	11.97

VE	3037.00	1.99	1.81	11.94
VE	3071.00	1.98	1.81	11.93
	3184.40	2.03	1.84	11.97
IF	3233.00	2.04	1.86	11.98
IF	3375.00	2.04	1.89	11.97
	3508.00	2.30	1.93	12.16
IF	3565.00	2.38	1.94	12.21
VH	3585.00	2.38	1.95	12.21
VH	3591.00	2.39	1.95	12.22
VH	3613.00	2.38	1.95	12.21
VH	3621.00	2.38	1.96	12.21
VH	3663.00	2.40	1.97	12.22
VH	3671.00	2.40	1.97	12.23
VH	3693.00	2.41	1.97	12.24
VH	3743.00	2.46	1.99	12.27

VH	3763.00	2.46	1.99	12.27
VH	3793.00	2.48	2.00	12.28
VH	3815.00	2.50	2.00	12.29
VH	3833.00	2.47	2.01	12.28
VH	3841.00	2.50	2.01	12.30
VH	3861.00	2.50	2.01	12.30
VH	3869.00	2.51	2.02	12.30
VH	3917.00	2.54	2.03	12.32
VH	3955.00	2.57	2.04	12.34
VE	3963.00	2.56	2.04	12.34
VE	3971.00	2.55	2.04	12.33
VE	3983.00	2.54	2.04	12.32
VE	3999.00	2.50	2.04	12.29
VE	4009.00	2.48	2.04	12.28

VE	4019.00	2.47	2.04	12.28
VE	4059.00	2.43	2.04	12.25
VE	4077.00	2.42	2.04	12.24
VE	4085.00	2.41	2.04	12.23
VE	4105.00	2.39	2.04	12.22
VE	4131.00	2.36	2.04	12.20
VE	4159.00	2.33	2.04	12.18
VE	4179.00	2.31	2.04	12.16
VE	4189.00	2.30	2.04	12.15
VH	4191.00	2.32	2.04	12.17
VH	4211.00	2.35	2.04	12.19
VH	4297.00	2.38	2.06	12.21
VH	4313.00	2.39	2.06	12.22
VH	4353.00	2.41	2.07	12.24
VE	4407.00	2.34	2.07	12.18

VE	4419.00	2.32	2.07	12.17
VE	4453.00	2.27	2.07	12.14
VE	4459.00	2.27	2.07	12.13
VE	4505.00	2.20	2.07	12.09
VE	4511.00	2.20	2.07	12.08
VE	4553.00	2.15	2.07	12.05
VE	4603.00	2.09	2.07	12.01
VE	4657.00	2.04	2.07	11.97
VE	4663.00	2.03	2.07	11.97
VH	4665.00	2.03	2.07	11.97
VH	4679.00	2.04	2.08	11.97
VH	4693.00	2.05	2.08	11.98
VH	4703.00	2.06	2.08	11.99
VH	4721.00	2.08	2.09	12.00

VH	4729.00	2.09	2.09	12.01
VH	4787.00	2.11	2.10	12.03
VH	4815.00	2.13	2.11	12.04
VH	4835.00	2.14	2.11	12.04
VH	4861.00	2.00	2.12	11.95
VH	4879.00	2.00	2.12	11.95
VH	4928.00	2.12	2.13	12.03
VH	4945.00	2.13	2.13	12.04
VH	4969.00	1.97	2.14	11.92
VH	4993.00	2.06	2.14	11.99
VH	5002.00	2.06	2.15	11.99
VH	5037.00	2.08	2.15	12.00
VH	5051.00	2.09	2.16	12.01
VH	5115.00	2.10	2.17	12.02
VH	5129.00	2.12	2.17	12.03

VH	5185.00	2.15	2.18	12.05
VH	5205.00	2.17	2.19	12.06
VH	5251.00	2.20	2.20	12.08
VH	5383.00	2.11	2.22	12.03
VH	5413.00	1.86	2.23	11.85
VH	5431.00	1.92	2.23	11.89
VH	5457.00	1.96	2.24	11.92
VH	5467.00	1.96	2.24	11.92
VH	5479.00	1.96	2.24	11.92
VH	5495.00	1.97	2.24	11.92
IF	5503.00	1.97	2.24	11.93
IF	5515.00	1.98	2.25	11.93
IF	5549.00	1.99	2.25	11.94
	5658.20	2.03	2.27	11.96

IF	5705.00	2.04	2.28	11.97
	5822.60	2.15	2.30	12.05
IF	5873.00	2.18	2.31	12.07
IF	5931.00	2.21	2.32	12.09
IF	5949.00	2.22	2.32	12.10
IF	5957.00	2.23	2.33	12.10
VH	5959.00	2.23	2.33	12.10
VH	6001.00	2.25	2.33	12.12
VH	6053.00	2.27	2.34	12.14
VH	6069.00	2.29	2.35	12.15
VH	6103.00	2.24	2.35	12.11
VH	6135.00	2.35	2.36	12.19
VH	6161.00	2.41	2.36	12.23
VH	6171.00	2.38	2.36	12.21
VH	6193.00	2.43	2.37	12.25

VH	6213.00	2.44	2.37	12.25
VH	6251.00	2.36	2.38	12.20
BU	6313.00	0.51	2.38	10.90
BU	6315.00	0.11	2.38	10.62
BU	6319.00	0.02	2.38	10.56
BU	6327.00	0.01	2.38	10.55
BU	6369.00	0.00	2.38	10.55
BU	6449.00	0.00	2.38	10.55
BU	6465.00	0.00	2.38	10.55
BU	6475.00	0.00	2.38	10.55
BU	6537.00	0.00	2.38	10.55
BU	6613.00	0.00	2.38	10.55
BU	6821.00	0.00	2.38	10.55
BU	6867.00	0.00	2.38	10.55

AS 6909.00 0.00 0.00 10.56

AS 6987.00 0.00 0.00 10.56

AS 7015.00 0.00 0.00 10.56

AS 7031.00 0.00 0.00 10.56

AS 7101.00 0.00 0.00 10.56

AS 7147.00 0.00 0.00 10.56

AS 7177.00 0.00 0.00 10.56

AS 7207.00 0.00 0.00 10.56

AS 7235.00 0.00 0.00 10.56

AS 7297.00 0.00 0.00 10.56

PART3 LOCATION OF AREAS ABOVE 100-YEAR SURGE

BETWEEN 35.00 AND 41.00

BETWEEN 41.00 AND 47.00

BETWEEN 47.00 AND 53.00

BETWEEN 53.00 AND 59.00

BETWEEN 59.00 AND 65.00

BETWEEN 65.00 AND 67.00

BETWEEN 67.00 AND 71.00

BETWEEN 71.00 AND 75.00

BETWEEN 75.00 AND 87.00

BETWEEN 87.00 AND 95.00

BETWEEN 95.00 AND 99.00

BETWEEN 99.00 AND 105.00

BETWEEN 105.00 AND 109.00

BETWEEN 109.00 AND 113.00

BETWEEN 113.00 AND 117.00

BETWEEN 117.00 AND 121.00

BETWEEN 6867.00 AND 6909.00

BETWEEN 6909.00 AND 6987.00

BETWEEN 6987.00 AND 7015.00

BETWEEN 7015.00 AND 7031.00

BETWEEN 7031.00 AND 7101.00

BETWEEN 7101.00 AND 7147.00

BETWEEN 7147.00 AND 7177.00

BETWEEN 7177.00 AND 7207.00

BETWEEN 7207.00 AND 7235.00

BETWEEN 7235.00 AND 7297.00

PART4 LOCATION OF SURGE CHANGES

STATION 10-YEAR SURGE 100-YEAR SURGE

NO SURGE CHANGES IN THIS TRANSECT

PART5 LOCATION OF V ZONES

STATION OF GUTTER LOCATION OF ZONE

26.12 WINDWARD

PART6 NUMBERED A ZONES AND V ZONES

STATION OF GUTTER ELEVATION ZONE DESIGNATION FHF

0.00 16.67

V26 EL=17 160

1.96 16.50

V26 EL=16 160

9.86 15.50

V26 EL=15 160

15.94 14.50

V26 EL=14 160

23.55 13.50

V26 EL=13 160

26.12 12.65

A22 EL=13 120

26.63 12.50

A22 EL=12 120

33.01 11.50

A22 EL=11 120

35.00 11.23

41.00 10.56

47.00 10.56

53.00 10.56

59.00 10.56

65.00	10.56
67.00	10.56
71.00	10.56
75.00	10.56
87.00	10.56
95.00	10.56
99.00	10.56
105.00	10.56
109.00	10.56
113.00	10.56

117.00 10.56

121.00 10.55

A22 EL=11 120

1832.39 11.50

A22 EL=12 120

6284.43 11.50

A22 EL=11 120

6867.00 10.55

6909.00 10.56

6987.00 10.56

7015.00 10.56

7031.00 10.56

7101.00 10.56

7147.00 10.56

7177.00 10.56

7207.00 10.56

7235.00 10.56

7297.00 10.56

ZONE TERMINATED AT END OF TRANSECT

PART 7 POSTSCRIPT NOTES

WHAFIS CARD	FIELD 1	FIELD 2	FIELD 3	FIELD 4	FIELD 5	FIELD 6	FIELD 7	FIELD 8	FIELD 9	FIELD 10
IE	0	-2.295	0	0	10.546	13.2	5.39	0	0.155	0
IF	1	-2.14	0	10.546	0	0	0	0	0.245	0
IF	7	-0.58	0	10.546	0	0	0	0	0.269	0
IF	8	-0.26	0	10.546	0	0	0	0	0.345	0
IF	9	0.11	0	10.546	0	0	0	0	0.397	0
IF	11	0.93	0	10.546	0	0	0	0	0.42	0
IF	14	2.21	0	10.546	0	0	0	0	0.461	0
DU	23	6.46	1	0	10.546	0	0	0	0.467	0
DU	25	7.35	1	0	10.546	0	0	0	0.423	0
DU	27	8.15	1	0	10.546	0	0	0	0.343	0
DU	31	9.41	1	0	10.546	0	0	0	0.27	0
DU	35	10.31	1	0	10.546	0	0	0	0.225	0
AS	41	10.56	0	10.546	0	0	0	0	0.225	0
AS	47	10.56	0	10.546	0	0	0	0	0.225	0
AS	53	10.56	0	10.546	0	0	0	0	0.225	0
AS	59	10.56	0	10.546	0	0	0	0	0.225	0
AS	65	10.56	0	10.546	0	0	0	0	0.225	0
AS	67	10.56	0	10.546	0	0	0	0	0.225	0
AS	71	10.56	0	10.546	0	0	0	0	0.225	0
AS	75	10.56	0	10.546	0	0	0	0	0.225	0
AS	87	10.56	0	10.546	0	0	0	0	0.225	0
AS	95	10.56	0	10.546	0	0	0	0	0.225	0
AS	99	10.56	0	10.546	0	0	0	0	0.225	0
AS	105	10.56	0	10.546	0	0	0	0	0.225	0
AS	109	10.56	0	10.546	0	0	0	0	0.225	0
AS	113	10.56	0	10.546	0	0	0	0	0.225	0
AS	117	10.56	0	10.546	0	0	0	0	0.225	0
AS	121	10.56	0	10.546	0	0	0	0	-0.004	0
BU	129	10.53	0.15	10	0	10.546	0	0	-0.011	0
BU	135	10.41	0.15	10	0	10.546	0	0	-0.012	0
BU	143	10.36	0.15	10	0	10.546	0	0	-0.012	0
BU	149	10.24	0.15	10	0	10.546	0	0	-0.021	0
BU	153	10.15	0.15	10	0	10.546	0	0	-0.025	0
BU	157	10.04	0.15	10	0	10.546	0	0	-0.035	0
BU	163	9.8	0.15	10	0	10.546	0	0	-0.032	0
BU	183	9.2	0.15	10	0	10.546	0	0	-0.032	0
BU	195	8.78	0.15	10	0	10.546	0	0	-0.033	0
BU	203	8.54	0.15	10	0	10.546	0	0	-0.03	0
BU	207	8.42	0.15	10	0	10.546	0	0	-0.031	0
BU	221	7.99	0.15	10	0	10.546	0	0	-0.025	0
BU	227	7.91	0.15	10	0	10.546	0	0	-0.014	0
BU	231	7.85	0.15	10	0	10.546	0	0	-0.015	0
BU	235	7.79	0.15	10	0	10.546	0	0	-0.015	0
BU	241	7.7	0.15	10	0	10.546	0	0	-0.015	0
BU	249	7.58	0.15	10	0	10.546	0	0	-0.015	0
BU	253	7.52	0.15	10	0	10.546	0	0	-0.013	0
BU	265	7.38	0.15	10	0	10.546	0	0	-0.012	0
BU	283	7.17	0.15	10	0	10.546	0	0	-0.011	0
BU	295	7.04	0.15	10	0	10.546	0	0	-0.007	0
BU	307	7	0.15	10	0	10.546	0	0	-0.002	0

BU	315	7	0.15	10	0	10.546	0	0	-0.005	0
BU	323	6.92	0.15	10	0	10.546	0	0	-0.011	0
BU	329	6.84	0.15	10	0	10.546	0	0	-0.014	0
BU	341	6.67	0.15	10	0	10.546	0	0	-0.014	0
BU	353	6.5	0.15	10	0	10.546	0	0	-0.014	0
BU	357	6.45	0.15	10	0	10.546	0	0	-0.014	0
BU	361	6.39	0.15	10	0	10.546	0	0	-0.013	0
BU	373	6.24	0.15	10	0	10.546	0	0	-0.011	0
BU	379	6.19	0.15	10	0	10.546	0	0	-0.004	0
BU	385	6.19	0.15	10	0	10.546	0	0	-0.004	0
BU	391	6.14	0.15	10	0	10.546	0	0	-0.009	0
BU	407	6	0.15	10	0	10.546	0	0	-0.006	0
BU	413	6	0.15	10	0	10.546	0	0	-0.003	0
BU	425	5.94	0.15	10	0	10.546	0	0	-0.013	0
BU	449	5.54	0.15	10	0	10.546	0	0	-0.018	0
BU	457	5.38	0.15	10	0	10.546	0	0	-0.017	0
BU	461	5.34	0.15	10	0	10.546	0	0	-0.003	0
BU	467	5.35	0.15	10	0	10.546	0	0	-0.001	0
BU	473	5.33	0.15	10	0	10.546	0	0	-0.007	0
BU	477	5.28	0.15	10	0	10.546	0	0	-0.005	0
BU	481	5.29	0.15	10	0	10.546	0	0	-0.005	0
BU	485	5.24	0.15	10	0	10.546	0	0	-0.013	0
BU	487	5.21	0.15	10	0	10.546	0	0	-0.018	0
BU	489	5.17	0.15	10	0	10.546	0	0	-0.006	0
BU	503	5.12	0.15	10	0	10.546	0	0	-0.003	0
BU	507	5.12	0.15	10	0	10.546	0	0	-0.003	0
BU	513	5.09	0.15	10	0	10.546	0	0	-0.007	0
BU	515	5.06	0.15	10	0	10.546	0	0	-0.015	0
BU	519	5	0.15	10	0	10.546	0	0	-0.01	0
BU	521	5	0.15	10	0	10.546	0	0	0	0
BU	527	5	0.15	10	0	10.546	0	0	0	0
BU	541	5	0.15	10	0	10.546	0	0	0	0
BU	547	5	0.15	10	0	10.546	0	0	0	0
BU	553	5	0.15	10	0	10.546	0	0	0	0
BU	557	5	0.15	10	0	10.546	0	0	0	0
BU	559	5	0.15	10	0	10.546	0	0	0	0
BU	565	5	0.15	10	0	10.546	0	0	0	0
BU	569	5	0.15	10	0	10.546	0	0	0	0
BU	573	5	0.15	10	0	10.546	0	0	0.01	0
BU	577	5.08	0.15	10	0	10.546	0	0	0.042	0
BU	583	5.42	0.15	10	0	10.546	0	0	0.053	0
BU	587	5.61	0.15	10	0	10.546	0	0	0.029	0
BU	599	5.88	0.15	10	0	10.546	0	0	-0.013	0
BU	615	5.25	0.15	10	0	10.546	0	0	-0.042	0
BU	621	4.96	0.15	10	0	10.546	0	0	-0.045	0
BU	623	4.89	0.15	10	0	10.546	0	0	-0.038	0
BU	629	4.66	0.15	10	0	10.546	0	0	-0.038	0
BU	635	4.44	0.15	10	0	10.546	0	0	-0.038	0
BU	639	4.28	0.15	10	0	10.546	0	0	-0.038	0
BU	647	3.99	0.15	10	0	10.546	0	0	-0.035	0
BU	649	3.93	0.15	10	0	10.546	0	0	-0.03	0
BU	653	3.81	0.15	10	0	10.546	0	0	-0.029	0
BU	657	3.7	0.15	10	0	10.546	0	0	-0.028	0

BU	667	3.42	0.15	10	0	10.546	0	0	-0.024	0
BU	675	3.26	0.15	10	0	10.546	0	0	-0.02	0
BU	679	3.18	0.15	10	0	10.546	0	0	-0.02	0
BU	685	3.06	0.15	10	0	10.546	0	0	-0.007	0
BU	705	3	0.15	10	0	10.546	0	0	0.004	0
BU	725	3.2	0.15	10	0	10.546	0	0	0.019	0
BU	759	4	0.15	10	0	10.546	0	0	0.02	0
BU	765	4	0.15	10	0	10.546	0	0	0	0
BU	769	4	0.15	10	0	10.546	0	0	0	0
BU	777	4	0.15	10	0	10.546	0	0	0	0
BU	783	4	0.15	10	0	10.546	0	0	0	0
BU	805	4	0.15	10	0	10.546	0	0	0	0
BU	823	4	0.15	10	0	10.546	0	0	0	0
BU	829	4	0.15	10	0	10.546	0	0	0	0
BU	837	4	0.15	10	0	10.546	0	0	-0.006	0
BU	845	3.91	0.15	10	0	10.546	0	0	0	0
BU	851	4	0.15	10	0	10.546	0	0	0.006	0
BU	861	4	0.15	10	0	10.546	0	0	0	0
BU	865	4	0.15	10	0	10.546	0	0	0	0
BU	873	4	0.15	10	0	10.546	0	0	0	0
BU	877	4	0.15	10	0	10.546	0	0	-0.008	0
BU	879	3.95	0.15	10	0	10.546	0	0	-0.073	0
BU	883	3.56	0.15	10	0	10.546	0	0	-0.098	0
BU	885	3.36	0.15	10	0	10.546	0	0	-0.093	0
BU	889	3	0.15	10	0	10.546	0	0	-0.023	0
BU	901	3	0.15	10	0	10.546	0	0	0	0
BU	907	3	0.15	10	0	10.546	0	0	0.008	0
BU	913	3.1	0.15	10	0	10.546	0	0	0.02	0
BU	917	3.2	0.15	10	0	10.546	0	0	0.007	0
BU	923	3.17	0.15	10	0	10.546	0	0	0	0
BU	935	3.2	0.15	10	0	10.546	0	0	-0.009	0
BU	945	2.97	0.15	10	0	10.546	0	0	-0.039	0
BU	953	2.49	0.15	10	0	10.546	0	0	-0.03	0
BU	957	2.61	0.15	10	0	10.546	0	0	0.031	0
BU	965	2.86	0.15	10	0	10.546	0	0	-0.001	0
BU	975	2.6	0.15	10	0	10.546	0	0	-0.027	0
BU	977	2.53	0.15	10	0	10.546	0	0	-0.027	0
VH	983	2.38	2	1	0	1	0	10.546	-0.021	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	985	2.36	2	1	0	1	0	10.546	0.102	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	991	3.2	2	1	0	1	0	10.546	0.1	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	997	3.56	2	1	0	1	0	10.546	0.059	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1009	4.26	2	1	0	1	0	10.546	0.046	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1015	4.39	2	1	0	1	0	10.546	-0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1017	4.13	2	1	0	1	0	10.546	-0.07	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1019	4.11	2	1	0	1	0	10.546	-0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0

VH	1021	4.07	2	1	0	1	0	10.546	-0.14	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1025	3.27	2	1	0	1	0	10.546	-0.212	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1026	3.01	2	1	0	1	0	10.546	-0.24	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1027	2.79	2	1	0	1	0	10.546	-0.19	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1029	2.44	2	1	0	1	0	10.546	-0.282	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1042	-1.44	2	1	0	1	0	10.546	-0.205	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1049	-1.65	2	1	0	1	0	10.546	0.105	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1057	0.13	2	1	0	1	0	10.546	0.257	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1059	0.92	2	1	0	1	0	10.546	0.28	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1063	1.81	2	1	0	1	0	10.546	0.182	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1065	2.01	2	1	0	1	0	10.546	0.09	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1073	2.71	2	1	0	1	0	10.546	0.083	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1077	3	2	1	0	1	0	10.546	0.131	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1089	4.8	2	1	0	1	0	10.546	0.147	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1091	5.06	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1097	4.78	2	1	0	1	0	10.546	-0.112	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1101	3.94	2	1	0	1	0	10.546	-0.208	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1103	3.53	2	1	0	1	0	10.546	-0.072	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1133	1.63	2	1	0	1	0	10.546	-0.059	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1135	1.63	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1141	1.64	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1145	1.67	2	1	0	1	0	10.546	0.018	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1151	1.82	2	1	0	1	0	10.546	0.026	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1159	2.04	2	1	0	1	0	10.546	0.034	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1161	2.16	2	1	0	1	0	10.546	0.16	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1169	3.64	2	1	0	1	0	10.546	0.168	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1171	3.84	2	1	0	1	0	10.546	-0.04	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	1177	3.32	2	1	0	1	0	10.546	-0.112	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1189	1.83	2	1	0	1	0	10.546	-0.094	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1193	1.81	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1199	1.86	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1221	1.87	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1227	1.91	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1231	1.9	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1235	1.9	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1239	1.9	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1243	1.91	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1251	1.94	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1257	1.93	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1265	1.9	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1273	1.87	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1285	1.75	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1291	1.81	2	1	0	1	0	10.546	0.014	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1297	1.92	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1303	1.93	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1307	1.93	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1315	2.01	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1321	2.08	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1343	2.18	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1351	2.16	2	1	0	1	0	10.546	-0.027	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1361	1.7	2	1	0	1	0	10.546	-0.033	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1365	1.7	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1369	1.7	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0

VH	1377	1.69	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1383	1.73	2	1	0	1	0	10.546	0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1387	1.77	2	1	0	1	0	10.546	0.008	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1389	1.78	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1397	1.87	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1401	1.91	2	1	0	1	0	10.546	0.01	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1405	1.95	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1409	1.97	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1411	1.96	2	1	0	1	0	10.546	-0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1413	1.91	2	1	0	1	0	10.546	-0.032	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1417	1.77	2	1	0	1	0	10.546	-0.031	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1421	1.66	2	1	0	1	0	10.546	-0.018	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1423	1.66	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1427	1.67	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1429	1.68	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1431	1.69	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	1433	1.69	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
IF	1437	1.73	0	10.546	0	0	0	0	0.027	0
IF	1453	2.24	0	10.546	0	0	0	0	0.031	0
IF	1467	2.67	0	10.546	0	0	0	0	0.024	0
IF	1471	2.67	0	10.546	0	0	0	0	0	0
IF	1481	2.67	0	10.546	0	0	0	0	0.007	0
IF	1571	3.4	0	10.546	0	0	0	0	0.008	0
IF	1585	3.51	0	10.546	0	0	0	0	0.008	0
IF	1589	3.55	0	10.546	0	0	0	0	0.009	0
IF	1595	3.6	0	10.546	0	0	0	0	0.008	0
IF	1599	3.63	0	10.546	0	0	0	0	0.008	0
IF	1611	3.73	0	10.546	0	0	0	0	0.009	0
IF	1619	3.8	0	10.546	0	0	0	0	0.009	0
IF	1627	3.87	0	10.546	0	0	0	0	0.008	0
IF	1631	3.9	0	10.546	0	0	0	0	0.007	0
IF	1635	3.93	0	10.546	0	0	0	0	0.009	0
IF	1645	4.02	0	10.546	0	0	0	0	0.009	0
IF	1651	4.07	0	10.546	0	0	0	0	0.025	0
IF	1665	4.53	0	10.546	0	0	0	0	0.028	0
IF	1669	4.57	0	10.546	0	0	0	0	0.01	0

IF	1671	4.59	0	10.546	0	0	0	0	0.01	0
IF	1673	4.61	0	10.546	0	0	0	0	0.01	0
IF	1681	4.69	0	10.546	0	0	0	0	0.01	0
IF	1695	4.83	0	10.546	0	0	0	0	0.01	0
IF	1707	4.95	0	10.546	0	0	0	0	0.01	0
IF	1715	5.03	0	10.546	0	0	0	0	0.01	0
IF	1735	5.23	0	10.546	0	0	0	0	0.01	0
IF	1739	5.26	0	10.546	0	0	0	0	0.005	0
IF	1743	5.27	0	10.546	0	0	0	0	-0.004	0
IF	1747	5.23	0	10.546	0	0	0	0	-0.01	0
IF	1751	5.19	0	10.546	0	0	0	0	-0.01	0
IF	1753	5.17	0	10.546	0	0	0	0	-0.009	0
IF	1759	5.12	0	10.546	0	0	0	0	-0.009	0
IF	1761	5.1	0	10.546	0	0	0	0	-0.01	0
IF	1763	5.08	0	10.546	0	0	0	0	-0.01	0
IF	1765	5.06	0	10.546	0	0	0	0	-0.009	0
IF	1777	4.95	0	10.546	0	0	0	0	-0.009	0
IF	1783	4.89	0	10.546	0	0	0	0	-0.01	0
IF	1793	4.79	0	10.546	0	0	0	0	-0.009	0
IF	1797	4.76	0	10.546	0	0	0	0	-0.009	0
IF	1813	4.6	0	10.546	0	0	0	0	-0.016	0
IF	1819	4.41	0	10.546	0	0	0	0	-0.03	0
IF	1827	4.18	0	10.546	0	0	0	0	-0.014	0
IF	1853	3.92	0	10.546	0	0	0	0	-0.01	0
IF	1855	3.9	0	10.546	0	0	0	0	-0.009	0
IF	1861	3.85	0	10.546	0	0	0	0	-0.009	0
IF	1877	3.71	0	10.546	0	0	0	0	-0.009	0
IF	1883	3.65	0	10.546	0	0	0	0	-0.009	0
IF	1889	3.6	0	10.546	0	0	0	0	-0.009	0
IF	1893	3.56	0	10.546	0	0	0	0	-0.009	0
IF	1897	3.53	0	10.546	0	0	0	0	-0.009	0
IF	1905	3.45	0	10.546	0	0	0	0	-0.009	0
IF	1933	3.2	0	10.546	0	0	0	0	-0.009	0
IF	1937	3.16	0	10.546	0	0	0	0	-0.01	0
IF	1943	3.1	0	10.546	0	0	0	0	-0.009	0
IF	1951	3.03	0	10.546	0	0	0	0	-0.009	0
IF	1961	2.94	0	10.546	0	0	0	0	-0.009	0
IF	1965	2.9	0	10.546	0	0	0	0	-0.01	0
IF	1969	2.86	0	10.546	0	0	0	0	-0.009	0
IF	1973	2.83	0	10.546	0	0	0	0	-0.009	0
IF	1977	2.79	0	10.546	0	0	0	0	-0.01	0
IF	1981	2.75	0	10.546	0	0	0	0	-0.009	0
IF	1995	2.62	0	10.546	0	0	0	0	0	0
IF	2027	2.73	0	10.546	0	0	0	0	0.004	0
IF	2031	2.76	0	10.546	0	0	0	0	0.005	0
IF	2051	2.86	0	10.546	0	0	0	0	0.005	0
IF	2069	2.96	0	10.546	0	0	0	0	0.005	0
IF	2091	3.08	0	10.546	0	0	0	0	0.005	0
IF	2101	3.13	0	10.546	0	0	0	0	0.005	0
IF	2131	3.28	0	10.546	0	0	0	0	0.005	0
IF	2137	3.31	0	10.546	0	0	0	0	0.005	0
IF	2151	3.38	0	10.546	0	0	0	0	0.005	0
IF	2163	3.45	0	10.546	0	0	0	0	0.025	0

IF	2183	4.17	0	10.546	0	0	0	0	0.024	0
IF	2203	4.4	0	10.546	0	0	0	0	0.01	0
IF	2209	4.43	0	10.546	0	0	0	0	0	0
IF	2213	4.4	0	10.546	0	0	0	0	-0.008	0
IF	2223	4.32	0	10.546	0	0	0	0	-0.008	0
IF	2227	4.29	0	10.546	0	0	0	0	-0.008	0
IF	2247	4.13	0	10.546	0	0	0	0	-0.008	0
IF	2257	4.05	0	10.546	0	0	0	0	-0.011	0
IF	2267	3.91	0	10.546	0	0	0	0	-0.019	0
IF	2273	3.74	0	10.546	0	0	0	0	-0.027	0
IF	2277	3.64	0	10.546	0	0	0	0	-0.015	0
IF	2283	3.59	0	10.546	0	0	0	0	-0.011	0
IF	2295	3.45	0	10.546	0	0	0	0	-0.009	0
IF	2305	3.4	0	10.546	0	0	0	0	-0.004	0
IF	2315	3.36	0	10.546	0	0	0	0	-0.004	0
IF	2331	3.31	0	10.546	0	0	0	0	-0.001	0
IF	2343	3.34	0	10.546	0	0	0	0	0.002	0
IF	2347	3.34	0	10.546	0	0	0	0	-0.004	0
IF	2363	3.27	0	10.546	0	0	0	0	-0.005	0
IF	2367	3.23	0	10.546	0	0	0	0	-0.009	0
IF	2379	3.12	0	10.546	0	0	0	0	-0.001	0
IF	2403	3.19	0	10.546	0	0	0	0	0.004	0
IF	2409	3.25	0	10.546	0	0	0	0	0.01	0
IF	2423	3.4	0	10.546	0	0	0	0	0.011	0
IF	2435	3.53	0	10.546	0	0	0	0	0.011	0
IF	2453	3.73	0	10.546	0	0	0	0	0.011	0
IF	2463	3.84	0	10.546	0	0	0	0	0.011	0
IF	2471	3.93	0	10.546	0	0	0	0	0.011	0
IF	2477	3.99	0	10.546	0	0	0	0	0.011	0
IF	2485	4.08	0	10.546	0	0	0	0	0.011	0
IF	2489	4.12	0	10.546	0	0	0	0	0.011	0
IF	2495	4.19	0	10.546	0	0	0	0	0.012	0
IF	2501	4.26	0	10.546	0	0	0	0	0.011	0
IF	2509	4.34	0	10.546	0	0	0	0	0.01	0
IF	2515	4.4	0	10.546	0	0	0	0	0.01	0
IF	2517	4.42	0	10.546	0	0	0	0	0.01	0
IF	2523	4.48	0	10.546	0	0	0	0	0.009	0
IF	2587	5.03	0	10.546	0	0	0	0	0.002	0
IF	2765	4.9	0	10.546	0	0	0	0	0.002	0
IF	2833	5.48	0	10.546	0	0	0	0	0.007	0
IF	2877	5.66	0	10.546	0	0	0	0	0.004	0
IF	2935	5.93	0	10.546	0	0	0	0	0.006	0
IF	3001	6.39	0	10.546	0	0	0	0	0.007	0
VE	3037	6.6	2.5	25	27	0	0	10.546	0.003	0
VE	3071	6.6	2.5	25	27	0	0	10.546	0	0
IF	3233	6.6	0	10.546	0	0	0	0	0.001	0
IF	3375	6.76	0	10.546	0	0	0	0	-0.01	0
IF	3565	3.17	0	10.546	0	0	0	0	-0.016	0
VH	3585	3.47	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3591	3.25	2	1	0	1	0	10.546	0.012	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3613	3.81	2	1	0	1	0	10.546	0.022	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	3621	3.91	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3663	4.14	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3671	4.13	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3693	4.16	2	1	0	1	0	10.546	-0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3743	3.73	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3763	4.01	2	1	0	1	0	10.546	0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3793	3.82	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3815	3.76	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3833	4.43	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3841	3.92	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3861	4.13	2	1	0	1	0	10.546	0.006	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3869	4.1	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3917	3.91	2	1	0	1	0	10.546	-0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	3955	3.74	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VE	3963	3.66	1	25	10	0	0	10.546	0.014	0
VE	3971	3.97	1	25	10	0	0	10.546	0.08	0
VE	3983	5.26	1	25	10	0	0	10.546	0.06	0
VE	3999	5.65	1	25	10	0	0	10.546	0.009	0
VE	4009	5.48	1	25	10	0	0	10.546	-0.079	0
VE	4019	4.06	1	25	10	0	0	10.546	-0.036	0
VE	4059	3.67	1	25	10	0	0	10.546	-0.005	0
VE	4077	3.77	1	25	10	0	0	10.546	0.003	0
VE	4085	3.74	1	25	10	0	0	10.546	0.036	0
VE	4105	4.78	1	25	10	0	0	10.546	0.018	0
VE	4131	4.58	1	25	10	0	0	10.546	0.024	0
VE	4159	6.1	1	25	10	0	0	10.546	0.024	0
VE	4179	5.73	1	25	10	0	0	10.546	-0.045	0
VE	4189	4.74	1	25	10	0	0	10.546	-0.123	0
VH	4191	4.26	2	1	0	1	0	10.546	-0.043	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4211	3.79	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4297	4.26	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4313	4.17	2	1	0	1	0	10.546	-0.002	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4353	4.14	2	1	0	1	0	10.546	-0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0

VE	4407	3.87	1	20	8	0	0	10.546	-0.005	0
VE	4419	3.79	1	20	8	0	0	10.546	0.014	0
VE	4453	4.52	1	20	8	0	0	10.546	0.03	0
VE	4459	5	1	20	8	0	0	10.546	-0.014	0
VE	4505	3.78	1	20	8	0	0	10.546	-0.025	0
VE	4511	3.72	1	20	8	0	0	10.546	0	0
VE	4553	3.8	1	20	8	0	0	10.546	0	0
VE	4603	3.76	1	20	8	0	0	10.546	0.003	0
VE	4657	4.07	1	20	8	0	0	10.546	0.005	0
VE	4663	4.07	1	20	8	0	0	10.546	0	0
VH	4665	4.07	2	1	0	1	0	10.546	-0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4679	4.06	2	1	0	1	0	10.546	0	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4693	4.06	2	1	0	1	0	10.546	-0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4703	3.93	2	1	0	1	0	10.546	-0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4721	3.81	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4729	3.76	2	1	0	1	0	10.546	0.004	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4787	4.09	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4815	4.23	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4835	4.34	2	1	0	1	0	10.546	0.061	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4861	7.02	2	1	0	1	0	10.546	0.06	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4879	7	2	1	0	1	0	10.546	-0.024	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4928	5.39	2	1	0	1	0	10.546	-0.025	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4945	5.36	2	1	0	1	0	10.546	0.049	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4969	7.4	2	1	0	1	0	10.546	0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	4993	5.7	2	1	0	1	0	10.546	-0.045	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5002	5.91	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5037	5.83	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5051	5.59	2	1	0	1	0	10.546	0.005	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5115	6.19	2	1	0	1	0	10.546	0.003	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5129	5.79	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5185	5.42	2	1	0	1	0	10.546	-0.009	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5205	5.14	2	1	0	1	0	10.546	-0.006	0

MG	0	0	0	0.85	327	0	0	0	0	0
VH	5251	5	2	1	0	1	0	10.546	0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5383	7.17	2	1	0	1	0	10.546	0.016	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5413	7.68	2	1	0	1	0	10.546	-0.029	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5431	5.8	2	1	0	1	0	10.546	-0.061	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5457	5	2	1	0	1	0	10.546	-0.022	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5467	5	2	1	0	1	0	10.546	0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5479	5.38	2	1	0	1	0	10.546	0.024	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	5495	5.68	2	1	0	1	0	10.546	0.015	0
MG	0	0	0	0.85	327	0	0	0	0	0
IF	5503	5.74	0	10.546	0	0	0	0	0.02	0
IF	5515	6.08	0	10.546	0	0	0	0	0.027	0
IF	5549	7	0	10.546	0	0	0	0	0.005	0
IF	5705	7	0	10.546	0	0	0	0	-0.003	0
IF	5873	6	0	10.546	0	0	0	0	-0.004	0
IF	5931	6	0	10.546	0	0	0	0	0	0
IF	5949	6	0	10.546	0	0	0	0	0	0
IF	5957	6	0	10.546	0	0	0	0	0	0
VH	5959	6	2	1	0	1	0	10.546	-0.018	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6001	5.22	2	1	0	1	0	10.546	-0.011	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6053	5	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6069	4.71	2	1	0	1	0	10.546	0.032	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6103	6.59	2	1	0	1	0	10.546	-0.02	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6135	3.42	2	1	0	1	0	10.546	-0.076	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6161	2.16	2	1	0	1	0	10.546	-0.007	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6171	3.18	2	1	0	1	0	10.546	0.001	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6193	2.18	2	1	0	1	0	10.546	-0.022	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6213	2.26	2	1	0	1	0	10.546	0.062	0
MG	0	0	0	0.85	327	0	0	0	0	0
VH	6251	5.76	2	1	0	1	0	10.546	0.017	0
MG	0	0	0	0.85	327	0	0	0	0	0
BU	6313	4	0.6	6	0	10.546	0	0	-0.027	0
BU	6315	4	0.6	6	0	10.546	0	0	0	0
BU	6319	4	0.6	6	0	10.546	0	0	0.054	0
BU	6327	4.65	0.6	6	0	10.546	0	0	0.104	0
BU	6369	9.22	0.6	6	0	10.546	0	0	0.042	0
BU	6449	9.82	0.6	6	0	10.546	0	0	0.004	0

BU	6465	9.65	0.6	6	0	10.546	0	0	-0.019	0
BU	6475	9.34	0.6	6	0	10.546	0	0	-0.009	0
BU	6537	9	0.6	6	0	10.546	0	0	-0.002	0
BU	6613	9	0.6	6	0	10.546	0	0	-0.011	0
BU	6821	6	0.6	6	0	10.546	0	0	-0.009	0
BU	6867	6.81	0.6	6	0	10.546	0	0	0.018	0
AS	6909	10.56	0	10.546	0	0	0	0	0.018	0
AS	6987	10.56	0	10.546	0	0	0	0	0.018	0
AS	7015	10.56	0	10.546	0	0	0	0	0.018	0
AS	7031	10.56	0	10.546	0	0	0	0	0.018	0
AS	7101	10.56	0	10.546	0	0	0	0	0.018	0
AS	7147	10.56	0	10.546	0	0	0	0	0.018	0
AS	7177	10.56	0	10.546	0	0	0	0	0.018	0
AS	7207	10.56	0	10.546	0	0	0	0	0.018	0
AS	7235	10.56	0	10.546	0	0	0	0	0.018	0
AS	7297	10.56	0	10.546	0	0	0	0	0.018	0

WHAFIS CARD	STATION	WAVE HEIGHT	WAVE PERIOD	WAVE CREST .EVATION
IE	0	8.75	5.39	16.67
IF	1	8.66	5.39	16.6
IF	7	7.72	5.39	15.95
IF	8	7.53	5.39	15.82
IF	9	7.3	5.39	15.66
IF	11	6.79	5.39	15.3
IF	14	5.96	5.39	14.72
DU	23	4.51	5.39	13.7
DU	25	3.46	5.39	12.97
DU	27	2.64	5.39	12.39
DU	31	1.76	5.39	11.78
DU	35	0.97	5.39	11.23
AS	41	0	0	10.56
AS	47	0	0	10.56
AS	53	0	0	10.56
AS	59	0	0	10.56
AS	65	0	0	10.56
AS	67	0	0	10.56
AS	71	0	0	10.56
AS	75	0	0	10.56
AS	87	0	0	10.56
AS	95	0	0	10.56
AS	99	0	0	10.56
AS	105	0	0	10.56
AS	109	0	0	10.56
AS	113	0	0	10.56
AS	117	0	0	10.56
AS	121	0	0	10.56
BU	129	0	0	10.55
BU	135	0	0	10.55
BU	143	0	0	10.55
BU	149	0	0	10.55
BU	153	0	0	10.55
BU	157	0	0	10.55
BU	163	0	0	10.55
BU	183	0	0	10.55
BU	195	0	0	10.55
BU	203	0	0	10.55
BU	207	0	0	10.55
BU	221	0	0	10.55
BU	227	0	0	10.55
BU	231	0	0	10.55
BU	235	0	0	10.55
BU	241	0	0	10.55
BU	249	0	0	10.55
BU	253	0	0	10.55
BU	265	0	0	10.55
BU	283	0	0	10.55
BU	295	0	0	10.55
BU	307	0	0	10.55

BU	315	0	0	10.55
BU	323	0	0	10.55
BU	329	0	0	10.55
BU	341	0	0	10.55
BU	353	0	0	10.55
BU	357	0	0	10.55
BU	361	0	0	10.55
BU	373	0	0	10.55
BU	379	0	0	10.55
BU	385	0	0	10.55
BU	391	0	0	10.55
BU	407	0	0	10.55
BU	413	0	0	10.55
BU	425	0	0	10.55
BU	449	0	0	10.55
BU	457	0	0	10.55
BU	461	0	0	10.55
BU	467	0	0	10.55
BU	473	0	0	10.55
BU	477	0	0	10.55
BU	481	0	0	10.55
BU	485	0	0	10.55
BU	487	0	0	10.55
BU	489	0	0	10.55
BU	503	0	0	10.55
BU	507	0	0	10.55
BU	513	0	0	10.55
BU	515	0	0	10.55
BU	519	0	0	10.55
BU	521	0	0	10.55
BU	527	0	0	10.55
BU	541	0	0	10.55
BU	547	0	0	10.55
BU	553	0	0	10.55
BU	557	0	0	10.55
BU	559	0	0	10.55
BU	565	0	0	10.55
BU	569	0	0	10.55
BU	573	0	0	10.55
BU	577	0	0	10.55
BU	583	0	0	10.55
BU	587	0	0	10.55
BU	599	0	0	10.55
BU	615	0	0	10.55
BU	621	0	0	10.55
BU	623	0	0	10.55
BU	629	0	0	10.55
BU	635	0	0	10.55
BU	639	0	0	10.55
BU	647	0	0	10.55
BU	649	0	0	10.55
BU	653	0	0	10.55
BU	657	0	0	10.55

BU	667	0	0	10.55
BU	675	0	0	10.55
BU	679	0	0	10.55
BU	685	0	0	10.55
BU	705	0	0	10.55
BU	725	0	0	10.55
BU	759	0	0	10.55
BU	765	0	0	10.55
BU	769	0	0	10.55
BU	777	0	0	10.55
BU	783	0	0	10.55
BU	805	0	0	10.55
BU	823	0	0	10.55
BU	829	0	0	10.55
BU	837	0	0	10.55
BU	845	0	0	10.55
BU	851	0	0	10.55
BU	861	0	0	10.55
BU	865	0	0	10.55
BU	873	0	0	10.55
BU	877	0	0	10.55
BU	879	0	0	10.55
BU	883	0	0	10.55
BU	885	0	0	10.55
BU	889	0	0	10.55
BU	901	0	0	10.55
BU	907	0	0	10.55
BU	913	0	0	10.55
BU	917	0	0	10.55
BU	923	0	0	10.55
BU	935	0	0	10.55
BU	945	0	0	10.55
BU	953	0	0	10.55
BU	957	0	0	10.55
BU	965	0	0	10.55
BU	975	0	0	10.55
BU	977	0	0	10.55
VH	983	0.05	0.27	10.58
VH	985	0.06	0.29	10.59
VH	991	0.09	0.35	10.61
VH	997	0.11	0.39	10.63
VH	1009	0.15	0.46	10.65
VH	1015	0.17	0.49	10.67
VH	1017	0.18	0.49	10.67
VH	1019	0.18	0.5	10.68
VH	1021	0.19	0.51	10.68
VH	1025	0.2	0.52	10.69
VH	1026	0.2	0.53	10.69
VH	1027	0.21	0.53	10.69
VH	1029	0.21	0.54	10.69
VH	1042	0.25	0.58	10.72
VH	1049	0.26	0.6	10.73
VH	1057	0.28	0.62	10.74

VH	1059	0.29	0.63	10.75
VH	1063	0.3	0.64	10.75
VH	1065	0.3	0.64	10.76
VH	1073	0.32	0.66	10.77
VH	1077	0.33	0.67	10.78
VH	1089	0.35	0.7	10.79
VH	1091	0.36	0.7	10.8
VH	1097	0.37	0.71	10.81
VH	1101	0.38	0.72	10.81
VH	1103	0.38	0.72	10.81
VH	1133	0.44	0.78	10.85
VH	1135	0.44	0.78	10.86
VH	1141	0.46	0.79	10.87
VH	1145	0.46	0.8	10.87
VH	1151	0.47	0.8	10.88
VH	1159	0.49	0.82	10.89
VH	1161	0.49	0.82	10.89
VH	1169	0.51	0.83	10.9
VH	1171	0.51	0.83	10.9
VH	1177	0.52	0.84	10.91
VH	1189	0.54	0.86	10.92
VH	1193	0.55	0.86	10.93
VH	1199	0.56	0.87	10.94
VH	1221	0.59	0.9	10.96
VH	1227	0.6	0.91	10.97
VH	1231	0.61	0.91	10.97
VH	1235	0.62	0.92	10.98
VH	1239	0.62	0.92	10.98
VH	1243	0.63	0.93	10.99
VH	1251	0.64	0.94	10.99
VH	1257	0.65	0.94	11
VH	1265	0.66	0.95	11.01
VH	1273	0.68	0.96	11.02
VH	1285	0.69	0.97	11.03
VH	1291	0.7	0.98	11.04
VH	1297	0.71	0.99	11.04
VH	1303	0.72	0.99	11.05
VH	1307	0.73	1	11.05
VH	1315	0.74	1	11.06
VH	1321	0.75	1.01	11.07
VH	1343	0.78	1.03	11.09
VH	1351	0.79	1.04	11.1
VH	1361	0.8	1.05	11.11
VH	1365	0.81	1.05	11.11
VH	1369	0.81	1.05	11.12
VH	1377	0.82	1.06	11.12
VH	1383	0.83	1.07	11.13
VH	1387	0.84	1.07	11.13
VH	1389	0.84	1.07	11.13
VH	1397	0.85	1.08	11.14
VH	1401	0.86	1.08	11.15
VH	1405	0.86	1.09	11.15
VH	1409	0.87	1.09	11.15

VH	1411	0.87	1.09	11.16
VH	1413	0.87	1.09	11.16
VH	1417	0.88	1.1	11.16
VH	1421	0.88	1.1	11.16
VH	1423	0.89	1.1	11.17
VH	1427	0.89	1.1	11.17
VH	1429	0.89	1.11	11.17
VH	1431	0.9	1.11	11.17
VH	1433	0.9	1.11	11.18
IF	1437	0.91	1.11	11.18
IF	1453	0.93	1.12	11.19
IF	1467	0.94	1.14	11.21
IF	1471	0.95	1.14	11.21
IF	1481	0.96	1.15	11.22
IF	1571	1.07	1.21	11.3
IF	1585	1.09	1.22	11.31
IF	1589	1.09	1.22	11.31
IF	1595	1.1	1.23	11.32
IF	1599	1.11	1.23	11.32
IF	1611	1.12	1.24	11.33
IF	1619	1.13	1.24	11.34
IF	1627	1.14	1.25	11.34
IF	1631	1.14	1.25	11.35
IF	1635	1.15	1.25	11.35
IF	1645	1.16	1.26	11.36
IF	1651	1.17	1.26	11.36
IF	1665	1.18	1.27	11.37
IF	1669	1.19	1.27	11.38
IF	1671	1.19	1.27	11.38
IF	1673	1.19	1.28	11.38
IF	1681	1.2	1.28	11.39
IF	1695	1.21	1.29	11.4
IF	1707	1.23	1.3	11.4
IF	1715	1.24	1.3	11.41
IF	1735	1.26	1.31	11.43
IF	1739	1.26	1.31	11.43
IF	1743	1.26	1.32	11.43
IF	1747	1.27	1.32	11.43
IF	1751	1.27	1.32	11.44
IF	1753	1.28	1.32	11.44
IF	1759	1.28	1.33	11.44
IF	1761	1.28	1.33	11.45
IF	1763	1.29	1.33	11.45
IF	1765	1.29	1.33	11.45
IF	1777	1.3	1.34	11.46
IF	1783	1.31	1.34	11.46
IF	1793	1.32	1.34	11.47
IF	1797	1.32	1.35	11.47
IF	1813	1.34	1.36	11.48
IF	1819	1.35	1.36	11.49
IF	1827	1.36	1.36	11.5
IF	1853	1.38	1.38	11.52
IF	1855	1.39	1.38	11.52

IF	1861	1.39	1.38	11.52
IF	1877	1.41	1.39	11.53
IF	1883	1.42	1.39	11.54
IF	1889	1.42	1.39	11.54
IF	1893	1.43	1.4	11.54
IF	1897	1.43	1.4	11.55
IF	1905	1.44	1.4	11.55
IF	1933	1.47	1.42	11.57
IF	1937	1.47	1.42	11.58
IF	1943	1.48	1.42	11.58
IF	1951	1.49	1.43	11.59
IF	1961	1.5	1.43	11.59
IF	1965	1.5	1.43	11.6
IF	1969	1.5	1.43	11.6
IF	1973	1.51	1.44	11.6
IF	1977	1.51	1.44	11.6
IF	1981	1.52	1.44	11.61
IF	1995	1.53	1.45	11.62
IF	2027	1.56	1.46	11.64
IF	2031	1.57	1.46	11.64
IF	2051	1.58	1.47	11.66
IF	2069	1.6	1.48	11.67
IF	2091	1.62	1.49	11.68
IF	2101	1.63	1.49	11.69
IF	2131	1.66	1.51	11.71
IF	2137	1.66	1.51	11.71
IF	2151	1.68	1.52	11.72
IF	2163	1.69	1.52	11.73
IF	2183	1.7	1.53	11.74
IF	2203	1.72	1.54	11.75
IF	2209	1.72	1.54	11.75
IF	2213	1.72	1.54	11.75
IF	2223	1.73	1.55	11.76
IF	2227	1.74	1.55	11.76
IF	2247	1.76	1.56	11.78
IF	2257	1.77	1.56	11.78
IF	2267	1.78	1.56	11.79
IF	2273	1.78	1.57	11.79
IF	2277	1.79	1.57	11.8
IF	2283	1.79	1.57	11.8
IF	2295	1.81	1.57	11.81
IF	2305	1.82	1.58	11.82
IF	2315	1.82	1.58	11.82
IF	2331	1.84	1.59	11.83
IF	2343	1.85	1.59	11.84
IF	2347	1.85	1.6	11.84
IF	2363	1.87	1.6	11.85
IF	2367	1.87	1.6	11.86
IF	2379	1.88	1.61	11.86
IF	2403	1.9	1.62	11.88
IF	2409	1.91	1.62	11.88
IF	2423	1.92	1.62	11.89
IF	2435	1.92	1.63	11.89

IF	2453	1.94	1.63	11.9
IF	2463	1.94	1.64	11.91
IF	2471	1.95	1.64	11.91
IF	2477	1.95	1.64	11.91
IF	2485	1.95	1.65	11.91
IF	2489	1.96	1.65	11.92
IF	2495	1.96	1.65	11.92
IF	2501	1.96	1.65	11.92
IF	2509	1.97	1.65	11.92
IF	2515	1.97	1.66	11.92
IF	2517	1.97	1.66	11.92
IF	2523	1.97	1.66	11.93
IF	2587	1.99	1.68	11.94
	2712	2.08	1.72	12
IF	2765	2.12	1.74	12.03
IF	2833	2.1	1.76	12.02
IF	2877	2.1	1.77	12.02
IF	2935	2.1	1.79	12.01
IF	3001	2.04	1.81	11.97
VE	3037	1.99	1.81	11.94
VE	3071	1.98	1.81	11.93
	3184	2.03	1.84	11.97
IF	3233	2.04	1.86	11.98
IF	3375	2.04	1.89	11.97
	3508	2.3	1.93	12.16
IF	3565	2.38	1.94	12.21
VH	3585	2.38	1.95	12.21
VH	3591	2.39	1.95	12.22
VH	3613	2.38	1.95	12.21
VH	3621	2.38	1.96	12.21
VH	3663	2.4	1.97	12.22
VH	3671	2.4	1.97	12.23
VH	3693	2.41	1.97	12.24
VH	3743	2.46	1.99	12.27
VH	3763	2.46	1.99	12.27
VH	3793	2.48	2	12.28
VH	3815	2.5	2	12.29
VH	3833	2.47	2.01	12.28
VH	3841	2.5	2.01	12.3
VH	3861	2.5	2.01	12.3
VH	3869	2.51	2.02	12.3
VH	3917	2.54	2.03	12.32
VH	3955	2.57	2.04	12.34
VE	3963	2.56	2.04	12.34
VE	3971	2.55	2.04	12.33
VE	3983	2.54	2.04	12.32
VE	3999	2.5	2.04	12.29
VE	4009	2.48	2.04	12.28
VE	4019	2.47	2.04	12.28
VE	4059	2.43	2.04	12.25
VE	4077	2.42	2.04	12.24
VE	4085	2.41	2.04	12.23
VE	4105	2.39	2.04	12.22

VE	4131	2.36	2.04	12.2
VE	4159	2.33	2.04	12.18
VE	4179	2.31	2.04	12.16
VE	4189	2.3	2.04	12.15
VH	4191	2.32	2.04	12.17
VH	4211	2.35	2.04	12.19
VH	4297	2.38	2.06	12.21
VH	4313	2.39	2.06	12.22
VH	4353	2.41	2.07	12.24
VE	4407	2.34	2.07	12.18
VE	4419	2.32	2.07	12.17
VE	4453	2.27	2.07	12.14
VE	4459	2.27	2.07	12.13
VE	4505	2.2	2.07	12.09
VE	4511	2.2	2.07	12.08
VE	4553	2.15	2.07	12.05
VE	4603	2.09	2.07	12.01
VE	4657	2.04	2.07	11.97
VE	4663	2.03	2.07	11.97
VH	4665	2.03	2.07	11.97
VH	4679	2.04	2.08	11.97
VH	4693	2.05	2.08	11.98
VH	4703	2.06	2.08	11.99
VH	4721	2.08	2.09	12
VH	4729	2.09	2.09	12.01
VH	4787	2.11	2.1	12.03
VH	4815	2.13	2.11	12.04
VH	4835	2.14	2.11	12.04
VH	4861	2	2.12	11.95
VH	4879	2	2.12	11.95
VH	4928	2.12	2.13	12.03
VH	4945	2.13	2.13	12.04
VH	4969	1.97	2.14	11.92
VH	4993	2.06	2.14	11.99
VH	5002	2.06	2.15	11.99
VH	5037	2.08	2.15	12
VH	5051	2.09	2.16	12.01
VH	5115	2.1	2.17	12.02
VH	5129	2.12	2.17	12.03
VH	5185	2.15	2.18	12.05
VH	5205	2.17	2.19	12.06
VH	5251	2.2	2.2	12.08
VH	5383	2.11	2.22	12.03
VH	5413	1.86	2.23	11.85
VH	5431	1.92	2.23	11.89
VH	5457	1.96	2.24	11.92
VH	5467	1.96	2.24	11.92
VH	5479	1.96	2.24	11.92
VH	5495	1.97	2.24	11.92
IF	5503	1.97	2.24	11.93
IF	5515	1.98	2.25	11.93
IF	5549	1.99	2.25	11.94
	5658	2.03	2.27	11.96

IF	5705	2.04	2.28	11.97
	5823	2.15	2.3	12.05
IF	5873	2.18	2.31	12.07
IF	5931	2.21	2.32	12.09
IF	5949	2.22	2.32	12.1
IF	5957	2.23	2.33	12.1
VH	5959	2.23	2.33	12.1
VH	6001	2.25	2.33	12.12
VH	6053	2.27	2.34	12.14
VH	6069	2.29	2.35	12.15
VH	6103	2.24	2.35	12.11
VH	6135	2.35	2.36	12.19
VH	6161	2.41	2.36	12.23
VH	6171	2.38	2.36	12.21
VH	6193	2.43	2.37	12.25
VH	6213	2.44	2.37	12.25
VH	6251	2.36	2.38	12.2
BU	6313	0.51	2.38	10.9
BU	6315	0.11	2.38	10.62
BU	6319	0.02	2.38	10.56
BU	6327	0.01	2.38	10.55
BU	6369	0	2.38	10.55
BU	6449	0	2.38	10.55
BU	6465	0	2.38	10.55
BU	6475	0	2.38	10.55
BU	6537	0	2.38	10.55
BU	6613	0	2.38	10.55
BU	6821	0	2.38	10.55
BU	6867	0	2.38	10.55
AS	6909	0	0	10.56
AS	6987	0	0	10.56
AS	7015	0	0	10.56
AS	7031	0	0	10.56
AS	7101	0	0	10.56
AS	7147	0	0	10.56
AS	7177	0	0	10.56
AS	7207	0	0	10.56
AS	7235	0	0	10.56
AS	7297	0	0	10.56

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STATION BEGIN	STATION END
35	41
41	47
47	53
53	59
59	65
65	67
67	71
71	75
75	87
87	95
95	99
99	105
105	109
109	113
113	117
117	121
6867	6909
6909	6987
6987	7015
7015	7031
7031	7101
7101	7147
7147	7177
7177	7207
7207	7235
7235	7297

Project: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Updated Topography and Proposed runway and terminal\

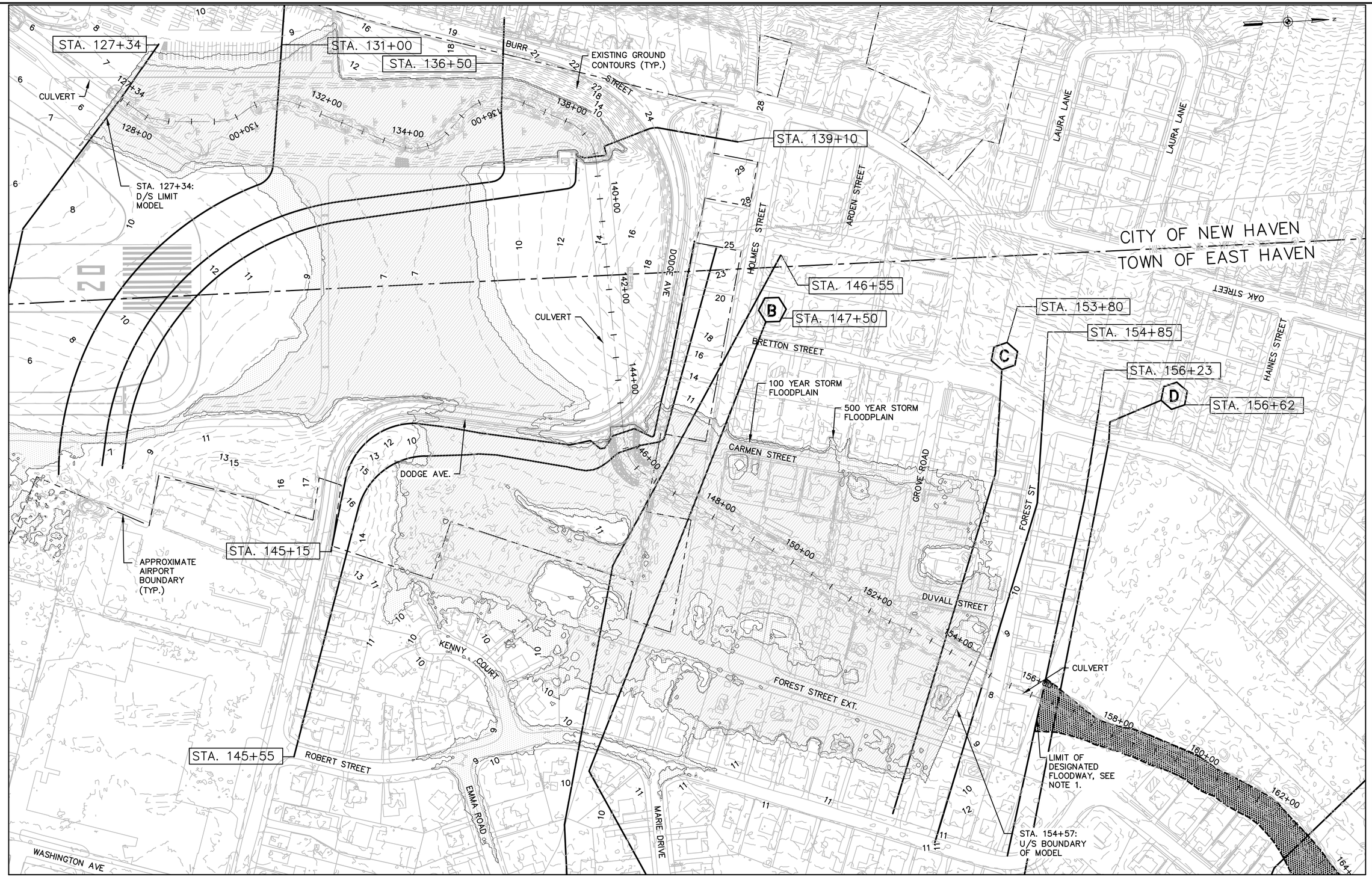
STATION	Location
26	WIND

Project: C:\TPB\Personal\Consulting\Tweed Airport New Haven, CT\December 2024 Models\Updated Topography and Proposed runway and terminal\

STATION BEGIN	.EVATION BEGIN	STATION END	.EVATION END	ZONE	ZONE .EVATION	FHF
0	16.67	2	16.5	V26	17	160
2	16.5	10	15.5	V26	16	160
10	15.5	16	14.5	V26	15	160
16	14.5	24	13.5	V26	14	160
24	13.5	26	12.65	V26	13	160
26	12.65	27	12.5	A22	13	120
27	12.5	33	11.5	A22	12	120
33	11.5	35	11.23	A22	11	120
35	11.23	41	10.56	X	11	120
41	10.56	47	10.56	X	11	120
47	10.56	53	10.56	X	11	120
53	10.56	59	10.56	X	11	120
59	10.56	65	10.56	X	11	120
65	10.56	67	10.56	X	11	120
67	10.56	71	10.56	X	11	120
71	10.56	75	10.56	X	11	120
75	10.56	87	10.56	X	11	120
87	10.56	95	10.56	X	11	120
95	10.56	99	10.56	X	11	120
99	10.56	105	10.56	X	11	120
105	10.56	109	10.56	X	11	120
109	10.56	113	10.56	X	11	120
113	10.56	117	10.56	X	11	120
117	10.56	121	10.55	X	11	120
121	10.55	1832	11.5	A22	11	120
1832	11.5	6284	11.5	A22	12	120
6284	11.5	6867	10.55	A22	11	120
6867	10.55	6909	10.56	X	11	120
6909	10.56	6987	10.56	X	11	120
6987	10.56	7015	10.56	X	11	120
7015	10.56	7031	10.56	X	11	120
7031	10.56	7101	10.56	X	11	120
7101	10.56	7147	10.56	X	11	120
7147	10.56	7177	10.56	X	11	120
7177	10.56	7207	10.56	X	11	120
7207	10.56	7235	10.56	X	11	120
7235	10.56	7297	10.56	X	11	120

Appendix D: FEMA Riverine Model Cross Section and Inundation Maps

- Existing FEMA Map (FE-1)
- Proposed FEMA Map (FE-2)
- 100-Year Pre- vs. Post-Project Comparison FEMA Map (FE-3)
- 500-Year Pre- vs. Post-Project Comparison FEMA Map (FE-4)



LEGEND:

- 1% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- STA. 153+80 — FEMA CROSS SECTION
- STA. 146+55 — 2012 LOMR CROSS SECTION

NOTES
1. FLOODWAY BOUNDARY REFLECTS THE BOUNDARY DEPICTED IN THE LOMR(EFFECTIVE 2012) AND THE LOMR (EFFECTIVE 2025)
2. FLOODPLAIN BOUNDARIES REFLECT THE HOYLE TANNER HEC-RAS 2D RIVERINE MODEL RESULTS ONLY AND DO NOT REFLECT THE CURRENTLY EFFECTIVE OR ANY PENDING FLOODPLAIN BOUNDARIES.
3. ELEVATIONS ARE BASED ON NAVD 88
4. PARCELS FROM CT GIS

0 100 200

ENGINEER'S SEAL

PROJECT DESIGNER

HOYLE TANNER
150 Dow Street
Manchester, NH 03101-1227
(603) 669-5555
www.hoyletanner.com

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DESIGNED BY: JC
DRAWN BY: JLC
CHECKED BY: RMF
DATE: NOVEMBER, 2024

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

RUNWAY 20 SAFETY AREA PRE-PROJECT CONDITION WITH ANNOTATED FIRM INFORMATION

REVISIONS

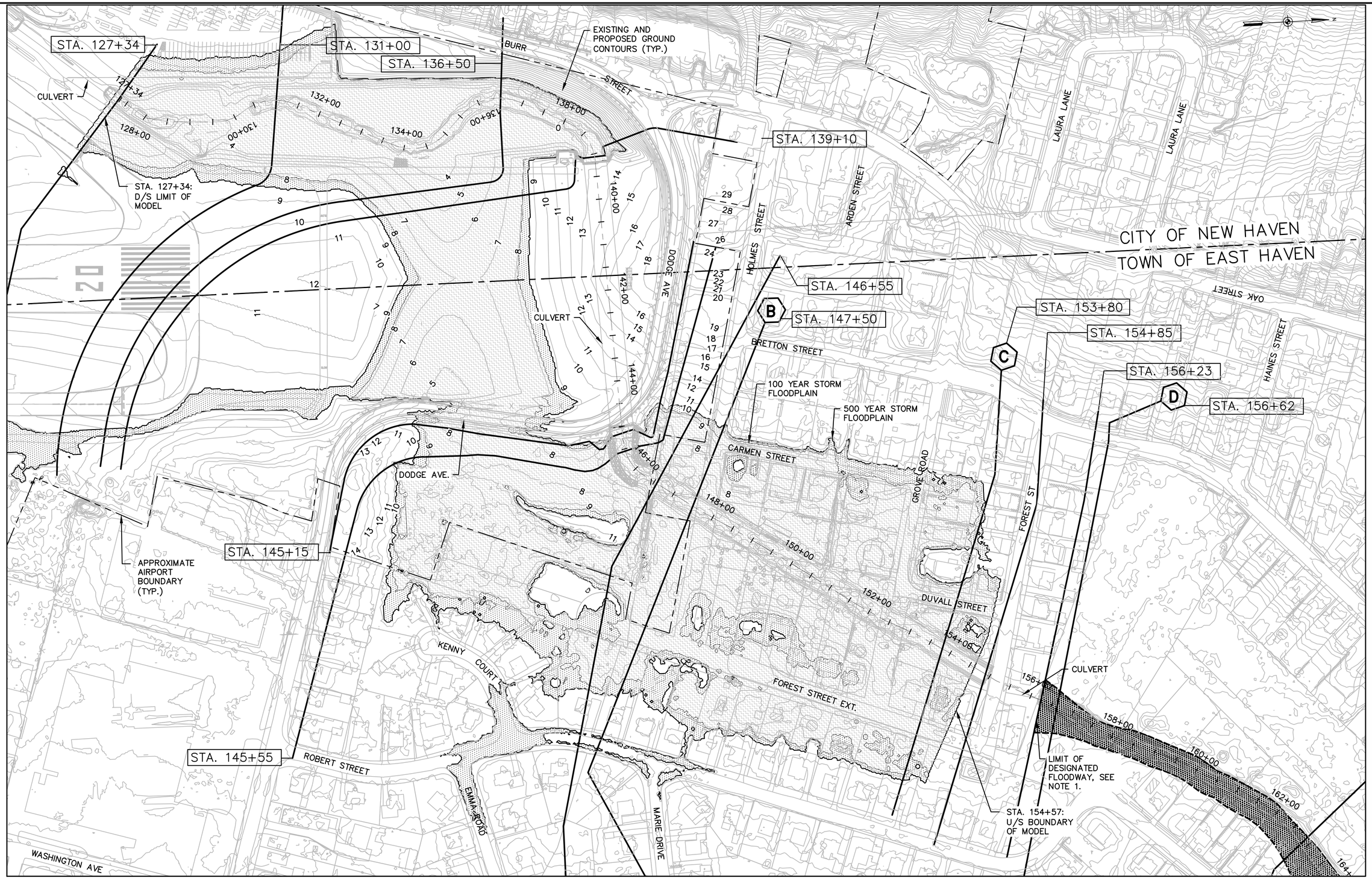
REV. NO.	DATE	DESCRIPTION	BY
			NEG

PROJ. No.: 22.063201.00
AIP: 3-09-0013-0XX-2023

DRAWING NO.

FE-1

1 OF 1



LEGEND:

- 1% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- STA. 153+80 — FEMA CROSS SECTION
- STA. 146+55 — 2012 LOMR CROSS SECTION

NOTES
1. FLOODWAY BOUNDARY REFLECTS THE BOUNDARY DEPICTED IN THE LOMR(EFFECTIVE 2012) AND THE LOMR (EFFECTIVE 2025)
2. FLOODPLAIN BOUNDARIES REFLECT THE HOYLE TANNER HEC-RAS 2D RIVERINE MODEL RESULTS ONLY AND DO NOT REFLECT THE CURRENTLY EFFECTIVE OR ANY PENDING FLOODPLAIN BOUNDARIES.
3. ELEVATIONS ARE BASED ON NAVD 88
4. PARCELS FROM CT GIS

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TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

RUNWAY 20 SAFETY AREA POST-PROJECT CONDITION WITH ANNOTATED FIRM INFORMATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

NEG

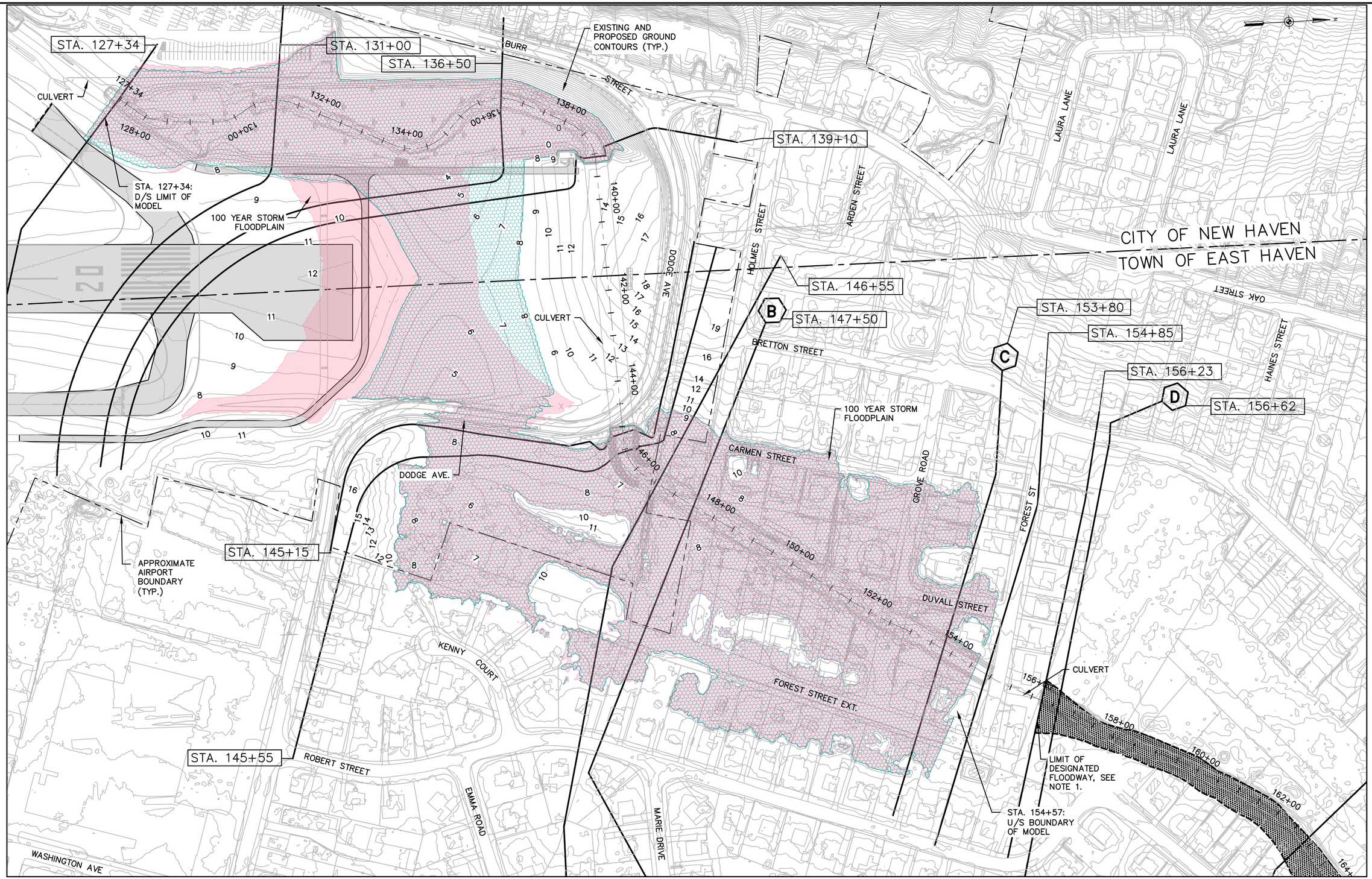
PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2023

DRAWING NO.

FE-2

1 OF 1



LEGEND:

- PRE–RROJECT 1% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- POST–PROJECT 1% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- Ⓒ—Ⓒ STA. 153+80 — FEMA CROSS SECTION
- STA. 146+55 — 2012 LOMR CROSS SECTION

NOTES
1. FLOODWAY BOUNDARY REFLECTS THE BOUNDARY DEPICTED IN THE LOMR(EFFECTIVE 2012) AND THE LOMR (EFFECTIVE 2025)
2. FLOODPLAIN BOUNDARIES REFLECT THE HOYLE TANNER HEC–RAS 2D RIVERINE MODEL RESULTS ONLY AND DO NOT REFLECT THE CURRENTLY EFFECTIVE OR ANY PENDING FLOODPLAIN BOUNDARIES.
3. ELEVATIONS ARE BASED ON NAVD 88
4. PARCELS FROM CT GIS

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PROJECT DESIGNER
HOYLE TANNER

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

RUNWAY 20 SAFETY AREA 100–YEAR PRE– VS. POST–PROJECT COMPARISON WITH ANNOTATED FIRM INFORMATION

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AIP: 3–09–0013–0XX–2023

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FE-3

1 OF 1

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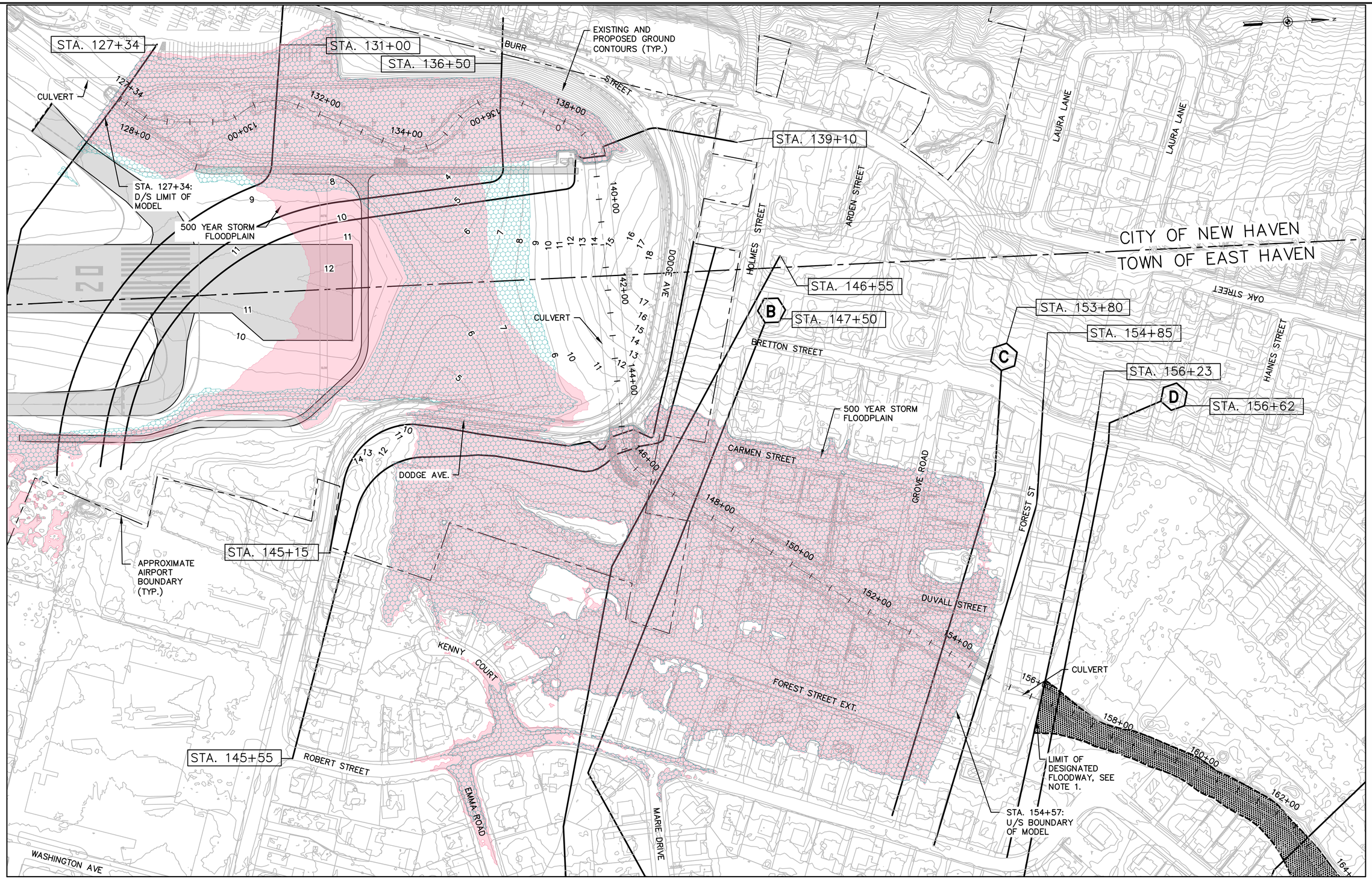

LEGEND:

- PRE–CONDITION 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- POST–CONDITION 0.2% ANNUAL CHANCE FLOODPLAIN BOUNDARY
- FLOODWAY BOUNDARY
- STA. 153+80 — FEMA CROSS SECTION
- STA. 146+55 — 2012 LOMR CROSS SECTION

NOTES
1. FLOODWAY BOUNDARY REFLECTS THE BOUNDARY DEPICTED IN THE LOMR(EFFECTIVE 2012) AND THE LOMR (EFFECTIVE 2025)
2. FLOODPLAIN BOUNDARIES REFLECT THE HOYLE TANNER HEC–RAS 2D RIVERINE MODEL RESULTS ONLY AND DO NOT REFLECT THE CURRENTLY EFFECTIVE OR ANY PENDING FLOODPLAIN BOUNDARIES.
3. ELEVATIONS ARE BASED ON NAVD 88
4. PARCELS FROM CT GIS

0 100 200

ENGINEER'S SEAL

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PROJECT DESIGNER

HOYLE TANNER

DESIGNED BY: JC
DRAWN BY: JLC
CHECKED BY: RMF
DATE: NOVEMBER, 2024

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

RUNWAY 20 SAFETY AREA
500–YEAR PRE– AND POST–
PROJECT COMPARISON WITH
ANNOTATED FIRM INFORMATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
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PROJ. No.: 22.063201.00

AIP: 3–09–0013–0XX–2023

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FE-4

1 OF 1

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Appendix E: FEMA Riverine Model Land Cover Maps

- Pre-Project Land Cover Map
- Post-Project Land Cover Map

Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project
Pre-Project Riverine Hydraulic Model Land Cover Map



Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project
Post-Project Riverine Hydraulic Model Land Cover Map



Appendix F: FEMA 1D to 2D Model Comparison Table

› Table 3: Comparison of 1D to 2D Model Water Surface Elevations for FEMA Compliance

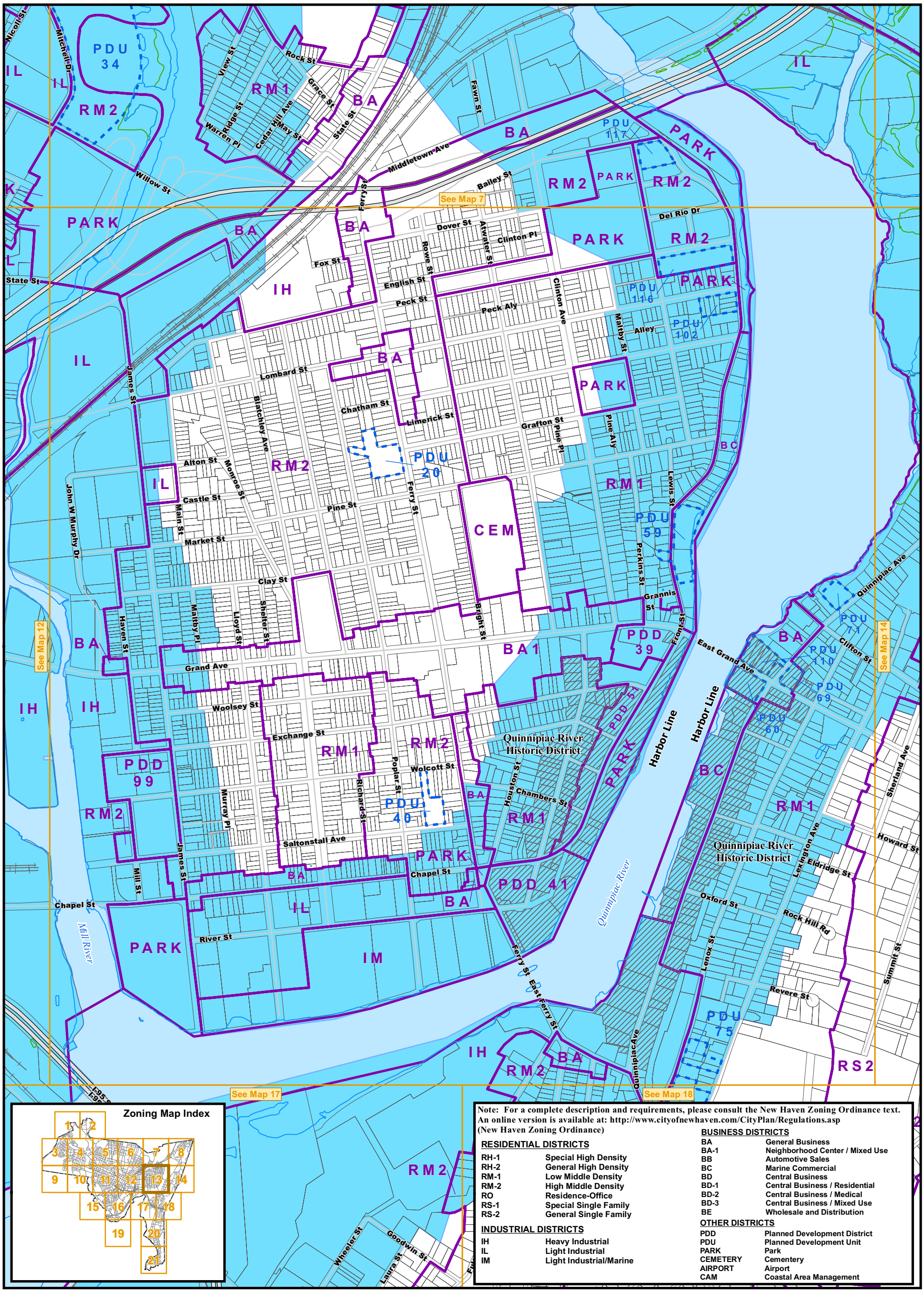
Table 3: Comparison of Duplicate Effective Model and Corrected Effective Model WSEs

		10 Year WSE (ft, NAVD88)	50 Year WSE (ft, NAVD88)	100 Year WSE (ft, NAVD88)	500 Year WSE (ft, NAVD88)
XS 127+34	Corrected Effective/Pre-Project	6.90	7.47	7.79	8.36
	Duplicate Effective (2012 LOMR)	6.76	7.41	7.76	8.53
	Difference (Corrected Effective - LOMR)	0.14	0.06	0.03	-0.17
XS 131+00	Corrected Effective/Pre-Project	7.17	7.77	8.07	8.63
	Duplicate Effective (2012 LOMR)	7.24	7.93	8.31	9.14
	Difference (Corrected Effective - LOMR)	-0.07	-0.16	-0.25	-0.51
XS 136+50	Corrected Effective/Pre-Project	7.26	7.88	8.18	8.75
	Duplicate Effective (2012 LOMR)	7.31	8.01	8.40	9.25
	Difference (Corrected Effective - LOMR)	-0.05	-0.14	-0.22	-0.50
XS 139+10	Corrected Effective/Pre-Project	7.49	8.09	8.39	8.94
	Duplicate Effective (2012 LOMR)	7.34	8.04	8.43	9.27
	Difference (Corrected Effective - LOMR)	0.15	0.05	-0.04	-0.33

XS 145+15	**Corrected Effective/Pre-Project**	8.28	9.10	9.47	10.15
	Duplicate Effective (2012 LOMR)	8.04	8.98	9.34	9.97
	Difference (Corrected Effective - LOMR)	0.24	0.12	0.13	0.17
XS 145+55	**Corrected Effective/Pre-Project**	8.28	9.10	9.47	10.15
	Duplicate Effective (2012 LOMR)	8.03	8.98	9.35	9.98
	Difference (Corrected Effective - LOMR)	0.25	0.12	0.12	0.17
XS 146+55	**Corrected Effective/Pre-Project**	8.35	9.18	9.54	10.20
	Duplicate Effective (2012 LOMR)	8.07	9.02	9.38	10.02
	Difference (Corrected Effective - LOMR)	0.28	0.16	0.16	0.18
XS 147+50 (B)	**Corrected Effective/Pre-Project**	8.41	9.20	9.56	10.22
	Duplicate Effective (2012 LOMR)	8.10	9.03	9.39	10.04
	Difference (Corrected Effective - LOMR)	0.31	0.17	0.17	0.18
XS 153+80 (C)	**Corrected Effective/Pre-Project**	8.92	9.64	9.97	10.60
	Duplicate Effective (2012 LOMR)	8.39	9.28	9.64	10.27
	Difference (Corrected Effective - LOMR)	0.53	0.36	0.33	0.33

Appendix G: Zoning and Soil Maps

- New Haven Zoning Map
- East Haven Zoning Map
- Soil Map



Note: For a complete description and requirements, please consult the New Haven Zoning Ordinance text. An online version is available at: http://www.cityofnewhaven.com/CityPlan/Regulations.asp (New Haven Zoning Ordinance)

RESIDENTIAL DISTRICTS

RH-1	Special High Density
RH-2	General High Density
RM-1	Low Middle Density
RM-2	High Middle Density
RO	Residence-Office
RS-1	Special Single Family
RS-2	General Single Family

INDUSTRIAL DISTRICTS

IH	Heavy Industrial
IL	Light Industrial
IM	Light Industrial/Marine

BUSINESS DISTRICTS

BA	General Business
BA-1	Neighborhood Center / Mixed Use
BB	Automotive Sales
BC	Marine Commercial
BD	Central Business
BD-1	Central Business / Residential
BD-2	Central Business / Medical
BD-3	Central Business / Mixed Use
BE	Wholesale and Distribution

OTHER DISTRICTS

PDD	Planned Development District
PDU	Planned Development Unit
PARK	Park
CEMETERY	Cemetery
AIRPORT	Airport
CAM	Coastal Area Management

City of New Haven, Connecticut
John DeStefano Jr., Mayor

Zoning Map No. 13

Produced by the
Office of Information Technology
Geographic Information System

Legend

- Zoning Boundary
- Zoning Grid Boundary
- PDU Boundary
- Local Historic District
- Coastal Area Management
- Water
- Airport
- Parcel Boundary
- Hydrology
- Wetland
- Railroad
- Centerline
- City Boundary
- I91-I95

0 350 700 Feet

1 inch = 700 feet

N W E S

Data Location

Server: GISDB-FS Database: NHMainGIS Name:

Airport_Boundary
Airport_runway
CityBoundary_CTTowns
CityBoundary_Line
CNH_StreetCenterlines
Coastal_Area_Management
HistoricDistricts_LocalDistricts
Parcel_adb_2008
PDU_Annotation
PDU_Point
PDU_Polygon
Railroad2007
Shoreline
Waterway
Zoning_Annotation
Zoning_Grid_new
Zoning_Point
Zoning_Polygon

Data Source

Zoning, PDU - City of New Haven, City Plan Department, Januar 2012
Hydrography - GNWPCA, Aerial Photography, 2007
Parcels - City of New Haven, Office of the Assessor, 2008
Historic Districts - City of New Haven, City Plan Department, June 2006
Railroads - GNWPCA, Aerial Photography, 2007
Coastal Area Management - NOAA, 2001

Map Status

Effective, March 21, 2007 Date Revised: October 13, 2010

ATTENTION: DISCLAIMER

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Map Document Information

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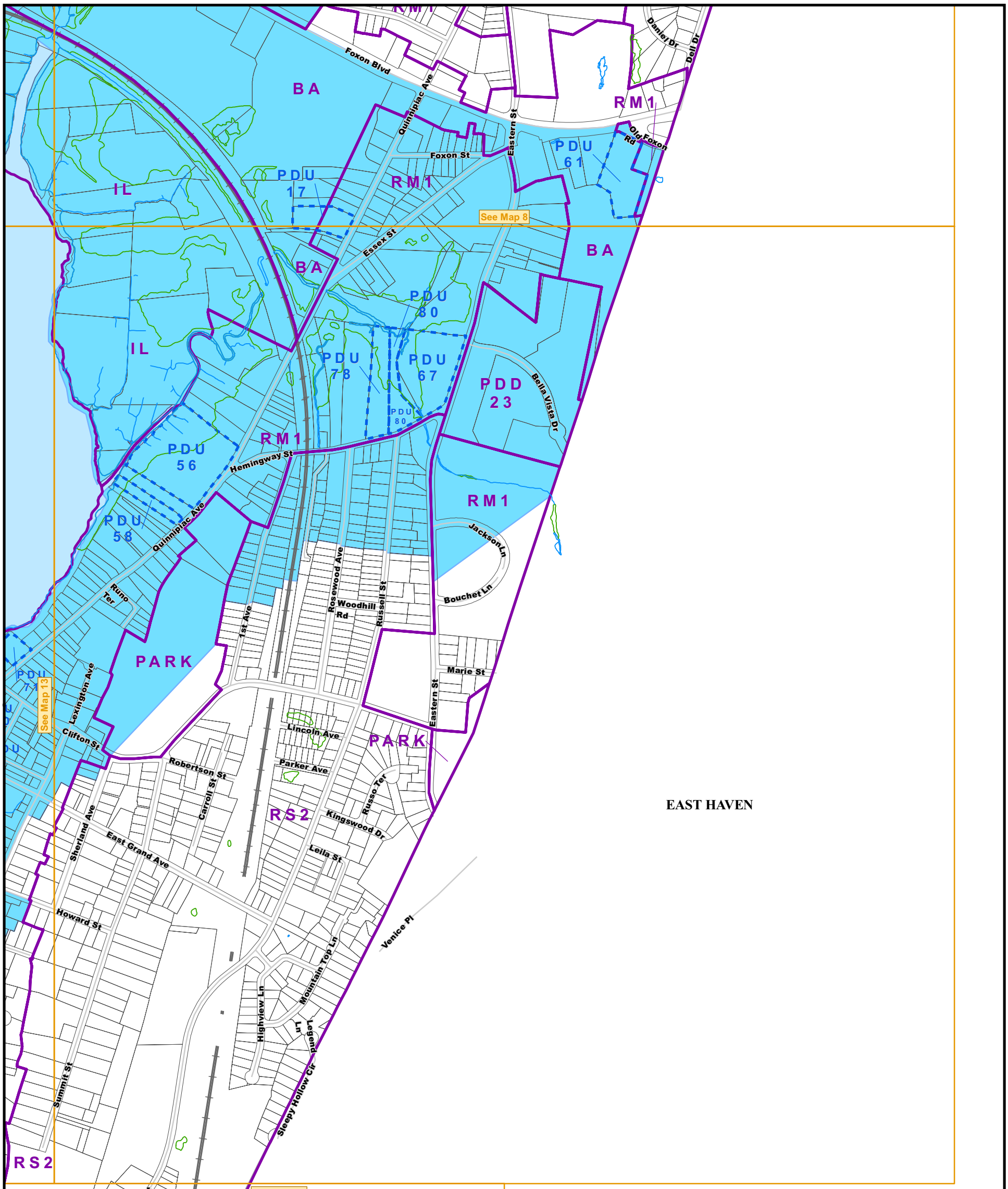
Mxd Loacation: W: (Engineer-fs)\Private \IT\Alec\working\Mxd\Zoning
Map Prepared by: Alec Vincitorio, GIS Analyst, (203) 946-6538, avincito@newhavenct.net
Creation Date: June 7, 2006
Last Modified: November 20, 2012



EAST HAVEN

Note: For a complete description and requirements, please consult the New Haven Zoning Ordinance text. An online version is available at: http://www.cityofnewhaven.com/CityPlan/Regulations.asp (New Haven Zoning Ordinance)

RESIDENTIAL DISTRICTS

RH-1	Special High Density
RH-2	General High Density
RM-1	Low Middle Density
RM-2	High Middle Density
RO	Residence-Office
RS-1	Special Single Family
RS-2	General Single Family

INDUSTRIAL DISTRICTS

IH	Heavy Industrial
IL	Light Industrial
IM	Light Industrial/Marine

BUSINESS DISTRICTS

BA	General Business
BA-1	Neighborhood Center / Mixed Use
BB	Automotive Sales
BC	Marine Commercial
BD	Central Business
BD-1	Central Business / Residential
BD-2	Central Business / Medical
BD-3	Central Business / Mixed Use
BE	Wholesale and Distribution

OTHER DISTRICTS

PDD	Planned Development District
PDU	Planned Development Unit
PARK	Park
CEMETERY	Cementery
AIRPORT	Airport
CAM	Coastal Area Management

City of New Haven, Connecticut
John DeStefano Jr., Mayor

Zoning Map No. 14

Produced by the
Office of Information Technology
Geographic Information System

Legend

- Zoning Boundary
- Zoning Grid Boundary
- PDU Boundary
- Local Historic District
- Coastal Area Management
- Water
- Airport
- Parcel Boundary
- Hydrology
- Wetland
- Railroad
- Centerline
- City Boundary
- I91-I95

0 350 700 Feet

1 inch = 700 feet

N W E S

Data Location

Server: GISDB-FS Database: NHMainGIS Name:

Airport_Boundary
Airport_runway
CityBoundary_CTTowns
CityBoundary_Line
CNH_StreetCenterlines
Coastal_Area_Management
HistoricDistricts_LocalDistricts
Parcel_adb_2008
PDU_Annotation
PDU_Point
PDU_Polygon
Railroad2007
Shoreline
Waterway
Zoning_Annotation
Zoning_Grid_new
Zoning_Point
Zoning_Polygon

Data Source

Zoning, PDU - City of New Haven, City Plan Department, Januar 2012
Hydrography - GNWPCA, Aerial Photography, 2007
Parcels - City of New Haven, Office of the Assessor, 2008
Historic Districts - City of New Haven, City Plan Department, June 2006
Railroads - GNWPCA, Aerial Photography, 2007
Coastal Area Management - NOAA, 2001

Map Status

Effective, March 21, 2007 Date Revised:

ATTENTION: DISCLAIMER

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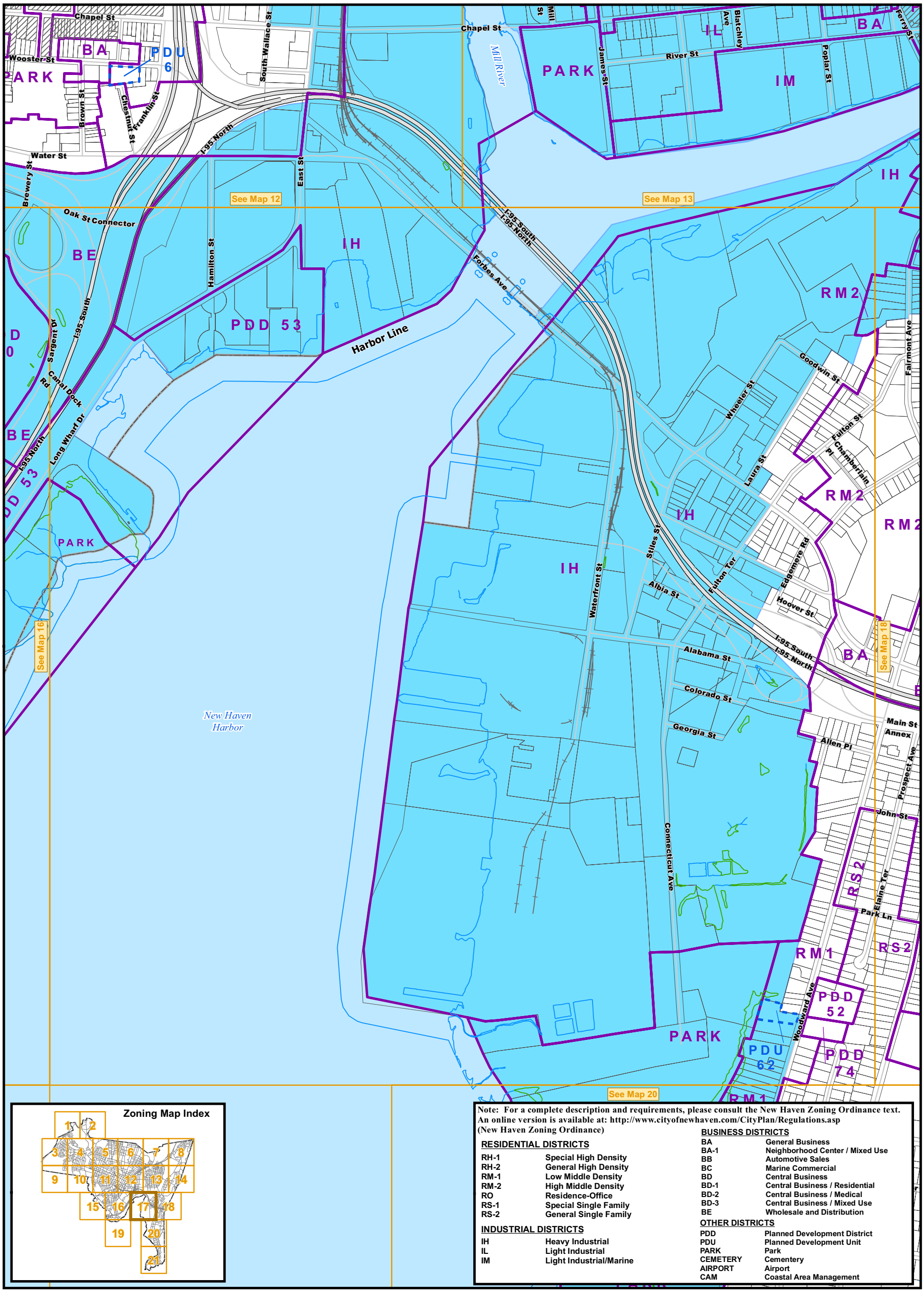
Map Document Information

Mxd: Zoning_11x17_Book.mxd Creation Date: June 7, 2006
Mxd Loacation: W: (Engineer-fs)\Private \IT\Alec\working\Mxd\Zoning Last Modified: November 20, 2012
Map Prepared by: Alec Vincitorio, GIS Analyst, (203) 946-6538, avincito@newhavenct.net



Zoning Map Index

Note: For a complete description and requirements, please consult the New Haven Zoning Ordinance text. An online version is available at: http://www.cityofnewhaven.com/CityPlan/Regulations.asp (New Haven Zoning Ordinance)

RESIDENTIAL DISTRICTS

RH-1	Special High Density
RH-2	General High Density
RM-1	Low Middle Density
RM-2	High Middle Density
RO	Residence-Office
RS-1	Special Single Family
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INDUSTRIAL DISTRICTS

IH	Heavy Industrial
IL	Light Industrial
IM	Light Industrial/Marine

BUSINESS DISTRICTS

BA	General Business
BA-1	Neighborhood Center / Mixed Use
BB	Automotive Sales
BC	Marine Commercial
BD	Central Business
BD-1	Central Business / Residential
BD-2	Central Business / Medical
BD-3	Central Business / Mixed Use
BE	Wholesale and Distribution

OTHER DISTRICTS

PDD	Planned Development District
PDU	Planned Development Unit
PARK	Park
CEMETERY	Cementery
AIRPORT	Airport
CAM	Coastal Area Management

City of New Haven, Connecticut
John DeStefano Jr., Mayor

Zoning Map No. 17

Produced by the
Office of Information Technology
Geographic Information System

Legend

- Zoning Boundary
- Zoning Grid Boundary
- PDU Boundary
- Local Historic District
- Coastal Area Management
- Water
- Airport
- Parcel Boundary
- Hydrology
- Wetland
- Railroad
- Centerline
- City Boundary
- I91-I95

0 350 700 Feet

1 inch = 700 feet

N W E S

Data Location

Server: GISDB-FS Database: NHMainGIS Name:

Airport_Boundary
Airport_runway
CityBoundary_CTTowns
CityBoundary_Line
CNH_StreetCenterlines
Coastal_Area_Management
HistoricDistricts_LocalDistricts
Parcel_adb_2008
PDU_Annotation
PDU_Point
PDU_Polygon
Railroad2007
Shoreline
Waterway
Zoning_Annotation
Zoning_Grid_new
Zoning_Point
Zoning_Polygon

Data Source

Zoning, PDU - City of New Haven, City Plan Department, Januar 2012
Hydrography - GNWPCA, Aerial Photography, 2007
Parcels - City of New Haven, Office of the Assessor, 2008
Historic Districts - City of New Haven, City Plan Department, June 2006
Railroads - GNWPCA, Aerial Photography, 2007
Coastal Area Management - NOAA, 2001

Map Status

Effective, March 21, 2007 Date Revised: November 26, 2008

ATTENTION: DISCLAIMER

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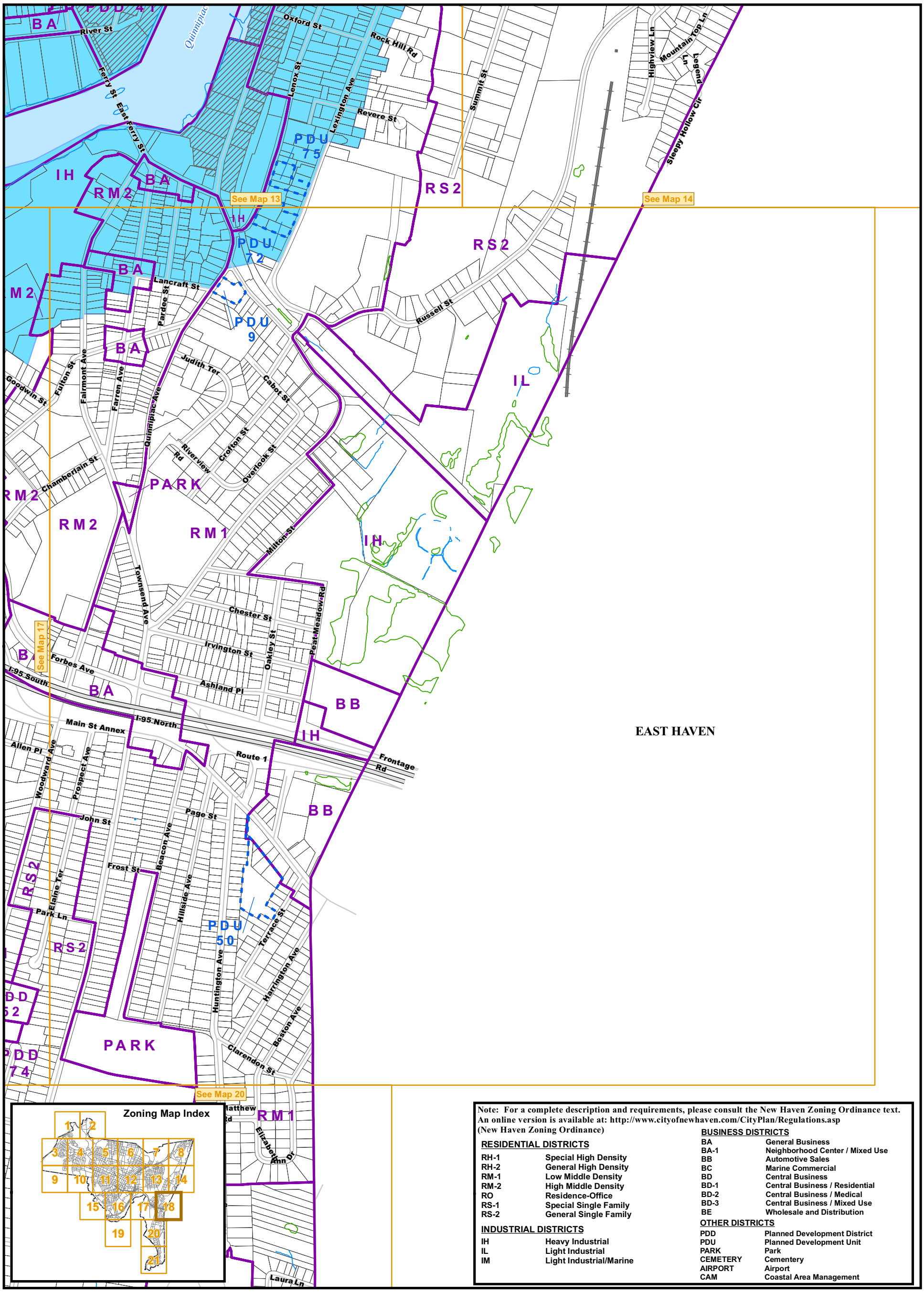
Map Document Information

Mxd: Zoning_11x17_Book.mxd
Creation Date: June 7, 2006
Mxd Loacation: W: (Engineer-fs)\Private \IT\Alec\working\Mxd\Zoning
Last Modified: November 20, 2012
Map Prepared by: Alec Vincitorio, GIS Analyst, (203) 946-6538, avincito@newhavenct.net



Note: For a complete description and requirements, please consult the New Haven Zoning Ordinance text. An online version is available at: http://www.cityofnewhaven.com/CityPlan/Regulations.asp (New Haven Zoning Ordinance)

RESIDENTIAL DISTRICTS

RH-1	Special High Density
RH-2	General High Density
RM-1	Low Middle Density
RM-2	High Middle Density
RO	Residence-Office
RS-1	Special Single Family
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INDUSTRIAL DISTRICTS

IH	Heavy Industrial
IL	Light Industrial
IM	Light Industrial/Marine

BUSINESS DISTRICTS

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BA-1	Neighborhood Center / Mixed Use
BB	Automotive Sales
BC	Marine Commercial
BD	Central Business
BD-1	Central Business / Residential
BD-2	Central Business / Medical
BD-3	Central Business / Mixed Use
BE	Wholesale and Distribution

OTHER DISTRICTS

PDD	Planned Development District
PDU	Planned Development Unit
PARK	Park
CEMETERY	Cementery
AIRPORT	Airport
CAM	Coastal Area Management

City of New Haven, Connecticut
John DeStefano Jr., Mayor

New Haven All-America City 2008

Zoning Map No. 18

Produced by the
Office of Information Technology
Geographic Information System

Legend

- Zoning Boundary
- Zoning Grid Boundary
- PDU Boundary
- Local Historic District
- Coastal Area Management
- Water
- Airport
- Parcel Boundary
- Hydrology
- Wetland
- Railroad
- Centerline
- City Boundary
- I91-I95

0 350 700 Feet

1 inch = 700 feet

N W E S

Data Location

Server: GISDB-FS Database: NHMainGIS Name:

Airport_Boundary
Airport_runway
CityBoundary_CTTowns
CityBoundary_Line
CNH_StreetCenterlines
Coastal_Area_Management
HistoricDistricts_LocalDistricts
Parcel_adb_2008
PDU_Annotation
PDU_Point
PDU_Polygon
Railroad2007
Shoreline
Waterway
Zoning_Annotation
Zoning_Grid_new
Zoning_Point
Zoning_Polygon

Data Source

Zoning, PDU - City of New Haven, City Plan Department, Januar 2012
Hydrography - GNWPCA, Aerial Photography, 2007
Parcels - City of New Haven, Office of the Assessor, 2008
Historic Districts - City of New Haven, City Plan Department, June 2006
Railroads - GNWPCA, Aerial Photography, 2007
Coastal Area Management - NOAA, 2001

Map Status

Effective, March 21, 2007 Date Revised: November 16, 2012

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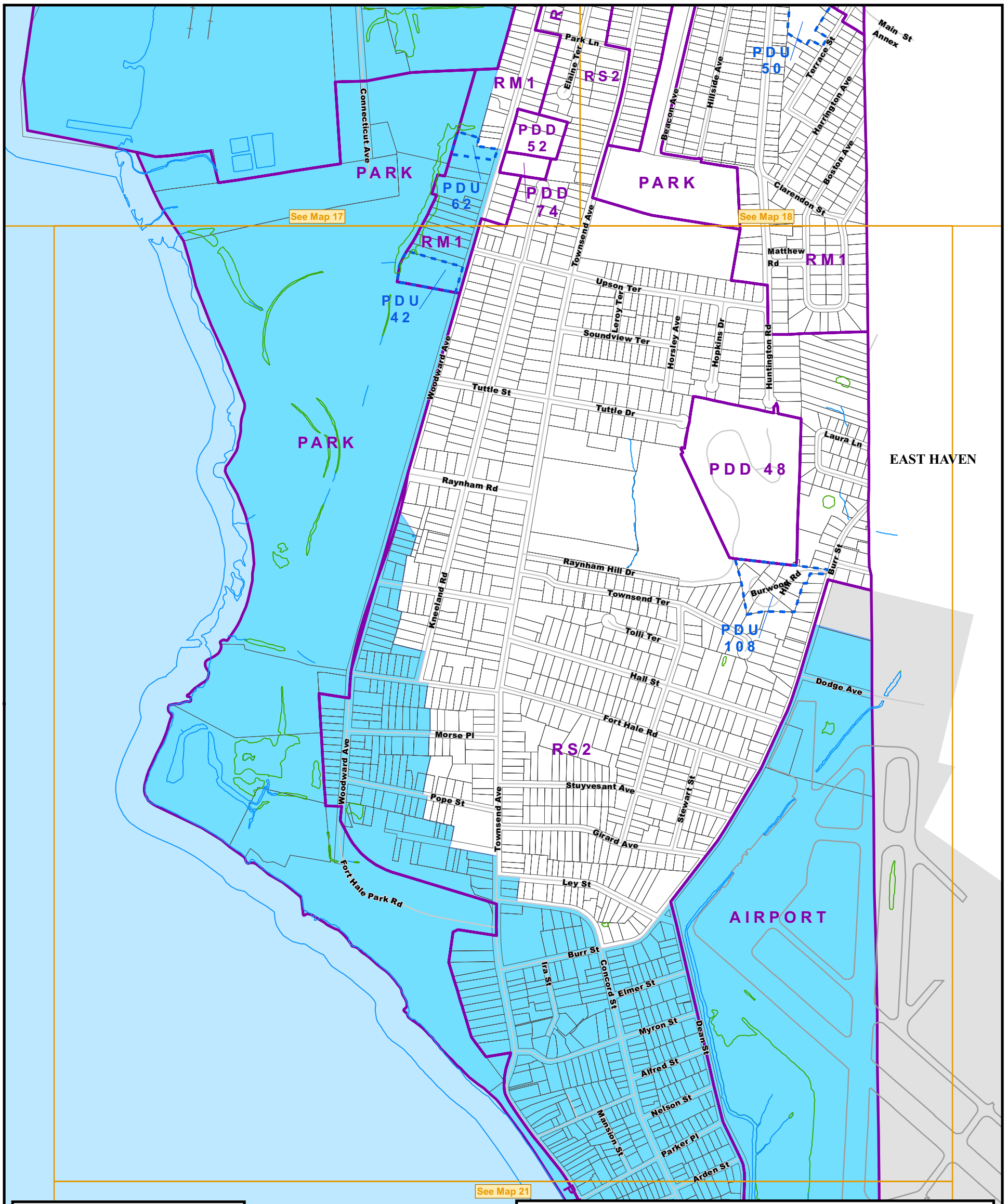
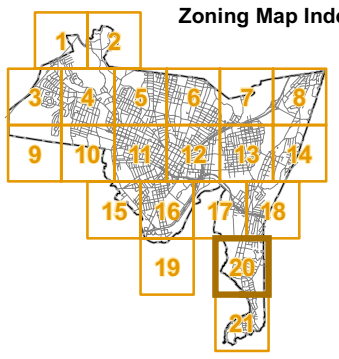
Last Modified: November 20, 2012
Map Prepared by: Alec Vincitorio, GIS Analyst, (203) 946-6538, avincito@newhavenct.net



Zoning Map Index



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INDUSTRIAL DISTRICTS

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OTHER DISTRICTS

PDD	Planned Development District
PDU	Planned Development Unit
PARK	Park
CEMETERY	Cementery
AIRPORT	Airport
CAM	Coastal Area Management

City of New Haven, Connecticut
John DeStefano Jr., Mayor

New Haven All-America City 2008

Zoning Map No. 20

Produced by the
Office of Information Technology
Geographic Information System

Legend

- Zoning Boundary
- Zoning Grid Boundary
- PDU Boundary
- Local Historic District
- Coastal Area Management
- Water
- Airport
- Parcel Boundary
- Hydrology
- Wetland
- Railroad
- Centerline
- City Boundary
- I91-I95

0 350 700 Feet

1 inch = 700 feet

N W E S

Data Location

Server: GISDB-FS Database: NHMainGIS Name:

Airport_Boundary	
Airport_runway	PDU_Polygon
CityBoundary_CTTowns	Railroad2007
CityBoundary_Line	Shoreline
CNH_StreetCenterlines	Waterway
Coastal_Area_Management	Zoning_Annotation
HistoricDistricts_LocalDistricts	Zoning_Grid_new
Parcel_adb_2008	Zoning_Point
PDU_Annotation	Zoning_Polygon
PDU_Point	

Data Source

Zoning, PDU - City of New Haven, City Plan Department, Januar 2012
Hydrography - GNWPCA, Aerial Photography, 2007
Parcels - City of New Haven, Office of the Assessor, 2008
Historic Districts - City of New Haven, City Plan Department, June 2006
Railroads - GNWPCA, Aerial Photography, 2007
Coastal Area Management - NOAA, 2001

Map Status

Effective, March 21, 2007 Date Revised:

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Map Document Information

Mxd: Zoning_11x17_Book.mxd Creation Date: June 7, 2006
Mxd Loacation: W: (Engineer-fs)\Private Last Modified: November 20, 2012
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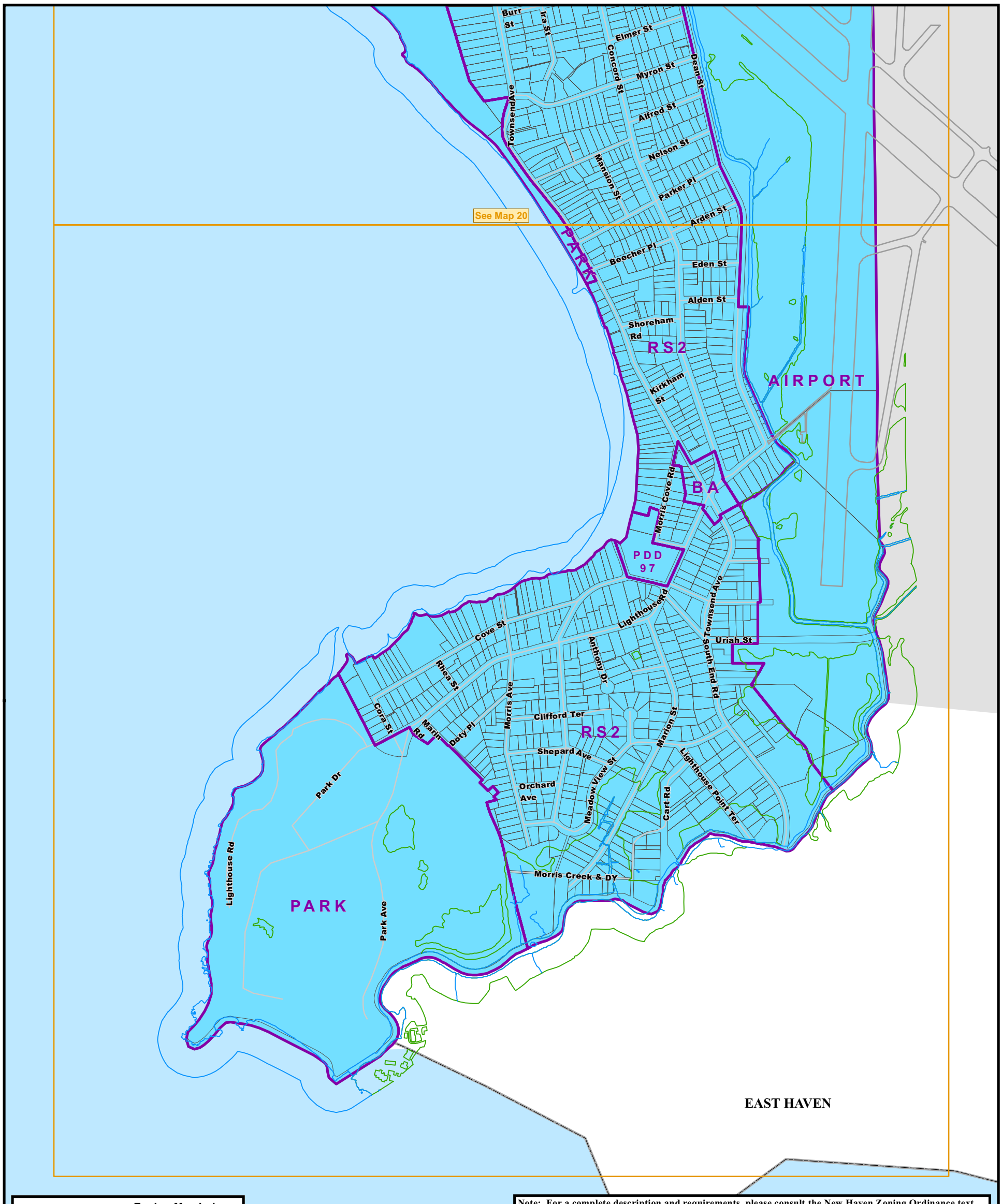
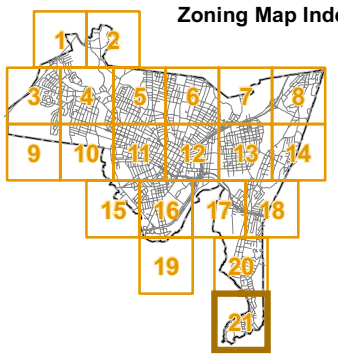
Map Prepared by: Alec Vincitorio, GIS Analyst, (203) 946-6538, avincito@newhavenct.net



Zoning Map Index



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PDU	Planned Development Unit
PARK	Park
CEMETERY	Cementery
AIRPORT	Airport
CAM	Coastal Area Management

City of New Haven, Connecticut
John DeStefano Jr., Mayor

New Haven All-America City 2008

Zoning Map No. 21

Produced by the
Office of Information Technology
Geographic Information System

Legend

- Zoning Boundary
- Zoning Grid Boundary
- PDU Boundary
- Local Historic District
- Coastal Area Management
- Water
- Airport
- Parcel Boundary
- Hydrology
- Wetland
- Railroad
- Centerline
- City Boundary
- I91-I95

0 350 700 Feet

1 inch = 700 feet

N W E S

Data Location

Server: GISDB-FS Database: NHMainGIS Name:

Airport_Boundary
Airport_runway
CityBoundary_CTTowns
CityBoundary_Line
CNH_StreetCenterlines
Coastal_Area_Management
HistoricDistricts_LocalDistricts
Parcel_adb_2008
PDU_Annotation
PDU_Point
PDU_Polygon
Railroad2007
Shoreline
Waterway
Zoning_Annotation
Zoning_Grid_new
Zoning_Point
Zoning_Polygon

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Parcels - City of New Haven, Office of the Assessor, 2008
Historic Districts - City of New Haven, City Plan Department, June 2006
Railroads - GNWPCA, Aerial Photography, 2007
Coastal Area Management - NOAA, 2001

Map Status

Effective, March 21, 2007 Date Revised:

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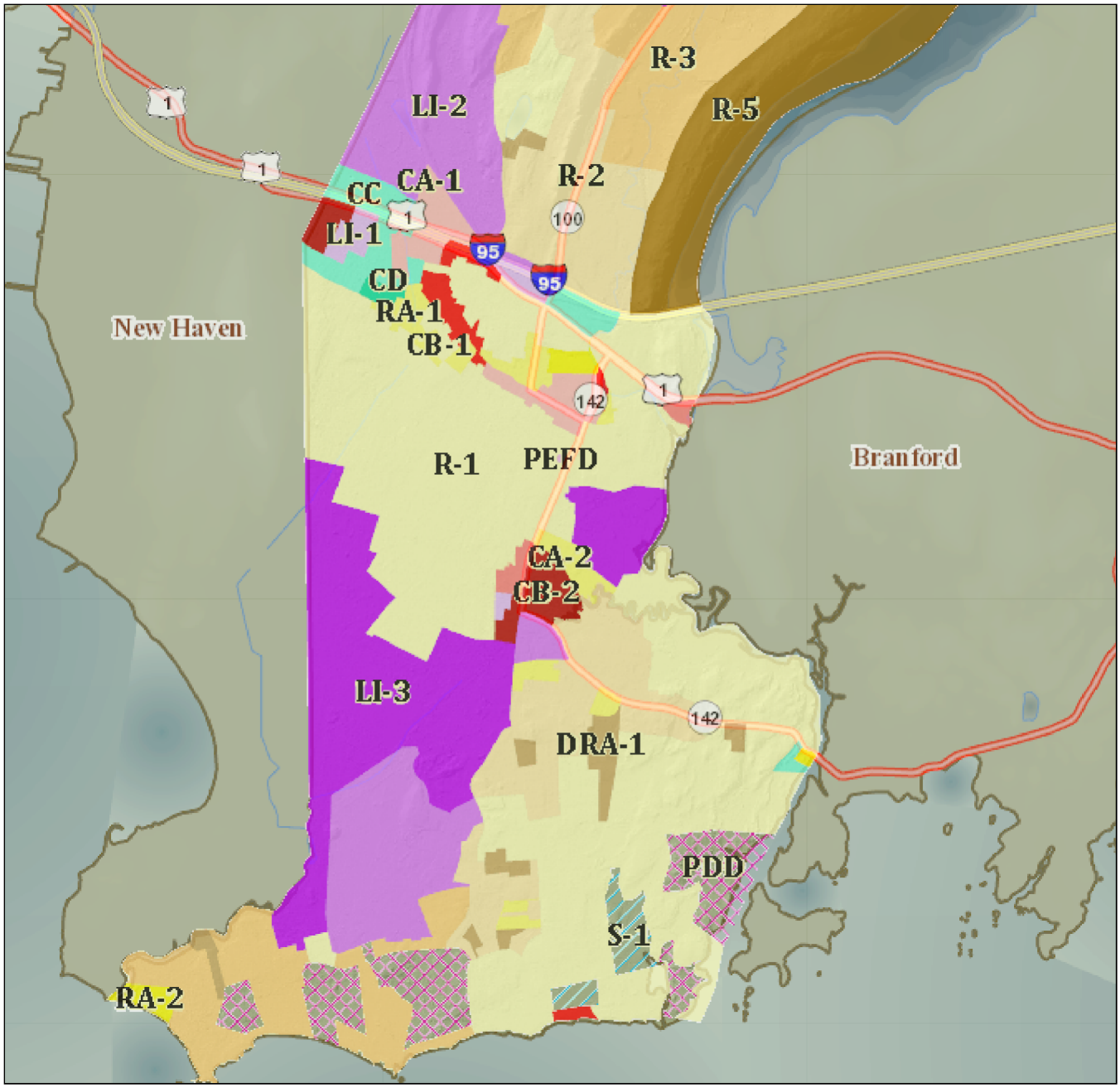
\IT\Alec\working\Mxd\Zoning
Map Prepared by: Alec Vincitorio, GIS Analyst, (203) 946-6538, avincito@newhavenct.net

Town of East Haven

Geographic Information System (GIS)

Date Printed: 4/3/2024



MAP DISCLAIMER - NOTICE OF LIABILITY

This map is for assessment purposes only. It is not for legal description or conveyances. All information is subject to verification by any user. The Town of East Haven and its mapping contractors assume no legal responsibility for the information contained herein.

Approximate Scale: 1 inch = 3000 feet

0 3,000 Feet

N W E S

Hydrologic Soil Group—State of Connecticut, Western Part
(Tweed New Haven Airport)

72° 55' 21" W — 72° 50' 20" W — 41° 19' 37" N — 41° 13' 38" N

674000 675000 676000 677000 678000 679000 680000 681000

4577000 4576000 4575000 4574000 4573000 4572000 4571000 4570000 4569000 4568000 4567000

Canner — English Dr — Canner St — Willow — Whitney — Cottage St — Ridge St — Exit 7 — Downing St — Foxon — Ann St — Russo — Dora Dr — Gay Rd — Maloney Brook — Farm River — Stroug St — Aaron Rd — N High St — Hellstrom Rd

Humphrey — Lombard — Trumbull — Exit 3 — Perkins St — Ferry — Ferry St — Mill River — Loyd St — Grove — Olive — East St — Mill St — Chapel — Chapel St — Quinnipiac — Grand — Eastern

Brewery — Exit 47 — Exit 46 — Quinnipiac River — Wheeler St — Warwick — Stiles — Fulton — Exit 50 — Exit 51 — Townsend — Ley St — Burr — Main St — Main — Coe — Beaver Swamp Brook — Exit 53 — Hosley Ave — Farm River — Rose Hill Rd — Montecello Dr — Peddlers Dr — Alps Rd — Clark Ave — Cliff St — Wheaton Rd — Taylor Pl — George St — 1st Ave

Interstates: 91, 95 — US routes: 1, 5 — State routes: 17, 34, 80, 100, 142

Map Scale: 1:14,000 if printed on D portrait (22" x 34") sheet.

Meters: 0 200 400 800 1200

Feet: 0 500 1000 2000 3000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84

USDA **Natural Resources Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

3/15/2024

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Lines

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Soil Rating Points

A
A/D
B
B/D
C
C/D
D
Not rated or not available

Water Features

Streams and Canals

Transportation

Rails
Interstate Highways
US Routes
Major Roads
Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: State of Connecticut, Western Part
Survey Area Data: Version 1, Sep 15, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 14, 2022—Oct 6, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
5	Wilbraham silt loam, 0 to 3 percent slopes	C/D	1.0	0.0%
6	Wilbraham and Menlo soils, 0 to 8 percent slopes, extremely stony	C/D	2.0	0.0%
10	Raynham silt loam, 0 to 3 percent slopes	C/D	22.0	0.3%
12	Raypol silt loam, 0 to 3 percent slopes	B/D	35.9	0.5%
13	Walpole sandy loam, 0 to 3 percent slopes	B/D	45.5	0.6%
15	Scarboro muck, 0 to 3 percent slopes	A/D	10.8	0.2%
17	Timakwa and Natchaug soils, 0 to 2 percent slopes	B/D	6.4	0.1%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	20.3	0.3%
20A	Ellington silt loam, 0 to 5 percent slopes	A/D	6.0	0.1%
24A	Deerfield loamy fine sand, 0 to 3 percent slopes	A	90.0	1.3%
27A	Belgrade silt loam, 0 to 5 percent slopes	B/D	4.2	0.1%
30A	Branford silt loam, 0 to 3 percent slopes	B	7.0	0.1%
30B	Branford silt loam, 3 to 8 percent slopes	B	1.6	0.0%
30C	Branford silt loam, 8 to 15 percent slopes	B	3.7	0.1%
35A	Penwood loamy sand, 0 to 3 percent slopes	A	19.8	0.3%
35B	Penwood loamy sand, 3 to 8 percent slopes	A	199.5	2.8%
37C	Manchester gravelly sandy loam, 3 to 15 percent slopes	A	77.5	1.1%
55B	Watchaug fine sandy loam, 3 to 8 percent slopes	B/D	14.8	0.2%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
63B	Cheshire fine sandy loam, 3 to 8 percent slopes	B	62.9	0.9%
63C	Cheshire fine sandy loam, 8 to 15 percent slopes	B	37.9	0.5%
63D	Cheshire fine sandy loam, 15 to 25 percent slopes	B	16.9	0.2%
68C	Narragansett silt loam, 3 to 15 percent slopes, extremely stony	B	3.0	0.0%
70C	Branford-Holyoke complex, 3 to 15 percent slopes, very rocky	B	47.7	0.7%
77C	Cheshire-Holyoke complex, 3 to 15 percent slopes, very rocky	B	321.9	4.5%
77D	Cheshire-Holyoke complex, 15 to 35 percent slopes, very rocky	B	131.1	1.8%
78C	Holyoke-Rock outcrop complex, 3 to 15 percent slopes	D	110.9	1.5%
78E	Holyoke-Rock outcrop complex, 15 to 45 percent slopes	D	407.4	5.7%
87B	Wethersfield loam, 3 to 8 percent slopes	C	4.9	0.1%
87C	Wethersfield loam, 8 to 15 percent slopes	C	4.6	0.1%
87D	Wethersfield loam, 15 to 25 percent slopes	C	44.7	0.6%
98	Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded	B/D	145.1	2.0%
99	Westbrook mucky peat, low salt	A/D	0.0	0.0%
104	Bash silt loam	B/D	66.6	0.9%
224A	Deerfield-Urban land complex, 0 to 3 percent slopes	A	118.3	1.6%
230B	Branford-Urban land complex, 0 to 8 percent slopes	B	55.8	0.8%
230C	Branford-Urban land complex, 8 to 15 percent slopes	B	62.5	0.9%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
235B	Penwood-Urban land complex, 0 to 8 percent slopes	A	606.3	8.4%
237C	Manchester-Urban land complex, 3 to 15 percent slopes	A	119.3	1.7%
255B	Watchaug-Urban land complex, 0 to 8 percent slopes	D	18.9	0.3%
263B	Cheshire-Urban land complex, 3 to 8 percent slopes	D	314.8	4.4%
263C	Cheshire-Urban land complex, 8 to 15 percent slopes	D	273.8	3.8%
269C	Yalesville-Urban land complex, 8 to 15 percent slopes	C	5.5	0.1%
287B	Wethersfield-Urban land complex, 3 to 8 percent slopes	C	4.8	0.1%
287C	Wethersfield-Urban land complex, 8 to 15 percent slopes	C	19.3	0.3%
302	Dumps		7.8	0.1%
305	Udorthents-Pits complex, gravelly	C	10.2	0.1%
306	Udorthents-Urban land complex	B	1,065.4	14.8%
307	Urban land	D	483.2	6.7%
308	Udorthents, smoothed	B	374.4	5.2%
313	Beaches, sand		6.0	0.1%
641	Beaches, sand-Verrazano-Urban land complex, 0 to 8 percent slopes		12.0	0.2%
642	Beaches-Hooksan-Urban land complex, 0 to 8 percent slopes		5.3	0.1%
W	Water		1,641.2	22.9%
Totals for Area of Interest			**7,178.7**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

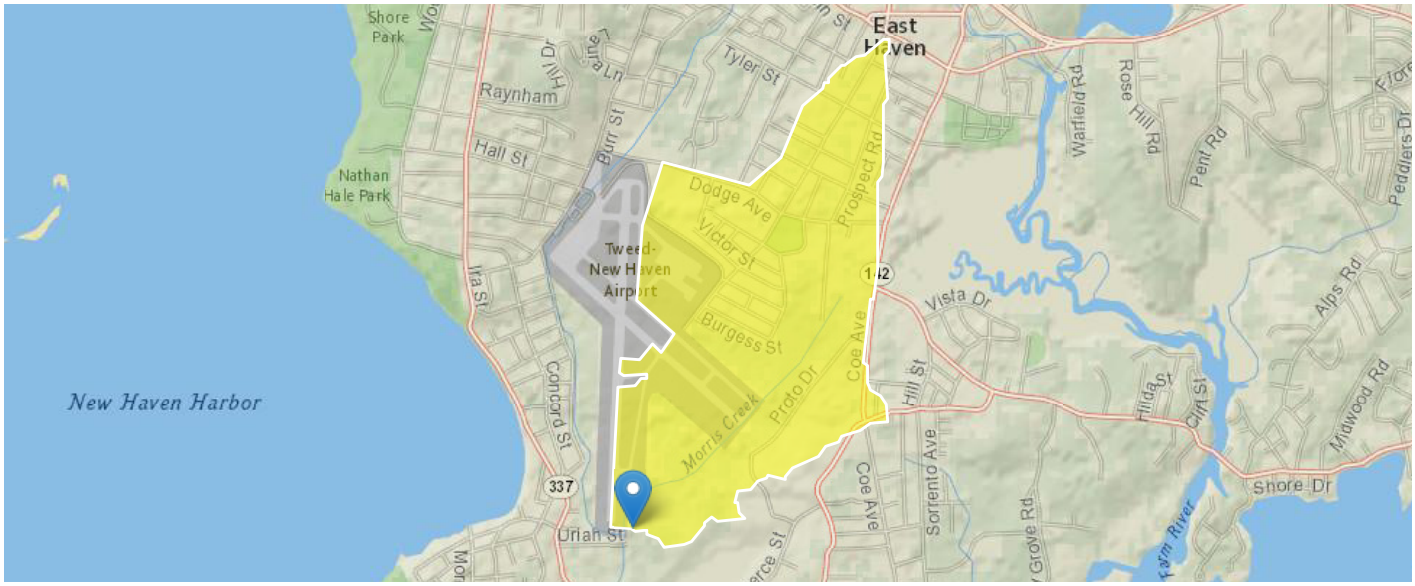
Tie-break Rule: Higher

Appendix H: Hydrology Computations

- StreamStats
- USGS 3-Variable "Urban" Regression Equations
- USGS 7-Variable "Urban" Regression Equations

StreamStats Report

Region ID: CT
Workspace ID: CT20240410154954709000
Clicked Point (Latitude, Longitude): 41.25571, -72.88701
Time: 2024-04-10 11:50:56 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CRSDFT	Percentage of area of coarse-grained stratified drift	1.76	percent
DRNAREA	Area that drains to a point on a stream	0.82	square miles
ELEV	Mean Basin Elevation	25.7	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	8.07	inches
I24H10Y	Maximum 24-hour precipitation that occurs on average once in 10 years	5.15	inches
I24H200Y	Maximum 24-hour precipitation that occurs on average once in 200 years	9.32	inches
I24H25Y	Maximum 24-hour precipitation that occurs on average once in 25 years	6.32	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	3.12	inches
I24H500Y	Maximum 24-hour precipitation that occurs on average once in 500 years	10.96	inches
I24H50Y	Maximum 24-hour precipitation that occurs on average once in 50 years	7.19	inches
I24H5Y	Maximum 24-hour precipitation that occurs on average once in 5 years	4.28	inches
NOVAVPRE	Mean November Precipitation	4.1	inches
PRCWINTER	Mean annual precipitation for December through February	3.7	inches
SSURGOCCDD	Percentage of area with hydrologic soil types C, D, or C/D from SSURGO	0.2295	percent
WETLAND	Percentage of Wetlands	4.98	percent

General Disclaimers

This watershed has been edited, computed flows and basin characteristics may not apply. For more information, submit a support request from the 'Help' button in the upper-right of the screen, attach a pdf of this report and request assistance from your local StreamStats regional representative.

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Statewide DA only SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.69	325

Peak-Flow Statistics Parameters [Statewide Multiparameter SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.69	325
I24H2Y	24 Hour 2 Year Precipitation	3.12	inches	2.77	3.32
SSURGOCCDD	Percent soil type C or D from SSURGO	0.2295	percent	0.118	0.945
I24H5Y	24 Hour 5 Year Precipitation	4.28	inches	4	4.7
I24H10Y	24 Hour 10 Year Precipitation	5.15	inches	4.86	5.79
I24H25Y	24 Hour 25 Year Precipitation	6.32	inches	5.99	7.22
I24H50Y	24 Hour 50 Year Precipitation	7.19	inches	6.81	8.3
I24H100Y	24 Hour 100 Year Precipitation	8.07	inches	7.62	9.38
I24H200Y	24 Hour 200 YearPrecipitation	9.32	inches	8.7	11.22
I24H500Y	24 Hour 500 Year Precipitation	10.96	inches	10.1	13.64

Peak-Flow Statistics Flow Report [Statewide DA only SIR 2020 5054]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
Drainage Area Only 50-percent AEP flood	54.9	ft^3/s	35
Drainage Area Only 20-percent AEP flood	97	ft^3/s	35
Drainage Area Only 10-percent AEP flood	132	ft^3/s	36.3
Drainage Area Only 4-percent AEP flood	184	ft^3/s	37.8
Drainage Area Only 2-percent AEP flood	228	ft^3/s	39.8
Drainage Area Only 1-percent AEP flood	277	ft^3/s	42.4
Drainage Area Only 0.5-percent AEP flood	331	ft^3/s	44.4
Drainage Area Only 0.2-percent AEP flood	412	ft^3/s	48

Peak-Flow Statistics Flow Report [Statewide Multiparameter SIR 2020 5054]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
50-percent AEP flood	36.6	ft^3/s	8.65	155	26.5
20-percent AEP flood	63.6	ft^3/s	13.8	293	26.3
10-percent AEP flood	84.8	ft^3/s	17	422	28.4

Statistic	Value	Unit	PIL	PIU	ASEp
4-percent AEP flood	120	ft^3/s	21.8	660	31.5
2-percent AEP flood	148	ft^3/s	24.5	893	34.3
1-percent AEP flood	180	ft^3/s	27.1	1190	37.1
0.5-percent AEP flood	219	ft^3/s	37.5	1280	40.6
0.2-percent AEP flood	277	ft^3/s	50.6	1520	45

Peak-Flow Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp		
Drainage Area Only 50-percent AEP flood	54.9	ft^3/s	35		
Drainage Area Only 20-percent AEP flood	97	ft^3/s	35		
Drainage Area Only 10-percent AEP flood	132	ft^3/s	36.3		
Drainage Area Only 4-percent AEP flood	184	ft^3/s	37.8		
Drainage Area Only 2-percent AEP flood	228	ft^3/s	39.8		
Drainage Area Only 1-percent AEP flood	277	ft^3/s	42.4		
Drainage Area Only 0.5-percent AEP flood	331	ft^3/s	44.4		
Drainage Area Only 0.2-percent AEP flood	412	ft^3/s	48		
50-percent AEP flood	36.6	ft^3/s	8.65	155	26.5
20-percent AEP flood	63.6	ft^3/s	13.8	293	26.3
10-percent AEP flood	84.8	ft^3/s	17	422	28.4
4-percent AEP flood	120	ft^3/s	21.8	660	31.5
2-percent AEP flood	148	ft^3/s	24.5	893	34.3
1-percent AEP flood	180	ft^3/s	27.1	1190	37.1
0.5-percent AEP flood	219	ft^3/s	37.5	1280	40.6
0.2-percent AEP flood	277	ft^3/s	50.6	1520	45

Peak-Flow Statistics Citations

Ahearn, E.A., and Hodgkins, G.A.,2020, Estimating flood magnitude and frequency on streams and rivers in Connecticut, based on data through water year 2015: U.S. Geological Survey Scientific Investigations Report 2020–5054, 42 p. (https://doi.org/10.3133/sir20205054)

Seasonal Flow Statistics

Seasonal Flow Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.92	150
PRCWINTER	Mean Annual Winter Precipitation	3.7	inches	3.19	4.4
CRSDFT	Percent Coarse Stratified Drift	1.76	percent	0.1	55.1

Seasonal Flow Statistics Disclaimers [Duration Flow 2010 5052]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Seasonal Flow Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration December to February	1.92	ft^3/s
50 Percent Duration December to February	1.1	ft^3/s
75 Percent Duration December to February	0.629	ft^3/s
95 Percent Duration DEC FEB	0.272	ft^3/s
99 Percent Duration December to February	0.123	ft^3/s
25 Percent Duration March to April	3.44	ft^3/s
50 Percent Duration March to April	2.14	ft^3/s
75 Percent Duration March to April	1.34	ft^3/s
95 Percent Duration March to April	0.759	ft^3/s
99 Percent Duration March to April	0.532	ft^3/s
25 Percent Duration July to October	0.432	ft^3/s
50 Percent Duration July to October	0.148	ft^3/s
75 Percent Duration July to October	0.0562	ft^3/s
80 Percent Duration July to October	0.0441	ft^3/s
99 Percent Duration July to October	0.00351	ft^3/s

Seasonal Flow Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

November Flow-Duration Statistics

November Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.92	150
NOVAVPRE	Mean November Precipitation	4.1	inches	3.48	4.93
CRSDFT	Percent Coarse Stratified Drift	1.76	percent	0.1	55.1

November Flow-Duration Statistics Disclaimers [Duration Flow 2010 5052]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

November Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
November 25 Percent Duration	1.6	ft^3/s
November 50 Percent Duration	0.845	ft^3/s
November 75 Percent Duration	0.348	ft^3/s
November 90 Percent Duration	0.119	ft^3/s
November 99 Percent Duration	0.0283	ft^3/s

November Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

May Flow-Duration Statistics

May Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.92	150
CRSDFT	Percent Coarse Stratified Drift	1.76	percent	0.1	55.1

May Flow-Duration Statistics Disclaimers [Duration Flow 2010 5052]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

May Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
May 25 Percent Duration	2.17	ft^3/s
May 50 Percent Duration	1.3	ft^3/s
May 75 Percent Duration	0.836	ft^3/s
May 95 Percent Duration	0.39	ft^3/s
May 99 Percent Duration	0.229	ft^3/s

May Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

June Flow-Duration Statistics

June Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.92	150
CRSDFT	Percent Coarse Stratified Drift	1.76	percent	0.1	55.1
WETLAND	Percent Wetlands	4.98	percent	0.3	18.1

June Flow-Duration Statistics Disclaimers [Duration Flow 2010 5052]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

June Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
June 25 Percent Duration	1.54	ft^3/s
June 50 Percent Duration	0.702	ft^3/s
June 75 Percent Duration	0.361	ft^3/s
June 90 Percent Duration	0.137	ft^3/s
June 99 Percent Duration	0.0491	ft^3/s

June Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

Flow-Duration Statistics

Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.92	150
ELEV	Mean Basin Elevation	25.7	feet	168	1287
CRSDFT	Percent Coarse Stratified Drift	1.76	percent	0.1	55.1

Flow-Duration Statistics Disclaimers [Duration Flow 2010 5052]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration	2.77	ft^3/s
99 Percent Duration	0.00917	ft^3/s

Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [Crippen Bue Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.1	3000

Maximum Probable Flood Statistics Flow Report [Crippen Bue Region 2]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	4890	ft^3/s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D.1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (https://pubs.usgs.gov/wsp/1887/report.pdf)

Bankfull Statistics

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.07722	940.1535

Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	0.82	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	14	ft
Bieger_D_channel_depth	1.06	ft
Bieger_D_channel_cross_sectional_area	15	ft^2

Bankfull Statistics Disclaimers [New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	23.9	ft
Bieger_P_channel_depth	1.32	ft
Bieger_P_channel_cross_sectional_area	31.3	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	11.5	ft
Bieger_USA_channel_depth	1.16	ft
Bieger_USA_channel_cross_sectional_area	15.4	ft^2

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	14	ft
Bieger_D_channel_depth	1.06	ft
Bieger_D_channel_cross_sectional_area	15	ft^2
Bieger_P_channel_width	23.9	ft
Bieger_P_channel_depth	1.32	ft
Bieger_P_channel_cross_sectional_area	31.3	ft^2
Bieger_USA_channel_width	11.5	ft
Bieger_USA_channel_depth	1.16	ft
Bieger_USA_channel_cross_sectional_area	15.4	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL

Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCoverPages)

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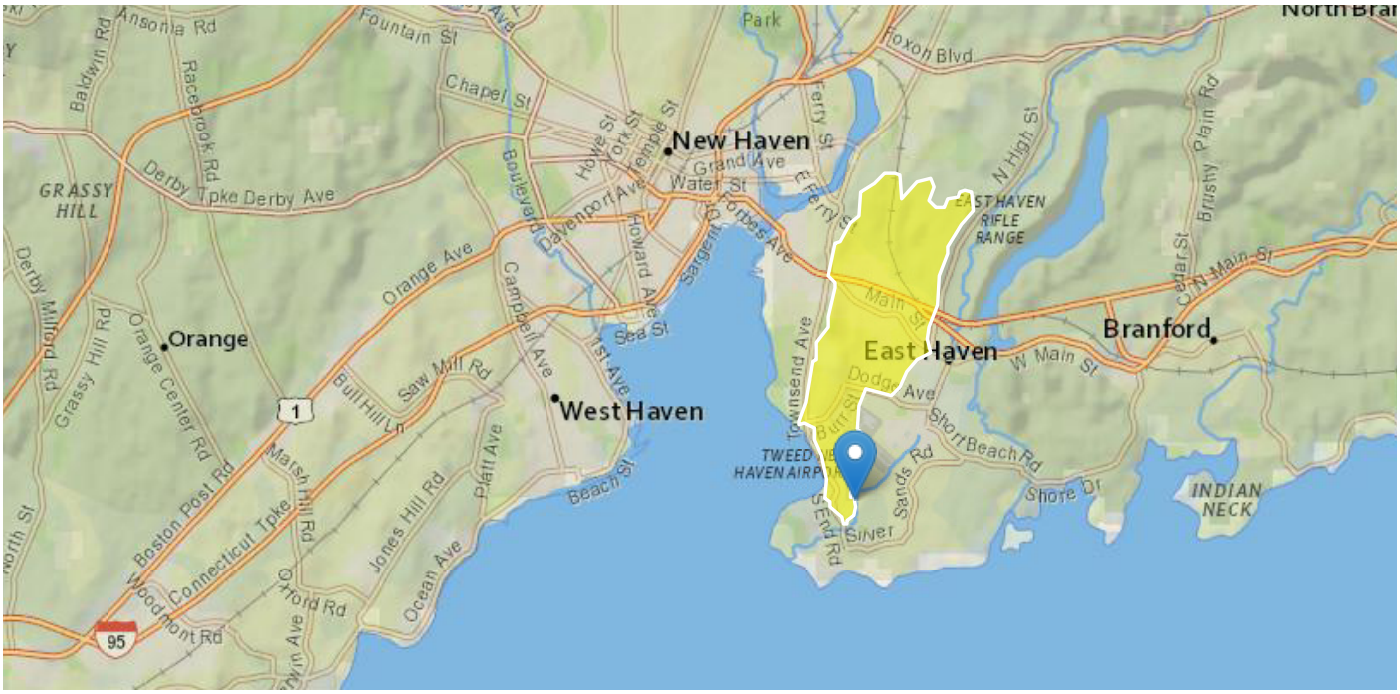
Application Version: 4.19.4
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

StreamStats Report

Region ID: CT
Workspace ID: CT20240410161922838000
Clicked Point (Latitude, Longitude): 41.25531, -72.88740
Time: 2024-04-10 12:19:42 -0400



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CRSDFT	Percentage of area of coarse-grained stratified drift	2.7	percent
DRNAREA	Area that drains to a point on a stream	2.91	square miles
ELEV	Mean Basin Elevation	60.1	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	8.13	inches
I24H10Y	Maximum 24-hour precipitation that occurs on average once in 10 years	5.18	inches
I24H200Y	Maximum 24-hour precipitation that occurs on average once in 200 years	9.38	inches
I24H25Y	Maximum 24-hour precipitation that occurs on average once in 25 years	6.35	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	3.13	inches

Parameter Code	Parameter Description	Value	Unit
I24H500Y	Maximum 24-hour precipitation that occurs on average once in 500 years	11.05	inches
I24H50Y	Maximum 24-hour precipitation that occurs on average once in 50 years	7.24	inches
I24H5Y	Maximum 24-hour precipitation that occurs on average once in 5 years	4.3	inches
NOVAVPRE	Mean November Precipitation	4.1	inches
PRCWINTER	Mean annual precipitation for December through February	3.7	inches
SSURGOCCDD	Percentage of area with hydrologic soil types C, D, or C/D from SSURGO	0.4499	percent
WETLAND	Percentage of Wetlands	1.25	percent

General Disclaimers

This watershed has been edited, computed flows and basin characteristics may not apply. For more information, submit a support request from the 'Help' button in the upper-right of the screen, attach a pdf of this report and request assistance from your local StreamStats regional representative.

Peak-Flow Statistics

Peak-Flow Statistics Parameters [Statewide DA only SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.69	325

Peak-Flow Statistics Parameters [Statewide Multiparameter SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.69	325
I24H2Y	24 Hour 2 Year Precipitation	3.13	inches	2.77	3.32
SSURGOCCDD	Percent soil type C or D from SSURGO	0.4499	percent	0.118	0.945
I24H5Y	24 Hour 5 Year Precipitation	4.3	inches	4	4.7
I24H10Y	24 Hour 10 Year Precipitation	5.18	inches	4.86	5.79
I24H25Y	24 Hour 25 Year Precipitation	6.35	inches	5.99	7.22
I24H50Y	24 Hour 50 Year Precipitation	7.24	inches	6.81	8.3
I24H100Y	24 Hour 100 Year Precipitation	8.13	inches	7.62	9.38
I24H200Y	24 Hour 200 YearPrecipitation	9.38	inches	8.7	11.22

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
I24H500Y	24 Hour 500 Year Precipitation	11.05	inches	10.1	13.64

Peak-Flow Statistics Flow Report [Statewide DA only SIR 2020 5054]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
Drainage Area Only 50-percent AEP flood	147	ft^3/s	35
Drainage Area Only 20-percent AEP flood	257	ft^3/s	35
Drainage Area Only 10-percent AEP flood	348	ft^3/s	36.3
Drainage Area Only 4-percent AEP flood	484	ft^3/s	37.8
Drainage Area Only 2-percent AEP flood	598	ft^3/s	39.8
Drainage Area Only 1-percent AEP flood	727	ft^3/s	42.4
Drainage Area Only 0.5-percent AEP flood	871	ft^3/s	44.4
Drainage Area Only 0.2-percent AEP flood	1090	ft^3/s	48

Peak-Flow Statistics Flow Report [Statewide Multiparameter SIR 2020 5054]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PIL	PIU	ASEp
50-percent AEP flood	141	ft^3/s	34.8	572	26.5
20-percent AEP flood	233	ft^3/s	52.3	1040	26.3
10-percent AEP flood	303	ft^3/s	62.7	1460	28.4
4-percent AEP flood	417	ft^3/s	78	2230	31.5
2-percent AEP flood	516	ft^3/s	87.8	3030	34.3
1-percent AEP flood	625	ft^3/s	96.6	4040	37.1
0.5-percent AEP flood	738	ft^3/s	129	4220	40.6
0.2-percent AEP flood	925	ft^3/s	172	4970	45

Peak-Flow Statistics Flow Report [Area-Averaged]

PIL: Lower 90% Prediction Interval, PIU: Upper 90% Prediction Interval, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
Drainage Area Only 50-percent AEP flood	147	ft^3/s	35
Drainage Area Only 20-percent AEP flood	257	ft^3/s	35
Drainage Area Only 10-percent AEP flood	348	ft^3/s	36.3
Drainage Area Only 4-percent AEP flood	484	ft^3/s	37.8
Drainage Area Only 2-percent AEP flood	598	ft^3/s	39.8
Drainage Area Only 1-percent AEP flood	727	ft^3/s	42.4

Statistic	Value	Unit	ASEp		
Drainage Area Only 0.5-percent AEP flood	871	ft^3/s	44.4		
Drainage Area Only 0.2-percent AEP flood	1090	ft^3/s	48		
50-percent AEP flood	141	ft^3/s	34.8	572	26.5
20-percent AEP flood	233	ft^3/s	52.3	1040	26.3
10-percent AEP flood	303	ft^3/s	62.7	1460	28.4
4-percent AEP flood	417	ft^3/s	78	2230	31.5
2-percent AEP flood	516	ft^3/s	87.8	3030	34.3
1-percent AEP flood	625	ft^3/s	96.6	4040	37.1
0.5-percent AEP flood	738	ft^3/s	129	4220	40.6
0.2-percent AEP flood	925	ft^3/s	172	4970	45

Peak-Flow Statistics Citations

Ahearn, E.A., and Hodgkins, G.A.,2020, Estimating flood magnitude and frequency on streams and rivers in Connecticut, based on data through water year 2015: U.S. Geological Survey Scientific Investigations Report 2020–5054, 42 p. (https://doi.org/10.3133/sir20205054)

Flow-Duration Statistics

Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.92	150
ELEV	Mean Basin Elevation	60.1	feet	168	1287
CRSDFT	Percent Coarse Stratified Drift	2.7	percent	0.1	55.1

Flow-Duration Statistics Disclaimers [Duration Flow 2010 5052]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration	8.9	ft^3/s
99 Percent Duration	0.0529	ft^3/s

Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

Seasonal Flow Statistics

Seasonal Flow Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.92	150
PRCWINTER	Mean Annual Winter Precipitation	3.7	inches	3.19	4.4
CRSDFT	Percent Coarse Stratified Drift	2.7	percent	0.1	55.1

Seasonal Flow Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration December to February	6.91	ft^3/s
50 Percent Duration December to February	3.99	ft^3/s
75 Percent Duration December to February	2.33	ft^3/s
95 Percent Duration DEC FEB	1.02	ft^3/s
99 Percent Duration December to February	0.48	ft^3/s
25 Percent Duration March to April	12.3	ft^3/s
50 Percent Duration March to April	7.74	ft^3/s
75 Percent Duration March to April	4.95	ft^3/s
95 Percent Duration March to April	2.81	ft^3/s
99 Percent Duration March to April	1.98	ft^3/s
25 Percent Duration July to October	1.66	ft^3/s
50 Percent Duration July to October	0.631	ft^3/s
75 Percent Duration July to October	0.265	ft^3/s
80 Percent Duration July to October	0.215	ft^3/s
99 Percent Duration July to October	0.0247	ft^3/s

Seasonal Flow Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

May Flow-Duration Statistics

May Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.92	150

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
CRSDFT	Percent Coarse Stratified Drift	2.7	percent	0.1	55.1

May Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
May 25 Percent Duration	7.69	ft^3/s
May 50 Percent Duration	4.75	ft^3/s
May 75 Percent Duration	3.11	ft^3/s
May 95 Percent Duration	1.53	ft^3/s
May 99 Percent Duration	0.942	ft^3/s

May Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

June Flow-Duration Statistics

June Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.92	150
CRSDFT	Percent Coarse Stratified Drift	2.7	percent	0.1	55.1
WETLAND	Percent Wetlands	1.25	percent	0.3	18.1

June Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
June 25 Percent Duration	4.3	ft^3/s
June 50 Percent Duration	2.07	ft^3/s
June 75 Percent Duration	1.07	ft^3/s
June 90 Percent Duration	0.585	ft^3/s
June 99 Percent Duration	0.232	ft^3/s

June Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

November Flow-Duration Statistics

November Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.92	150
NOVAVPRE	Mean November Precipitation	4.1	inches	3.48	4.93
CRSDFT	Percent Coarse Stratified Drift	2.7	percent	0.1	55.1

November Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
November 25 Percent Duration	5.56	ft^3/s
November 50 Percent Duration	2.91	ft^3/s
November 75 Percent Duration	1.26	ft^3/s
November 90 Percent Duration	0.468	ft^3/s
November 99 Percent Duration	0.127	ft^3/s

November Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (http://pubs.usgs.gov/sir/2010/5052/)

Bankfull Statistics

Bankfull Statistics Parameters [95.0 Percent (2.77 square miles) Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.07722	940.1535

Bankfull Statistics Parameters [95.0 Percent (2.77 square miles) New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [95.0 Percent (2.77 square miles) Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	23.7	ft
Bieger_D_channel_depth	1.52	ft
Bieger_D_channel_cross_sectional_area	36.6	ft^2

Bankfull Statistics Disclaimers [95.0 Percent (2.77 square miles) New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors.

Bankfull Statistics Flow Report [95.0 Percent (2.77 square miles) New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	34.1	ft
Bieger_P_channel_depth	1.74	ft
Bieger_P_channel_cross_sectional_area	59.7	ft^2

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	18	ft
Bieger_USA_channel_depth	1.51	ft
Bieger_USA_channel_cross_sectional_area	30.4	ft^2

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G.,2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_campaign=PDFCc

Maximum Probable Flood Statistics

Maximum Probable Flood Statistics Parameters [Crippen Bue Region 2]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	2.91	square miles	0.1	3000

Maximum Probable Flood Statistics Flow Report [Crippen Bue Region 2]

Statistic	Value	Unit
Maximum Flood Crippen Bue Regional	11600	ft^3/s

Maximum Probable Flood Statistics Citations

Crippen, J.R. and Bue, Conrad D.1977, Maximum Floodflows in the Conterminous United States, Geological Survey Water-Supply Paper 1887, 52p. (https://pubs.usgs.gov/wsp/1887/report.pdf)

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Application Version: 4.19.4
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

HOYLE TANNER

HYDROLOGY
CALCULATION SHEET

PROJECT	Tweed RW Extension and Terminal		
PROJECT NO.	63201	ROUTE	
CALCULATED BY	JEC	DATE	04/10/24
CHECKED BY	RMF	DATE	12/19/24
		SHEET	1 OF 2

3 Variable USGS Regression Equation Method
Morris Creek (East Branch) at confluence with Tuttle Brook (West Branch)

NOAA Atlas 14 Precipitation Frequency: 24 Hour Duration (Station ID: 06-5273)

P2 = 3.42 in
P10 = 5.22 in
P25 = 6.34 in
P50 = 7.17 in
P100 = 8.07 in
P500 = 10.8 in

A = Watershed Area

A = 1.13 sq miles

Percentage of Drainage Area Classified as HSG C, C/D, and D

SoilCorD = 0.17

BDF = Basin Development Factor

	Channel Modifications	Channel Lining	Storm Sewers	Curb and Gutter
Upper Third of Drainage Area	1	1	1	1
Middle Third of Drainage Area	1	0	1	1
Lower Third of Drainage Area	1	0	0	0

BDF = 8

Regression Equations for Nonurban (Rural) Basins in CT (Equations from SIR 2020-5054)

$RQ2 = 10^{-1.015}*(A^{0.819})*10^{(0.618*P2)}*10^{(0.586*(SoilCorD+1))}$ = 67 cfs
$RQ10 = 10^{-0.775}*(A^{0.795})*10^{(0.426*P10)}*10^{(0.470*(SoilCorD+1))}$ = 110 cfs
$RQ25 = 10^{-0.432}*(A^{0.790})*10^{(0.322*P25)}*10^{(0.442*(SoilCorD+1))}$ = 147 cfs
$RQ50 = 10^{-0.255}*(A^{0.789})*10^{(0.274*P50)}*10^{(0.426*(SoilCorD+1))}$ = 177 cfs
$RQ100 = 10^{-0.104}*(A^{0.789})*10^{(0.238*P100)}*10^{(0.413*(SoilCorD+1))}$ = 219 cfs
$RQ500 = 10^{0.74}*(A^{0.784})*10^{(0.120*P500)}*10^{(0.37*(SoilCorD+1))}$ = 323 cfs

Regression Equations for Urban Basins in CT: 3 Variables (Equations from SIR 2004-5160)

$UQ2 = 13.2(A)^{0.21}(13-BDF)^{-0.43}(RQ2)^{0.73}$ = 146.06 cfs
$UQ10 = 9.51(A)^{0.16}(13-BDF)^{-0.36}(RQ10)^{0.79}$ = 222.11 cfs
$UQ25 = 8.68(A)^{0.15}(13-BDF)^{-0.34}(RQ25)^{0.80}$ = 277.32 cfs
$UQ50 = 8.04(A)^{0.15}(13-BDF)^{-0.32}(RQ50)^{0.81}$ = 324.54 cfs
$UQ100 = 7.70(A)^{0.15}(13-BDF)^{-0.32}(RQ100)^{0.82}$ = 389.36 cfs
$UQ500 = 7.47(A)^{0.16}(13-BDF)^{-0.30}(RQ500)^{0.82}$ = 537.2 cfs

HOYLE TANNER

HYDROLOGY
CALCULATION SHEET

PROJECT	Tweed RW Extension and Terminal		
PROJECT NO.	63201	ROUTE	
CALCULATED BY	JEC	DATE	04/10/24
CHECKED BY	RMF	DATE	12/19/24
		SHEET	2 OF 2

3 Variable USGS Regression Equation Method
Tuttle Brook-Morris Creek at Tide Gate - Existing Conditions

NOAA Atlas 14 Precipitation Frequency: 24 Hour Duration (Station ID: 06-5273)

P2 =	3.42	in
P10 =	5.22	in
P25 =	6.34	in
P50 =	7.17	in
P100 =	8.07	in
P500 =	10.8	in

A = Watershed Area

A = 4.12 sq miles

Percentage of Drainage Area Classified as HSG C, C/D, and D

SoilCorD = 0.36

BDF = Basin Development Factor

	Channel Modifications	Channel Lining	Storm Sewers	Curb and Gutter
Upper Third of Drainage Area	1	0	0	0
Middle Third of Drainage Area	1	1	1	1
Lower Third of Drainage Area	1	1	1	1

BDF = 9

Regression Equations for Nonurban (Rural) Basins in CT (Equations from SIR 2020-5054)

$RQ2 = 10^{-1.015}*(A^{0.819})*10^{(0.618*P2)}*10^{(0.586*(SoilCorD+1))}$ = 251 cfs

$RQ10 = 10^{-0.775}*(A^{0.795})*10^{(0.426*P10)}*10^{(0.470*(SoilCorD+1))}$ = 378 cfs

$RQ25 = 10^{-0.432}*(A^{0.790})*10^{(0.322*P25)}*10^{(0.442*(SoilCorD+1))}$ = 498 cfs

$RQ50 = 10^{-0.255}*(A^{0.789})*10^{(0.274*P50)}*10^{(0.426*(SoilCorD+1))}$ = 595 cfs

$RQ100 = 10^{-0.104}*(A^{0.789})*10^{(0.238*P100)}*10^{(0.413*(SoilCorD+1))}$ = 731 cfs

$RQ500 = 10^{0.74}*(A^{0.784})*10^{(0.120*P500)}*10^{(0.37*(SoilCorD+1))}$ = 1052 cfs

Regression Equations for Urban Basins in CT: 3 Variables (Equations from SIR 2004-5160)

$UQ2 = 13.2(A)^{0.21}(13\text{-}BDF)^{-0.43}(RQ2)^{0.73}$ = 553.2 cfs

$UQ10 = 9.51(A)^{0.16}(13\text{-}BDF)^{-0.36}(RQ10)^{0.79}$ = 787.2 cfs

$UQ25 = 8.68(A)^{0.15}(13\text{-}BDF)^{-0.34}(RQ25)^{0.80}$ = 963.3 cfs

$UQ50 = 8.04(A)^{0.15}(13\text{-}BDF)^{-0.32}(RQ50)^{0.81}$ = 1128 cfs

$UQ100 = 7.70(A)^{0.15}(13\text{-}BDF)^{-0.32}(RQ100)^{0.82}$ = 1364 cfs

$UQ500 = 7.47(A)^{0.16}(13\text{-}BDF)^{-0.30}(RQ500)^{0.82}$ = 1858 cfs

HOYLE TANNER

HYDROLOGY
CALCULATION SHEET

PROJECT	Tweed RW Extension and Terminal		
PROJECT NO.	63201	ROUTE	
CALCULATED BY	JEC	DATE	04/10/24
CHECKED BY	RMF	DATE	12/19/24
		SHEET	1 OF 2

7 Variable USGS Regression Equation Method
Morris Creek (East Branch) at confluence with Tuttle Brook (West Branch)

NOAA Atlas 14 Precipitation Frequency: 24 Hour Duration (Station ID: 06-5273)

P2 = 3.42 in R2 = 1.58 in
P10 = 5.22 in
P25 = 6.34 in
P50 = 7.17 in
P100 = 8.07 in
P500 = 10.8 in

8231
823.1
6996.35
1234.65

A = Watershed Area

A = 1.13 sq miles

Percentage of Drainage Area Classified as HSG C, C/D, and D

SoilCorD = 0.17

IA = Percent Impervious Surface Area

IA = 64 %

SL = Main Channel Slope

Elevation @ 10% of Main Channel Length = -1 ft
Elevation @ 85% of Main Channel Length = 4 ft
Length of Channel = 2 mi
SL = 3 ft/mi

ST = Drainage-basin Storage

ST = 1.0 %

BDF = Basin Development Factor

	Channel Modifications	Channel Lining	Storm Sewers	Curb and Gutter
Upper Third of Drainage Area	1	1	1	1
Middle Third of Drainage Area	1	0	1	1
Lower Third of Drainage Area	1	0	0	0

BDF = 8

Regression Equations for Nonurban (Rural) Basins in CT (Equations from SIR 2020-5054)

$RQ2 = 10^{-1.015}*(A^{0.819})*10^{(0.618*P2)}*10^{(0.586*(SoilCorD+1))}$ = 67 cfs
$RQ10 = 10^{-0.775}*(A^{0.795})*10^{(0.426*P10)}*10^{(0.470*(SoilCorD+1))}$ = 110 cfs
$RQ25 = 10^{-0.432}*(A^{0.790})*10^{(0.322*P25)}*10^{(0.442*(SoilCorD+1))}$ = 147 cfs
$RQ50 = 10^{-0.255}*(A^{0.789})*10^{(0.274*P50)}*10^{(0.426*(SoilCorD+1))}$ = 177 cfs
$RQ100 = 10^{-0.104}*(A^{0.789})*10^{(0.238*P100)}*10^{(0.413*(SoilCorD+1))}$ = 219 cfs
$RQ500 = 10^{0.74}*(A^{0.784})*10^{(0.120*P500)}*10^{(0.37*(SoilCorD+1))}$ = 323 cfs

Regression Equations for Urban Basins in CT: 7 Variables (Equations from SIR 2004-5160)

$UQ2 = 2.35(A)^{0.41}(SL)^{0.17}(R2+3)^{2.04}(ST+8)^{-0.65}(13-BDF)^{-0.32}(IA)^{0.15}(RQ2)^{0.47}$ = 129.23 cfs
$UQ10 = 2.99(A)^{0.32}(SL)^{0.15}(R2+3)^{1.75}(ST+8)^{-0.57}(13-BDF)^{-0.30}(IA)^{0.09}(RQ10)^{0.58}$ = 207.12 cfs
$UQ25 = 2.78(A)^{0.31}(SL)^{0.15}(R2+3)^{1.76}(ST+8)^{-0.55}(13-BDF)^{-0.29}(IA)^{0.07}(RQ25)^{0.60}$ = 250.11 cfs
$UQ50 = 2.67(A)^{0.29}(SL)^{0.15}(R2+3)^{1.74}(ST+8)^{-0.53}(13-BDF)^{-0.28}(IA)^{0.06}(RQ50)^{0.62}$ = 293.88 cfs
$UQ100 = 2.50(A)^{0.29}(SL)^{0.15}(R2+3)^{1.76}(ST+8)^{-0.52}(13-BDF)^{-0.28}(IA)^{0.06}(RQ100)^{0.63}$ = 348.95 cfs
$UQ500 = 2.27(A)^{0.29}(SL)^{0.16}(R2+3)^{1.86}(ST+8)^{-0.54}(13-BDF)^{-0.27}(IA)^{0.05}(RQ500)^{0.63}$ = 503.6 cfs

HOYLE TANNER

HYDROLOGY
CALCULATION SHEET

PROJECT	Tweed RW Extension and Terminal		
PROJECT NO.	63201	ROUTE	
CALCULATED BY	JEC	DATE	04/10/24
CHECKED BY	RMF	DATE	12/19/24
		SHEET	2 OF 2

7 Variable USGS Regression Equation Method - Existing Conditions
Tuttle Brook-Morris Creek at Tide Gate

NOAA Atlas 14 Precipitation Frequency: 24 Hour Duration (Station ID: 06-5273)

P2 = 3.42 in R2 = 1.58 in
P10 = 5.22 in
P25 = 6.34 in
P50 = 7.17 in
P100 = 8.07 in
P500 = 10.8 in

A = Watershed Area

A = 4.12 sq miles

Percentage of Drainage Area Classified as HSG C, C/D, and D

SoilCorD = 0.36

IA = Percent Impervious Surface Area

IA = 58 %

SL = Main Channel Slope

Elevation @ 10% of Main Channel Length = -1 ft
Elevation @ 85% of Main Channel Length = 17 ft
Length of Channel = 4 mi
SL = 4 ft/mi

ST = Drainage-basin Storage

ST = 0.6 %

BDF = Basin Development Factor

	Channel Modifications	Channel Lining	Storm Sewers	Curb and Gutter
Upper Third of Drainage Area	1	0	0	0
Middle Third of Drainage Area	1	1	1	1
Lower Third of Drainage Area	1	1	1	1

BDF = 9

Regression Equations for Nonurban (Rural) Basins in CT (Equations from SIR 2020-5054)

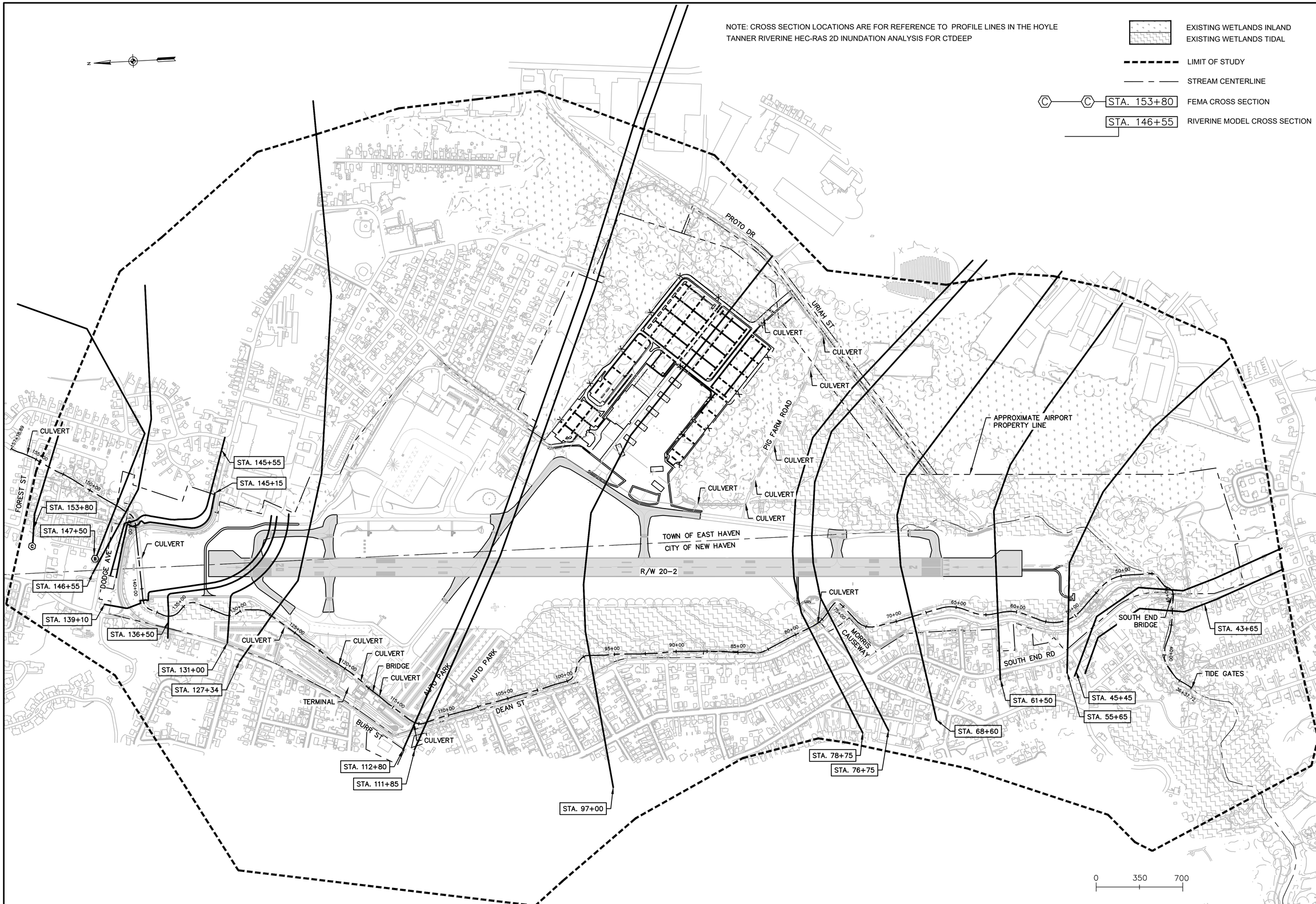
RQ2 = $10^{-1.015}*(A^{0.819})*10^{(0.618*P2)}*10^{(0.586*(SoilCorD+1))}$ = 251 cfs
RQ10 = $10^{-0.775}*(A^{0.795})*10^{(0.426*P10)}*10^{(0.470*(SoilCorD+1))}$ = 378 cfs
RQ25 = $10^{-0.432}*(A^{0.790})*10^{(0.322*P25)}*10^{(0.442*(SoilCorD+1))}$ = 498 cfs
RQ50 = $10^{-0.255}*(A^{0.789})*10^{(0.274*P50)}*10^{(0.426*(SoilCorD+1))}$ = 595 cfs
RQ100 = $10^{-0.104}*(A^{0.789})*10^{(0.238*P100)}*10^{(0.413*(SoilCorD+1))}$ = 731 cfs
RQ500 = $10^{0.74}*(A^{0.784})*10^{(0.120*P500)}*10^{(0.37*(SoilCorD+1))}$ = 1052 cfs

Regression Equations for Urban Basins in CT: 7 Variables (Equations from SIR 2004-5160)

UQ2 = $2.35(A)^{0.41}(SL)^{0.17}(R2+3)^{2.04}(ST+8)^{-0.65}(13-BDF)^{-0.32}(IA)^{0.15}(RQ2)^{0.47}$ = 468.48 cfs
UQ10 = $2.99(A)^{0.32}(SL)^{0.15}(R2+3)^{1.75}(ST+8)^{-0.57}(13-BDF)^{-0.30}(IA)^{0.09}(RQ10)^{0.58}$ = 730.5 cfs
UQ25 = $2.78(A)^{0.31}(SL)^{0.15}(R2+3)^{1.76}(ST+8)^{-0.55}(13-BDF)^{-0.29}(IA)^{0.07}(RQ25)^{0.60}$ = 881.46 cfs
UQ50 = $2.67(A)^{0.29}(SL)^{0.15}(R2+3)^{1.74}(ST+8)^{-0.53}(13-BDF)^{-0.28}(IA)^{0.06}(RQ50)^{0.62}$ = 1026.5 cfs
UQ100 = $2.50(A)^{0.29}(SL)^{0.15}(R2+3)^{1.76}(ST+8)^{-0.52}(13-BDF)^{-0.28}(IA)^{0.06}(RQ100)^{0.63}$ = 1228.7 cfs
UQ500 = $2.27(A)^{0.29}(SL)^{0.16}(R2+3)^{1.86}(ST+8)^{-0.54}(13-BDF)^{-0.27}(IA)^{0.05}(RQ500)^{0.63}$ = 1749.4 cfs

Appendix I: CTDEEP Riverine Model Cross Section Map, Summary Tables, and Inundation Maps

- Cross Section Map
- 2-, 10-, 25-, and 50-year Summary Tables
- 2-year Inundation Map
- 10-year Inundation Map
- 25-year Inundation Map
- 50-year Inundation Map
- 100-year Inundation Map



ENGINEER'S SEAL

PROJECT DESIGNER

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DATE: DECEMBER, 2024

DESIGNED BY NEG | DRAWN BY JLC | CHECKED BY RMF

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND DRAINAGE DESIGN

RIVERINE MODEL CROSS SECTION MAP

REVISIONS

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			NEG

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Summary Tables for the 2-, 10-, 25-, and 50-year Inundation Results from the CTDEEP Riverine 2D HEC-RAS Model. Only impacts outside of airport property are noted.

NAVD88	2 Year Storm Event			Notes
River Station	Max Pre-Project WSE (ft, NAVD88)	Max Post-Project WSE (ft, NAVD88)	Change in WSE (ft, NAVD88)	
153+80 (C)	7.73	7.72	0.0	
147+50 (B)	7.16	7.15	-0.1	
127+35	6.67	6.65	-0.1	
112+80	5.35	5.34	0.1	Encroachment limits similar to existing conditions for existing structures of nearby suburbs but no change to FEMA 100-year regulatory limits.
111+85	5.29	5.30	0.0	Localized increase in Alfred St-Nelson St neighborhood. Potential for increased encroachment of existing structures per CT GIS and aerial imagery but no change to FEMA 100-year regulatory limits.
97+00	4.87	4.94	0.0	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
78+75	4.86	4.93	0.0	Localized WSE increase in the area of Kirkham St-Concord St-Townsend Avenue. Potential for increased encroachment of existing structures per CT GIS and aerial imagery but no change to FEMA 100-year regulatory limits.
76+75	4.86	4.93	0.0	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
68+60	4.86	4.91	0.0	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
61+50	4.84	4.90	0.1	WSE increase in existing wetland area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
55+65	4.84	4.89	0.1	WSE increase in existing wetland area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
45+45	4.84	4.88	0.1	WSE increase contained within airport property. No change to FEMA 100-year regulatory limits.
43+65	4.72	4.77	0.1	WSE increase near Morris Creek. Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.

NAVD88	10 Year Storm Event			Notes
River Station	Max Pre-Project WSE (ft, NAVD88)	Max Post-Project WSE (ft, NAVD88)	Change in WSE (ft, NAVD88)	
153+80 (C)	8.54	8.53	0.0	
147+50 (B)	7.97	7.96	0.0	
127+35	7.11	7.08	0.0	
112+80	5.69	5.81	0.1	Encroachment limits similar to existing conditions for existing structures of nearby suburbs but no change to FEMA 100-year regulatory limits.
111+85	5.69	5.81	0.1	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
97+00	5.65	5.77	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
78+75	5.65	5.75	0.0	Localized WSE increase in existing wetland area. Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
76+75	5.65	5.74	0.0	Localized WSE increase in existing wetland area. Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
68+60	5.65	5.74	0.0	Localized WSE increase in existing wetland area. Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
61+50	5.65	5.74	0.1	Localized WSE increase in existing wetland area. Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
55+65	5.65	5.74	0.1	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
45+45	5.64	5.73	0.1	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
43+65	5.55	5.64	0.1	WSE increase near Morris Creek. Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.

NAVD88	25 Year Storm Event			Notes
River Station	Max Pre-Project WSE (ft, NAVD88)	Max Post-Project WSE (ft, NAVD88)	Change in WSE (ft, NAVD88)	
153+80 (C)	8.90	8.89	0.0	
147+50 (B)	8.38	8.36	0.0	
127+35	7.30	7.27	0.0	
112+80	6.10	6.15	0.1	Encroachment limits similar to existing conditions for existing structures of nearby suburbs but no change to FEMA 100-year regulatory limits.
111+85	6.05	6.15	0.1	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
97+00	6.03	6.13	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
78+75	6.03	6.13	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
76+75	6.03	6.13	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
68+60	6.03	6.12	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
61+50	6.03	6.12	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
55+65	6.02	6.12	0.1	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
45+45	6.02	6.12	0.1	WSE increase contained within airport property. No change to FEMA 100-year regulatory limits.
43+65	5.93	6.03	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.

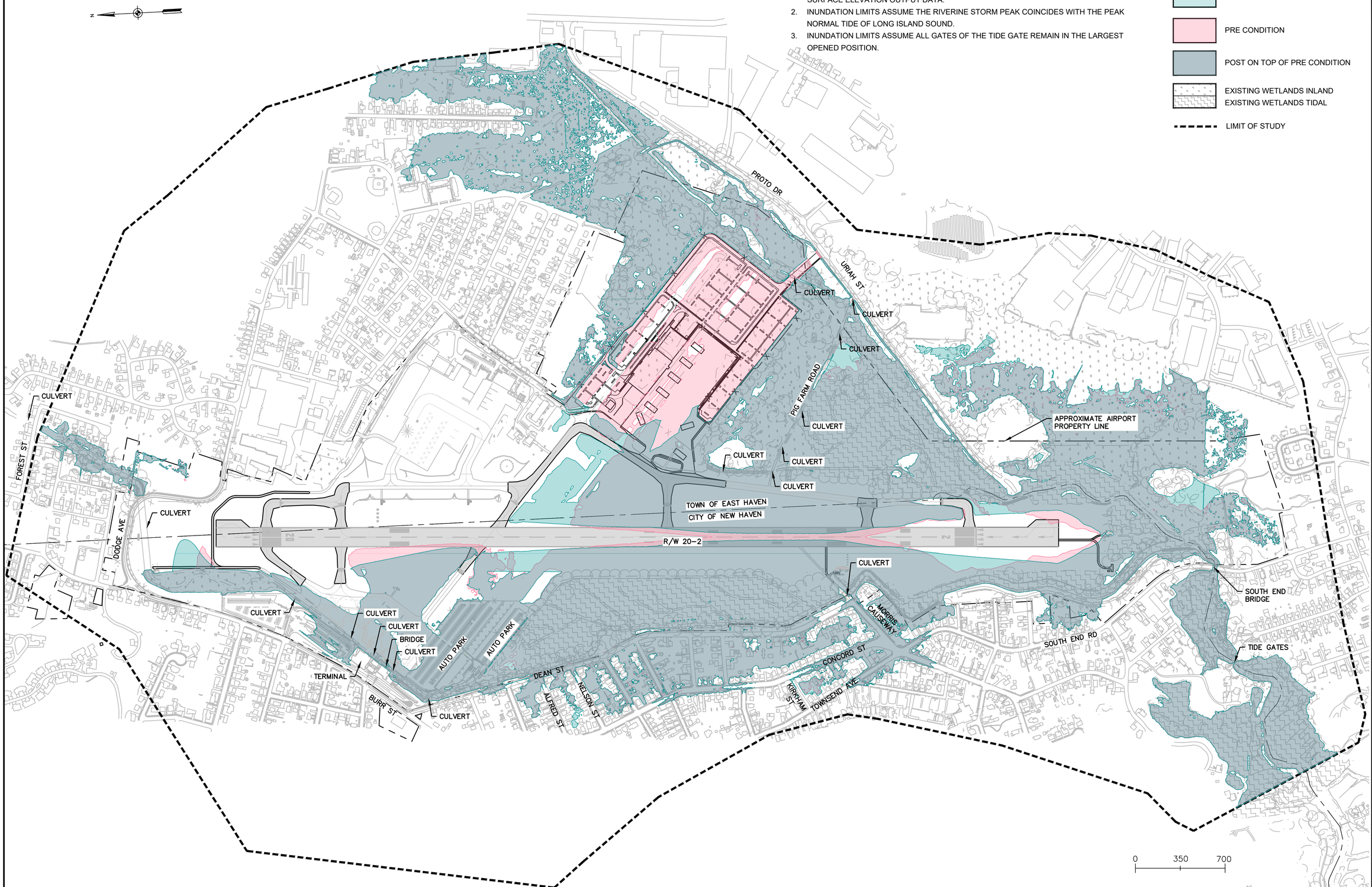
NAVD88	50 Year Storm Event			Notes
River Station	Max Pre-Project WSE (ft, NAVD88)	Max Post-Project WSE (ft, NAVD88)	Change in WSE (ft, NAVD88)	
153+80 (C)	9.19	9.19	0.0	
147+50 (B)	8.70	8.69	0.0	
127+35	7.47	7.43	0.0	
112+80	6.35	6.48	0.1	Encroachment limits similar to existing conditions for existing structures of nearby suburbs but no change to FEMA 100-year regulatory limits.
111+85	6.35	6.47	0.2	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
97+00	6.34	6.47	0.2	Encroachment limits similar to existing conditions for existing structures of nearby suburbs but no change to FEMA 100-year regulatory limits.
78+75	6.34	6.46	0.2	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
76+75	6.34	6.46	0.2	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
68+60	6.34	6.46	0.2	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
61+50	6.34	6.46	0.2	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.
55+65	6.34	6.46	0.2	WSE increase in existing wetland/forested area. No encroachment of existing structures per CT GIS or aerial imagery. No change to FEMA 100-year regulatory limits.
45+45	6.33	6.46	0.2	WSE increase contained within airport property. No change to FEMA 100-year regulatory limits.
43+65	6.26	6.38	0.1	Encroachment limits similar to existing conditions for existing structures but no change to FEMA 100-year regulatory limits.

NOTES:

1. INUNDATION LIMITS TAKEN FROM HOYLE, TANNER HEC-RAS 2D MODEL MAXIMUM WATER SURFACE ELEVATION OUTPUT DATA.
2. INUNDATION LIMITS ASSUME THE RIVERINE STORM PEAK COINCIDES WITH THE PEAK NORMAL TIDE OF LONG ISLAND SOUND.
3. INUNDATION LIMITS ASSUME ALL GATES OF THE TIDE GATE REMAIN IN THE LARGEST OPENED POSITION.

LEGEND

- POST CONDITION
- PRE CONDITION
- POST ON TOP OF PRE CONDITION
- EXISTING WETLANDS INLAND
- EXISTING WETLANDS TIDAL
- LIMIT OF STUDY



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DESIGNED BY JEC | DRAWN BY JLC | CHECKED BY RMF

DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

2 YEAR PRE/POST CONDITIONS WATER SURFACE INUNDATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

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1 OF 5

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NOTES:

1. INUNDATION LIMITS TAKEN FROM HOYLE, TANNER HEC-RAS 2D MODEL MAXIMUM WATER SURFACE ELEVATION OUTPUT DATA.
2. INUNDATION LIMITS ASSUME THE RIVERINE STORM PEAK COINCIDES WITH THE PEAK NORMAL TIDE OF LONG ISLAND SOUND.
3. INUNDATION LIMITS ASSUME ALL GATES OF THE TIDE GATE REMAIN IN THE LARGEST OPENED POSITION.

LEGEND

- POST CONDITION
- PRE CONDITION
- POST ON TOP OF PRE CONDITION
- EXISTING WETLANDS INLAND
  EXISTING WETLANDS TIDAL
- LIMIT OF STUDY

PROTO DR
URIAH ST
PIG FARM ROAD
APPROXIMATE AIRPORT PROPERTY LINE
TOWN OF EAST HAVEN
CITY OF NEW HAVEN
R/W 20-2
FOREST ST
DODGE AVE
TERMINAL
BURR ST
AUTO PARK
AUTO PARK
DEAN ST
ALFRED ST
NELSON ST
CONCORD ST
KIRKHAM ST
TOWNSEND AVE
MORRIS CAUSEWAY
SOUTH END RD
SOUTH END BRIDGE
TIDE GATES
CULVERT
BRIDGE

0 350 700

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www.hoyletanner.com

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DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

10 YEAR PRE/POST CONDITIONS
WATER SURFACE INUNDATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
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AIP: 3-09-0013-0XX-2025

DRAWING NO.

IN-2

2 OF 5

NOTES:

1. INUNDATION LIMITS TAKEN FROM HOYLE, TANNER HEC-RAS 2D MODEL MAXIMUM WATER SURFACE ELEVATION OUTPUT DATA.
2. INUNDATION LIMITS ASSUME THE RIVERINE STORM PEAK COINCIDES WITH THE PEAK NORMAL TIDE OF LONG ISLAND SOUND.
3. INUNDATION LIMITS ASSUME ALL GATES OF THE TIDE GATE REMAIN IN THE LARGEST OPENED POSITION.

LEGEND

- POST CONDITION
- PRE CONDITION
- POST ON TOP OF PRE CONDITION
- EXISTING WETLANDS INLAND
  EXISTING WETLANDS TIDAL
- LIMIT OF STUDY

N

PROTO DR
URIAH ST
CULVERT
PIG FARM ROAD
APPROXIMATE AIRPORT PROPERTY LINE
FOREST ST
DODGE AVE
TOWN OF EAST HAVEN
CITY OF NEW HAVEN
R/W 20-2
SOUTH END BRIDGE
MORRIS CAUSEWAY
SOUTH END RD
TIDE GATES
AUTO PARK
BRIDGE
TERMINAL
BURR ST
DEAN ST
ALFRED ST
NELSON ST
CONCORD ST
KIRKHAM ST
TOWNSEND AVE

0 350 700

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HOYLE TANNER

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CHECKED BY: RMF
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

25 YEAR PRE/POST CONDITIONS WATER SURFACE INUNDATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
			NEG

PROJ. No.: 22.063201.00

AIP: 3-09-0013-0XX-2025

DRAWING NO.

IN-3

3 OF 5

NOTES:

1. INUNDATION LIMITS TAKEN FROM HOYLE, TANNER HEC-RAS 2D MODEL MAXIMUM WATER SURFACE ELEVATION OUTPUT DATA.
2. INUNDATION LIMITS ASSUME THE RIVERINE STORM PEAK COINCIDES WITH THE PEAK NORMAL TIDE OF LONG ISLAND SOUND.
3. INUNDATION LIMITS ASSUME ALL GATES OF THE TIDE GATE REMAIN IN THE LARGEST OPENED POSITION.

LEGEND

- POST CONDITION
- PRE CONDITION
- POST ON TOP OF PRE CONDITION
- EXISTING WETLANDS INLAND
  EXISTING WETLANDS TIDAL
- LIMIT OF STUDY

PROTO DR
URIAH ST
CULVERT
PIG FARM ROAD
APPROXIMATE AIRPORT PROPERTY LINE
FOREST ST
DODGE AVE
TOWN OF EAST HAVEN
CITY OF NEW HAVEN
R/W 20-2
BRIDGE
AUTO PARK
TERMINAL
BURR ST
DEAN ST
ALFRED ST
NELSON ST
CONCORD ST
KIRKHAM ST
TOWNSEND AVE
MORRIS CAUSEWAY
SOUTH END RD
SOUTH END BRIDGE
TIDE GATES

0 350 700

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DESIGNED BY: JEC
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

50 YEAR PRE/POST CONDITIONS WATER SURFACE INUNDATION

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4 OF 5

NOTE: 100-YEAR FLOODPLAIN BOUNDARY REFLECTS THE CURRENTLY EFFECTIVE FEMA BOUNDARY (EFFECTIVE JANUARY 10, 2025) WHICH INCLUDES BOTH RIVERINE AND COASTAL MODELING RESULTS

LEGEND

- POST CONDITION
- PRE CONDITION
- POST ON TOP OF PRE CONDITION
- EXISTING WETLANDS INLAND
- EXISTING WETLANDS TIDAL
- LIMIT OF STUDY

PROTO DR
URIAH ST
CULVERT
PIG FARM ROAD
APPROXIMATE AIRPORT PROPERTY LINE
FOREST ST
DODGE AVE
TOWN OF EAST HAVEN
CITY OF NEW HAVEN
R/W 20-2
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TERMINAL
BURR ST
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NELSON ST
CONCORD ST
KIRKHAM ST
TOWNSEND AVE

0 350 700

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DESIGNED BY: JEC
DRAWN BY: JLC
CHECKED BY: RMF
DATE: APRIL, 2025

TWEED NEW HAVEN REGIONAL AIRPORT
RUNWAY EXTENSION AND TERMINAL EXPANSION

100 YEAR PRE/POST CONDITIONS WATER SURFACE INUNDATION

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
			NEG

PROJ. No: 22.063201.00
AIP: 3-09-0013-0XX-2025

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5 OF 5

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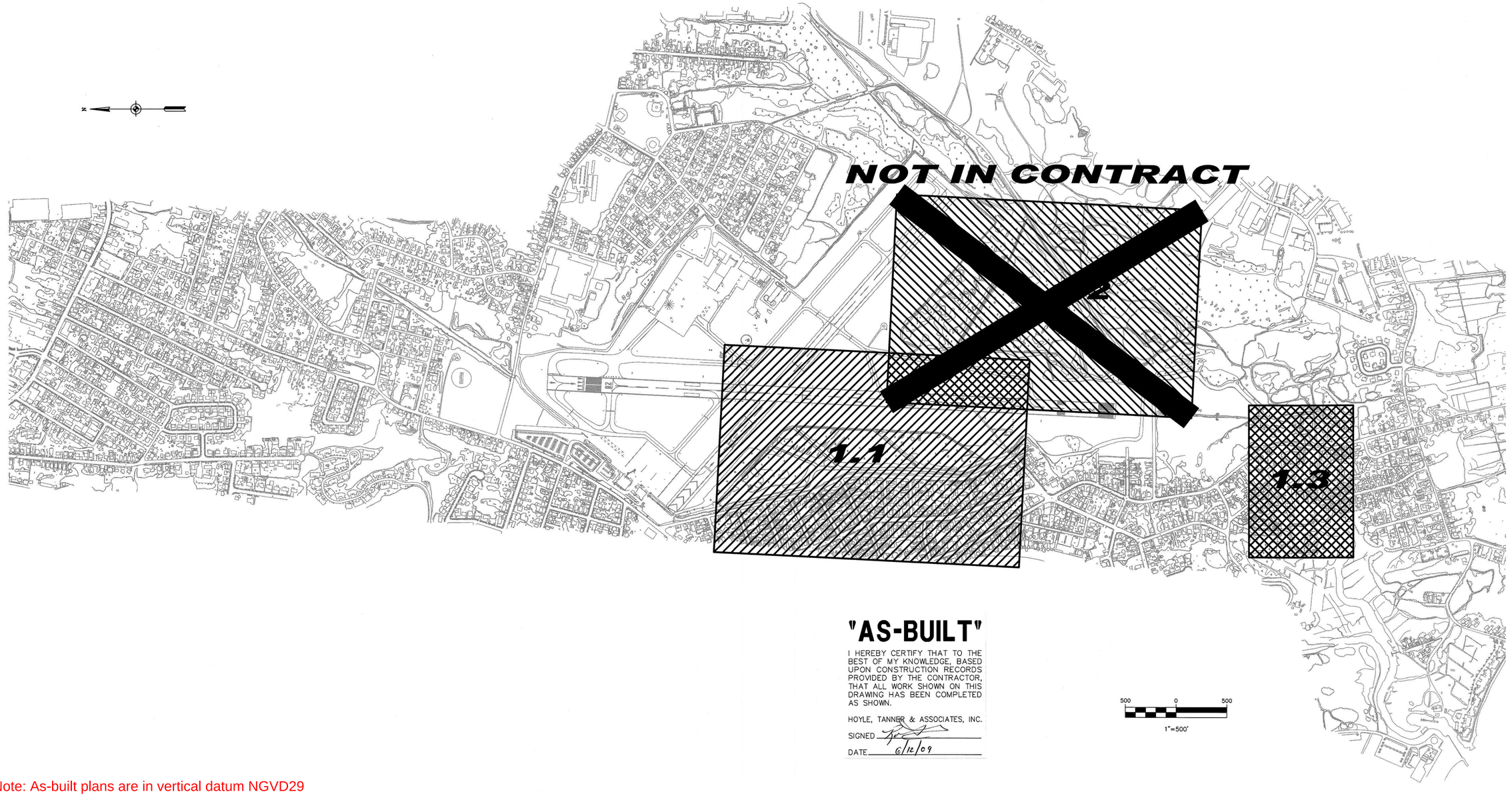
Appendix J: Tide Gate As-builts

WETLAND MITIGATION AND TIDE GATE IMPROVMENTS



"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE 6/12/09

Note: As-built plans are in vertical datum NGVD29

ENGINEER'S SEAL

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DESIGNED BY TJA | DRAWN BY DDS | CHECKED BY RMF

TWEED – NEW HAVEN REGIONAL AIRPORT
SAFETY IMPROVEMENTS

WETLAND MITIGATION AND TIDE GATE IMPROVEMENTS
KEY MAP

SCALE: 1"=500' | DATE: AUGUST, 2007

REVISIONS

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1	03/01/2009	AS BUILTS	DDS

DO NOT SCALE DRAWING

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AIP No.: 3-09-0013-32

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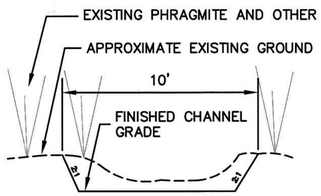
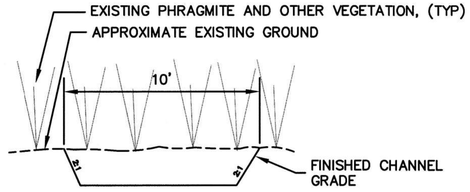
SHEET 83 OF 99



EXISTING CHANNEL REPAIR DETAIL, NTS

NOTE: SEE CONTRACT GENERAL NOTES FOR CONSTRUCTION MEANS AND METHODS DETAILS



NEW CHANNEL REPAIR DETAIL, NTS

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CHANNEL 4	40+00	657621.4679	961297.1037
	41+00	657530.7495	961337.5148
	42+00	657445.7755	961390.1503
	43+00	657352.7598	961426.0500
	44+00	657265.4967	961472.8524
	45+00	657171.6596	961504.3461
CHANNEL 4A	46+00	657556.8268	961470.8561
	47+00	657457.3037	961469.4418
	48+00	657366.1259	961428.9892

	STATION	NORTHING	EASTING
CHANNEL 5	50+00	656861.0616	961782.1887
	51+00	656830.5785	961690.5330
	52+00	656742.2779	961645.9028
	53+00	656663.8027	961584.1910
	54+00	656577.7008	961534.5213
	55+00	656480.3537	961516.0399
	56+00	656386.0147	961545.2462
	57+00	656288.5785	961563.1270
	58+00	656189.3997	961551.1697
CHANNEL 5A	59+00	656598.9481	961693.3629
	60+00	656548.7138	961609.6667
	61+00	656476.9724	961542.7176

	STATION	NORTHING	EASTING
CHANNEL 6	62+00	656141.4460	961733.3118
	63+00	656055.5692	961684.4815
	64+00	655976.8358	961623.4392
	65+00	655880.4390	961601.1213
	66+00	655780.7467	961600.5749
	67+00	655690.0753	961560.3160
	68+00	655602.5576	961512.5206

HVN-F
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HVN F 1999
NAD 83, CT83F
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GRID E: 961802.7487
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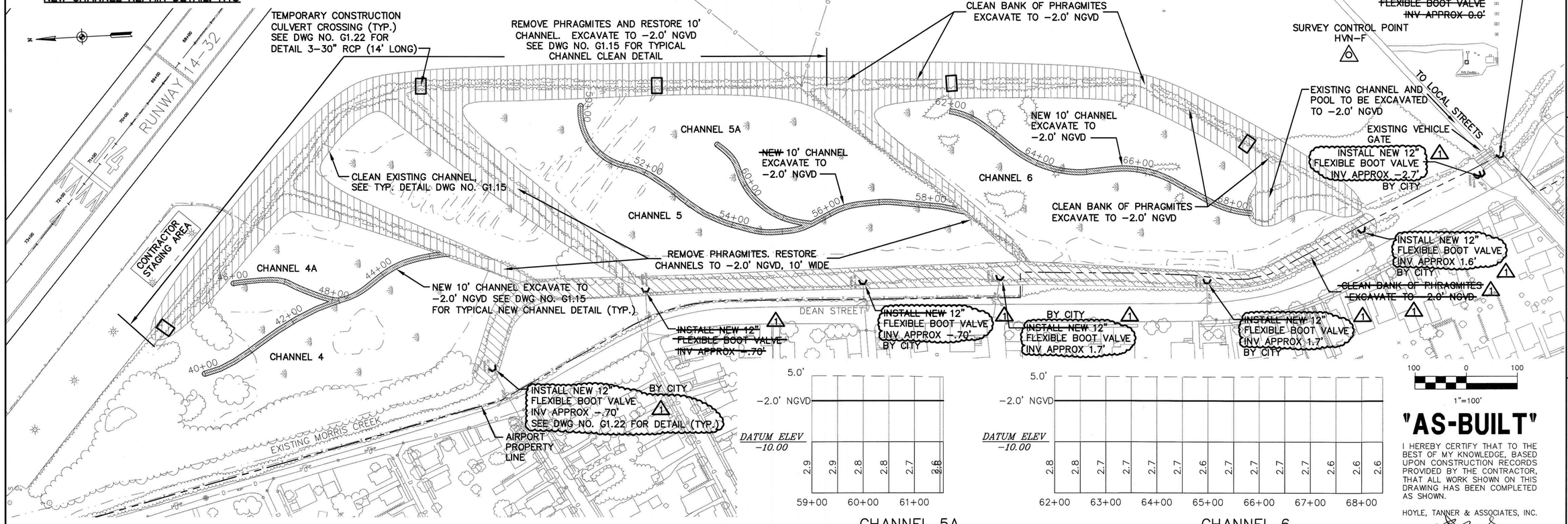


CHANNEL 5A

CHANNEL 6

100 0 100
1"=100'

"AS-BUILT"

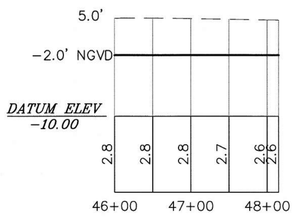
I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

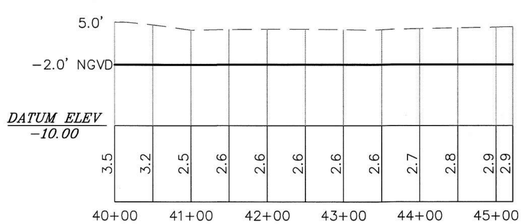
SIGNED _____

DATE 6/12/09

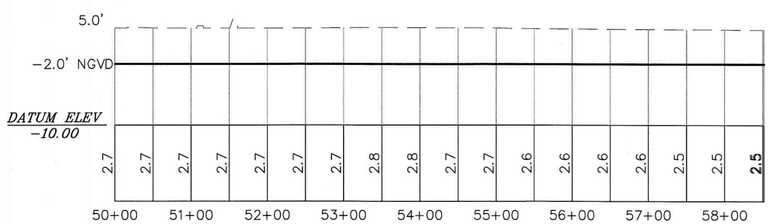
PROFILE SCALE
V – 1"=10'
H – 1"=100'



CHANNEL 4A



CHANNEL 4



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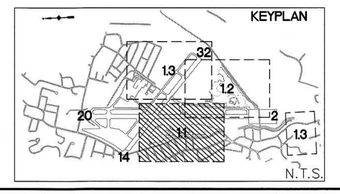

ENGINEER'S SEAL

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101-1227
Tel 603-669-5555
Fax 603-669-4168
Web Page: www.hoyletanner.com
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DESIGNED BY WSW | DRAWN BY SLS | CHECKED BY RMF

TWEED – NEW HAVEN REGIONAL AIRPORT
SAFETY IMPROVEMENTS

DEAN STREET MITIGATION AREA
NEW TIDAL CHANNELS
GEOMETRY PLAN & PROFILES

DATE: AUGUST, 2007
SCALE: AS SHOWN

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

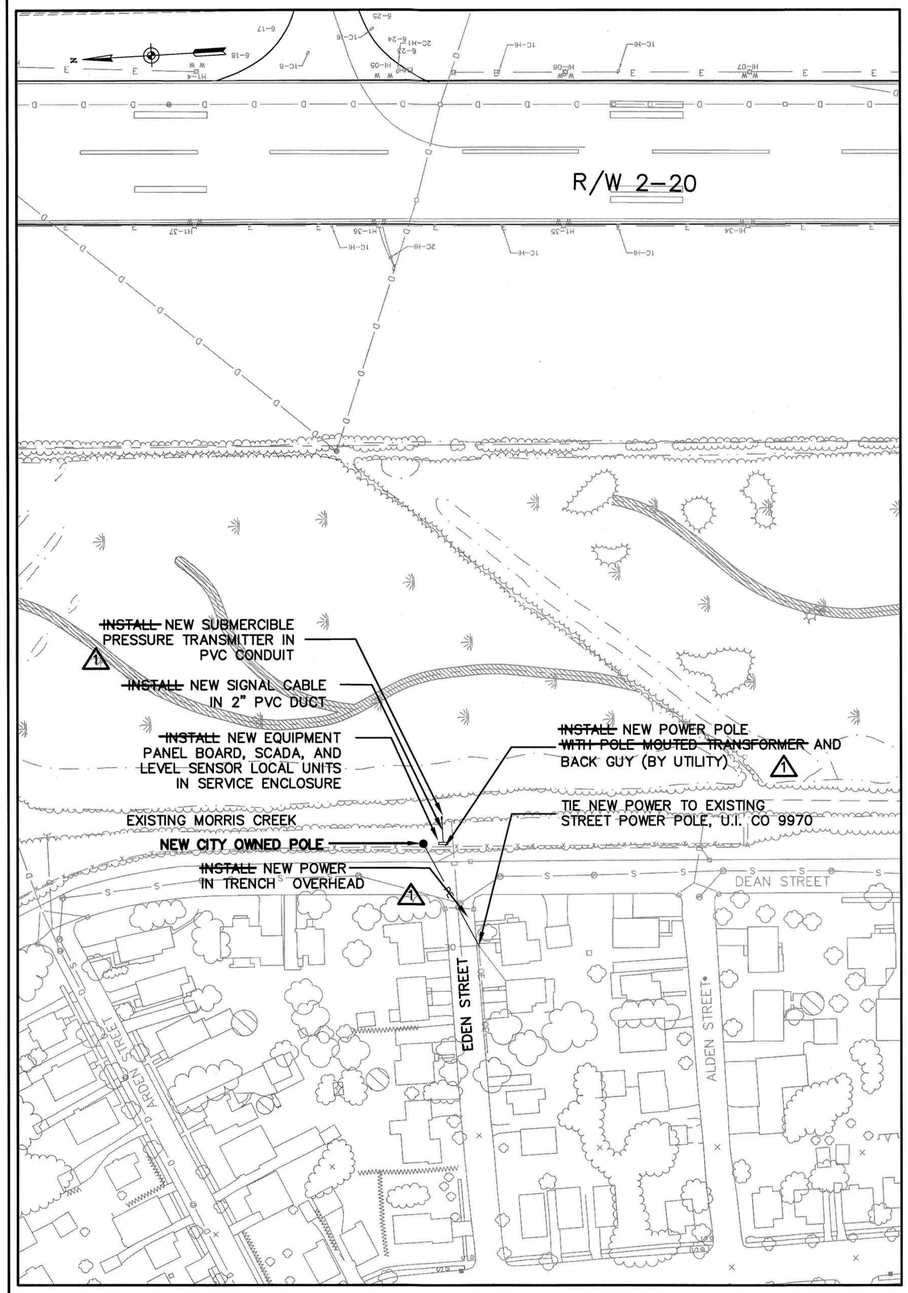
DO NOT SCALE DRAWING

PROJ. No.: 063212
FILE NAME: WET-GE101
AIP No.: 3-09-0013-32

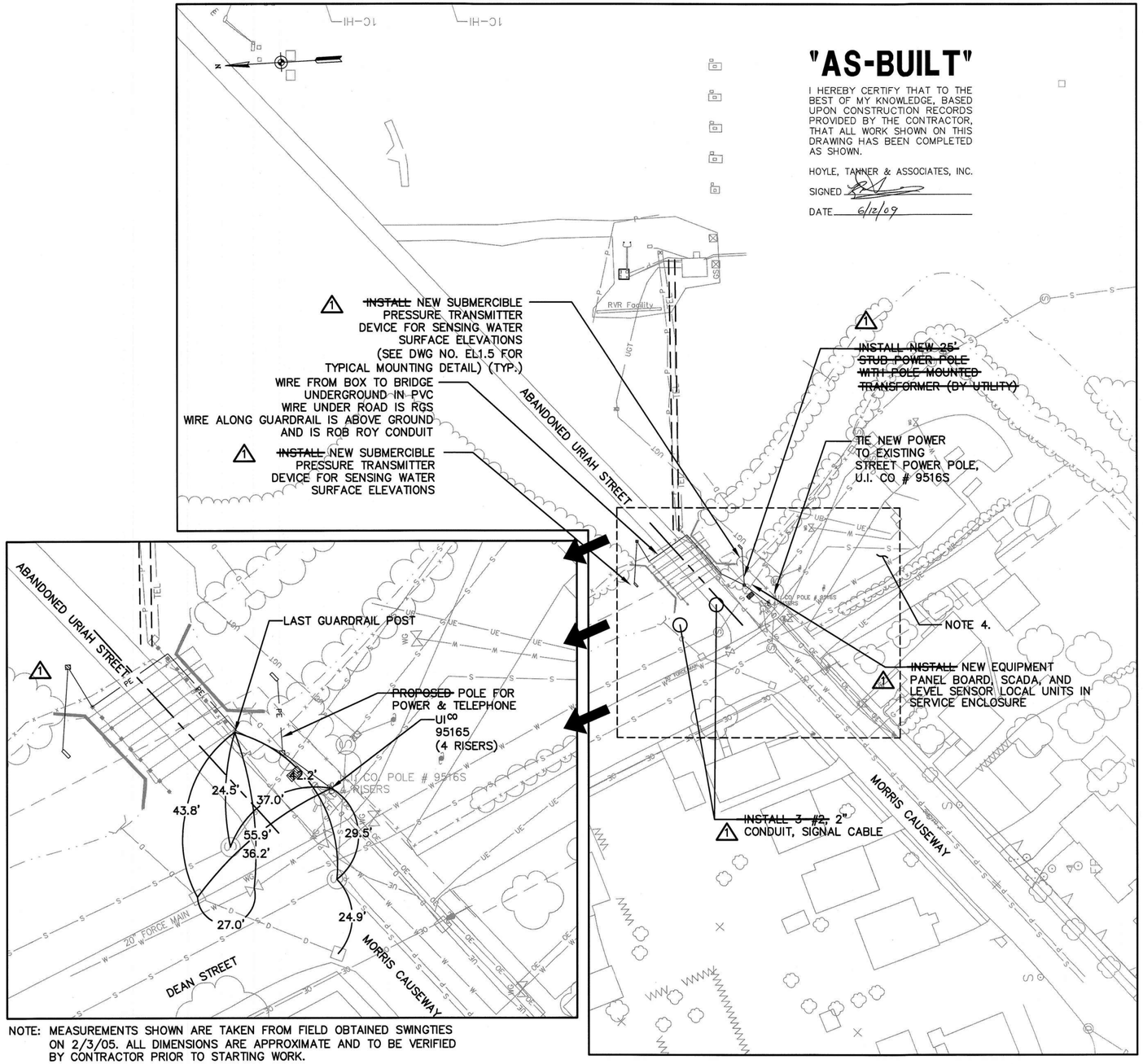
DRAWING NO.
GE1.1

SHEET 84 OF 99

FILE: WHG-GE101.dwg PLOT DATE: Jun 12, 2009 - 4:23pm SAVED BY: rdes



EDEN STREET LOCATION
ES-DS SCADA SITE
SCALE: 1" = 80'



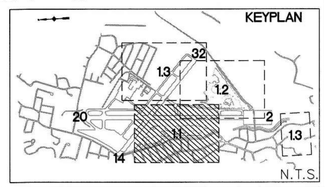
NOTE: MEASUREMENTS SHOWN ARE TAKEN FROM FIELD OBTAINED SWINGTIES ON 2/3/05. ALL DIMENSIONS ARE APPROXIMATE AND TO BE VERIFIED BY CONTRACTOR PRIOR TO STARTING WORK.

MORRIS CAUSEWAY CULVERT DETAIL
MCS SCADA SITE
SCALE: 1" = 20'

MORRIS CAUSEWAY LOCATION
MCS SCADA SITE
SCALE: 1" = 40'

NOTES:
1. CONTRACTOR SHALL INSTALL 1 WATER SURFACE ELEVATION SENSOR AT EDEN ST LOCATION, AND (2) AT DEAN ST/MORRIS CAUSEWAY LOCATION.
2. EACH SENSOR SHALL TRANSMIT A TELEPHONE SIGNAL DIRECTLY TO TIDE GATE LOCATION, AND TO COMPUTER SCADA SYSTEM AT AIRPORT OPERATION OFFICE. CONTRACTOR SHALL COORDINATE WITH SBC TELEPHONE COMPANY TO OBTAIN A DEDICATED PHONE LINE TO SERVICE THIS SYSTEM.
3. UNITED ILLUMINATING HAS DESIGNATED THE MORRIS CAUSEWAY/DEAN ST LOCATION WITH ADDRESS OF 1237 DEAN ST. CONTRATOR TO USE THIS ADDRESS WHEN REQUESTING COORDINATION ON NEW STUB POWER POLES AT EACH LOCATION.

4. SEWAGE PUMP STATION AREA HAS BEEN CHANGED/IMPROVED SINCE CREATION OF THIS EXISTING LAYOUT PLAN.

KEYPLAN


ENGINEER'S SEAL

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Tel 603-669-5555
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Web Page: www.hoyletanner.com
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DESIGNED BY TJA | DRAWN BY DDS | CHECKED BY RMF

TWEED - NEW HAVEN REGIONAL AIRPORT
SAFETY IMPROVEMENTS

DEAN STREET MITIGATION AREA
ELECTRICAL PLAN

DATE: AUGUST, 2007
SCALE: AS NOTED

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

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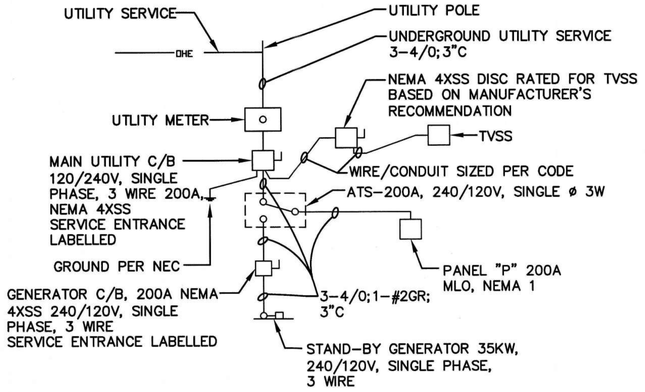
PROJ. No.: 063212
FILE NAME: WET-EL101
AIP No.: 3-09-0013-32

DRAWING NO.
EL1.1

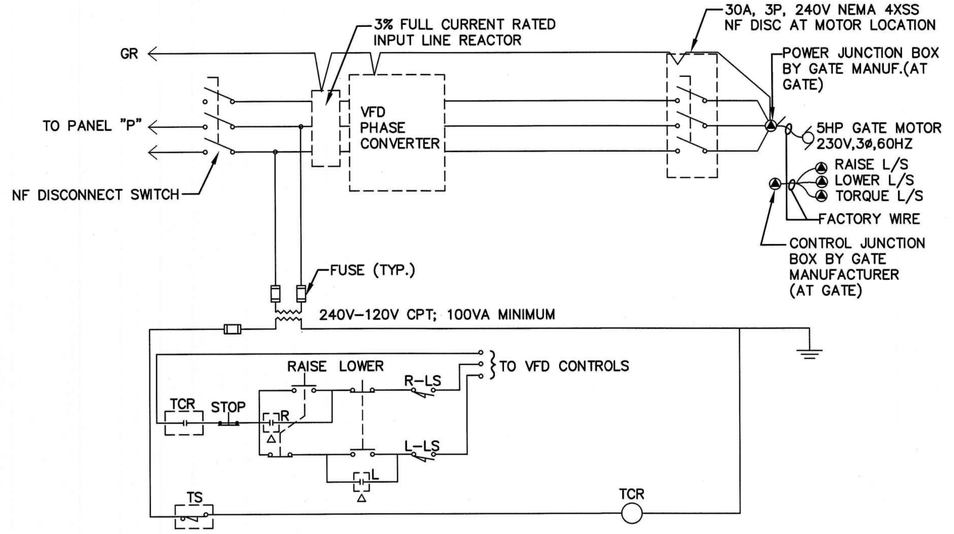
SHEET 86 OF 99

FILE: WET-EL101.dwg PLOT DATE: Jun 12, 2009 - 4:45pm SAVED BY: mdix



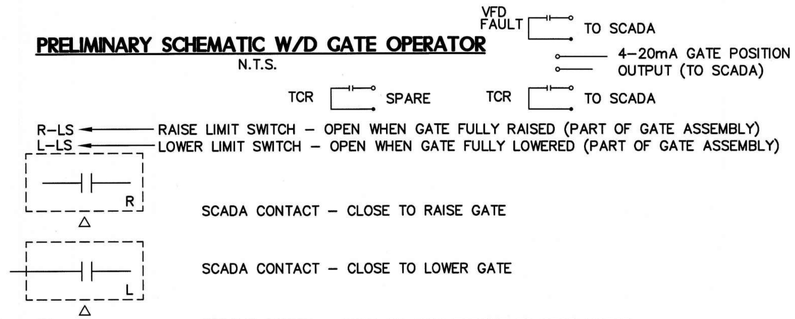
POWER ONE-LINE DIAGRAM - GATE LOCATION, (TGS)

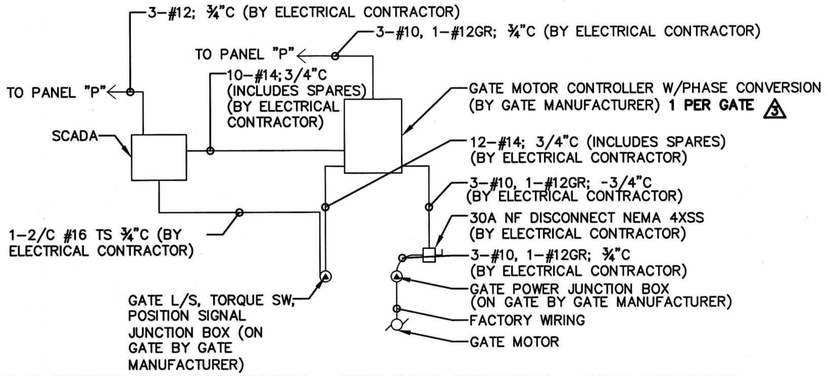
N.T.S.



PRELIMINARY SCHEMATIC W/D GATE OPERATOR

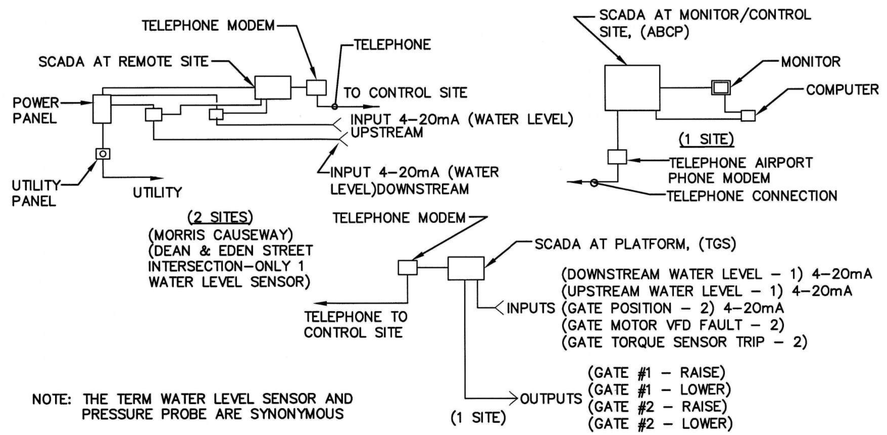
N.T.S.





TYPICAL INTERCONNECTIONS: SCADA - TIDE GATE CONTROLS - GATE LOCATION

(TYP. FOR 2)
N.T.S.



SCADA SYSTEM WITH TELEPHONE LINK COMMUNICATIONS - TYPICAL INTERCONNECTIONS

N.T.S.

PANEL "P" DIAGRAM

DIRECTORY	KVA LOAD A	KVA LOAD B	AVG. SIZE	CKT#	POLES	BRKR	A	B	BRKR	POLES	CKT#	AVG. SIZE	KVA LOAD A	KVA LOAD B	DIRECTORY
	3.4			1							2		3.4		
GATE #1 (5 HP)		3.4	6	3	2	60			60	2	4	6		3.4	GATE #2 (5 HP)
EQUIP. ENCLOSURE RECEPTICLES	1.0		12	5	1	20			20	1	6	12	.4		LEVEL INSTRUMENTATION
GENERATOR BLOCK HEATER *		1.5	12	7	1	20			15	1	8	12		.4	GENERATOR BATTERY CHARGER *
SERVICE RECEPTACLE ENCLOSURE	1.5		12	9	1	20			20	1	10	12	.5		ENCLOSURE HVAC
SCADA/RADIO		1.5	12	11	1	20			15	1	12	12		.2	LIGHTS - ENCLOSURE
EQUIP. ENCLOSURE HVAC	1.5		10	13	2	20			20	1	14				SPARE
		1.5		15		20			20	1	16				SPARE
SPARE				17	1	20					18				SPACE
SPACE				19							20				SPACE
SPACE				21							22				SPACE
SPACE				23							24				SPACE
SPACE				25							26				SPACE
SPACE				27							28				SPACE
SUB-TOTAL							NEUTRAL BUS / GROUND BUS								SUB-TOTAL (BASE BID ONLY)
VOLTAGE:	120/240V, SINGLE ph, 3W, 60 HZ														
MAIN BREAKER:	MLO - 200A														PANEL: P
MOUNTING:	SURFACE														
SC RATING:	22,000 AIC SYMMETRICAL						TOTAL KVA = 23.6								LOCATION: SERVICE PLATFORM AT GATE LOCATION
NOTES:	*PROVIDE WITH HANDLE LOCKS														FEEDER: 3-4/0; 1-#2GR; 3"C
	*PROVIDE SURGE ARRESTORS BUILT INTO PANELBOARD														

"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE 6/12/09

ENGINEER'S SEAL

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Web Page: www.hoyletanner.com
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DESIGNED BY TJA | DRAWN BY JDG | CHECKED BY RMF

TWEED - NEW HAVEN REGIONAL AIRPORT SAFETY IMPROVEMENTS

ELECTRICAL DETAILS

DATE: AUGUST, 2007

SCALE: 1"=50'

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

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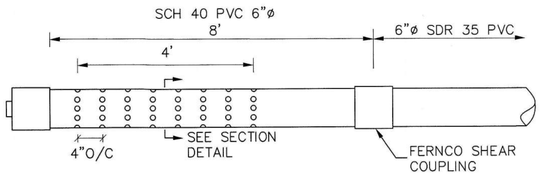
PROJ. No.: 063212
FILE NAME: WET-EL104
AIP No.: 3-09-0013-32

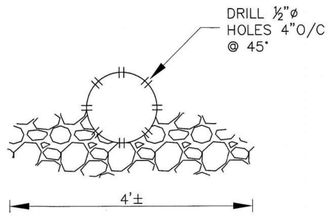
DRAWING NO.
EL1.4

SHEET 88 OF 99

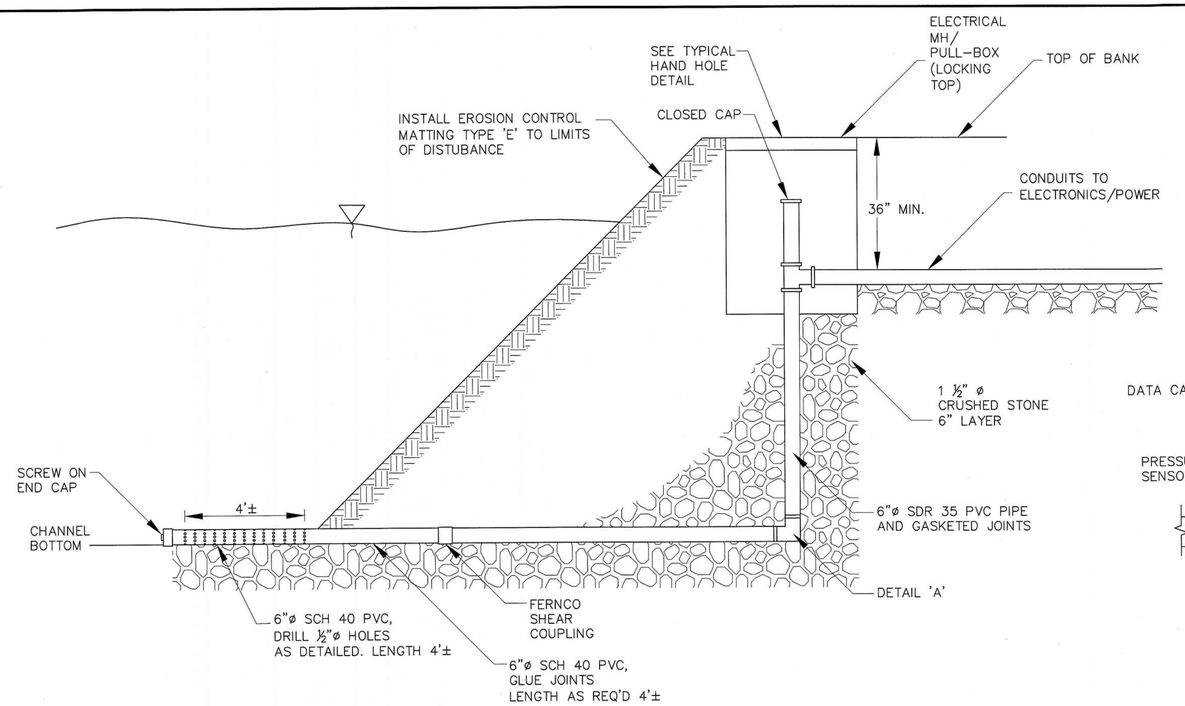
FILE: WET-EL104.dwg PLOT DATE: Jun 12, 2009 - 1:30pm SAVED BY: --dds



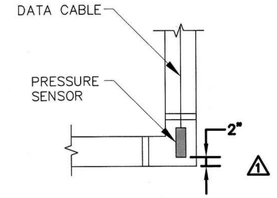
PRESSURE PROBE SCREEN OUTLET DETAIL
N.T.S.



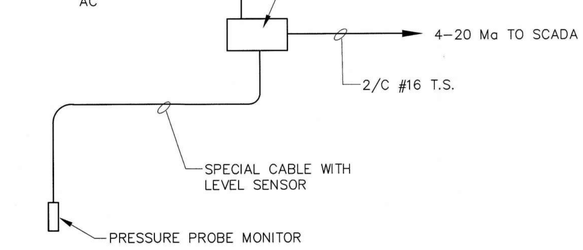
SECTION–SCREENED OUTLET DETAIL
N.T.S.



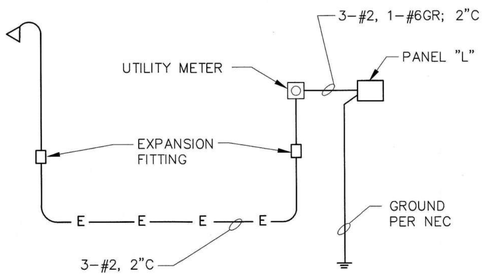
PRESSURE PROBE MONITOR STATION AT MORRIS CAUSEWAY, EDEN ST, AND TIDE GATE, (MCS, ES–DS, TGS)
N.T.S.



DETAIL 'A'
N.T.S.

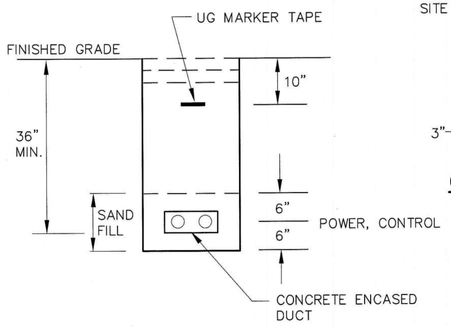


TYPICAL LEVEL SENSOR INTERCONNECTION DIAGRAM
N.T.S.

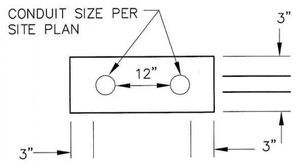


POWER ONE–LINE DIAGRAM
N.T.S.

MORRIS CAUSEWAY, DEAN/EDEN ST. INTERSECTION



DITCH DETAIL
N.T.S.



CONCRETE ENCASED CONDUIT DETAIL
N.T.S.

NOTE:
FOR CONDUITS AT TIDE GATE, MORRIS CAUSEWAY, DEAN/EDEN ST. INTERSECTIONS

N.T.S.

PANEL L SURFACE MOUNTED

100 AMP M CB, 120 / 240 VOLT, 1 PHASE 3 WIRE 60 HERTZ

CIRCUIT NO.	NO. POLES	RATING	DESCRIPTION	LOAD
1 *	1	15	PRESSURE PROBE SENSOR #1	
2 *	1	15	PRESSURE PROBE SENSOR #2	
3 *	1	20	ENCLOSURE HEATER #1	
4 *	1	20	ENCLOSURE HEATER #2	
5	1	15	ENCLOSURE LIGHTS	
6	1	20	ENCLOSURE RECEPTACLES	
7 *	1	15	SCADA	
8–10	1	20	SPARE	
11,12	1	–	SPARE	

* PROVIDE HANDLE LOCK ON CIRCUITS

PANEL–MORRIS CAUSEWAY AND, DEAN/EDEN ST. INTERSECTION
NOTE: CIRCUIT #2 IS "SPARE" AT DEAN/EDEN STREET

"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED

DATE 6/12/09

ENGINEER'S SEAL

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101–1227
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Fax 603–669–4168
Web Page: www.hoyletanner.com
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TWEED – NEW HAVEN REGIONAL AIRPORT SAFETY IMPROVEMENTS

ELECTRICAL DETAILS

DATE: AUGUST, 2007

SCALE: 1"=50'

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

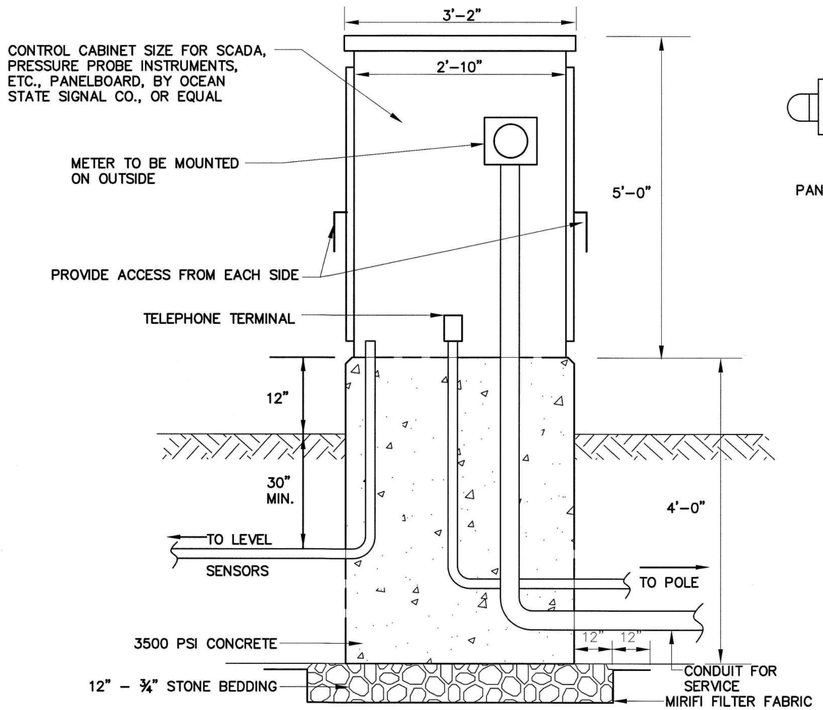
DO NOT SCALE DRAWING

PROJ. No.: 063212
FILE NAME: WET–EL105
AIP No.: 3–09–0013–32

DRAWING NO.
EL1.5

SHEET 89 OF 99

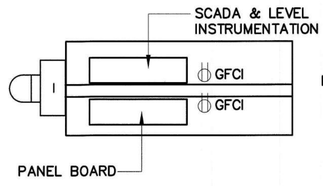
PLOT DATE: Jun 12, 2009 – 1:31pm SAVED BY: mbb
FILE: WET–EL105.dwg



EQUIPMENT ENCLOSURE MORRIS CAUSWEAY

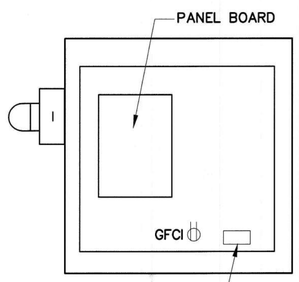
N.T.S.

(EDEN/DEAN STREET SIMILAR)

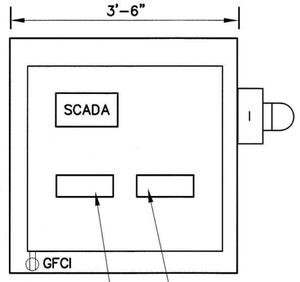


TOP VIEW

NOTE: PHYSICAL SIZE OF EQUIPMENT ENCLOSURE IS TO BE COORDINATED BY THE CONTRACTOR BASED ON ACTUAL EQUIPMENT SIZES INVOLVED. DIMENSIONS NOTED ARE BASED ON ENGINEER'S BEST ESTIMATE, BUT ARE NOT TO BE UTILIZED WITHOUT VERIFICATION BY THE CONTRACTOR.



FRONT VIEW

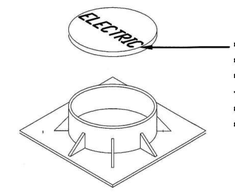


BACK VIEW

TYPICAL ARRANGEMENT LEVEL MONITOR LOCATION SERVICE ENCLOSURE - MORRIS CAUSWEAY

N.T.S.

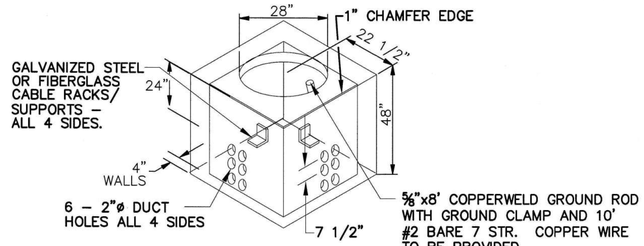
(EDEN/DEAN STREET SIMILAR)



"ELECTRIC" FOR POWER
"TELEPHONE" OR
"COMMUNICATION" FOR TELEPHONE
"FAA CONTROL" OR
"FAA POWER"

FRAME & COVER

NOT TO SCALE

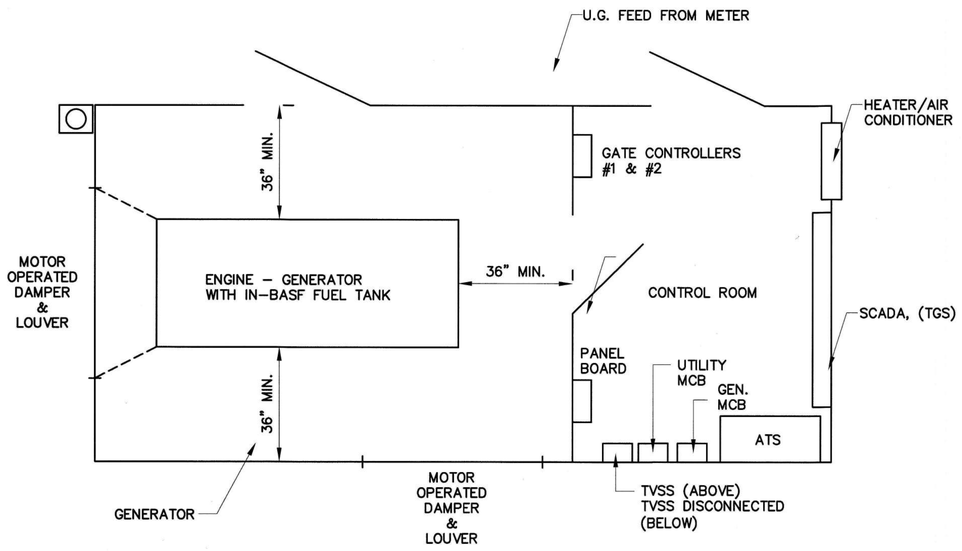


NOTES:

1. CONCRETE TO BE 5000 PSI HIGH EARLY STRENGTH AND VIBRATOR COMPACTED.
2. INSTALL GALVANIZED PULLING EYES, ONE ON EACH WALL (4) 3/4" EYES.
3. CONDUIT OPENING TO HAVE 4" BELL ENDS FLUSH WITH INSIDE WALL.
4. NO MANHOLE SHALL BE BURIED DEEPER THAN 18" BELOW FINISHED GRADE.
5. HANDHOLE SHALL BE CONSTRUCTED FOR B-737-700 (171,00 LB DUAL WHEEL GEAR LOADING).

TYPICAL HANDHOLE DETAIL FOR TIDE GATE LOCATION UTILITY SERVICES

NOT TO SCALE



PROPOSED PLAN VIEW STAND-BY GENERATOR/CONTROL ROOM AT TIDE GATES

N.T.S.

"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE 6/12/09

NOTE:

1. ALL ELECTRICAL EQUIPMENT TO BE MOUNTED AT A HEIGHT OF 10.7' MSL OR HIGHER TO PROTECT AGAINST 100 YEAR FLOOD EVENT, AT ALL SITES.
2. WORK FOR THE STANDBY GENERATOR/CONTROL ROOM ENCLOSURE ALSO INCLUDES ALL SUPPORTING STRUCTURAL AND SITE WORK INCLUDING, BUT NOT LIMITED TO EXCAVATION, FOUNDATION, COMPACTION, TOPSOIL, SEED, EROSION CONTROL, ETC.

ENGINEER'S SEAL

PROJECT DESIGNER
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TWEED - NEW HAVEN REGIONAL AIRPORT SAFETY IMPROVEMENTS

ELECTRICAL DETAILS

DATE: AUGUST, 2007

SCALE: NONE

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

DO NOT SCALE DRAWING

PROJ. No.: 063212

FILE NAME: WET-EL106

AIP No.: 3-09-0013-32

DRAWING NO.

EL1.6

SHEET 90 OF 99

FILE: WET-EL106.dwg PLOT DATE: Jun 12, 2009 - 1:34pm SAVED BY: rcote

"AS-BUILT"

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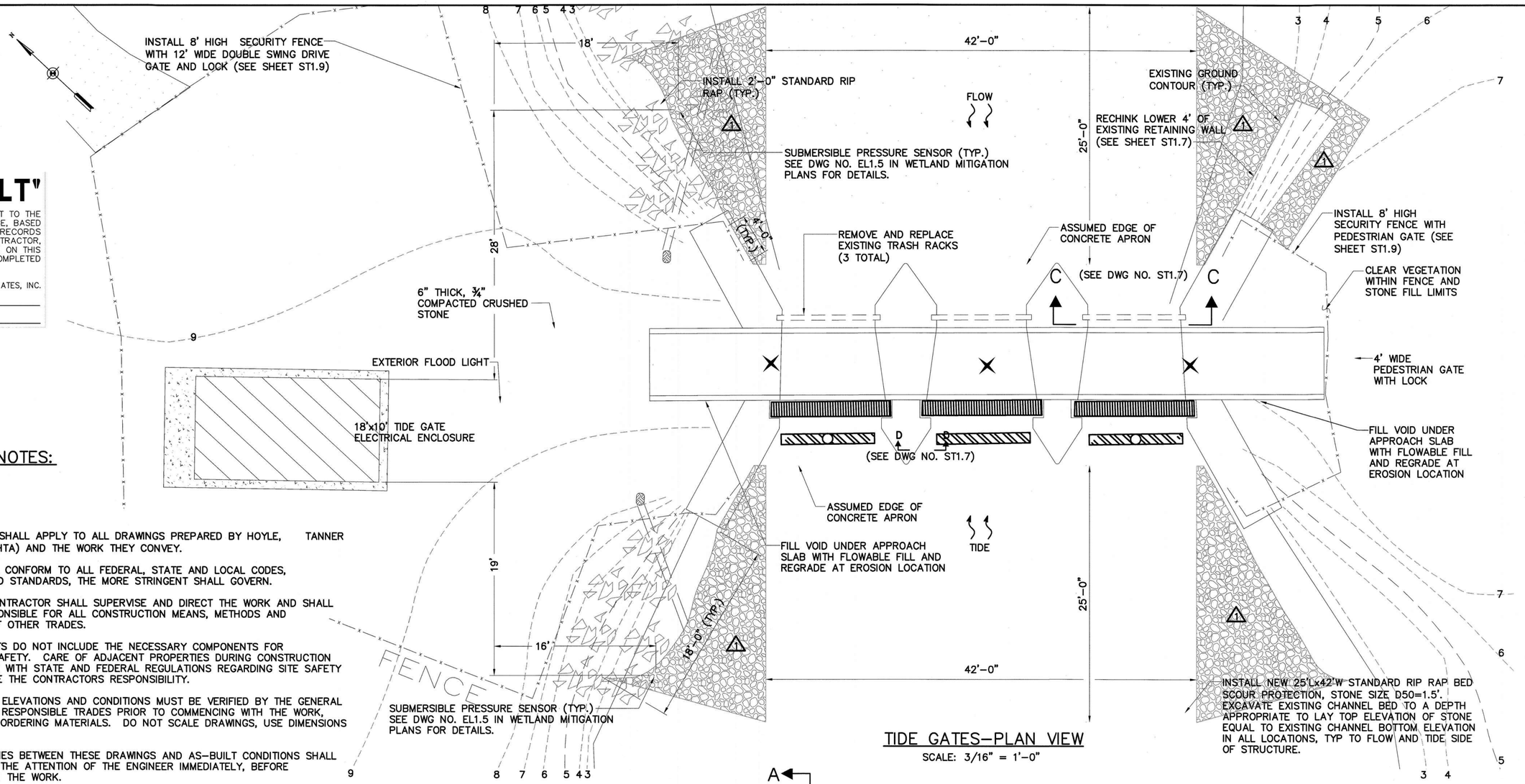
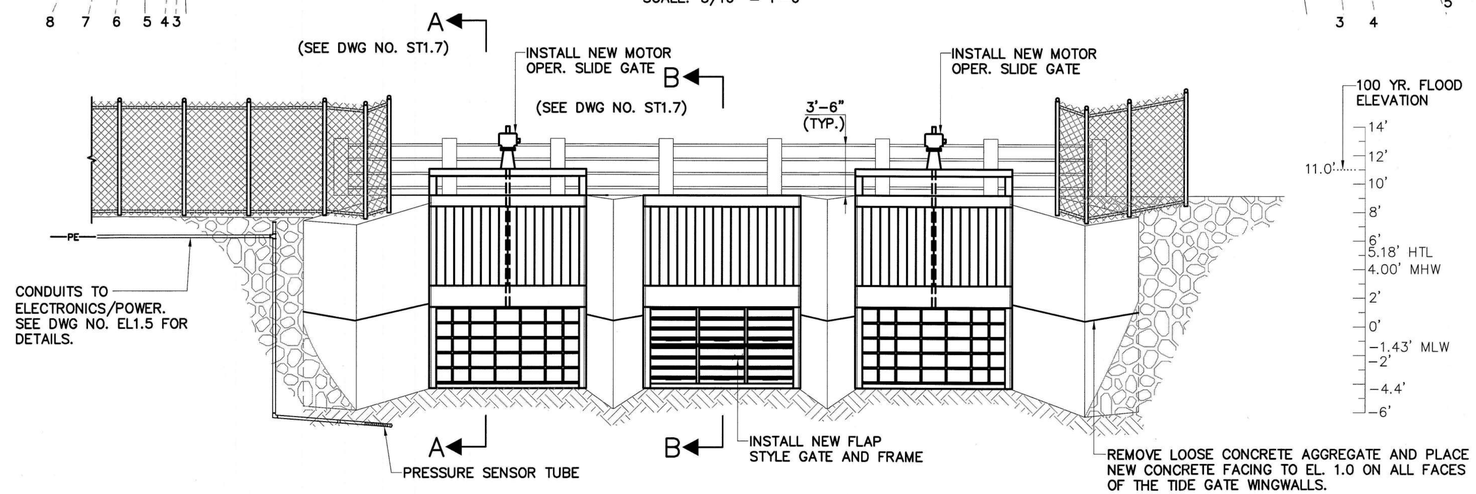
SIGNED _____

DATE 6/12/09



TIDE GATES–PLAN VIEW

SCALE: 3/16" = 1'-0"



TIDE GATES–OCEAN SIDE–ELEVATION VIEW

SCALE: 3/16" = 1'-0"

GENERAL NOTES:

G–1. GENERAL NOTES SHALL APPLY TO ALL DRAWINGS PREPARED BY HOYLE, TANNER & ASSOCIATES (HTA) AND THE WORK THEY CONVEY.

G–2. ALL WORK SHALL CONFORM TO ALL FEDERAL, STATE AND LOCAL CODES, REGULATIONS AND STANDARDS, THE MORE STRINGENT SHALL GOVERN.

G–3. THE GENERAL CONTRACTOR SHALL SUPERVISE AND DIRECT THE WORK AND SHALL BE SOLELY RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS AND COORDINATION OF OTHER TRADES.

G–4. THESE DOCUMENTS DO NOT INCLUDE THE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. CARE OF ADJACENT PROPERTIES DURING CONSTRUCTION AND COMPLIANCE WITH STATE AND FEDERAL REGULATIONS REGARDING SITE SAFETY SHALL SOLELY BE THE CONTRACTORS RESPONSIBILITY.

G–5. ALL DIMENSIONS, ELEVATIONS AND CONDITIONS MUST BE VERIFIED BY THE GENERAL CONTRACTOR OR RESPONSIBLE TRADES PRIOR TO COMMENCING WITH THE WORK, FABRICATION OR ORDERING MATERIALS. DO NOT SCALE DRAWINGS, USE DIMENSIONS SHOWN.

G–6. ANY DISCREPANCIES BETWEEN THESE DRAWINGS AND AS–BUILT CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY, BEFORE PROCEEDING WITH THE WORK.

G–7. THE INFORMATION SHOWN ON THESE PLANS CONCERNING THE TYPE AND LOCATION OF UNDERGROUND UTILITIES IS NOT GUARANTEED TO BE ACCURATE OR ALL INCLUSIVE. THE CONTRACTOR IS RESPONSIBLE FOR MAKING HIS OWN DETERMINATIONS AS TO THE TYPE AND LOCATION OF UNDERGROUND UTILITIES AS MAY BE NECESSARY TO AVOID DAMAGE THERETO.

G–8. ALL APPLICABLE UTILITY DEPARTMENTS AND COMPANIES SHALL BE NOTIFIED BEFORE EXCAVATION IS STARTED. UTILITIES WITHIN 50 FEET OF AN EXCAVATION SHALL BE MARKED IN THE FIELD.

G–9. HOYLE, TANNER & ASSOCIATES, INC. WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS THAT ARISE DUE TO THE FAILURE OF THE CONTRACTOR:

G–10. TO FOLLOW THESE DRAWINGS AND SPECIFICATIONS AND THE DESIGN INTENT THEY CONVEY.

—TO NOTIFY HTA OF ANY DISCREPANCIES, ERRORS, OMISSIONS OR CONFLICTS AND OBTAIN THEIR GUIDANCE TO RESOLVE.

—DESIGN CRITERIA

A. DESIGN STANDARD: 2000 INTERNATIONAL BUILDING CODE

B. MOTOR DEAD LOAD: 500 LBS.

C. AASHTO ICE LOADING.

G–11. SEE DRAWING NO. ST1.6 FOR PROPOSED PHASING AND EROSION CONTROL DETAILS.

G–12. WORK FOR THE STANDBY GENERATOR/CONTROL ROOM ENCLOSURE ALSO INCLUDES ALL SUPPORTING STRUCTURAL AND SITE WORK INCLUDING, BUT NOT LIMITED TO EXCAVATION, FOUNDATION, COMPACTION, TOPSOIL, SEED, EROSION CONTROL, ETC.

ENGINEER'S SEAL

PROJECT DESIGNER
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Web Page: www.hoylетanner.com

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DESIGNED BY STU/JB | DRAWN BY JBM | CHECKED BY RHD

TWEED – NEW HAVEN REGIONAL AIRPORT SAFETY IMPROVEMENTS

TIDE GATE
PLAN AND ELEVATION

DATE: AUGUST, 2007

SCALE: AS SHOWN

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

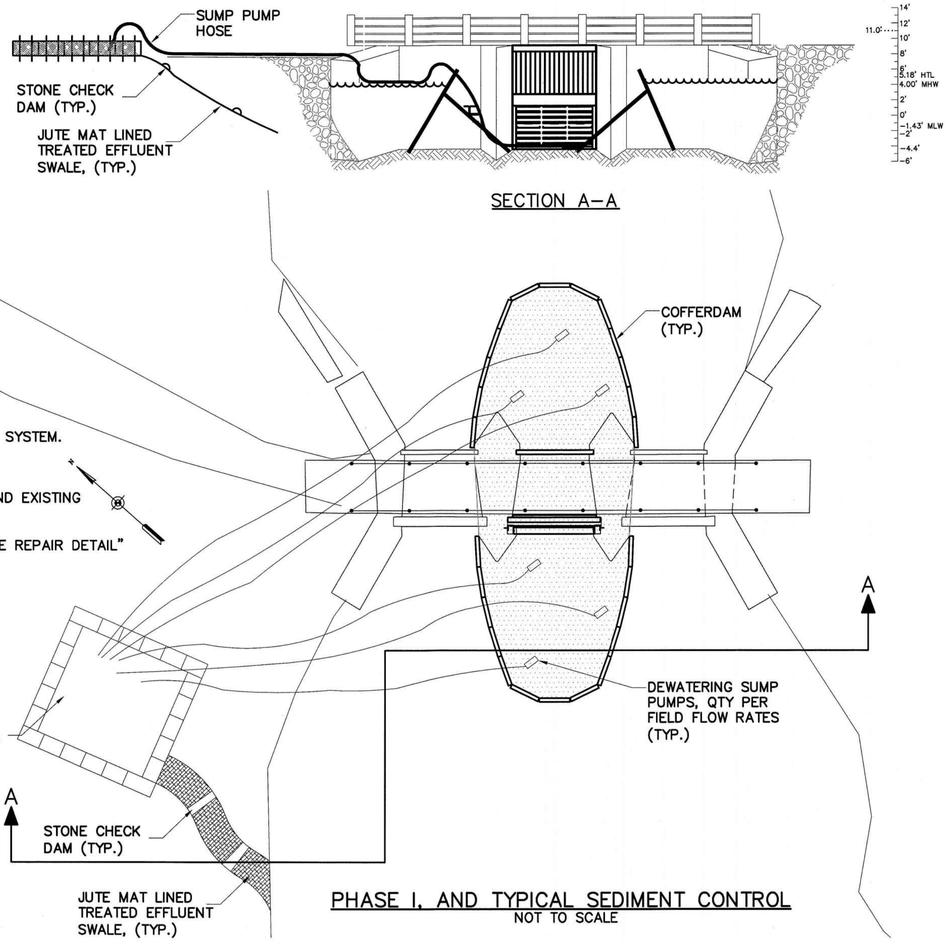
DO NOT SCALE DRAWING

PROJ. No.: 063212
FILE NAME: WET–ST105
AIP No.: 3–09–0013–32

DRAWING NO.
ST1.5

SHEET 95 OF 99

PLOT DATE: Jun 12, 2009 - 11:39pm
SAVED BY: mdix
FILE: WET-ST105.dwg



SECTION A–A

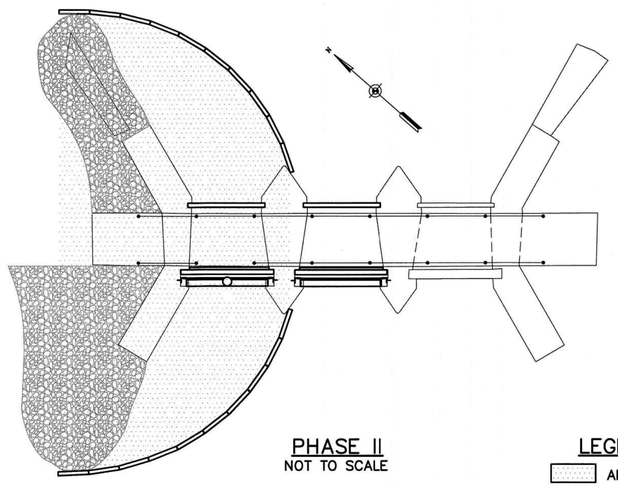
PHASE I, AND TYPICAL SEDIMENT CONTROL

1. INSTALL SEDIMENT CONTROL BASIN AND DEWATERING SUMP PUMP SYSTEM.
2. INSTALL PORTIONS OF COFFERDAMS FOR PHASE I CONSTRUCTION.
3. REMOVE EXISTING TRASH RACK UPSTREAM OF THE TIDE GATES AND EXISTING WOOD TIDE GATE.
4. REPAIR THE SPALLED CONCRETE AREAS AS SHOWN ON "CONCRETE REPAIR DETAIL" AND NOTES ON DWG NO. ST1.9.
5. SAWCUT EXISTING CONCRETE AT GATE POCKETS.
6. INSTALL NEW TRASH RACK AND FLAP GATE WITH FRAME.
7. REMOVE COFFERDAMS OF PHASE I.
8. MOVE SUMP PUMP AND HOSE SYSTEM TO NEXT PHASE, REMOVE SEDIMENT BUILD UP IN BASIN AS NEEDED.

PHASE I, AND TYPICAL SEDIMENT CONTROL
NOT TO SCALE

PHASE II

1. INSTALL PORTIONS OF COFFERDAMS FOR PHASE II CONSTRUCTION.
2. REMOVE EXISTING TRASH RACK UPSTREAM OF THE TIDE GATES AND EXISTING WOOD TIDE GATE.
3. REPAIR THE SPALLED CONCRETE AREAS AS SHOWN ON "CONCRETE REPAIR DETAIL" AND NOTES ON DWG NO. ST1.9.
4. SAWCUT EXISTING CONCRETE AT GATE POCKETS.
5. INSTALL NEW TRASH RACK AND NEW MOTOR OPERATED SLIDE GATE WITH FRAME.
6. INSTALL NEW PRESSURE SENSORS.
7. INSTALL 2'–0" THICK STANDARD RIPRAP PER THE DETAIL SHOWN ON DWG NO. ST1.9 AND TO THE LIMITS SHOWN ON DWG NO. ST1.5
8. REMOVE COFFERDAMS OF PHASE II.
9. MOVE SUMP PUMP AND HOSE SYSTEM TO NEXT PHASE, REMOVE SEDIMENT BUILD UP IN BASIN AS NEEDED.



PHASE II
NOT TO SCALE

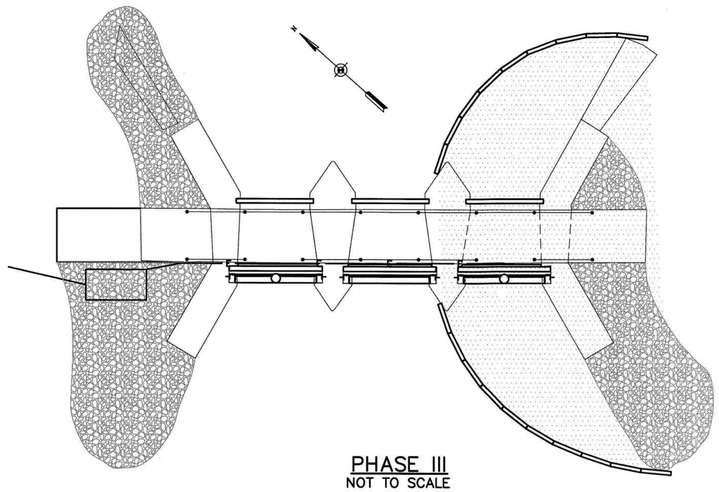
"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE 6/12/09



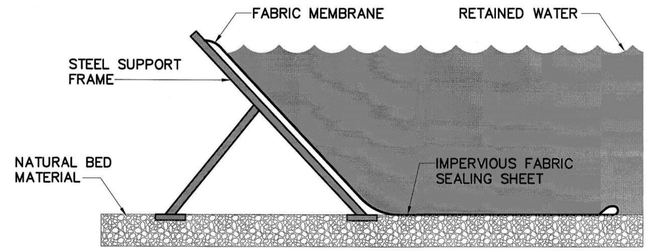
PHASE III
NOT TO SCALE

PHASE III

1. INSTALL PORTIONS OF COFFERDAMS FOR PHASE III CONSTRUCTION.
2. REMOVE EXISTING TRASH RACK UPSTREAM OF THE TIDE GATE AND EXISTING WOOD TIDE GATE.
3. REPAIR THE SPALLED CONCRETE AREAS AS SHOWN ON "CONCRETE REPAIR DETAIL" AND NOTES ON DWG NO. ST1.9. RECHINK LOWER 4' OF EXISTING RETAINING WALL UPSTREAM OF TIDE GATE.
4. SAWCUT EXISTING CONCRETE AT GATE POCKETS.
5. INSTALL NEW TRASH RACK AND NEW MOTOR OPERATED SLIDE GATE WITH FRAME.
6. INSTALL 2'–0" THICK STANDARD RIPRAP PER THE DETAIL SHOWN ON DWG NO. ST1.9 AND TO THE LIMITS SHOWN ON DWG NO. ST1.5
7. REMOVE COFFERDAMS OF PHASE III AND SETTLING BASIN, SWALE AND CHECK DAM.

PHASE IV

1. COMPLETE ALL REMAINING WORK: INSTALL SECURITY FENCE, PERIMETER FENCING, FILL VOIDS UNDER APPROACH WALKWAY SLAB, ETC.
2. DREDGE CHANNEL BOTTOM IN AREA WHERE STANDARD RIP RAP (D 50 =1.5') IS PROPOSED, TO A DEPTH OF 1.5' (±) BELOW EXISTING GRADE, AND PLACE (D 50= 1.5') STONE. PROTECT DOWNSTREAM WITH TURBIDITY CURTAIN DURING PHASE IV STEP 2.



TYPICAL COFFERDAM SECTION
NOT TO SCALE

COFFERDAM NOTES:

1. COFFERDAMS SHALL BE REQUIRED AT EACH CONSTRUCTION PHASE TO CONTROL WATER INFLOW AND ADEQUATELY DEWATER THE WORKING AREAS. SUMP PUMPING AREAS AROUND THE ENTIRE PERIMETER WILL BE REQUIRED TO ADEQUATELY CONTROL THE WATER WITHIN THE WORKING AREAS.
2. A PORTA–DAM COFFERDAM SYSTEM IS SHOWN HERE FOR CONCEPT ONLY. THE CONTRACTOR SHALL PROVIDE TO THE ENGINEER SHOP DRAWINGS AND DESIGN CALCULATIONS OF THE SELECTED COFFERDAM SYSTEM FOR APPROVAL PRIOR TO BEGINNING OF CONSTRUCTION.
3. WATER PUMPED FROM DEWATERING LOCATIONS SHALL BE FILTERED ADEQUATELY TO REMOVE FINE MATERIALS PRIOR TO RETURNING THE WATER TO THE RIVER. ACTUAL LOCATION OF SEDIMENTATION BASIN TO BE DETERMINED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER PRIOR TO INSTALLATION OF COFFERDAMS.

LEGEND:

AREA TO BE DEWATERED

ENGINEER'S SEAL

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DESIGNED BY STD/JB | DRAWN BY JBM | CHECKED BY RHD

TWEED – NEW HAVEN REGIONAL AIRPORT
SAFETY IMPROVEMENTS

CONSTRUCTION PHASING AND SEDIMENT CONTROL PLAN

SCALE: AS SHOWN | DATE: AUGUST, 2007

REVISIONS

REV NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

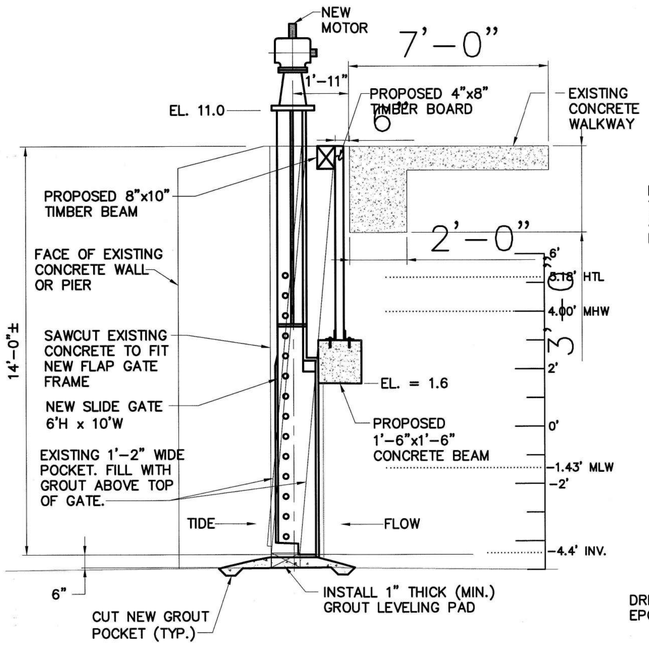
DO NOT SCALE DRAWING

PROJ. No.: 063212
FILE NAME: WET-ST106
AIP No.: 3-09-0013-32

DRAWING NO.
ST1.6

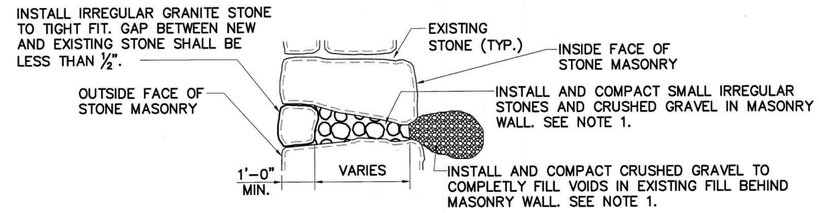
SHEET 96 OF 99

FILE: WET-ST106.dwg PLOT DATE: Jun 12, 2009 - 1:45pm SAVED BY: rdm



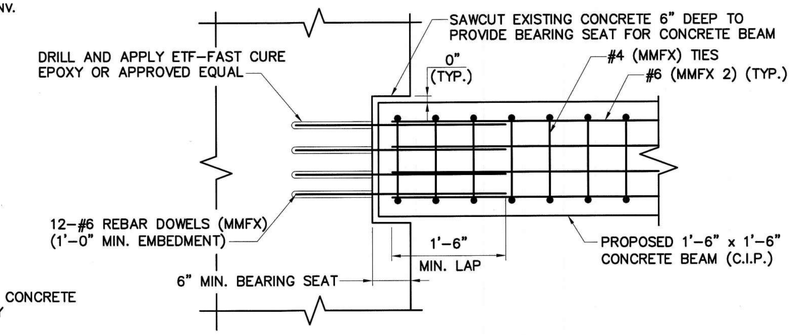
SECTION A–A (SEE DWG NO. ST1.5)

SCALE: 3/8"=1'-0"



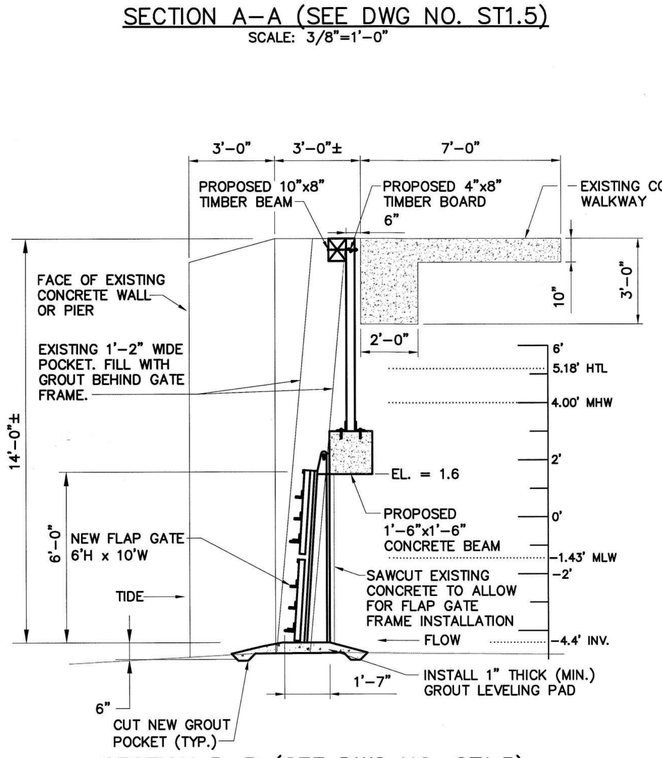
CHINKING DETAIL

NOT TO SCALE



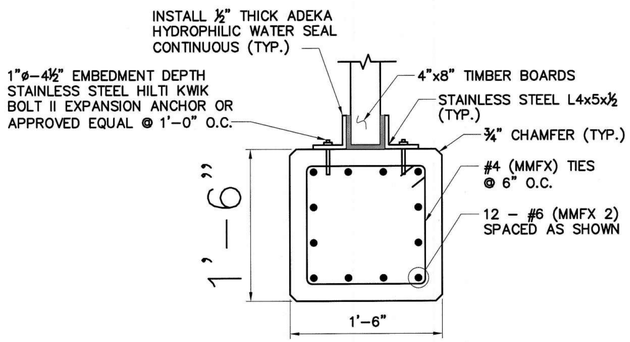
SECTION D–D ELEVATION VIEW (ST1.5)

SCALE: 1" = 1'-0"



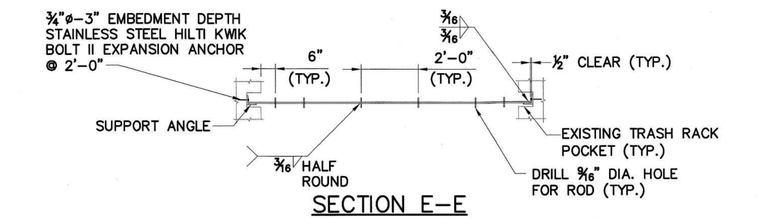
SECTION B–B (SEE DWG NO. ST1.5)

SCALE: 3/8"=1'-0"

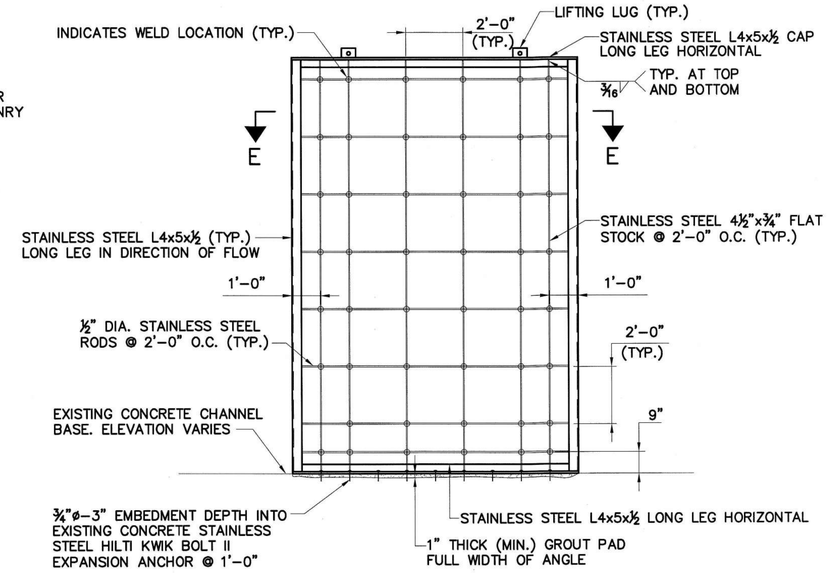


CONCRETE BEAM REINFORCING SECTION

SCALE: 3/4" = 1'-0"

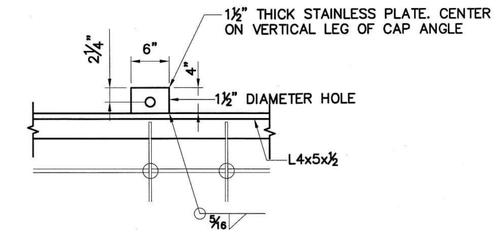


SECTION E–E



SECTION C–C (SEE DWG NO. ST1.4)

SCALE: 3/8"=1'-0"



LIFTING LUG DETAIL

SCALE: 1" = 1'-0"

LEGEND:

MMFX MMFX REINFORCING STEEL

C.I.P. CAST IN PLACE

PLAN NOTES:

1. COMPACT MATERIALS BEHIND AND INTO MASONRY WALL BY USING TAMPING RODS OR OTHER METHODS ACCEPTABLE TO THE ENGINEER.
2. SEE SHEET ST1.8 FOR DETAILS THAT APPLY TO THIS SHEET.

TIMBER NOTES:

1. ALL WOOD CONSTRUCTION SHALL COMPLY WITH THE LATEST NATIONAL DESIGN SPECIFICATIONS (NDS) SUPPLEMENT FOR WOOD CONSTRUCTION AND THE AMERICAN INSTITUTE OF TIMBER CONSTRUCTION.
2. EACH PIECE OF WOOD OR TIMBER SHALL BE GRADED BY A RECOGNIZED LUMBER GRADING AGENCY. A CERTIFICATE OF COMPLIANCE SHALL BE SUBMITTED FOR ALL WOOD.
3. ALL WOOD SHALL BE SOUTHERN PINE, NO. 1 OR BETTER, AND PRESSURE TREATED TO THE RECOMMENDATIONS OF THE SOUTHERN PINE MARKETING COUNCIL FOR SALT WATER (OR MARINE) USE.
4. ALL NUTS, BOLTS, WASHERS AND SCREWS SHALL BE STAINLESS STEEL.
5. ALL JOB SITE FABRICATION CUTS AND BORINGS OF WOOD TO BE TREATED SHALL HAVE TWO (2) COATS OF AN APPROVED PRESERVATIVE LIBERALLY APPLIED WITH PRESSURE TREATMENT PRESERVATIVE USED IN ACCORDANCE WITH AWPA STANDARD M4.

"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE _____

ENGINEER'S SEAL

PROJECT DESIGNER
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150 Dow Street
Manchester, NH 03101-1227
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Web Page: www.hoyletanner.com

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TWEED – NEW HAVEN REGIONAL AIRPORT SAFETY IMPROVEMENTS

TIDE GATE DETAILS (1 OF 3)

DATE: AUGUST, 2007

SCALE: AS SHOWN

DO NOT SCALE DRAWING

REV NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

PROJ. No.: 063212

FILE NAME: WET-ST107

AIP No.: 3-09-0013-32

DRAWING NO.

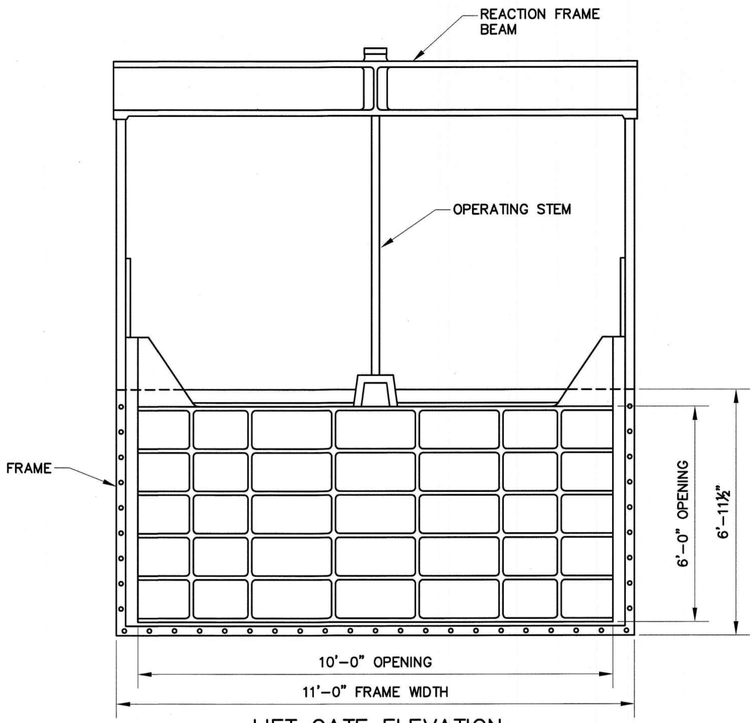
ST1.7

SHEET 97 OF 99

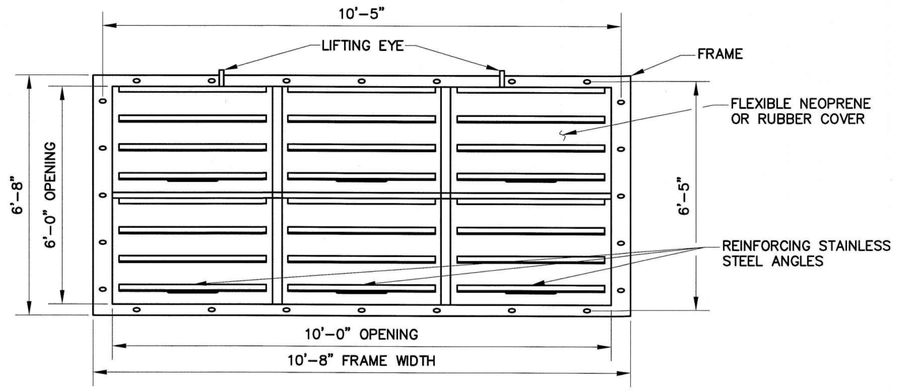
FILE: WET-ST107.dwg PLOT DATE: Jun 12, 2009 - 1:43pm SAVED BY: mdix

LIFT/FLAP GATE NOTES:

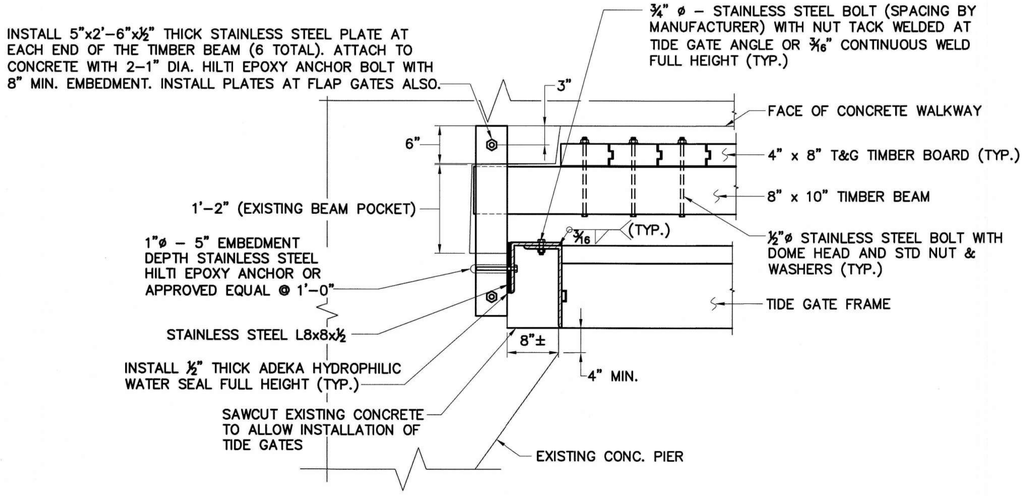
1. THE LIFT GATE AND FLAP GATE SHOWN ARE BASED UPON THE 'GLYDASEAL GATES' AND 'FLAP VALUE' PRODUCTS MANUFACTURED BY THE RODNEY HUNT COMPANY OF ORANGE, MA (978544–2511) AND ARE ACCEPTABLE FOR THIS PROJECT. THE CONTRACTOR MAY SUBMIT PRODUCTS FROM THIS MANUFACTURER OR ANY OTHER THAT MEETS THE SPECIFICATIONS AND DESIGN INTENT AND GEOMETRY SHOWN HERE.
2. THE LIFT GATE AND FLAP GATE MANUFACTURER SHALL BE RESPONSIBLE FOR DESIGNING THE GATE, FRAME AND ALL CONNECTIONS OF THE TIDE GATE FRAME TO CONCRETE SURFACES.



LIFT GATE ELEVATION
NOT TO SCALE



FLAP GATE ELEVATION
NOT TO SCALE



SLIDE GATE FRAME CONNECTION DETAIL (PLAN VIEW)
(TIDE GATE TO WINGWALL AND FLAP GATE CONNECTION SIMILAR)
SCALE: 1" = 1'–0"

CONCRETE AND REINFORCING STEEL NOTES:

1. THE CONTRACTOR WILL NOTIFY THE ENGINEER A MINIMUM OF 24 HOURS IN ADVANCE OF ALL CONCRETE OPERATIONS.
2. ALL CONCRETE WORK SHALL COMPLY WITH THE LATEST A.C.I. SPECIFICATIONS.
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5,000 PSI AT 28 DAYS.
4. ALL REINFORCING STEEL SHALL CONFORM TO ASTM A615 GRADE 75 (MMFX 2) AND SHALL BE DETAILED, FABRICATED AND INSTALLED IN ACCORDANCE WITH THE LATEST A.C.I. SPECIFICATIONS.
5. MAXIMUM ALLOWABLE SLUMP OF CONCRETE SHALL NOT EXCEED 4".
6. ALL CONCRETE SHALL BE AIR ENTRAINED A MINIMUM OF 6%.
7. PROVIDE A CLEAR COVER FROM REINFORCING STEEL TO ADJACENT CONCRETE SURFACES AS FOLLOWS:

   CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH = 3".
   CONCRETE EXPOSED TO WEATHER = 2".

   THESE DIMENSIONS SHALL BE CONSIDERED ACTUAL AND ARE NOT TO BE ADJUSTED IN EITHER DIRECTION.
8. SUBMIT REINFORCING SHOP DRAWINGS FOR REVIEW BY THE ENGINEER.
9. FOR CONSTRUCTION DURING HOT WEATHER, ALL CONCRETE WILL REQUIRE PROTECTION FROM HIGH TEMPERATURES IN ACCORDANCE WITH ACI 305.
10. FIELD FABRICATION OR CUTTING OF REINFORCING STEEL WILL NOT BE PERMITTED WITHOUT THE APPROVAL OF THE ENGINEER.
11. ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED ¾" UNLESS NOTED OTHERWISE.
12. WATER REPELLENT (SILANE–SILOXANE), SHALL BE APPLIED TO ALL EXPOSED CONCRETE SURFACES OF THE TIDE GATE AND WINGWALLS.

"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE _____

ENGINEER'S SEAL

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101–1227
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Web Page: www.hoyletanner.com

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TWEED – NEW HAVEN REGIONAL AIRPORT
SAFETY IMPROVEMENTS

TIDE GATE DETAILS (2 OF 3)

SCALE: AS SHOWN | DATE: AUGUST, 2007

REVISIONS

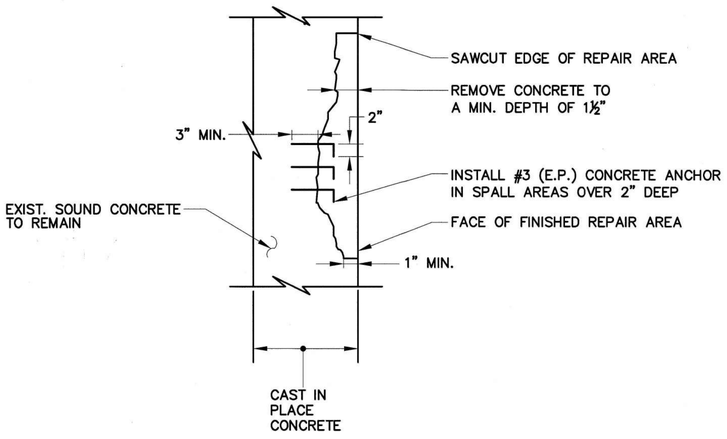
REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

DO NOT SCALE DRAWING

PROJ. No.: 063212
FILE NAME: WET–ST108
AIP No.: 3–09–0013–32

DRAWING NO.
ST1.8

FILE: WET–ST108.dwg PLOT DATE: Jul 13, 2009 - 1:43pm SAVED BY: mbs

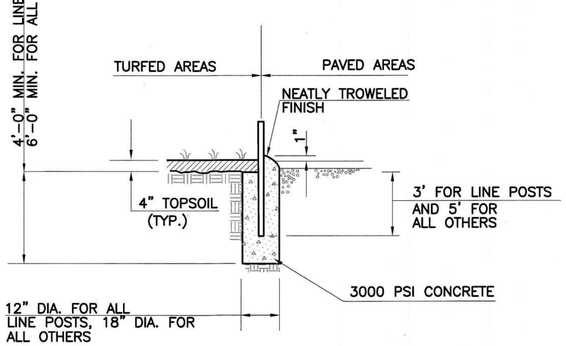


CONCRETE REPAIR DETAIL
NOT TO SCALE

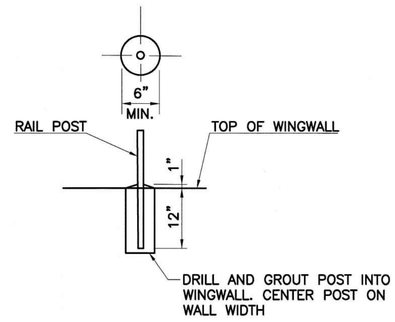
NOTES:

1. THE INTENTION OF THIS WORK IS TO REPAIR THE ENTIRE AREA OF CONCRETE WINGWALL AND TIDE GATE BELOW EL. 1.0. SAWCUT THE EDGE OF CONCRETE REPAIR AREA DEFINED AS FOLLOWS: THE VERTICAL LIMIT OF THE NEW CONCRETE FACING SHALL BE FROM THE BASE OF THE WINGWALL OR TIDE GATE TO EL. 1.0. THE HORIZONTAL LIMIT INCLUDES ALL FACES OF THE WINGWALLS AND TIDE GATE EXPOSED TO WATER.
2. PREPARE THE REPAIR AREA BY REMOVAL OF ALL UNSOUND CONCRETE TO A DEPTH OF 1½" MIN. FEATHERED REMOVAL EDGES WILL NOT BE PERMITTED. JACKHAMMERS HEAVIER THAN NOMINAL 15 POUND CLASS SHALL NOT BE USED.
3. AFTER CONCRETE REMOVAL, THE REPAIR AREA SHALL BE THOROUGHLY CLEANED OF INJURIOUS RUST, CONCRETE, DIRT, GREASE, OR ANY OTHER BOND INHIBITING MATERIAL.
4. INSTALL EPOXY COATED OR STAINLESS STEEL ANCHORS IN ALL REPAIR AREAS GREATER THAN 2" IN DEPTH. THE ANCHOR SHALL EXTEND A MINIMUM OF THREE INCHES INTO THE EXISTING MATERIAL AND HAVE A 2" LONG BENT END RETURN WITH 2" COVER MIN. ANCHORS SHALL BE A #3 REBAR OR EQUIVALENT SPACED AT 6" ON CENTER.
5. COAT ALL REPAIR SURFACES WITH AN APPROVED BONDING AGENT PRIOR TO PLACING REPAIR MATERIAL.
6. INSTALL SMOOTH FACED FORMS OVER THE ENTIRE REPAIR AREA AND PLACE A VERTICAL EPOXY REPAIR MORTAR. CONCRETE WILL NOT BE ALLOWED. THE REPAIR MORTAR SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDED PROCEDURES AND SHALL CONTAIN AN APPROVED FIBER REINFORCEMENT.

Fences shall be grounded on each side of every gate, at points 150 feet (45.7 m) on each side of high-tension line crossings, and at 150-foot (47.5 m) intervals along the fence where high tension lines (as defined by ANSI C2) are directly overhead and run parallel to the fence. Fences shall be ground every 1,000 feet to 1,500 feet of length when fence are in isolated places and at lesser distances depending on proximity of fence to public roads, highways, and buildings. The ground shall be accomplished with a copper clad rod 10 feet long and a minimum of 3/4 inch in diameter driven vertically until the top is 6 inches below the ground surface. A No. 6 solid copper conductor shall be clamped to the rod and to the fence in such a manner that each element of the fence is grounded.

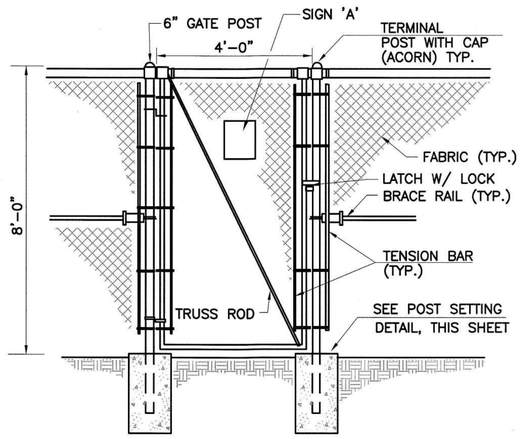


EARTH



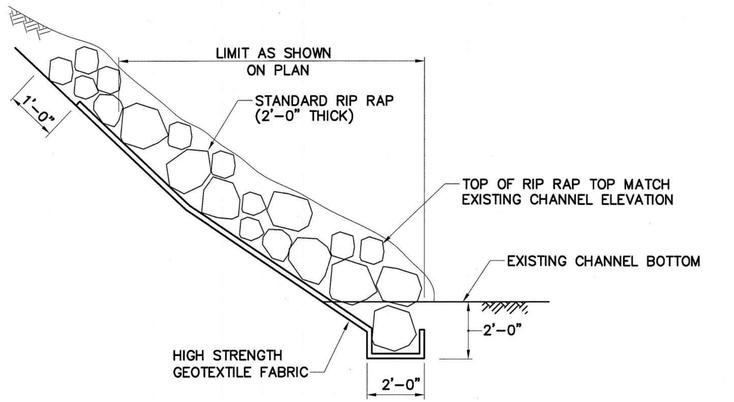
WINGWALL

POST SETTING DETAILS
NOT TO SCALE



PEDESTRIAN GATE DETAIL
NOT TO SCALE

NOTE: SEE SIGN DETAIL DWG. NO. G1.22



RIP RAP DETAIL
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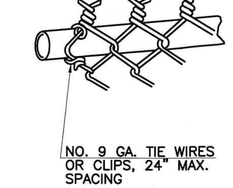
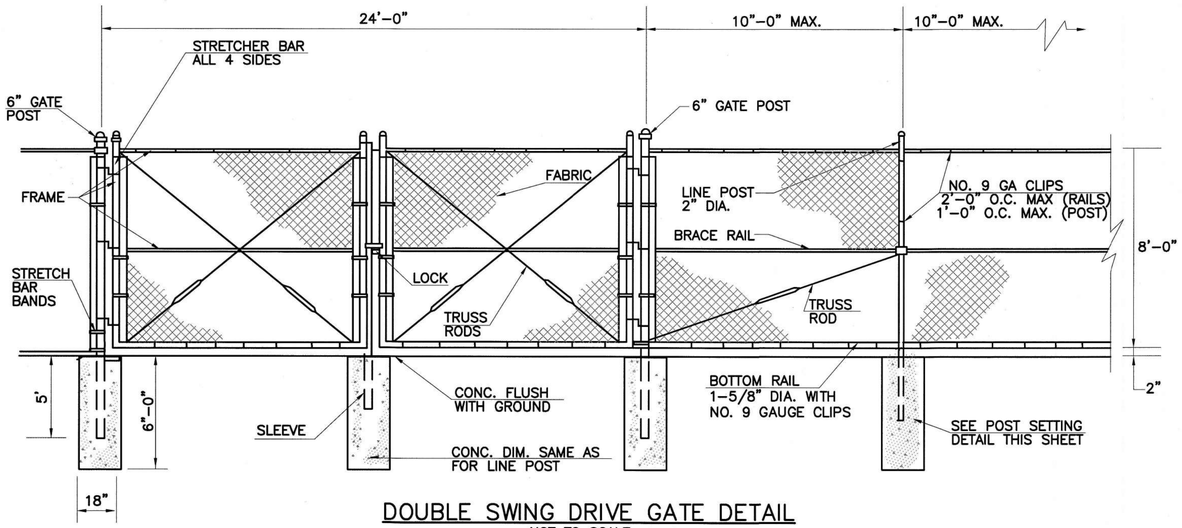
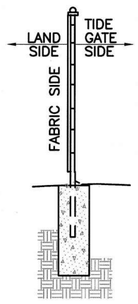
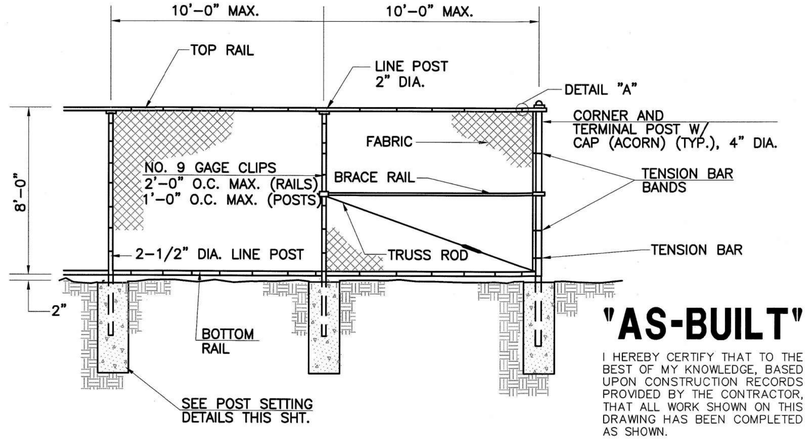


DETAIL "A"
NOT TO SCALE



DOUBLE SWING DRIVE GATE DETAIL
NOT TO SCALE





SECURITY FENCE
NOT TO SCALE

"AS-BUILT"

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE, BASED UPON CONSTRUCTION RECORDS PROVIDED BY THE CONTRACTOR, THAT ALL WORK SHOWN ON THIS DRAWING HAS BEEN COMPLETED AS SHOWN.

HOYLE, TANNER & ASSOCIATES, INC.

SIGNED _____

DATE _____

ENGINEER'S SEAL

PROJECT DESIGNER
Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, NH 03101-1227
Tel 603-669-5555
Fax 603-669-4168
Web Page: www.hoyletanner.com
Hoyle Tanner & Associates © 2007

DESIGNED BY STU/JB | DRAWN BY JBM | CHECKED BY RHD

TWEED – NEW HAVEN REGIONAL AIRPORT
SAFETY IMPROVEMENTS

TIDE GATE DETAILS (3 OF 3)

DATE: AUGUST, 2007
SCALE: AS SHOWN

REVISIONS

REV. NO.	DATE	DESCRIPTION	BY
1	03/01/2009	AS BUILTS	DDS

DO NOT SCALE DRAWING

PROJ. No.: 063212
FILE NAME: WET-ST109
AIP No.: 3-09-0013-32

DRAWING NO.
ST1.9

SHEET 99 OF 99

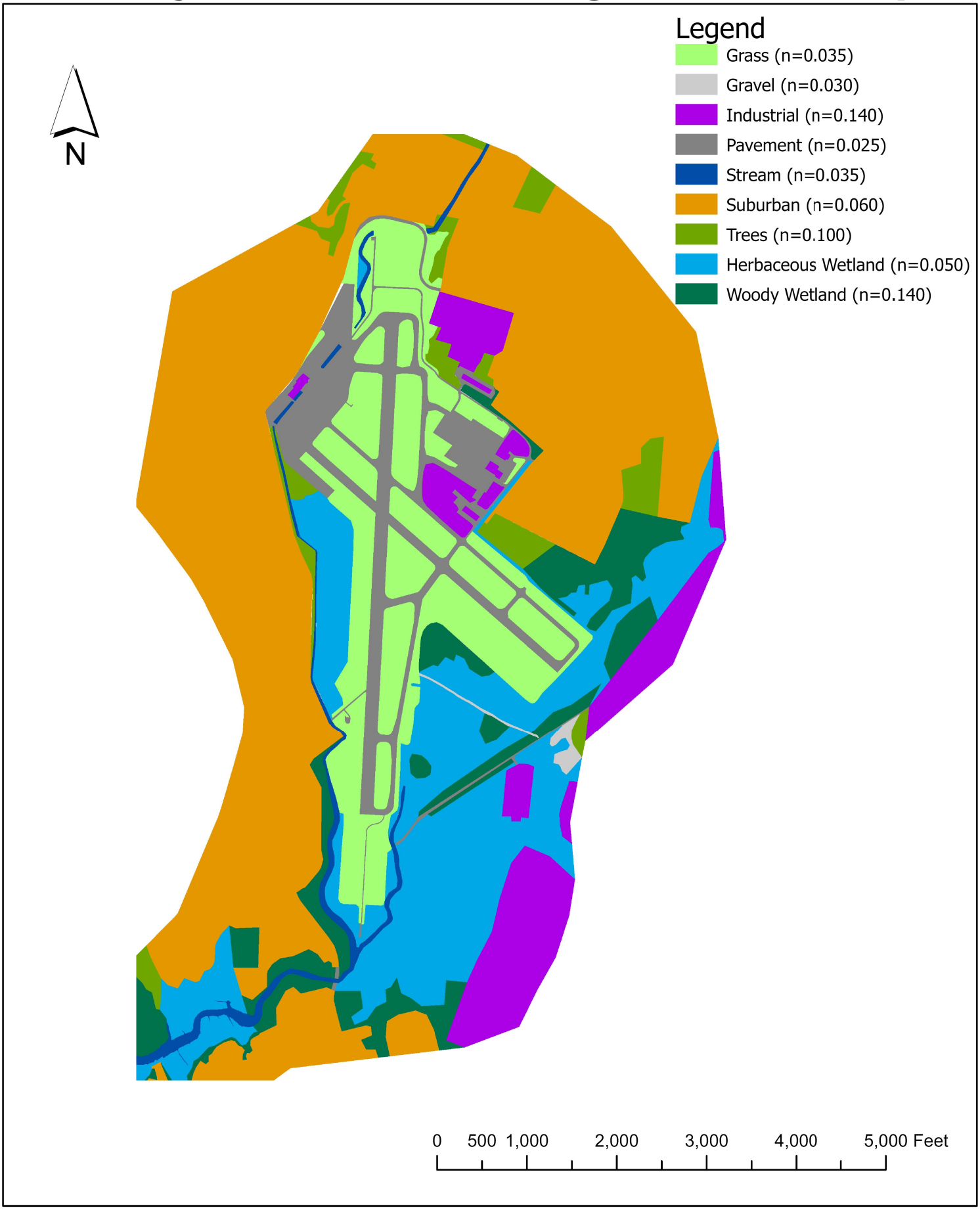
PLOT DATE: Jun 12, 2009 - 1:45pm
SAVED BY =dbs
FILE: WET-ST109.dwg

Appendix K: CTDEEP Riverine Model Land Cover Maps

- Existing Land Cover Map
- Proposed Land Cover Map

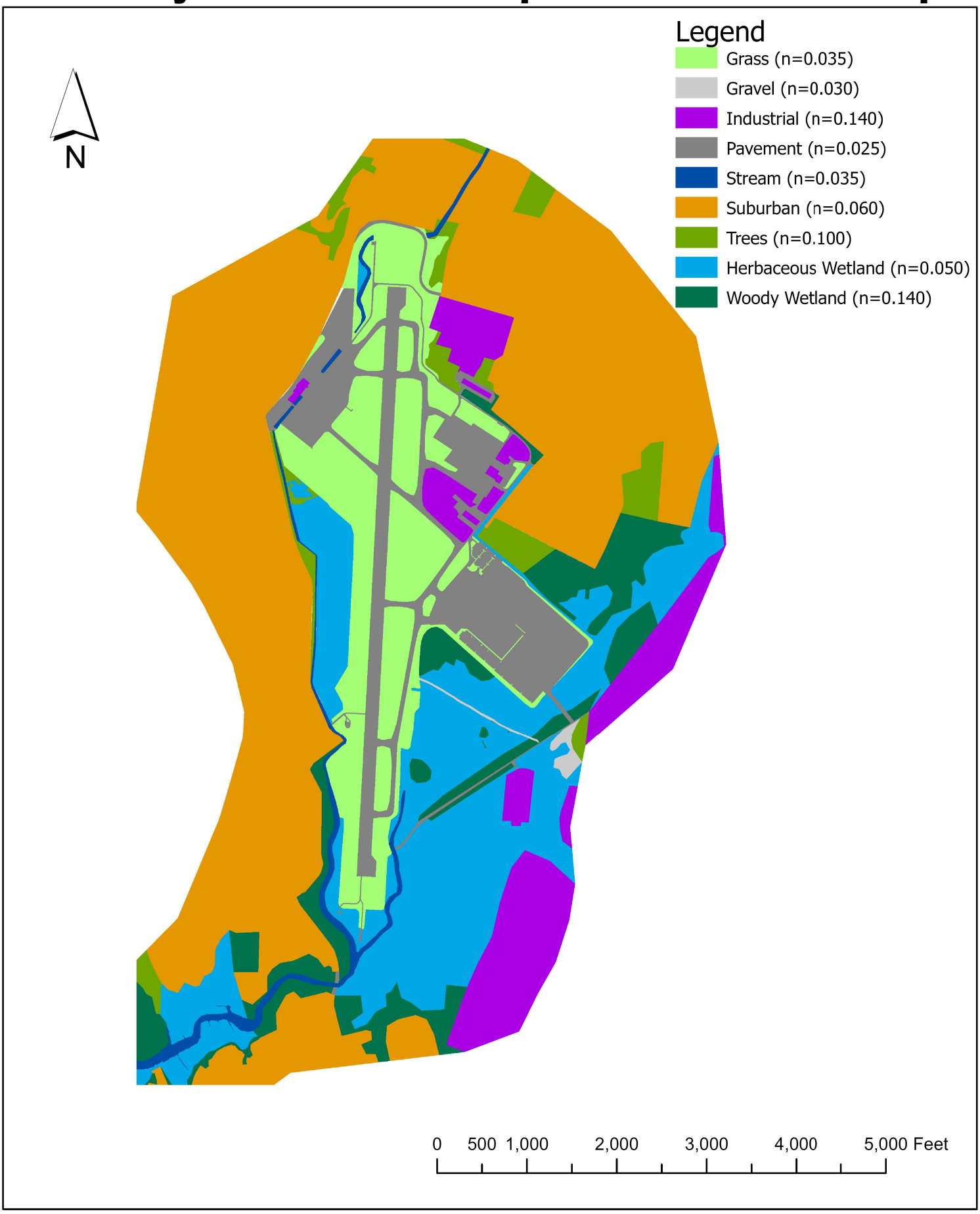
Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project

Riverine Hydraulic Model Existing Land Cover Map



Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project

Riverine Hydraulic Model Proposed Land Cover Map



TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 19 – HYDRAULICS SUMMARY

PROPOSED CROSS COUNTRY CULVERTS
35" x 24" Corrugated Steel Arch Pipes (3)
HydroCAD node - CC1

Hydraulics Summary

Hydraulic and Drainage Structures

Water Surface Elevation (feet) (Immediately upstream of structure)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change

Aerial Extent of Inundation (square feet) (Maximum)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change

Duration of Inundation (hours)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change

Discharge Velocity (fps)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change
	3.18			4.02			4.95			5.98			7.16	

Flow (cfs)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change
	19.42			49.24			68.99			83.10			99.85	

PROPOSED CULVERTS UNDER CAUSEWAY
6' x 3' Box Pipes (5)
HydroCAD node - 11P

Hydraulics Summary

Hydraulic and Drainage Structures

Water Surface Elevation (feet) (Immediately upstream of structure)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change

Aerial Extent of Inundation (square feet) (Maximum)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change

Duration of Inundation (hours)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change

Discharge Velocity (fps)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change
	3.96			4.81			5.31			5.61			5.67	

Flow (cfs)

Storm Event Frequency

2-yr			10-yr			25-yr			50-yr			100-yr		
Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change	Existing	Proposed	%Change
	98.35			190.71			266.92			339.13			425.30	

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 20 – NATURAL DIVERSITY DATA BASE (NDDB)

April 15, 2025

Deb Coon
Hoyle, Tanner and Associates
150 Dow Street
Manchester, NH 03101

NDDB Final Determination
Project: Tweed New Haven Airport Runway Extension and Terminal Expansion
Filing ID 107828
NDDB Determination 202402808
Expiration: April 15, 2027

Dear Ms. Coon,

We have reviewed Natural Diversity Database maps and files regarding the area delineated on the map provided for the proposed Tweed New Haven Airport Runway Extension and Terminal Expansion project in New Haven, Connecticut. According to our information, the following species have been documented within the vicinity of the work to be conducted:

Plants

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  - Habitat: Coastal grasslands; airports; open-canopy trailsides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  - Blooms June – July.
- Saltpond grass (*Leptochloa fusca ssp. fascicularis*) – State Endangered
  - Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  - Blooms and fruits August – November.
- Field paspalum (*Paspalum laeve*) – State Threatened
  - Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial Grassland/Outcrop; Grassland Subtype: Coastal Grassland.
  - Fruits August – October.
- Two-flowered Cynthia (*Krigia biflora*) – State Threatened

  - Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.
  - Blooms Jun.
- Hoary plantain (*Plantago virginica*) – State Special Concern
  - Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidic Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest.
  - Blooms/fruits May – June. Spring and early summer ephemeral, typically disappearing by late June.

NDDB has received and reviewed the *Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Rare Plant Survey Report and Protection Plan*, *December 2024, Revised March 2025 (The Report and Protection Plan)*. Note that *The Report and Protection Plan* addresses both the Runway Extension and Terminal Expansion (NDDB 202402808, Filing 107828), as well as the Tide Gate Alteration components of the project (NDDB 202408268, Filing ID 117005). NDDB has additional information from botanist Tom Groves provided via email correspondence dated April 10, 2025. This information is relative to Runway Extension and Terminal Expansion activities and is addressed and incorporated in this review.
NDDB accepts the information provided in *The Report and Protection Plan*, with modification of the Protection Plan (see below). A summary of *The Report and Protection Plan* information and additional correspondence relative to Runway Extension and Terminal Expansion activities is described below. *The Report and Protection Plan* and additional correspondence is attached to this determination.

- The rare species occurrences and highest plant species diversity was observed in the open airfield area, along the edges of open habitat, and where the new terminal construction is proposed on the southeastern part of the property.
- Field Paspalum (*Paspalum laeve*)

  - Field paspalum (*Paspalum laeve* var. *circulare*) occurs throughout the upland and wetland portions of the airfield survey area in various densities. This species was observed in areas that will be disturbed by the Runway Extension, Terminal Expansion, and Tuttle Brook. The highest density areas total approximately 19 acres and account for between 66.92% - 68.15% of the total extant population. These sections are primarily outside of the project impact limits except for 2 acres where turf to turf conversion is proposed.

  - The largest single impact will be in the Terminal Expansion Area, estimated at maximum of 1 acre of direct impact.

  - Project related land conversion alterations from terrestrial habitat (pervious) to pavement (impervious) will impact an estimated 2.51% to 3.53% of the extant field paspalum population. Other non-permanent impacts, such as turf to turf conversions have the potential to impact between 52.39% - 53.25% of the extant population.

If the protection measures for Field paspalum set forth below are implemented, I do not anticipate significant impacts to state listed plant species resulting from this project.

Modified Protection Plan for Field Paspalum

1. Due to the observed negative impact of hydroseeding using non-native species on the existing field paspalum population, it is recommended that seeding of any kind be abandoned as a revegetation strategy on the airfield at any location where this rare species occurs. Otherwise, Turf-to-Turf (TTT) conversions have the potential to reduce field paspalum populations dramatically if hydroseeding with non-native species is used following the construction phase of this project. There are 8 specific locations where both TTT and Pavement-to-Turf (PTT) land conversion is proposed, and field paspalum is present. These locations (see Rare Plants Map in Appendix A), totaling 31 acres, will be allowed to revegetate naturally from the existing seed bank (Table 7). Promoting the growth of field paspalum in these areas will compensate for plants lost to the footprint of the new terminal. Based on the average seed count per individual plant collected during the 2024 seed collection, it is conservatively estimated that 4 to 8 million seeds are present across the survey area. Specifically in the proposed TTT land conversion areas, the estimate is 1.89 – 3.75 million seeds (Table 7). Only 1.18% of the available seed bank in these TTT areas would need to germinate to replace the number of individuals potentially lost in the Terminal Expansion Area.

2. Compensation for plants lost to the footprint of the new terminal will also be provided if areas where PTT conversions remove pavement are allowed to revegetate naturally. If erosion controls are required to satisfy BMPs, a biodegradable, stable, product like BioNet Biodegradable Erosion Control Blankets will be used to stabilize soil and limit erosion to meet Federal Aviation Administration (FAA) regulations without the use of non-native or non-local ecotype seed stock. These small areas of PTT conversion are proposed in Tweed New Haven Airport Sections 1 – 4, 6 – 9, 14 – 15, 18, 20 – 21 and 23. The approximate size of these specific PTT conversions where rare plants occur totals 1.44 acres. Refer to Appendix A of *The Report and Protection Plan* for maps of these locations.

3. To retain the seed bank present for the TTT land conversion portion of this project, topsoil in each TTT area will be segregated to retain any potential field paspalum seeds present. At the completion of construction, the topsoil will be returned to each area where grading has occurred. The naturally revegetated areas total 31 acres.

4. Future monitoring of these sites is required for 5 growing seasons after the topsoil has been returned to the TTT areas and PTT areas to determine if natural revegetation of field paspalum is occurring in select areas where TTT land conversion disturbed the soil. If field paspalum recruitment is low in years post-construction, seeds collected during the 2024 growing season will be contract grown and transplanted onto the sites (31 acres) of previous occurrence. Yearly monitoring reports, including counts or scientifically robust statistical estimates of numbers of genets, assessments of population vigor, and rates of increase or decrease, shall be submitted to DEEEP NDDB (deep.nddbrequest@ct.gov) by Dec. 31 of each year of monitoring.

5. Secondary mitigation involves seed collection. Seed collection was approved, conducted, and completed during the mature fruiting window in November 2024. If the primary mitigation strategy fails, transplanting field paspalum plugs from contract-grown seed collected in 2024 to revegetate the site would provide mitigation post construction. The number of the seeds collected (8,464) from the Terminal Expansion Area are estimated to be 3.7X to 5.3X the number of plants represented by the

potential taking of this species.

6. Monitoring of the mitigation areas will occur annually until one of the two following criteria is met. Stipulation 1, the population has exceeded a 3:1 ratio based on the highest total impact numbers to this species (44,098) i.e. a total repopulation estimate of the converted areas exceeds 132,294. Or Stipulation 2, the area has been monitored for five years without sufficient recruitment to meet stipulation one, but the population has approximately met and/or substantially exceeds the highest total impact numbers to this species (44,098). This stipulation triggers an evaluation a consultation with DEEP NDDB and evaluation of the observed rate of increase in the population over the 5 years of monitoring. If, based on the observed rate of increase over the last 5 years, it appears clear that the population is likely to meet the Stipulation 1 population target eventually, NDDB may consider the mitigation complete, at NDDB's sole discretion. Or Stipulation 3, the area has been monitored for five years without sufficient recruitment to meet stipulation 1, and the population is substantially less than the highest total impact numbers to this species (44,098). This situation triggers a request for the 2024 collected seed to be grown by Native Plant Trust and replacement plugs of this species are planted into the 8conversion areas. Planting of the plugs into the 8 conversion areas will restart the monitoring clock, and yearly monitoring shall continue for 5 more years, or until the population meets the criteria of Stipulation 1 or 2.

- Saltpond grass (*Leptochloa fusca* var. *fasciculata*) was observed in two distinct locations. Neither of these areas are within the footprint of the proposed Airport projects, and therefore these plants will not experience any impact from these projects.

Grassland Birds

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Horned lark (*Eremophila alpestris*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern

On April 9, 2025, NDDB was provided with the document *DRAFT Grassland Bird Habitat Mitigation Plan Developed for Pre-application Review*. NDDB understands this to be the final version of the document. NDDB has reviewed the document and finds the proposed measures acceptable as mitigation for impacts to state-listed grassland bird species. A copy of this document is included as an attachment to this letter. In summary, the Plan proposes:

- Establishment of a dedicated grassland bird conservation site at the 76-acre Warren Property in Eastford, Connecticut. The site features a mix of grassland, floodplain, and forested areas, with over 25 acres of grassland fields and low-vegetation habitat areas designated for enhancement and permanent protection.
- The site will be managed as an early successional grassland bird habitat in perpetuity.
- Conduct pre-enhancement bird surveys and annual follow-up surveys (beginning in 2028)
- Short-term period (five years) of habitat enhancement and adaptive management including:
  - seeding of native grassland species
  - selective removal of patches of invasive and undesired woody vegetation
  - implementation of a rotational mowing strategy to prevent woody encroachment

- Long-term adaptive management performed in perpetuity, to be informed by annual vegetative surveys and follow-up bird surveys. Approaches include:
  - annual mowing (rotational – 1/3 per year)
  - selective vegetation control and shrub management
  - removal of invasive species
  - periodic monitoring. NDDB recommends utilizing volunteers for supplemental monitoring efforts.
- Partnership with Joshua's Trust – After the initial 5-year period, either ownership or a conservation easement will be enacted with Joshua's Tract Conservation and Historic Trust, Inc (Joshua's Trust), who will then provide management in perpetuity

Additional details are available in the Plan document.

Instructions for submitting survey information and other additional reporting requirements relative to the Grassland Bird Habitat Mitigation Plan can be found at the end of this letter.

Your submission information indicates that your project requires a state permit, license, registration, or authorization, or utilizes state funding or involves state agency action. This Final NDDB Determination for Tweed New Haven Airport Runway Extension and Terminal Expansion may be utilized to fulfill the Endangered and Threatened Species requirements for state-issued permit applications, licenses, registration submissions, and authorizations.

Please be aware of the following limitations and conditions:
Natural Diversity Database information includes all information regarding listed species available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, landowners, private conservation groups and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as enhance existing data. Such new information is incorporated into the Database and accessed through the ezFile portal as it becomes available. New information may result in additional review, and new or modified restrictions or conditions may be necessary to remain in compliance with certain state permits.

- During your work listed species may be encountered on site. A report must be submitted by the observer to the Natural Diversity Database promptly and additional review and restrictions or conditions may be necessary to remain in compliance with certain state permits. Please fill out the appropriate survey form and follow the instructions for submittal.
- Your project involves the state permit application process or other state involvement, including state funding or state agency actions; please note that consultations with your permit analyst or the agency may result in additional requirements. In this situation, additional evaluation of the proposal by the DEEP Wildlife Division may be necessary and additional information, including but not limited to species-specific site surveys, may be required. Any additional review may result in specific restrictions or conditions relating to listed species that may be found at or in the vicinity of the site.
- If your project involves preparing an Environmental Impact Assessment, this NDDB consultation and determination should not be substituted for biological field surveys assessing on-site habitat and species presence.

- The Final NDDB determination for the Tweed New Haven Airport Runway Extension and Terminal Expansion, New Haven, as described in the submitted information and summarized at the end of this document is valid until April 15, 2027. This determination applies only to the project as described in the submission and summarized at the end of this letter. Please re-submit an updated Request for Review if the project's scope of work and/or timeframe changes, including if work has not begun by April 27, 2027.

Additional reporting requirements indicated above have been requested. Include the Project Name (Tweed New Haven Airport Runway Extension and Terminal Expansion, Filing ID (107828) and Determination Number 202402808 on all correspondence. Forward additional reporting requirements to each of the following two addresses:

1. robin.blum@ct.gov
2. DEEP.nddbrequest@ct.gov

If you have further questions, please contact me at the following:

Robin Blum
CT DEEP Bureau of Natural Resources
Wildlife Division
Natural Diversity Database
79 Elm Street
Hartford, CT 06106-5127
(860)424-4137
robin.blum@ct.gov

Please reference the Determination Number 202402808 or Filing ID 107828 when you e-mail or write. Thank you for consulting the Natural Diversity Data Base.

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm Street
Hartford, CT 06106-5127
(860)424-4137
robin.blum@ct.gov

April 16, 2025

Deb Coon
Hoyle, Tanner, and Associates
150 Dow Street
Manchester, NH 03101

Project: Tweed New Haven Runway Extension and Terminal Expansion – Tide Gate Alteration
NDDB 202408268 Final Determination
Filing ID: 117005
Expiration date: April 16, 2027

Dear Deb Coon,

We have received and reviewed the materials submitted pursuant to a Natural Diversity Data Base review request for Tide Gate Alteration at Tweed Airport, New Haven project. According to our records, populations of State listed species have been documented in the vicinity of the project area.

Plants:

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  Habitat: Coastal grasslands; airports; open-canopy trail sides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  Blooms: June, July
- Salt pond grass (*Leptochloa fusca ssp. Fascicularis*) – State Endangered
  Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  Blooms and fruits August - November
- Field paspalum (*Paspalum laeve*) - State Threatened
  Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial grassland/Outcrop, Grassland Subtype; Coastal Grassland.
  Fruits August – October
- Swamp lousewort (*Pedicularis lanceolata*) – State Threatened
  Habitat: Moist fields, swamp edges, wet ground, wet meadows, open swamps, stream edges, fresh tidal wetlands.
  Blooms mid-August, September
- Two-flowered cynthia *(Krigia biflora*) - State Threatened
  Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.
  Blooms June
- Hoary plantain (*Plantago virginica*) – State Special Concern

Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidc Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest. Blooms/fruits May-June. Spring and early summer ephemeral, typically disappearing by late June.

- New England blazing star (*Liatris novae-angliae*) – State Special Concern
  Habitat: Sandplains, dry fields, sandy sea beaches, rock outcrops, sandy or rocky roadsides.
  Blooms Aug, September

NDDB has received and reviewed the *Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Rare Plant Survey Report and Protection Plan*, *December 2024, Revised March 2025 (The Report and Protection Plan)*. Note that *The Report and Protection Plan* addresses both the Runway Extension and Terminal Expansion (NDDB 202402808, Filing 107828), as well as the Tide Gate Alteration components of the project (NDDB 202408268, Filing ID 117005). NDDB has additional information from botanist Tom Groves provided via email correspondence dated April 10, 2025. This information is relative to Runway Extension and Terminal Expansion activities and is addressed and incorporated in the NDDB review of those project activities. NDDB accepts the information provided in *The Report and Protection Plan*. A summary of *The Report and Protection Plan* information relative to Tide Gate Alteration activities is described below, and *The Report and Protection Plan* is attached to this determination.

- Survey work conducted between October 16 – 17 included a vegetative community and habitat suitability assessment in the Tide gate Alteration Area to estimate the likelihood of target species presence in selected locations. The survey was broadened to include any plant species within the species' genera because the survey was conducted outside of the proper flowering window for most of the target species.
- There were no observations made of any target species in the tide gate alteration area during the October 2024 surveys. Due to a moderate to heavy density of common reed in this survey area, and the density of common reed thatch covering the soil, the habitat in the tide gate alteration area is unsuitable for any of the target species.
- Tide gate alteration impact areas were increased by 3.8 acres after the 2024 field season. Therefore, a presumed presence approach will be utilized for seven state-listed species. The need to implement any of the suggested mitigation strategies will be verified by BSC Botanists during the 2025 field season. Of note, NDDB has indicated to BSC botanist that suitable habitat is likely only for yellow thistle (*Cirsium horridulum*) and therefore survey work should focus on this species. However, given the limited acreage that needs to be covered, BSC botanists should give consideration to all seven target species.
  - Mitigation strategies for the seven target species will all involve seed collection. Collected seeds will be sorted, counted and labeled according to Native Plant Trust NEPCoP Seed Collection Protocols and stored with NASAMI Farm for propagation.
  - Yellow thistle (E) – This perennial will be transplanted if observed within the additional survey areas. Transplanting this species will include a site assessment of the current location, associated species, elevation, soil type, moisture content and habitat characteristics to determine the best transplant location site on airport property.
  - Two flowered cynthia (T) – As a perennial species, transplanting any observed individuals to a similar location based on collected in situ habitat characteristics to include associated species, elevation, soil type, moisture content and habitat characteristics will be used to locate a suitable transplanting location that is buffered from any present or future project impacts.
  - Saltpond grass (E) – If this species is observed in any of the 2025 survey locations, individuals will be transplanted 200 feet north of Pig Farm Road to an area where a subpopulation is already known to occur. This area has existing available habitat and is protected from airport project impacts.
  - Field paspalum (T) – Observed individuals of this species will be transplanted to non-impacted locations 200 feet north of Pig Farm Road where a subpopulation of this species is already known to occur.

- Swamp lousewort (T) – If this species is observed a meter-by-meter plot will be created around any individual or population. Both vegetative and abiotic factors within the plot will be recorded and used to determine a suitable transplanting location elsewhere on the Tweed New Haven Airport Property. A suitable new location for transplants will have a similar host vegetation, especially to include similar species composition and densities of graminoids and composites.
- New England blazing star (SC) – If this species is observed, individuals will be transplanted to non-impacted locations. The area 200 feet north of Pig Farm Road where other rare plants occur has available suitable sandy exposed habitat.
- Hoary plantain (SC) - If this species is observed, individuals will be transplanted to non-impacted locations. The area 200 feet north of Pig Farm Road where other rare plants occur has available suitable sandy exposed habitat.
- Translocation sites may require habitat management or invasive plant management to create suitable conditions for the target species.
- Monitoring of transplant areas will take place during the appropriate identification windows for each species. Monitoring is recommended to occur in any transplant location for up to five years. If at any time during these five years the population fails to meet the required species recruitment ratio, additional plants will be requested to be grown by Native Plant Trust for further transplantation.
- Adaptive management during these five years may be required to alter, expand, or manage the selected transplant site to enhance available habitat for the transplants if population numbers are declining.

Grassland Birds:

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern

In association with the NDDB review of the Runway Extension and Terminal Expansion portion of this project (NDDB 202402808 Filing 107828), the Grassland Bird Habitat Mitigation Plan, dated April 2025 was provided to NDDB on April 9, 2025. NDDB has reviewed and accepted this plan to mitigate for impacts to grassland birds from project activities implemented under the Runway Extension and Terminal Expansion project and the Tide Gate Alteration project. The Grassland Bird Habitat Mitigation Plan is attached and made part of this determination.

Fish:

- Sand tiger shark (*Carcharias taurus*) – State Special Concern
- Atlantic seasnail (*Liparis atlanticus*) – State Special Concern
- Radiated shanny (*Ulvaria subbifurcata*) – State Special Concern

Contact a DEEP Fisheries Biologist for more information regarding potential impacts to listed fish species. You may need to submit a fisheries consultation form.

Your submission information indicates that your project requires a state permit, license, registration, or authorization, or utilizes state funding or involves state agency action. This NDDB - New determination may be utilized to fulfill the Endangered and Threatened Species requirements for state-issued permit applications, licenses, registration submissions, and authorizations.

Please be aware of the following limitations and conditions:
Natural Diversity Database information includes all information regarding listed species available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Natural History Survey and cooperating units of DEEP, land owners, private conservation groups and the scientific community. This information is not necessarily the result of

comprehensive or site-specific field investigations. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as enhance existing data. Such new information is incorporated into the Database and accessed through the ezFile portal as it becomes available. New information may result in additional review, and new or modified restrictions or conditions may be necessary to remain in compliance with certain state permits.

- During your work listed species may be encountered on site. A report must be submitted by the observer to the Natural Diversity Database promptly and additional review and restrictions or conditions may be necessary to remain in compliance with certain state permits. Please fill out the appropriate survey form and follow the instructions for submittal.
- Your project involves the state permit application process or other state involvement, including state funding or state agency actions; please note that consultations with your permit analyst or the agency may result in additional requirements. In this situation, additional evaluation of the proposal by the DEEP Wildlife Division may be necessary and additional information, including but not limited to species-specific site surveys, may be required. Any additional review may result in specific restrictions or conditions relating to listed species that may be found at or in the vicinity of the site. If your project involves preparing an Environmental Impact Assessment, this NDDB consultation and determination should not be substituted for biological field surveys assessing on-site habitat and species presence.
- The NDDB - New determination for the Tweed New Haven Runway Extension and Terminal Expansion – Tide Gate Alteration as described in the submitted information and summarized at the end of this document is valid until 4/16/2027. This determination applies only to the project as described in the submission and summarized at the end of this letter. Please re-submit an updated Request for Review if the project's scope of work and/or timeframe changes, including if work has not begun by 4/16/2027.

If you have further questions, please contact me at the following:

Robin Blum
CT DEEP Bureau of Natural Resources
Wildlife Division
Natural Diversity Database
79 Elm Street
Hartford, CT 06106-5127
(860) 424-4137
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Please reference the Determination Number 202502546 when you e-mail or write. Thank you for consulting the Natural Diversity Data Base.

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Grassland Bird Habitat Mitigation Plan

April 2025

Prepared for:
Connecticut Department of Energy & Environmental Protection

Project Name:
Tweed New Haven Regional Airport Runway Extension and Terminal Expansion

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Appendix E Email from the President of Joshua's Trust

1. Executive Summary

This Grassland Bird Habitat Mitigation Plan is submitted in support of the proposed Tweed New Haven Regional Airport (Airport) Runway Extension and Terminal Expansion Project (the Proposed Project) on behalf of the Tweed New Haven Airport Authority (TNHAA) and The New HVN, LLC.

The Proposed Project will impact 3.96 acres of grassland bird habitat that was created as a prior permit condition. This Plan has been developed to serve as mitigation for the loss of grassland bird habitat at the Airport resulting from those impacts and the continuation of the current grassland management regime.

The objective of this mitigation plan is to enhance and preserve an existing grassland ecosystem to support biodiversity, including grassland birds, particularly targeting the conservation needs of the targeted species, savannah sparrow.

The mitigation plan establishes a dedicated grassland bird conservation site at the Warren Property in Eastford, Connecticut. The 76-acre mitigation site features a mix of grassland, floodplain, and forested areas, with over 25 acres of grassland fields and low-vegetation habitat areas designated for enhancement and permanent protection. The site is currently managed for agriculture but upon commencement of the mitigation plan, the site will be managed as an early successional grassland bird habitat in perpetuity. The presence of Bungee Brook and its floodplain provides critical resources for grassland bird species and enhances habitat connectivity. This site's proximity to protected lands, its existing habitat conditions, and its documented use by grassland species make it a suitable and strategic location for the mitigation.

A central focus of the plan is a five-year period of habitat enhancement and adaptive management achieved through the seeding of native grassland species, the selective removal of patches of invasive and undesired woody vegetation, and the implementation of a rotational mowing strategy to prevent woody encroachment. These practices will create high-quality, diverse grassland ecosystems that support the ecological needs of grassland bird species and other wildlife.

Long-term management is a cornerstone of the plan, establishing a perpetual framework to ensure the sustainability of the grassland habitat. Adaptive management, including the rotational mowing schedule in the late fall and ongoing vegetation management will continue in perpetuity, to forever maintain the open landscape and preserve its ecological integrity. By fostering an environment that supports a variety of grassland-dependent species, the plan aims to promote biodiversity and enhance the site's overall ecological value.

Collaboration with the landowners of the property, the Warrens, and a local conservation organization, Joshua's Trust, strengthens the plan's long-term success, creating a model for preserving Connecticut's declining grassland habitats and the species that depend on them. This mitigation plan exemplifies a steadfast commitment to ecological stewardship and the sustainable management of critical natural resources.

This grassland mitigation plan has been revised to address comments from the Connecticut DEEP's Natural Diversity Database (NDDB) Wildlife Biologist and includes modifications to accommodate

brown thrasher (*Toxostoma rufum*) habitat while maintaining suitable conditions for savannah sparrows. Mitigation plan updates include strategic retention of shrub patches, vegetation and invasive species management to be performed by Joshua's Trust in the long-term, a revised mowing regime to promote habitat diversity, and annual follow-up bird surveys beginning in spring 2028 to assess habitat usage and inform adaptive management. Joshua's Trust is committed to the long-term management described herein.

2. Proposed Project Introduction

The Tweed New Haven Regional Airport (Airport) Runway Extension and Terminal Expansion Project (the Proposed Project) consists of the extension and strengthening of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property (Figure 1 Proposed project location).

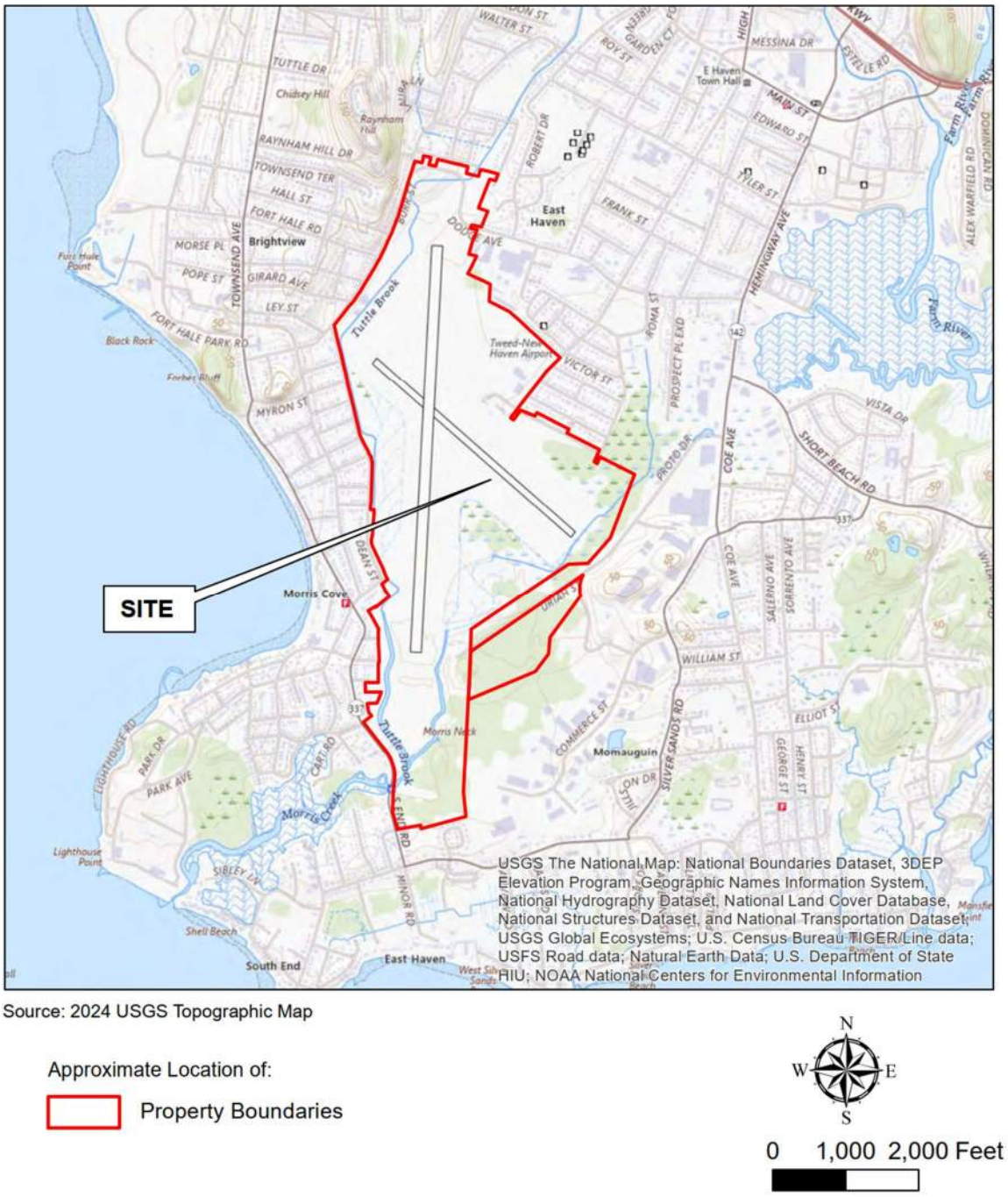


Figure 1 Proposed project location.

Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways.

The **proposed runway improvements** (extension and drainage) include:

- Extension of Runway 02-20, which entails an approximate addition of 639 feet at the Runway 02 end and 336 feet at the Runway 20 end.
- Adjustment of runway cross-section and profile to be compliant with FAA standards.

- Strengthening of existing runway to meet pavement design requirements of the existing aircraft fleet.
- Incidental grading, stormwater drainage and markings.
- Adjustment of and calibration of navigation aids for both runway ends.
- Installation of runway edge lighting, guidance signs, and other accessory features to be compliant with FAA design standards.

The **proposed East Terminal development** includes:

- New East Terminal Building
    - Construction of a new terminal building ("East Terminal") on the east side of the Airport with an approximate gross square footage (SF) (functional area) of 80,000 SF, with four (4) aircraft gates and two (2) additional aircraft boarding positions (6 total, all ground boarding).
    - Installation/relocation of security fencing and vehicle access gate.
    - Incidental site work, including grading, installation of a stormwater management system and connection to existing on-site utilities such as electricity, water, wastewater, telephone and internet, and site work activities.

- New Apron at East Terminal
    - Construction of a new aircraft apron, with an area of approximately 450,000 SF, including ancillary site elements, would include two (2) Remain Overnight (RON) parking positions and six (6) gate parking positions.
    - Construction of two access taxilanes from the terminal apron to an extended Taxiway A.
    - Incidental site work, including deicing pads, blast deflector fence, grading, stormwater management system and utilities.
    - Removal of a FAA owned decommissioned very high frequency omni-directional range (VOR).

- New Vehicle Parking and Access Road
    - Construction of approximately 2,000 new parking spaces with an approximate footprint of 1,042,000 SF, including building support areas, to serve the new East Terminal.
    - Construction of a causeway and new two-lane (with potential to expand to four lane) airport access road from Proto Drive and associated improvements.
    - Installation of electrical lighting, wayfinding, signage, landscaping associated with new parking.
    - Incidental site work, including grading, stormwater management system and utilities.

The Proposed Project takes into consideration the Airport's location within the 100-year floodplain and incorporates resiliency measures, such as raising the finished floor elevation above the 100-year flood base flood elevation, placing key building mechanical systems in a raised mezzanine or on roof top locations where they will be above flood elevation, and site design considerations to promote drainage and increase flood resistance for site facilities.

The proposed East Terminal will be constructed on piers, raising the finished floor elevation above mean sea level. The space below the finished floor elevation will be left open to allow floodwater to pass. Additionally, the project will take place within the airport property and within an existing airport-dedicated easement. The new access road will connect with existing Proto Drive; therefore, limited construction would occur within public rights-of-way which mainly entails roads in the immediate vicinity of the Airport. No private property will be acquired as part of the Proposed Project.

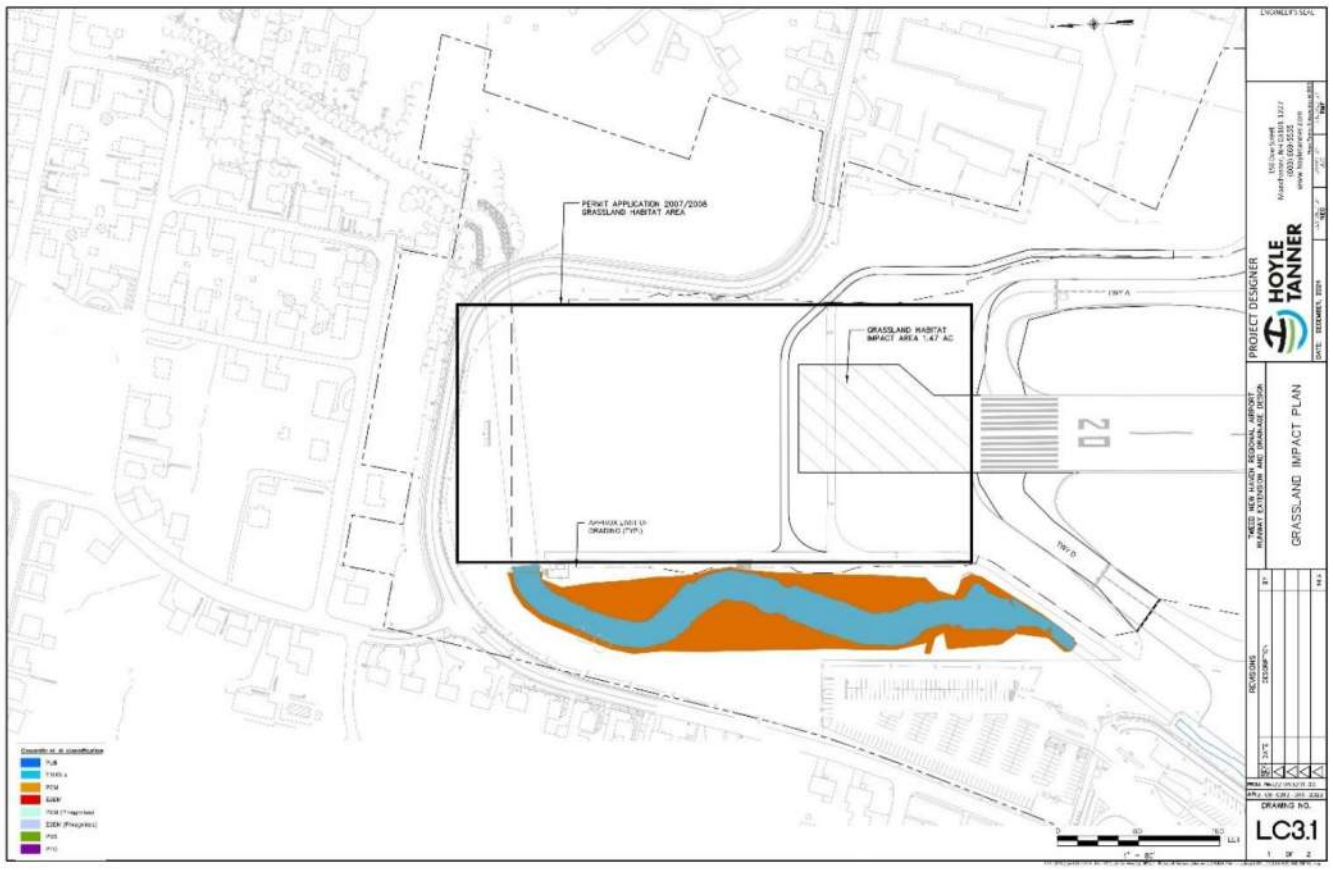


Figure 2 Proposed project impacts.

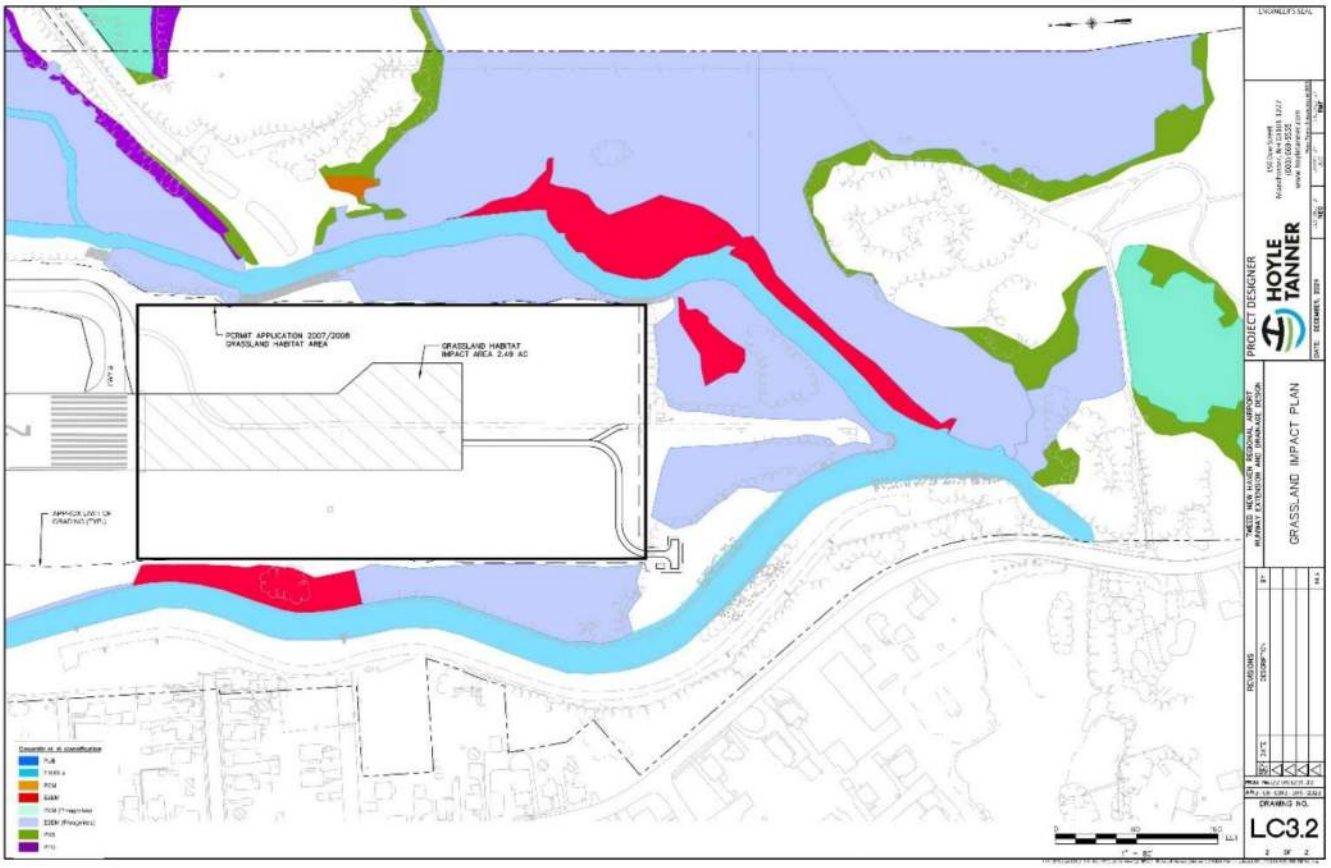


Figure 3 Proposed project impacts.

As a result of these activities, the Proposed Project will impact 3.96 acres of the 23-acre grassland bird habitat that was developed to address prior permit conditions (Figure 2 and Figure 3 Proposed project impacts).

3. Proposed Project Site

3.1 Regulatory Context

In 2007/2008 the TNHAA received permits from the CT Department of Energy and Environmental Protection (DEEP) for extension of the Runway 02-20 Safety Areas; Permits 200003049-KZ, IW-2000-116, DIV-200003052 and WQC-200003051 were issued for that project and contain specific conditions or reference to conditions that were included in plans provided at that time that addressed impacts to grassland bird habitat. Specifically, conditions included seeding disturbed lands with a mixture of warm seasonal grasses making up approximately 23 acres of new or enhanced grassland habitat, and submittal of a mowing plan for the 23 acres of grassland noted above. The area in question of 23 acres was intended to be comprised of the approximately 500'X1000' RW 2 Safety Area and the 500'X1000' RW 20 Safety Area.

A Grassland Management Plan (to serve as the mowing plan referenced above) was developed and submitted to CT DEEP in response to these permit conditions. The original plan was dated February 2008 and noted that the plan was developed to serve as a guideline for grassland management at the airport, but the goal of the plan has to remain in balance with the FAA's requirements, specifically FAA Advisory Circular 150/5200-33 *Hazardous Wildlife Attractants on or near Airports*. Notably, the 23-acre RSAs that were planted with warm season grasses were identified as being mowed between heights of 4-6 inches, to address FAA requirements.

Further coordination with FAA resulted in a supplement to that plan, dated April 2011 that was developed in response to the continued wildlife hazard issues that the airport was facing as documented in their Wildlife Hazard Management Plan. Specifically, areas that were initially identified as non-safety or non-critical areas that could be mowed once annually and not before September 1, were shifted to allow for mowing as needed to prevent seed growth and heights at which the grasses could be used for food or cover. This was in response to several wildlife hazard incidents, and it is crucial to future efforts that all parties recognize that the airport currently continues to follow this supplemented plan and mows all grassed areas as needed to keep grasses between 7"-14" to reduce the potential for grasses to attract wildlife, including grassland birds.

Coordination with CT DEEP Bureau of Natural Resources, Wildlife Division for the Proposed project (documented in Appendix A) was initiated by filing an NDDB Review. The response, Filing ID 107828, dated May 17 2024 identified the following grassland bird species:

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Horned lark (*Eremophila alpestris*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern

Follow-up coordination resulted in the investigation of an off-site location that could serve as grassland bird habitat mitigation. This site has prior recorded use by a species of special concern, brown thrasher (*Toxostoma rufum*) per communication with DEEP. The site was identified and is discussed further as the proposed mitigation site. DEEP has asked that a minimum of 25 acres be provided for offsite mitigation with the potential for more acreage if the habitat needs enhancement, part of the soils are excessively wet, or areas of the parcel are not favorable for nesting by this species for some other reason, and that documentation of current species use of the mitigation area will be factored into the minimum acreage proposals.

3.2 Proposed Project Site Description

The Proposed Project Site is located at the Tweed New Haven Airport (Airport) which is located on the boundary between the City of New Haven and the Town of East Haven, Connecticut. The Airport is situated approximately ¾-mile north of Long Island Sound, ¼-mile east of New Haven Harbor, and ¼-mile from Morris Cove. The Airport is a commercial service airport owned by the City of New Haven. TNHAA has full control of the operation and management of the airport, including land,

buildings and easements by virtue of a lease to the authority by the City of New Haven. On August 19, 2022, TNHAA entered into a long-term Lease & Development Agreement with The New HVN, LLC.

The Airport has been managed since 2009 to reduce wildlife hazards by mowing all grassland within the airport boundary to remain in balance with the FAA's requirements, specifically FAA Advisory Circular 150/5200-33 *Hazardous Wildlife Attractants on or near Airports.* Notably, this management includes the 23-acre area within the Runway Safety Areas (RSAs) that was planted with warm season grasses to serve as grassland bird habitat as a condition of prior permitting (see 3.1 Regulatory Context). As a result of these practices, the airport does not currently contain functional grassland bird habitat and does not intend to manage grassland on the airport for grassland birds in order to maintain safe conditions for aviation use as is the intended purpose of an airport.

3.3 Species surveys

As recommended by CT DEEP NDDB in the request for additional information Filing ID 107828 for the proposed project, a survey of grassland bird use was conducted at the Airport in 2024 (Appendix B). Only a single state-listed species, savannah sparrow (*Passerculus sandwichensis*), was observed using the airport habitats.

The Wildlife Hazard Assessment conducted in 2007 through 2008 for the permits required for the Runway 02-20 RSA extensions documented savannah sparrow, horned lark and eastern meadowlark. No other wildlife or bird surveys have been conducted between those surveys and the survey conducted in 2024. The reduction in grassland bird species diversity is reflective of the change in management of grassland within the airport.

4. Grassland Mitigation

4.1 Mitigation Site Introduction

The Warren Property, located in Eastford, Connecticut, along Bungee Brook, is the proposed mitigation site for grassland bird habitat. This approximately 76-acre parcel in Windham County comprises a mix of grassland and forested habitats and is currently managed for agricultural uses, including hay production, corn cultivation, and maple syrup harvesting. A key ecological feature of the property is Bungee Brook and its associated floodplain, which traverse the site, enhancing habitat connectivity and providing critical resources for wildlife.



Figure 4 Warren Property site.

The property includes over 25 acres of open habitat comprising of grassland fields and low-vegetation areas that support documented populations of Connecticut-listed special concern grassland birds and other threatened and endangered species. The Warren Property's proximity to existing protected lands further enhances its potential to contribute to a larger, contiguous landscape for grassland species.

Strong local support from the environmental community highlights the importance of preserving this unique site. Additionally, Joshua's Trust, a highly knowledgeable and dedicated local conservation organization, has committed to participating in the long-term success of the project with financial support coming from The New HVN, LLC.

4.2 Existing Conditions of the Mitigation Site

The existing conditions of the Warren Property (mitigation site) have been recorded by ornithologists, biologists, and herpetologists in numerous reports and site visits. Additionally, the mitigation site conditions are documented in publicly available databases and surveys. The sections below summarize the existing soils, vegetation, and observed wildlife species for the mitigation site.

4.2.1 Existing soils

Mitigation site soils are of two origins. The first is Pleistocene glaciofluvial sands and gravels carried by glacial melt water that are well drained to the point of being droughty. The second is Holocene

alluvial sediment associated with the floodplain of Bungee Brook. According to the USDA[1], UCONN[2], and CTDEEP[3] the soils represented are as follows (refer to Figure 5 Soil map units for the mitigation site):

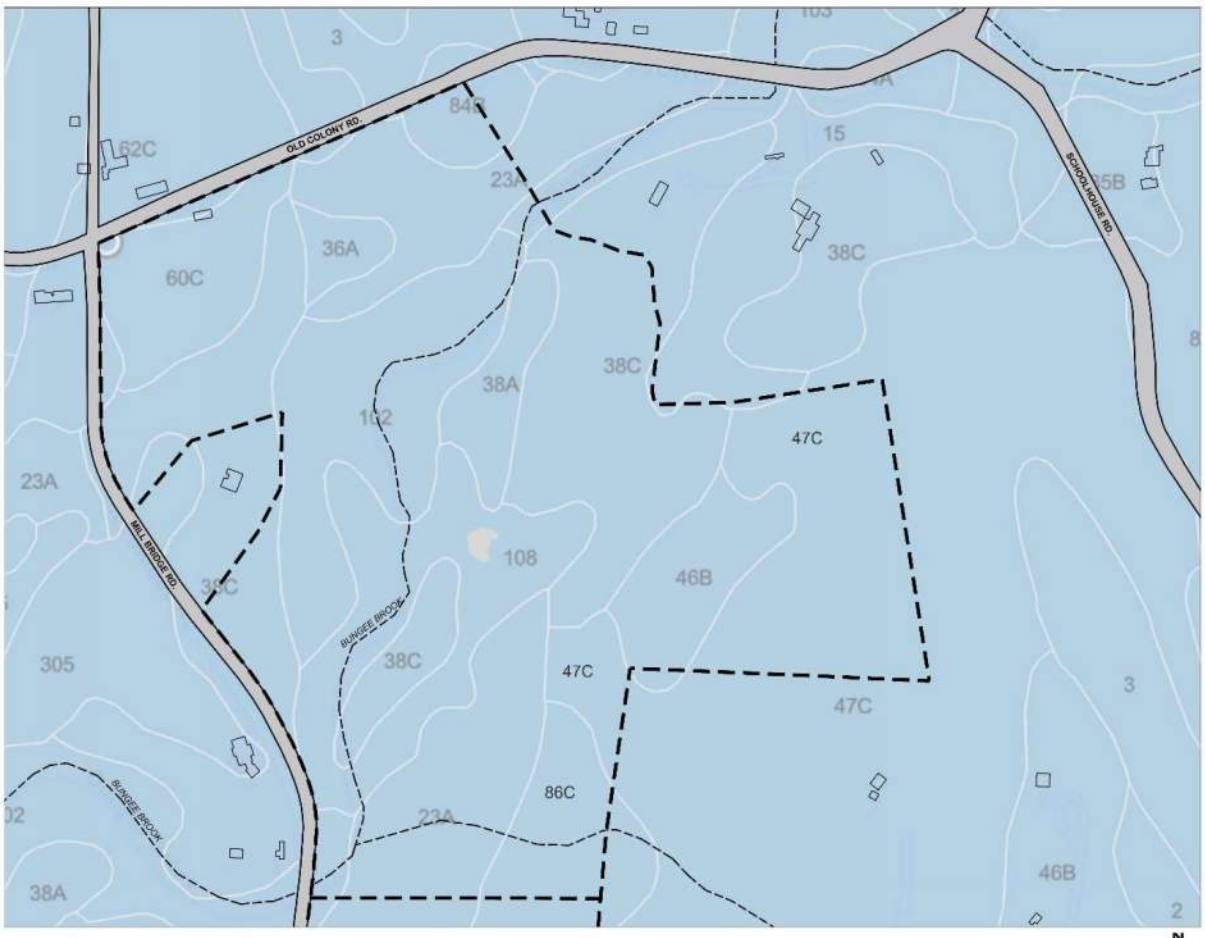
- 23A Sudbury Sandy Loam. Moderately well drained; very strongly to moderately acidic;
- 36A Windsor Sandy loam. Excessively drained; very strongly to mildly acidic.
- 38 A; 38 C Hinckley Gravelly sandy loam. Excessively drained; extremely to moderately acidic;
- 60C Canton-Charlton Soils. Gravelly and/or sandy loams; excessively to moderately drained; excessively to moderately acidic;
- 84B Paxton and Montauk Fine Sand Loam. Well drained; very strongly to moderately acidic;
- 102 Pootatuck Fine Sandy Loam. Moderately well drained; very strongly to moderately acidic; and
- 108 Saco Silt Loam. Very poorly drained; very strongly acidic to neutral.

The dominant condition of very well drained, acidic soil is propitious for the management of grassland due to the xeric moisture regime, acidic soil interfering with nutrient availability, and the tendency of sandy soil to leach nitrogen. However, maintaining grassland in the northeastern US requires continued management due to average precipitation supporting the establishment of forest canopy. Existing site conditions of low moisture, low pH, and low nitrogen as nitrate make the continued management of herbaceous plant cover less onerous.

Existing grassland soil conditions at the airport project site are listed by the CT.gov GIS data as Udorthents-Urban land complex soils. This soil type is generally well-draining, level or gently sloping, and typically indicative of areas where original soils have been removed or covered with loamy fill material. Such soil conditions are well-suited for grassland species due to their dry and well-draining substrate.[4]

The soils at the mitigation site share many similarities with the airport's Udorthents-Urban land complex soils in their suitability for supporting grassland habitat. The mitigation site's predominant soil types such as Sudbury Sandy Loam, Windsor Sandy Loam, Hinckley Gravelly Sandy Loam, and Paxton and Montauk Fine Sandy Loam, are well to excessively drained, with sandy or gravelly textures that promote good drainage—key characteristics for grassland establishment. While some areas, such as those with Saco Silt Loam, are poorly drained, the majority of the mitigation site's soils align closely with the well-draining conditions found at the airport, making them equally conducive to creating and maintaining grassland habitat.

[1] (United States Department of Agriculture and Natural Resource Conservation Service, 2003)
[2] (University of Connecticut, 2023)
[3] (Connecticut Department of Energy & Environmental Protection, 2009)
[4] (BSC Group, December 6, 2024)



Soil Map Unit Symbol	Soil Map Unit Name
60C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes
36A	Windsor loamy sand, 0 to 3 percent slopes
84B	Paxton and Montauk fine sandy loams, 3 to 8 percent slopes
23A	Sudbury sandy loam, 0 to 5 percent slopes
38C	Hinckley loamy sand, 3 to 15 percent slopes
102	Pootatuck fine sandy loam
38A	Hinckley loamy sand, 0 to 3 percent slopes
108	Saco silt loam, frequently ponded, 0 to 2 percent slopes, frequently flooded
46B	Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony
47C	Woodbridge fine sandy loam, 3 to 15 percent slopes, extremely stony
86C	Paxton and Montauk fine sandy loams, 3 to 15 percent slopes, extremely stony

Figure 5 Soil map units for the mitigation site.

4.2.2 Vegetation

eDesign Dynamics visited the mitigation site on October 18, 2024, for a preliminary site and vegetation rapid assessment. The eDesign Dynamics team consisted of ornithologist Michael Feller and ecologist Eric Rothstein. At the time of the site assessment the larger vegetation matrix was a mowed pasture/grasslands and cornfield. Other plant community associations observed are as follows:

- Bungee Brook Floodplain

Alnus sp. (alder)
Asclepius incarnata (swamp milkweed)
Bohemeria cylindrica (stinging nettle)
Cornus sericea (grey dogwood)
Dicanthelium clandestinum (deer tongue)
Eutrichium sp. (Joe Pye weed)
Polygonum acerifolium (tear thumb)
Salix nigra (black willow)
Scirpus cyperinus (woolgrass)

- Hedgerow Thicket
  Celastrus orbiculatus (Asiatic bittersweet)
  Prunus serotinum (black cherry)
  Pytolacca americana (pokeweed)
  Rubus sp. (raspberry bramble)

- Shelter Belt at Eastern Edge of Property
  Clematis sp. (clematis)
  Cornus sericea (grey dogwood)
  Euonymous elatus (burning bush)
  Malus sp. (crab apple)
  Rosa multiflora (multiflora rose)
  Sambucus canadensis (elderberry)

- Shrub Swamp
  Alnus sp. (alder)
  Lonicera cf. tartarica (Tartarian honeysuckle)
  Salix sp. (willow)

- Vegetated Swale
  Populus tremuloides (quaking aspen)
  Rosa multiflora (multiflora rose)
  Thelypterus palustris (marsh fern)
  Typha latifolia (cattail)

- Vegetated Buffer along Old Colony Road
  Acer rubrum (red maple)
  Acer saccharum (sugar maple)
  Celastrus orbiculatus (Asiatic bittersweet)
  Eleagnus umbellatus (autumn olive)
  Euonymous elatus (burning bush)
  Euthamia sp. (flat-topped goldenrod)
  Populus deltoides (eastern cottonwood)
  Solidago sp. (goldenrod)

In addition to the vegetation listed above, the site includes a steep woody slope on the northwest and west the easternmost field. At its northern extent, the forest canopy is formed from mature mixed oaks. The stature of the trees decreases and species composition changes to include more black cherry and white pine.

Over 25 acres of open habitat comprised of grassland fields and low-vegetation areas exist on the property with two large contiguous areas bisected by the Bungee Brook floodplain. Research suggests that the existing floodplain between the two habitat patches may be facultative and provide better habitat for grassland birds than a grassland of equal size and shape that is adjacent to a forest[5].

4.2.3 Documented species

Several species inventories have been conducted at the mitigation site including both herpetology assessments and bird surveys. The Natural Diversity Database (NDDB) indicates that the wood turtle, American kestrel, and brook floater, all species of special concern, have been documented within or close to the Property. In addition, CT DEEP's NDDB Wildlife Biologist noted that the brown thrasher (*Toxostoma rufum)*, a CT-listed Species of Special Concern, has been documented at the site (see Appendix A Regulatory Communication).

On August 8, 2024, professor of conservation biology at the University of Connecticut, Chris Elphick, visited the Property and observed several bird species.[6] The species included Species of Special Concern, bobolink. Several bobolinks were seen on site including at least one female acting in an agitated manner, indicating the bird had a nest in the field. Dr. Elphick also noted that the site is also suitable for other state-listed bird species (American kestrel, alder flycatcher, brown thrasher), some of which have been reported on the Property.

Bryan Avery, land protection manager at Joshua's Trust, and Andy Rzeznikiewicz, land manager for the Audubon Pomfret Center observed several bird species while onsite during June 5, 2024. The species include:

CT State Listed Species:

- *Dolichonyx oryzivorus* (bobolink), Species of Special Concern
- *Empidonax alnorum* (alder flycatcher), Species of Special Concern
- *Progne subis* (purple martin), Species of Special Concern
- *Toxostoma rufum* (brown thrasher), Species of Special Concern

Other Species:

- *Agelaius phoeniceus* (red-winged blackbird)
- *Anas platyrhynchos* (mallard)
- *Archilochus colubris* (ruby-throated hummingbird)

[5] (Cadenasso, Pickett, Weathers, & Jones, 2003)
[6] (Chris Elphick, August 2024) see also Appendix D.

- *Ardea herodias* (great blue heron)
- *Baeolophus bicolor* (tufted titmouse)
- *Bombycilla cedrorum* (cedar waxwing)
- *Buteo jamaicensis* (red-tailed hawk)
- *Cardinalis cardinalis* (northern cardinal)
- *Catharus fuscescens* (veery)
- *Cathartes aura* (turkey vulture)
- *Certhia americana* (brown creeper)
- *Colaptes auratus* (northern flicker)
- *Contopus virens* (eastern wood-pewee)
- *Coragyps atratus* (black vulture)
- *Corvus brachyrhynchos* (American crow)
- *Corvus corax* (common raven)
- *Cyanocitta cristata* (blue jay)
- *Dryobates pubescens* (downy woodpecker)
- *Dumetella carolinensis* (gray catbird)
- *Empidonax minimus* (least flycatcher)
- *Empidonax traillii* (willow flycatcher)
- *Geothlypis trichas* (common yellowthroat)
- *Haemorhous mexicanus* (house finch)
- *Hirundo rustica* (barn swallow)
- *Hylocichla mustelina* (wood thrush)
- *Icterus galbula* (Baltimore oriole)
- *Icterus spurius* (orchard oriole)
- *Megaceryle alcyon* (belted kingfisher)
- *Melanerpes carolinus* (red-bellied woodpecker)
- *Meleagris gallopavo* (wild turkey)
- *Melospiza melodia* (song sparrow)
- *Mniotilta varia* (black-and-white warbler)
- *Molothrus ater* (brown-headed cowbird)
- *Myiarchus crinitus* (great crested flycatcher)
- *Parkesia motacilla* (Louisiana waterthrush)
- *Passerina cyanea* (indigo bunting)
- *Pheucticus ludovicianus* (rose-breasted grosbeak)
- *Piranga olivacea* (scarlet tanager)
- *Poecile atricapillus* (black-capped chickadee)
- *Quiscalus quiscula* (common grackle)
- *Sayornis phoebe* (eastern phoebe)
- *Seiurus aurocapilla* (ovenbird)
- *Setophaga petechia* (yellow warbler)
- *Sialia sialis* (eastern bluebird)
- *Sitta carolinensis* (white-breasted nuthatch)

- *Spinus tristis* (American goldfinch)
- *Spizella passerina* (chipping sparrow)
- *Stelgidopteryx serripennis* (northern rough-winged swallow)
- *Sturnus vulgaris* (European starling)
- *Tachycineta bicolor* (tree swallow)
- *Troglodytes aedon* (house wren)
- *Turdus migratorius* (American robin)
- *Tyrannus tyrannus* (eastern kingbird)
- *Vireo flavifrons* (yellow-throated vireo)
- *Vireo gilvus* (warbling vireo)
- *Vireo olivaceus* (red-eyed vireo)
- *Zenaida macroura* (mourning dove)

During eDesign Dynamics' October 18, 2024 visit to the mitigation site the team observed and recorded several bird species, including savannah sparrow (see Figure 6). The following species were observed onsite during this visit:

CT State Listed Species:

- *Passerculus sandwichensis* (savannah sparrow), Species of Special Concern

Other Species:

- *Agelaius phoeniceus* (red-winged blackbird)
- *Buteo jamaicensis* (red-tailed hawk)
- *Cardinalis cardinalis* (northern cardinal)
- *Cathartes aura* (turkey vulture)
- *Circus hudsonius (*northern harrier*)*
- *Colaptes auratus* (northern flicker)
- *Corvus brachyrhynchos* (American crow)
- *Corvus corax* (common raven)
- *Junco hyemalis* (dark-eyed junco)
- *Lanius borealis* (northern shrike)
- *Melospiza melodia* (song sparrow)
- *Sialia sialis* (eastern bluebird)
- *Sturnus vulgaris* (European starling)



Figure 6 Picture of a savannah sparrow at the mitigation site, photographed Oct 18, 2024.

On May 24, 2024, herpetologist Hank J. Gruner assessed the mitigation site's potential to support amphibian and reptile species of conservation importance. While the focus of the assessment[7] was on herpetofauna, the findings underscore the broader ecological importance of the mitigation site highlighting its role in supporting a diverse array of species and contributing to regional biodiversity. The assessment documented species with occurrences categorized as "Confirmed," "Probable," or "Possible." Confirmed species were directly observed during the site walk, while probable occurrences indicate suitable habitat and widespread regional distribution. Possible occurrences suggest the presence of suitable habitat, though the species has a more restricted distribution in the area. The following list of species were observed or documented at the mitigation site, according to the Herpetological Assessment (see Appendix C).

Amphibians

- Confirmed:
    - *Lithobates catesbeianus* (American bullfrog)
    - *Lithobates clamitans* (green frog)
    - *Lithobates sylvaticus* (wood frog)
- Probable:
    - *Ambystoma maculatum* (spotted salamander)
    - *Anaxyrus americanus* (American toad)
    - *Desmognathus fuscus* (northern dusky salamander)
    - *Dryophytes versicolor* (gray treefrog)
    - *Eurycea bislineata* (northern two-lined salamander)
    - *Lithobates palustris* (pickerel frog)

[7] (Gruner, July 2024) see also Appendix C

    - *Pseudacris crucifer* (spring peeper)
- Possible:
    - *Ambystoma opacum* (marbled salamander)
    - *Anaxyrus fowleri* (Fowler's toad)
    - *Hemidactylium scutatum* (four-toed salamander)
    - *Notophthalmus viridescens* (red-spotted newt)

Reptiles

- Confirmed:
    - *Chrysemys picta* (painted turtle)
    - *Thamnophis sirtalis* (eastern gartersnake)
- Probable:
    - *Chelydra serpentina* (snapping turtle)
    - *Clemmys guttata* (spotted turtle)
    - *Diadophis punctatus* (northern ring-necked snake)
    - *Glyptemys insculpta* (wood turtle)
    - *Nerodia sipedon* (northern watersnake)
    - *Sternotherus odoratus* (eastern musk turtle)
    - *Storeria dekayi* (DeKay's brownsnake)
    - *Storeria occipitomaculata* (red-bellied snake)
- Possible:
    - *Carphophis amoenus* (eastern wormsnake)
    - *Coluber constrictor* (northern black racer)
    - *Heterodon platirhinos* (eastern hog-nosed snake)
    - *Lampropeltis triangulum* (eastern milksnake)
    - *Opheodrys vernalis* (smooth greensnake)
    - *Terrapene carolina* (eastern box turtle)
    - *Thamnophis saurita* (ribbonsnake)

In addition, a bird species assessment was performed by Davison Environmental for a proposed solar facility at 254 Putnam Road, Pomfret Center, Connecticut, located approximately 7 miles east of the mitigation site.[8] The assessment serves as a reference landscape for the mitigation site and includes habitat evaluations and bird surveys to document the presence and potential habitat suitability for various grassland and wetland bird species, providing insights into regional avian populations and their conservation needs. According to the assessment, "[c]onfirmation of the presence of two of these species [State-listed bird species] within the project area, bobolink and savannah sparrow, were made in May 2021 during grassland bird surveys." The following is a table of state-listed bird species recorded on or near the 254 Putnam Road site during May of 2021.

[8] (Davison Environmental, 2021)

Table 1 State-listed bird species recorded at or near 254 Putnam Road.

Scientific Name	Common Name	NDDB Status	Status	Preferred Habitat	Recorded Location(s)
Asio flammeus	short-eared owl	T	Winter roost/forage	Grassland	Duck Marsh, 254 Putnam Rd
Asio otus	long-eared owl	E	Winter roost/forage	Grassland	Duck Marsh, 254 Putnam Rd
Botaurus lentiginosus	American bittern	E	Confirmed Breeding	Wetlands	Duck Marsh
Circus hudsonius	northern harrier	E	Possible Breeding	Grassland	Duck Marsh, 254 Putnam Rd
Cistothorus platensis	sedge wren	E	Confirmed Breeding	Wetlands	Duck Marsh
Dolichonyx oryzivorus	bobolink	SC	Confirmed Breeding	Grassland	Duck Marsh, 254 Putnam Rd
Falco sparverius	American kestrel	SC	Confirmed Breeding	Grassland	Duck Marsh
Passerculus sandwichensis	savannah sparrow	SC	Confirmed Breeding	Grassland	Duck Marsh, 254 Putnam Rd
Podilymbus podiceps	pied-billed grebe	E	Confirmed Breeding	Open water	Duck Marsh
Progne subis	purple martin	SC	Unknown	Nest Boxes	Unknown

4.3 Suitability of the Mitigation Site

The mitigation site is a highly suitable site for conservation for grassland bird habitat due to its ecological characteristics, alignment with established habitat preferences, documented species presence, and exceptional management potential. The significance of this property centers on its ability to support state-listed species, its scarcity as a protected grassland habitat in the region, and its suitability for a wide variety of grassland bird species, including savannah sparrows, bobolinks, and potentially eastern meadowlarks.

The proposed mitigation site is uniquely suited for this project as the land will be preserved in perpetuity and managed as an early successional grassland. Additionally, agricultural production on the site will cease upon commencement of the mitigation, allowing the land to fully transition to its intended ecological function. The Warren family's dedication to conservation, in partnership with Joshua's Trust, underscores their shared commitment to safeguarding this critical ecological resource in Connecticut. Refer to the Financial Assurances & Responsible Parties (Section 5) for additional information on the ownership and stewardship of the land.

4.3.1 Documented species preference

Connecticut-listed special concern grassland bird species have been documented on the mitigation site. Dr. Chris Elphick noted the site's suitability for additional state-listed species such as American kestrel, alder flycatcher, and brown thrasher, as well as its potential to attract nesting eastern meadowlarks. The latter species is one of the rarest nesting birds in Connecticut, confirmed at only five sites statewide during the four-year Connecticut Bird Atlas survey.

As noted in previous sections, additional on-site surveys have documented a number of grassland birds that are currently utilizing the site, including savannah sparrow. The documented presence of species underscores the ecological importance of the mitigation site for grassland bird conservation. The potential to attract additional state-listed species, such as the rare eastern meadowlark, highlights the site's critical role in supporting regional biodiversity. Targeted management practices, including habitat enhancements and mowing in perpetuity, will further promote the suitability of this area for both existing and potential grassland bird populations.

4.3.2 Habitat preferences

The site's grassland features align closely with the habitat preferences of savannah sparrows. According to Fisher and Davis, grassland bird habitat quality is strongly influenced by bare ground, litter depth, and vegetation height.[9] The current agricultural practices at the mitigation site including hay production, maintain these conditions by supporting areas of bare ground, managing litter accumulation, and ensuring medium vegetation height—critical for nesting and foraging. Future management practices will further enhance the grassland's suitability for a wide range of nesting and foraging species as mowing will be conducted in late fall, outside of nesting windows, using a rotational strategy to maximize species diversity while preventing woody encroachment.

Savannah sparrows are well-documented as thriving in such mesic environments, characterized by moderate moisture and medium vegetation height, which are typical of hayfields, idle fields, and lightly grazed pastures. Additionally, studies by Wiens[10] and Rottenbury and Wiens[11] highlight the importance of forb cover, a feature present in the mitigation site's diverse vegetated habitats. These factors make the site an ideal location for supporting savannah sparrow populations alongside other grassland bird species.

These ecological features support the site's role as a rare and vital habitat in a region where protected grasslands are scarce. Moreover, its connectivity to adjacent habitats and proximity to protected lands, including the Natchaug State Forest, further increases its conservation importance by reducing edge effects and supporting species movement across the landscape.

In addition to its value for grassland birds, the site's mix of wet meadow and shrubby edge habitats provides resources for a broader array of plant and wildlife species, further enhancing its ecological importance and benefits of preservation. For example, while savannah sparrows thrive in grassland areas, brown thrashers rely on brushy thickets and hedgerows along field edges for nesting and cover. This enhances overall biodiversity, providing essential resources for multiple species and reinforcing the importance of a balanced management approach.

4.3.3 Pre-enhancement bird survey

Before implementing any habitat enhancement activities, an ornithologist will conduct a bird survey at the mitigation site during the savannah sparrow breeding season to confirm that the site is

[9] (Fisher & Davis, 2010)
[10] (Wiens, 1973)
[11] (John T. Rotenberry, 1980)

utilized by savannah sparrows, meets their habitat requirements, and assess if the site could benefit from habitat enhancement measures.

The following bird survey methodology was informed by CT DEEP's methodology for the grassland bird survey prescribed for the project site located at the Tweed New Haven Airport. Refer to the CT DEEP Grassland Bird Habitat Conceptual Plan dated April 8, 2024, included within the Appendix A Regulatory Communication.

- Ornithologist to conduct three visits during the breeding season; savannah sparrow breeding season informed by the Connecticut Bird Atlas as May 10 through August 1st.[12]
- For standard grassland point count surveys, each point location consists of a 100-meter radius plot centered on the observation point with a minimum distance of 250 meters between observation points. Points will be identified through a desktop evaluation of the survey area and GPS located in the field. All birds seen/heard within approximately 100 meters of a point are recorded, and birds observed beyond 100 meters from a point while traveling between points are also recorded. Surveys are to be conducted between a half hour before sunrise and 9:00 AM. Surveys shall not be conducted during inclement weather, including precipitation, fog, or strong winds (i.e., greater than 10-12mph). Point counts are conducted for five minutes after an initial 1-2 minutes of silence after arriving at the point to allow birds to recover from any disturbance. Data recorded for each survey point includes date; surveyor name; point number; start and end time; and weather information (temperature, wind speed and direction, precipitation and cloud cover), species observed, number of individuals per species, and behavior (carrying food, flying, perching, singing, displaying, etc.). Surveys must be conducted by personnel able to identify CT grassland birds in the field by song and by sight.

Within one month of conducting the bird survey, the results of the bird surveys, including data on species observed, behaviors, and environmental conditions, will be compiled by the ornithologist and submitted to DEEP for review to confirm suitability of habitat enhancement measures.

4.3.4 Follow-up bird survey

To assess the effectiveness of the habitat mitigation efforts and ensure the sustained support of grassland bird populations, annual follow-up bird surveys will be conducted beginning in spring 2028, following two full mowing/growing seasons after the initiation of mitigation work and adaptive management. These surveys will continue through the duration of the five-year mitigation plan to monitor grassland bird usage and habitat conditions. Survey results will be compiled and submitted to the Connecticut DEEP Natural Diversity Database (NDDB) no later than August 31 each year, allowing sufficient time for NDDB review and feedback before the implementation of adaptive management activities in the late fall.

4.4 Mitigation Overview

The mitigation site offers a significant opportunity to preserve and enhance grassland habitat, supporting declining populations of grassland bird species such as the savannah sparrow.

[12] (UCONN, 2024)

According to the Northeast Upland Habitat Technical Committee, "[w]ildlife species adapted to grassland landscapes are now diminishing as farmlands are left idle and revert to forests or are replaced by housing and commercial development." [13] To address the natural tendency of northeastern grasslands to revert to forests, annual mowing will be implemented in perpetuity to prevent the encroachment of woody trees and shrubs.

The site selected for this mitigation project includes former corn and hay fields that will be enhanced, managed, and permanently preserved as grassland habitat. With the cessation of agricultural activities, the site will transition into an early successional grassland landscape.

The proposed mitigation includes:

- Habitat Enhancement and Adaptive Management: Enhancement will include reseeding fields with a diverse mix of native forbs and grasses, tailored to the nesting and foraging needs of savannah sparrow. In addition, invasive or undesirable woody vegetation will be removed selectively to create shrub patches and transitional habitat zones that blend the habitat structure of grassland and shrubland plant communities. Adaptive management over a 5-year period will help to ensure the success of the enhancement.
- Long-Term Preservation and Management: Over 25 acres of open habitat comprising of grassland fields and low-vegetation areas will be permanently protected, providing essential habitat for grassland-dependent species like the savannah sparrow. Management will include annual rotational mowing (which includes mowing one-third of the fields each year) to maintain the open landscape and prevent natural succession to forest.

The proposed mitigation offers significant added value by supporting a broader range of species that depend on grassland and adjacent habitats. Enhancing the grassland will benefit wood turtles by maintaining open, low-vegetation areas critical for basking and nesting. The American kestrel, a species reliant on open fields for hunting, will find improved foraging opportunities in the enhanced habitat. The strategic retention of shrub patches, hedgerows, and thickets along field edges will preserve nesting habitat for the brown thrasher. Bobolinks and potentially nesting eastern meadowlarks, both grassland obligate species, will benefit from the increased availability of high-quality nesting sites and food resources provided by the reintroduction of native wildflowers and grasses. Collectively, these efforts contribute to the conservation of a diverse suite of species while enriching the ecological value of the site.

The grassland mitigation is a commitment to safeguarding the delicate balance of an early-successional habitat. By preventing woody plant encroachment and preserving the continuity of open grasslands, this mitigation works to create a sanctuary for grassland-dependent species.

4.5 Mitigation Research

The proposed mitigation is informed by research and background information for the mitigation site gleaned from several grassland management experts and sources.

Some key research findings include the following.

[13] (The Northeast Upland Habitat Technical Committee, 2006)

Grassland Bird Habitat Needs

- Chris Elphick, PhD (UConn Conservation Biology):[14]
  Eastern meadowlarks and bobolinks require large, contiguous patches of open grasslands. Proper timing of grass cutting and tree removal presents an opportunity to enhance habitat for these species, which serve as representatives of Connecticut's grassland bird community, including savannah sparrows.

- Swanson et al.:[15]
  Savannah sparrows and other grassland birds benefit from a mosaic of successional stages. Rotational treatments like burning, grazing, mowing, or disking are essential for creating and maintaining these mosaics.
  Keys to management: Extensive grasslands of intermediate height, well-developed litter layers, controlled succession, and protection of nesting habitats during breeding seasons.

Landscape Considerations

- Grassland birds are area-sensitive, requiring habitats above a minimum size threshold with a low edge-to-interior ratio. Studies (e.g., Fletcher and Koford,[16] Gieselman[17]) indicate that grasslands within 25-30 meters of edge habitats are less suitable for nesting due to increased predation and habitat disruption.

- Gruner:[18]
  If the primary management goal for the property is wildlife, including wood turtles, mowing should only take place between October 15-March 15, outside of the activity season (March 15-October 15). This will help to prevent inadvertent injury or mortality of individual wood turtles from mowing.

Practical Management Recommendations

- Audubon New York:[19]
  Remove woody vegetation and brush lines to reduce predation risks and improve habitat connectivity.
  Employ a rotational mowing strategy to maintain healthy grasslands, such as mowing one-third or one-half of the area each year.
  Use spot-mowing and other targeted controls to manage invasive species effectively.

Savannah Sparrow Dietary Needs

- Cornell Lab, *Birds of the World*:[20]
  During the breeding season, savannah sparrows rely heavily on insects, including beetles,

[14] (Chris Elphick, August 2024) see also Appendix D
[15] (David A. Swanson, May 2023)
[16] (Robert J. Fletcher, October 2022)
[17] (Tanis M. Gieselman, 2013)
[18] (Gruner, July 2024) see also Appendix C
[19] (Audubon New York , 2024)
[20] (Audubon New York , 2024)

flies, and caterpillars, supplemented by seeds early in the season when insect availability is low.

Based on these findings, the following strategies are incorporated within the mitigation to address the specific needs of grassland-dependent species while promoting habitat resilience:

- Implement Rotational Management: A rotational mowing strategy of mowing one-third of the grasslands annually (i.e., mow one-third of the grasslands one year, one-third the following year, and the remaining one-third the following year, and repeating this cycle) will be followed. This strategy supports habitat needs for savannah sparrow and other grassland species, promoting biodiversity and ecological balance.
- Strategically Timed Mowing: The mowing will occur in the late fall to avoid disturbance during sensitive breeding and nesting periods for wildlife.
- Prevent Woody Encroachment: Targeted removals of invasive vegetation, particularly along grassland edges, will be removed to increase the size and contiguity of the grassland while reducing edge effects that negatively impact grassland bird habitat.
- Enhance Grassland Habitat: Grassland fields will be overseeded with a native forb and grassland mix to improve diversity, provide essential food resources, and create optimal nesting conditions.

It is important to note that habitat management supporting the savannah sparrow will be carefully designed to avoid negatively impacting any other species, including the brown thrasher and American kestrel. Management activities will preserve a hybrid mosaic of habitat including maintaining the openness and structural diversity of grassland, strategic retention of shrub patches for the brown thrasher, and scattered perching opportunities and edge habitat features that are important for the American kestrel. Timing of mowing and enhancement actions will be planned to minimize disturbances during species' breeding seasons, ensuring that the habitat supports a range of grassland and grassland-adjacent species without conflict.

4.6 Mitigation Description

The proposed mitigation enhancement activities aim to improve habitat quality by diversifying plant species composition and structure, creating an ideal environment for savannah sparrow and other grassland-dependent birds.

The grassland preservation mitigation is designed to ensure the long-term viability of the grassland by addressing key ecological challenges, including woody plant encroachment and disturbance to nesting birds, especially during their critical breeding season. Central to this strategy is the implementation of a rotational mowing schedule, with one-third of the grassland fields being mowed each year with mowing activities deferred to late fall, allowing nesting birds, such as savannah sparrow and eastern meadowlark, to successfully rear their young.

Enhancement activities include the overseeding of grassland fields with a native seed mix and targeted removal of invasive and undesirable vegetation, particularly along field edges where woody plants encroach into grassland areas. Mechanical removal methods will be employed to clear these areas, opening space for native vegetation. Native wildflowers such as *Solidago* (goldenrod) and *Echinacea* (coneflower) will be seeded to enrich plant diversity, provide optimal ground cover,

and offer critical food resources for foraging grassland birds. A cover seed mix will also be applied to ensure coverage of bare ground and prevent unwanted plants from re-establishing. Refer to Table 3 Grassland enhancement seed mix.

To support a diverse range of species beyond grassland birds, a balanced mix of habitat types will be preserved and managed. Invasive and woody vegetation will be managed through selective removal, ensuring that some shrub cover remains to support transitional habitat zones that integrate both grassland and shrubland features. This method fosters gradual, structured edges rather than abrupt habitat transitions, which have been shown to lower nest predation rates for species compared to stark habitat boundaries.[21]

The following outlines the mitigation in more detail.

4.6.1 Timing and species windows

To minimize impacts on wildlife and breeding birds, enhancement and mowing activities will be carefully timed. The Connecticut Bird Atlas "Safe Dates"[22] suggest key breeding periods, such as May 10–August 1 for savannah sparrow in grasslands and May 10–July 20 for American kestrel in open country. To protect breeding birds, enhancement activities will occur outside the primary breeding season (April 1–August 30), with a fall schedule benefiting most species. Similarly, mowing will be limited to once per season after October 15, when birds and terrestrial wildlife like wood turtles are less active, preventing inadvertent injury or mortality.

With the commencement of the mitigation, agricultural activities at the mitigation site such as haying will no longer occur, allowing the site to prioritize grassland habitat preservation. Mowing will be carefully timed to support conservation goals, with a single late-season mow (after October 15) to promote biodiversity, maintain grassland structure, and prevent injury to wildlife. This shift in management will enhance habitat quality for grassland-dependent species by avoiding disturbances during breeding and nesting seasons while supporting the long-term ecological health of the site.

Table 2 Mitigation activity windows.

Mitigation Activity	**Time of Year for Activity to Occur**
Enhancement activities – removing invasive, undesired vegetation	October 16 to November 16 Selective removal of vegetation at the very end of the growing season.
Annual mowing – mow one-third of the grassland habitat each year	October 16 to November 16 Mowing to occur before the seeding of fields during the five-year enhancement and adaptive management period.
Enhancement activities - seeding	October 16 to November 16 The seeding cannot occur if the ground is frozen. The seeding to occur after mowing of the grassland fields.

[21] (Bird Conservation Network)
[22] (UCONN, 2024)

4.6.2 Removal of unwanted vegetation

To establish and sustain a dynamic grassland habitat mosaic, enhancement efforts will prioritize the selective removal of invasive species and encroaching woody vegetation that disrupt the openness and connectivity essential for grassland-dependent species. This approach will maintain scattered shrub patches to support species that rely on transitional habitat. Management efforts will also extend to invasive and undesired woody saplings and shrubs along adjacent forest edges, reducing their potential to spread into grassland areas while preventing the formation of abrupt habitat boundaries. This strategic, adaptive approach will help control invasive species while fostering a balanced, ecologically diverse landscape that accommodates both grassland and shrubland species.

Importantly, no herbicides or pesticides will be used in these management activities to protect the health of the ecosystem and avoid unintended impacts on non-target species.

To remove unwanted vegetation from the grassland site while minimizing disturbance, these practices will be followed:

- Vegetation removal will occur outside of the primary breeding and growing seasons (e.g., after October 15) to avoid disturbing nesting birds, pollinators, and other wildlife.
- Vehicular traffic shall be avoided from May 15 – September 15. Any access to the site during this period must be made by foot.
- Removals will not occur during wet conditions to prevent soil compaction and erosion.
- Hand tools like loppers, saws, and/or brush cutters will be utilized to remove individual saplings and shrubs, focusing on targeted vegetation without disturbing surrounding native plants.
- The uprooting of vegetation in a way that disturbs the soil significantly will be avoided, as exposed soil can invite further invasive species establishment. When complete root removal is not necessary, cutting vegetation at ground level will be prioritized rather than pulling out and uprooting the plant.
- Cut vegetation from the site will be removed to prevent reseeding or regrowth. Cut materials will be tarped and/or bagged and hauled from the site and disposed of per local ordinances.
- No herbicides or pesticides shall be used.

4.6.3 Seeding

Grassland fields will be seeded with a custom seed mix designed to include a variety of northeast/Connecticut native grasses and forbs. Additionally, a cover seed will be applied to further suppress the re-establishment of undesirable vegetation.

The seeding shall occur after the annual mowing, within the third of the grassland fields that were mowed. This timing ensures optimal seed-to-soil contact by taking advantage of the reduced vegetation height, which minimizes competition and promotes successful germination. The process will focus on distributing seed evenly across the designated area to achieve consistent coverage and support the establishment of native grassland species.

The custom seed mix is specifically designed to create an ideal grassland habitat for savannah sparrow in the Northeast, balancing ecological diversity with the structural requirements of their nesting and foraging needs. The inclusion of native grasses, such as *Schizachyrium scoparium* (little bluestem) and *Panicum virgatum* (switchgrass), provides the vertical structure and cover critical for ground-nesting birds, while supporting a stable habitat framework. The high proportion of wildflowers, including *Rudbeckia hirta* (black-eyed susan) and *Monarda fistulosa* (wild bergamot), ensures abundant insect activity for foraging and seed availability, which are vital components of the savannah sparrow's diet.

The seed mix also emphasizes species that are well-suited to the well-drained and moderately acidic soils typical of the region, ensuring long-term establishment and sustainability. By combining grasses and wildflowers in these proportions, the mix fosters habitat heterogeneity, which is crucial for supporting not only savannah sparrows but also other grassland-dependent wildlife species. This approach aligns with best practices for ecological restoration and long-term habitat enhancement.

Seed material, including cover crop seed shall be evenly applied over the recently mowed grassland fields in the late fall. The seed shall be spread and incorporated into the top quarter to top half inch of the soil. The seed shall be fresh, re-cleaned seed of the latest crop meeting the following standards of pure live seed content (purity & germination) and maximum allowable weed seed content. All seed shall be free of noxious weeds and undesirable grasses. The minimum germination rate shall be 80% and the maximum weed seed shall be 0.25%. All seed shall be delivered in sealed standard size bags of the vendor, showing weight, analysis, and name of vendor. The seed shall be stored in such a manner that its effectiveness will not be impaired.

Table 3 Grassland enhancement seed mix.

Botanical Name	**Common Name**	**Mix Percentage (%)**
Andropogon gerardii	big bluestem	5
Chamaecrista fasciculata	partridge pea	6
Coreopsis lanceolata	lance-leaf coreopsis	6
Coreopsis tinctoria	plains coreopsis	3
Desmodium canadense	showy tick-trefoil	5
Echinacea purpurea	purple coneflower	8
Heliopsis helianthoides	oxeye sunflower	4
Monarda fistulosa	wild bergamot	8
Panicum virgatum	switchgrass	10
Rudbeckia hirta	black-eyed susan	10
Schizachyrium scoparium	little bluestem	15
Senna hebecarpa	wild senna	3
Sorghastrum nutans	yellow grass	10
Symphyotrichum novae-angliae	New England aster	5
Zizia aurea	golden alexander	2

- *The cover seed mix will include both Avena sativa (oat) and Secale cereale (winter rye) each applied at a rate of 20 pounds per acre (a total of 40 pounds (lbs) per acre).*
  The native mix shall be at an application rate of 20 pounds (lbs) per acre.

4.6.4 Mowing regime

- Mowing will occur once a year, in late fall.
- Mowing will occur between October 16 – November 16.
- Mowing to occur before overseeding of the grassland fields (seeding to occur during the five-year enhancement and adaptive management period).
- Only one-third of the grassland areas will be mowed each year in late fall. This allows for a compromise between the need for overwintering species to be undisturbed for a year. These species require standing stems and aboveground biomass for nesting. The other two-thirds of the grassland will not be mowed in late fall, ensuring that there is adequate nesting material for grassland birds the following spring. In addition, rotational mowing allows for a greater source of insect food for the grassland birds in the spring and "would allow for a more natural progression of habitat as well as maintain a truer habitat mosaic for the benefit of all species present which utilize the grassland."[23]
- Mowing will be conducted at slow speeds and/or in low gear to allow animals to react and move out of the field.
- Flail mower heads with guide bars that ride along the ground shall be avoided. Sickle bar mowers have the least impact and shall be utilized.
- The mowing operator shall start mowing from the center of the field and use a back-and-forth approach, or large circular pattern, to avoid concentrating fleeing animals where they may be killed or stranded. A 30-ft strip around the perimeter of the field shall be mowed last. In addition:
    - If the field is near a stream: the mowing shall start on the side furthest from the stream and work towards the stream.
    - If the field is bordered by woodland: the mowing shall start on the side furthest from the woodland and work towards the woodland.
    - If the field is bordered by road, the mowing shall start next to the road and work inward, across the field.

4.7 Adaptive Management

Adaptive management will be conducted within enhancement areas over a five-year period, with fall vegetation surveys to occur each year. Follow-up bird surveys will occur annually in the spring, two growing seasons after the mitigation work commences and during the five-year management period. Surveys will use fixed plots or transects and document findings through notes, photographs, and GIS mapping. Based on survey results, adaptive management strategies, such as additional invasive species removal or reseeding, will be implemented during the enhancement activity window (October 16–November 16). Annual reports detailing survey findings, trends, and management actions will be submitted to CT DEEP each year during the five-year management period.

[23] CT DEEP NDDB Wildlife Biologist comments dated Feb 19, 2025, see Appendix A

4.7.1 Timeframe

- Adaptive management to occur over a five-year period upon completion of the initial enhancement plant removal and seeding activities.
- An annual vegetation survey will be performed in the fall between September 1 – October 15.
    - Based on the information gathered from the annual vegetation survey, the restoration team will recommend that adaptive management strategies are to be implemented as needed. These adaptive strategies shall be enacted during the enhancement activity window (i.e., October 16 – November 16).
- A follow-up bird survey shall be conducted in the spring, beginning two growing seasons after the mitigation work commences.
    - The surveys will be shared with CT DEEP NDDB's Wildlife Biologist no later than August 31st, to allow time for DEEP's review and provision of recommendations for adaptive management that can be enacted during the enhancement activity window (i.e., October 16 – November 16).

4.7.2 Adaptive management strategy

If invasive or woody species re-establish and/or grow excessively in areas after initial removal, additional mechanical removal will be employed, as needed over the five-year period. Woody vegetation will be selectively removed to preserve habitat permeability and to enhance the appeal of nesting habitat for grassland birds. However, the preservation of select shrub and hedgerow patches will be maintained to contribute to a diverse habitat mosaic. In addition, areas with insufficient native plant coverage will be reseeded as needed, using the approved seed mix. These activities will only be performed during the enhancement activity window from October 16 to November 16. This adaptive management strategy ensures that the enhancement areas progress toward the desired ecological outcome while maintaining high-quality habitat for grassland-dependent species.

4.8 Long-term Management

The preservation of the grassland habitat will be managed in perpetuity to ensure its ecological integrity and support for grassland-dependent species. Annual mowing, conducted in late fall, with one-third of the grassland habitat mowed each year, will remain a cornerstone of the management plan for the lifetime of the habitat. In addition to annual mowing, Joshua's Trust will perform selective vegetation control, removal of invasive species, and periodic monitoring to ensure the continued success of the habitat. Joshua's Trust is committed to the long-term management described herein as indicated in the email from John Hankins, President, in Appendix E.

This consistent management approach will maintain the grassland's structure, prevent encroachment by woody vegetation and invasive species, and sustain its value as a critical nesting and foraging area. The grassland will be forever protected through these ongoing efforts, ensuring its role as a vital ecological resource and habitat for generations to come.

Refer to the Financial Assurances & Responsible Parties section for more information on site ownership and protection of the mitigation site in perpetuity.

4.9 Maintenance and enhancement schedule

The mitigation schedule prioritizes minimizing impacts to sensitive species like grassland birds and wood turtles and includes a late fall window for mowing and enhancement activities and features a five-year adaptive management plan for enhancement areas.

Table 4 Maintenance and enhancement schedule.

Pre-enhancement bird surveys Includes 3 visits by an ornithologist during the grassland breeding season to conduct the site bird survey	May 10 – Aug 1 2026
Commencement of grassland maintenance and enhancement Includes annual rotational mowing in perpetuity (rotation includes mowing one-third of the grassland fields each year)	Sept 1 2026, and onward
Annual vegetation survey (sometime during Sept 1 to Oct 15) to occur during the 5-year adaptive management period	Sept 1 to Oct 15 in 2027, 2028, 2029, 2030 and 2031
Follow-up bird surveys Conducted in the spring during the 5-year adaptive management period, commencing two growing seasons after the mitigation work begins	Spring 2028, Spring 2029, Spring 2030, and Spring 2031
Enhancement activities of vegetation removals and native seeding, including adaptive management	Oct 16 to Nov 16 in 2027, 2028, 2029, 2030 and 2031
Final reporting on the mitigation	Dec 2031
Change site management to Joshua's Trust	Dec 2031

5. Financial Assurances & Responsible Parties

5.1 Responsible Parties

The Tweed New Haven Airport Authority (TNHAA) and The New HVN, LLC, as the permittee for the Proposed Project, will be the responsible parties for ensuring execution of this mitigation plan.

5.2 Land Ownership

It is anticipated that The New HVN, LLC, on behalf of TNHAA, will purchase the Warren property and will own the parcel and provide oversight and management of activities detailed in this plan, including the 5-year monitoring and potential adaptive management. Execution of legal interest documenting such will be forthcoming.

After the 5-year monitoring and adaptive management period, either ownership or a conservation easement will be enacted with Joshua's Tract Conservation and Historic Trust, Inc (Joshua's Trust) a nonprofit and largely volunteer regional conservation organization protecting more than 5,000 acres in Northeastern Connecticut. Joshua's Trust will then provide management in perpetuity after the 5-year period as detailed in this plan.

5.3 Financial Assurances

TNHAA and The New HVN, LLC will provide sufficient financial assurance to achieve successful execution of this Plan and transfer to Joshua's Trust for long-term management and stewardship. Details regarding this will be provided in the final mitigation plan submittal.

6. Conclusion

This grassland mitigation plan represents a comprehensive and forward-thinking approach to addressing the ecological impacts of the Tweed New Haven Regional Airport Runway Extension and Terminal Expansion. By focusing on habitat enhancement and long-term management, the plan seeks to create and sustain high-quality grassland habitats that support state-listed grassland birds and other wildlife.

At the heart of the mitigation strategy is the transition of the Warren Property (the mitigation site) from agricultural use to a protected grassland habitat managed in perpetuity. The plan prioritizes ecological integrity through targeted enhancements, including invasive vegetation removal and native seeding. Rotational mowing of one-third of the grassland fields each year will continue upon commencement of the mitigation and in perpetuity. Adaptive management practices, conducted over a five-year period, ensure that the habitat evolves to meet the needs of wildlife and achieve its ecological objective as an early successional grassland habitat.

A critical component of the plan is its long-term vision, supported by a partnership with the Warren family and Joshua's Trust. This collaboration ensures the site's perpetual protection and management, creating a model for successful mitigation and land stewardship. This mitigation plan embodies a commitment to preserving Connecticut's declining grassland habitats and the species that depend on them.

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Appendix A- Regulatory Communication

Appendix A
Regulatory Communication

Date	**Entity**	**Communication Summary** *Includes but is not limited to a summary of highlights from each document. Refer to each source document included within this Appendix.*
April 8, 2024	Hoyle Tanner Associates (HTA) to Connecticut Department of Energy and Environmental Protection (CT DEEP)	HTA prepared a Grassland Bird Habitat Conceptual Plan and Grassland Habitat memo to address prior permitting requirements for grassland habitat within the airport boundary; document existing grassland habitat on the airport; and propose a study of bird use and functionality of existing grassland habitat at the airport. Attachments in this memo included: 1) 2008 Grassland Management Plan 2) 2011 Updated Grassland Management Plan 3) Grassland Management Plan Sheet 4) 2016 Wildlife Hazard Management Plan 5) Runway 2 Grasslands Plan 6) Runway 20 Grasslands Plan 7) 2022 NDDB Preliminary Determination Letter
April 25, 2024	CT DEEP to HTA	Robin Blum (of CT DEEP) emailed Notes on the CT Grassland Bird Habitat Conceptual Plan submitted by HTA. The notes include mention of conflicts at the airport with grassland habitat management and wildlife hazard management. The mowing practices at the airport, intended to maintain wildlife hazard safety, conflict with the original 2008 Grassland Management Plan. Due to an FAA 2011 update allowing exceptions for increased wildlife hazards, mowing has been consistently maintained at 7–14 inches. This deviates from the 2008 Grassland Management Plan's approach which included: 1) areas at the airport mowed regularly to maintain grass height of 4" to 14" and 2) areas mowed once a month. CT DEEP NDDB comments: "Estimated habitat loss is approximately 5.6 acres."
May 17, 2024	CT DEEP to HTA	CTDEEP letter to HTA requesting additional information on the NDDB. Includes lists of state-listed plant and grassland bird species documented to occur within the vicinity of the airport.

		CTDEEP states that state-listed plant species surveys of the site should be performed by a qualified botanist or plant ecologist and welcomes that a grassland bird survey be done. CTDEEP states, "[t]he Project is expected to impact 5.6 acres of grassland habitat." CTDEEP states, "…on April 29th, 2024, it was made clear that there is no remaining suitable grassland habitat on the property due to the mowing regime adopted in 2009." CTDEEP states, "[s]ince impacts to grassland birds have already been committed and earlier plan mowing regimes are not able to be implemented, off-site mitigation should be pursued."
July 31, 2024	CT DEEP to HTA	Includes a letter from CT DEEP to HTA of a summary of outstanding issues for NDDB review. CT DEEP requests that the airport mowing regime be clarified and that updated Wildlife Management and Grassland Management Plans for the airport be provided.
October 23, 2024	CT DEEP to HTA	Includes an email from CT DEEP to HTA of natural history needs of grassland birds and requirements for off-site grassland bird mitigation. CT DEEP states "… we will be looking for a minimum of 25 acres for offsite mitigation and may require more if the habitat needs enhancement, part of the soils are excessively wet, or areas of the parcel are not favorable for nesting by this species for some other reason. Please note that we will require documentation of current species use of the mitigation area to consider minimum acreage proposals."
November 6, 2024	Federal Aviation Administration (FAA) to Tweed New Haven Airport Authority	Email from FAA stating the preference for offsite grassland mitigation.
November 25, 2024	Monthly permitting meeting attendees (CT DEEP, USACE, FAA, Avports, HTA, BSC Group, WSP, EDD)	[This Appendix includes regulatory communication information relevant to the grassland mitigation only.] Meeting notes include that: • The grassland impact has been revised to approximately 4 acres; on-site mitigation is not feasible. • CT DEEP awaits a detailed management plan and conservation approach for the off-site mitigation Warren parcel. • Seeds have been collected for the Plant Mitigation Plan (Native Plant Trust involvement).

February 19, 2025	CT DEEP NDDB to HTA	CT DEEP NDDB states that the plan must address potential impacts on brown thrasher, a documented species on-site that relies on shrubby habitat. Additionally, CT DEEP NDDB requests annual bird surveys beginning in 2028, adjustments to the proposed mowing regime (including a 1/3 – 1/3 – 1/3 pattern and specific mowing techniques to minimize wildlife impact), and coordination with Joshua's Trust for long-term vegetation management post-conveyance.

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Memo

To:	CTDEEP
From:	Kimberly Peace – Hoyle, Tanner & Associates, Inc.
Date:	April 8, 2024
Re:	Tweed New Haven Airport Runway Extension and East Terminal Project Grassland Habitat

Hoyle Tanner & Associates, Inc. (Hoyle Tanner) has prepared this memo to:

1. Address prior permitting requirements for Grassland Habitat within the airport boundary;
2. Document existing grassland habitat on the airport; and,
3. Propose a study of bird use and functionality of existing Grassland Habitat at the airport.

Prior Permitting Requirements

A requirement of CTDEEP permit #200003049-KZ dated May 8, 2007, Special Terms and Conditions #14:

> *14: Prior to the completion of the work authorized herein, the Permittee shall seed disturbed land adjacent to the reconstructed/extended Taxiway Bravo, disturbed lands east and west of the Runway-20 RSA, the area to be disturbed immediately northwest of the Runway-2 RSA and the RSAs themselves with a mixture of "warm seasonal grasses" consisting of 60 percent little bluestem, 20 percent indiangrass and 20 percent switchgrass, making up approximately 23 acres of new or enhanced grassland habitat. Within 30 days of completing the grass seeding, the Permittee shall submit for the review and written approval of the Commissioner a mowing plan for the 23 acres of grassland noted above. The Permittee shall conduct mowing of these grassland areas in accordance with the approved plan unless otherwise authorized in writing by the Commissioner*.

Upon review of that permit and submittals, it is understood that the area in question of 23 acres was intended to be comprised of the approximately 500'X1000' RW 2 Safety Area and the 500'X1000' RW 20 Safety Area. Permits IW-2000-116, DIV-200003052 and WQC-200003051 also have conditions relating to grassland habitat and planning.

Grassland Management Plan

A Grassland Management Plan (to serve as the mowing plan referenced in the condition above) was developed and submitted to CTDEEP in response to this permit condition (Attachment 1). The original plan was dated February 2008, and noted that the plan as developed to serve as a **guideline** for grassland management at the airport, but that goal has to remain in balance with the FAA's requirements, specifically FAA Advisory Circular 150/5200-33 *Hazardous Wildlife Attractants on or near Airports.* Notably, the 23-acre RSAs that were planted with warm season grasses were identified as, to address FAA requirements, being mowed between heights of 4-6 inches.

Further coordination with FAA resulted in a supplement to that plan, dated April 2011 that was developed in response to the continued wildlife hazard issues that the airport was facing as documented in their Wildlife Hazard Management Plan (Attachment 2). Specifically, areas that were initially identified as non-safety or non-critical areas that could be mowed once annually and not before September 1, were shifted to allow for mowing as needed to prevent seed growth and heights at which the grasses could be used for food or cover. This was in response to several wildlife hazard incidents, and **it is crucial to future efforts that all parties recognize that the airport currently continues to follow this supplemented plan and mows all grassed areas as needed to keep grasses between 7"-14" to reduce the potential for grasses to attract wildlife, including grassland birds. See the Grassland Management Plan that has been updated to reflect this (Attachment 3).**

Note that this condition is included in the airport's most recent Wildlife Hazard Management Plan dated April 2016, see Table 1 (Attachment 4).

The FAA's FONSI for this project, dated December 2023, includes a requirement that the current Grassland Management Plan be updated, and that the airport maintain compliance with that plan.

Existing Grassland Habitat

To date, as shown in the figures provided in Attachments 5 and 6, the areas around Runway 2 and Runway 20, including the corresponding RSAs and Taxiway Bravo that are currently managed grassland habitat are as follows:

Area	Currently	Proposed Impact	Total After Completion
Runway 20	11.6 acres	1.5 acres	10.1 acres
Runway 2 and TW B	23.1 acres	4.1 acres	19 acres
Total			**29.1 acres**

There is additional grassland habitat in areas between the taxiways and runways and along the length of both runways that is not included in this accounting exercise as this was designed to specifically address this prior permit condition, however, it is worth noting that the total area of grassland habitat within the airport is significantly higher than 23 acres.

Grassland Impacts

As noted in the EA and confirmed in the FONSI, while the construction of the proposed development will reduce grassland habitat within the airport, it will not significantly affect local or regional populations of wildlife species because those found on the Airport are mobile and adaptable to transition in adjacent habitats. Furthermore, the Project would adhere applicable conservation recommendations from CT DEEP as per their NDDB Preliminary Determination letter dated March 3, 2022 (Attachment 7) that notes that the applicant must comply with pre-existing mitigation plans prepared to protect grassland birds.

The applicant feels like the site is currently, and will in the future condition, be in compliance with the existing permit requirements.

Grassland Bird Functionality and Survey

To determine if the mowed grassland habitats on Tweed Airport currently provides breeding habitat for grassland bird species, the applicant proposes conducting a standard Breeding Bird Census type survey, consisting of three visits during the 2024 breeding season. Data available from eBird suggests that

Tweed Airport (https://ebird.org/barchart?r=L4208182&yr=all&m=) and surrounding open habitats (https://ebird.org/barchart?r=L466566&yr=all&m=) are infrequently used by low numbers of migrating or overwintering bird species associated with open habitat types.

This survey would be offered as mitigation for the loss of grassland habitat due to the proposed development.

Methodology:

For standard grassland point count surveys, each point location consists of a 100-meter radius plot centered on the observation point with a minimum distance of 250 meters between observation points. Points would be identified through a desktop evaluation of the survey area and GPS located in the field. All birds seen/heard within approximately 100 meters of a point are recorded, and birds observed beyond 100 meters from a point while traveling between points are also recorded. Surveys are conducted between a half hour before sunrise and 9:00 AM. Surveys are not conducted during inclement weather, including precipitation, fog, or strong winds (i.e., greater than 10-12mph). Point counts are conducted for five minutes after an initial 1-2 minutes of silence after arriving at the point to allow birds to recover from any disturbance. Data recorded for each survey point includes date; surveyor name; point number; start and end time; and weather information (temperature, wind speed and direction, precipitation and cloud cover), species observed, number of individuals per species, and behavior (carrying food, flying, perching, singing, displaying, etc.). Surveys must be conducted by personnel able to identify CT grassland birds in the field by song and by sight.

Attachments

1 2008 Grassland Management Plan
2 2011 Updated Grassland Management Plan
3 Grassland Management Plan Sheet
4 2016 Wildlife Hazard Management Plan
5 Runway 2 Grasslands Plan
6 Runway 20 Grasslands Plan
7 2022 NDDB Preliminary Determination Letter

Attachment 1
2008 Grassland Management Plan

Hoyle, Tanner & Associates, Inc.
150 Dow Street
Manchester, New Hampshire 03101
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603-669-4168 fax
www.hoyletanner.com

February 19, 2008

Gina McCarthy, Commissioner
CT DEPARTMENT OF ENVIRONMENTAL PROTECTION
79 Elm Street
Hartford, CT 06106
ATTN: Marla Butts, Inland Water Resources Division

Re: Grassland Management Plan – Tweed-New Haven Airport
Permit # IW-2000-116, DIV-200003052, WQC-200003051

Dear Commissioner McCarthy:

Pursuant to Special Condition #1 of the above-referenced permits, the attached Grassland Management Plan (the 'Plan') is being submitted for review and written approval by the CT Department of Environmental Protection (DEP). Special Condition #1 of these permits states:

> The permittee shall provide in writing for review and approval to the Department within 60 days of the issuance of this permit, a long-term management plan for the airport property with the goal of preserving and maintaining habitat for grassland bird species, including the Horned Lark (*Eremophila alpestris*), Grasshopper Sparrow (*Ammodramus savannarum*) and Savannah Sparrow (*Passerculus sandwichensis*).

Accordingly, the attached *Grassland Management Plan* (the 'Plan') has been prepared in accordance with and is intended to comply with Special Condition #1 of the DEP permits.

Specifically, the *Grassland Management Plan* outlines a series of proposed measures associated with the maintenance of grassed areas resulting from implementation of the runway safety area and taxiway improvements at Tweed-New Haven Airport. It is important to note, however, that the goal of grassland management must be carefully balanced with the airport's primary goal of maintaining aviation safety. It is within the context of aviation safety that this program is proposed.

The grassland management plan described herein has been developed with consideration of the Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports,* which states that "Land use practices that attract or sustain hazardous wildlife populations on or near airports can

significantly increase the potential for wildlife strikes." In this light, the goal of this program is to provide safe operating conditions at Tweed-New Haven Airport while contributing to the conservation of listed grassland bird species. In this manner, the grassland management plan strives to maintain appropriate habitat that is adequately and safely separated from airport operations.

Lastly, it is anticipated that the grassland management measures included herein will be used as **guidelines** for grassland management at the Airport. Thus, while the Plan allows for the management of grasslands, particular attention will be paid to the effect that higher grass heights may have on attracting other hazardous wildlife species.

In closing and in accordance with General Conditions #11, the undersigned hereby certifies that:

> "I have personally examined and am familiar with the information submitted in this document and all attachments. I certify that, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in this document or its attachments may be punishable as a criminal offense in accordance with section 22a-376 under section 53a-157b of the Connecticut General Statutes."

Thank you for your review of this material and please contact me with any questions.

Sincerely,

Hoyle, Tanner & Associates, Inc.



Robert Furey, PE, Vice President

Attachments

cc: Hoyle, Tanner File
Brian Golembiewski (DEP/IWRD)
Marla Butts (DEP/IWRD)
Charles Kurtz (HVN)
Marshall Dennis (Wetlands & Wildlife, Inc.)

GRASSLAND MANAGEMENT PLAN

PERMIT # IW-2000-116, DIV-200003052, WQC-200003051
TWEED-NEW HAVEN AIRPORT

Prepared for:
Tweed-New Haven Airport Authority

Prepared by:
Hoyle, Tanner & Associates, Inc.

In association with:
Wetlands & Wildlife, Inc.

February 2008

1.0 INTRODUCTION

1.1 Background

On 1 May 2007, the CT Department of Environmental Protection (DEP) issued permits to the Tweed-New Haven Airport Authority (the 'Authority') to construct the proposed Runway Safety Area & Taxiway Improvements at Tweed-New Haven Airport (the 'Airport'). Special Condition #1 of these permits states:

> The permittee shall provide in writing for review and approval to the Department within 60 days of the issuance of this permit, a long-term management plan for the airport property with the goal of preserving and maintaining habitat for grassland bird species, including the Horned Lark (*Eremophila alpestris*), Grasshopper Sparrow (*Ammodramus savannarum*) and Savannah Sparrow (*Passerculus sandwichensis*).

Accordingly, this Grassland Management Plan (the 'Plan') has been prepared in accordance with and is intended to comply with Special Condition #1 of the DEP permits.

1.2 Project Summary

In order to comply with Federal Aviation Administration requirements, the Authority applied and was issued permits for the construction of runway safety areas (RSAs) at each end of Runway 2/20, as well as the extension of Taxiway 'B' and the rehabilitation of Taxiways 'B' and 'E'. More specifically, these improvements include the actions listed in Table I, below.

TABLE I

RUNWAY SAFETY AREA AND TAXIWAY IMPROVEMENTS
TWEED-NEW HAVEN AIRPORT

IMPROVEMENT/ACTION	DESCRIPTION
Runway 2 Safety Area	- 1,000-foot by 500-foot RSA - Relocation of Morris Creek
Runway 20 Safety Area	- Modified 1,000-foot by 500-foot RSA - Relocation of Tuttle Brook/Morris Creek - Relocation of Dodge Avenue
Taxiway 'B' Extension/ Taxiway 'E' Rehabilitation	- Reconstruction/Strengthening Taxiways 'E' and 'B' - Extension of Taxiway 'B'
Wetland Mitigation Program	

The proposed Runway 2 safety area will entail the rechannelization of a portion of Morris Creek. This new channel will consist of a meandering alignment more akin to a natural creek bed. Grading of the Runway 2 safety area is designed specifically to 1) minimize the placement of fill in the 100-year flood plain and 2) keep the RSA dry in a 5-year rainfall event.

The proposed Runway 20 safety area will entail the rechannelization of Tuttle Brook/Morris Creek and the relocation of Dodge Avenue. A 584-foot-long segment of Tuttle Brook/Morris Creek will be placed in a culvert beneath the runway safety area and relocated Dodge Avenue. A length of existing Dodge Avenue will be removed, decommissioned as a public right-of-way and incorporated into the boundaries of the airport as runway safety area. A new Dodge Avenue will be constructed between the end of the runway safety area and the rear of properties along Holmes Street.

Proposed taxiway improvements include the reconstruction/strengthening of Taxiway 'E' and the reconstruction/strengthening/extension of Taxiway 'B.' By these actions, Taxiway 'B' will become a full parallel taxiway, eliminating the need to use the primary runway, i.e. Runway 2-20, for taxi movements. Under existing conditions, such movements decrease safety margins and reduce the efficiency and utility of runways.

The locations of the RSA and taxiway improvements, as well as existing airfield vegetated areas on the airfield that will not disturbed by this the proposed project are presented in Figure 1.

REALIGNED DODGE AVE.

DODGE AVE.

HOLMES STREET

T/W 'A'

T/W 'A-1'

T/W 'D'

T/W 'A-2'

RUNWAY 14-32

T/W 'B' GRAVEL HAUL ROAD

ORA AVENUE

T/W 'B' FINGER CHANNELS

RECONSTRUCT T/W 'B', 'E' & 'J'

EXTEND T/W 'B'

T/W 'B'

T/W 'J'

RUNWAY 2-20

DEAN ST. FINGER CHANNELS

GLIDE SLOPE ANTENNA

MORRIS CREEK RE-ALIGNMENT

BURR STREET

AIRPORT PROPERTY LINE

DEAN STREET

EDEN ST.

TOWNSEND ROAD

MORRIS CAUSEWAY

UHAM ST.

SOUTH END ROAD

LIGHTHOUSE ROAD

MORRIS CREEK RE-ALIGNMENT

MORRIS CREEK PAVED SERVICE ROAD

N

LEGEND

AIRFIELD SAFETY AREA & GLIDESLOPE CRITICAL AREA FOR PROPOSED PROJECT

AIRFIELD NON-SAFETY/NON CRITICAL AREAS FOR PROPOSED PROJECT

EXISTING AIRFIELD VEGETATION NOT DISTURBED BY PROPOSED PROJECT

PROPOSED WATER BODY

300 0 300

1" = 300'

FILE: GWMP-1.dwg

TWEED / NEW HAVEN REGIONAL AIRPORT
GRASSLAND MAGAGEMENT PLAN

DRAWING NO.
1

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Hoyle Tanner & Associates © 2007

2.0 GRASSLAND MANAGEMENT PLAN

This *Grassland Management Plan* outlines a series of proposed measures associated with the maintenance of grassed areas resulting from implementation of the runway safety area and taxiway improvements at Tweed-New Haven Airport (the 'Airport'). It is important to note, however, that **the goal of grassland management must be carefully balanced with the airport's primary goal of maintaining aviation safety.** It is within the context of aviation safety that this program is proposed.

2.1 Overview

While formerly common, natural grasslands are a vegetative community in decline in the New England region due to a combination of natural succession, development, and a decline in farming. Consequently, populations of grassland birds also have declined. As stated in *Conserving Grassland Birds*[1], "We are rapidly losing these [bobolinks and eastern meadowlarks] and other grassland birds that were once a common and integral part of our countryside. As land use and agricultural practices have changed dramatically since the turn of the century, remaining grasslands have become smaller and isolated."

Accordingly, many airports that maintain extensive grassland areas, over time, have come to provide not only favorable habitat but in some instances the only habitat for grassland birds over large geographic areas. This relationship, however, can be a significant aviation safety concern, particularly when there is an increase of the risk, frequency and potential severity of wildlife-aircraft collisions.

As documented throughout the environmental review and permitting process, the DEP has expressed concern relative to the runway safety area and taxiway improvements at the Airport due to the potential presence of grassland birds. In their review of project permit applications, for example, CT DEP set forth the following comment:

> A review of Endangered, Threatened, and Special Concern species has been conducted for the proposed project location. This review has identified *Panicum amarum* a listed State Threatened species to be known to grow in coastal dunes and beaches. It appears that the proposed project will not impact this type of habitat. However, the review has also identified a State listed bird species that may be impacted as a result of the proposed activity. You need to contact Jenny Dickson of the DEP-Wildlife Division directly on this issue. Please forward Ms. Dickson's comments to this Office for further review regarding these issues.

[1] Jones, Andrea L. and Peter D. Vickery. Undated. *Conserving Grassland Birds: Managing Small Grasslands including Conservation lands, Corporate Headquarters, Recreation Fields, and Small Landfills for Grassland Birds.* Grassland Conservation Program/Center for Biological Conservation. U. S. Fish and Wildlife Service/MA Audubon Society. Lincoln, MA.

In accordance with the DEP comment, Ms Dickson was contacted by Wetlands & Wildlife, Inc. on 25 September 2001. According to Ms. Dickson, the primary species of concern was the horned lark (*Eremophila alpestris*), a ground nesting State-listed Threatened bird that favors open areas and grasslands. Other State-listed grassland species also were noted by Ms Dickson as potentially occurring onsite, including the Endangered grasshopper sparrow (*Ammodramus savannarum*) and Savannah sparrow (*Passerculus sandwichensis*), a Species of Special Concern. Based on *The Atlas of Breeding Birds of Connecticut*[2], each of the above-referenced species has been documented from airport grasslands, most notably Bradley International Airport in Windsor Locks. Enser (1992) also noted the occurrence of these species at airports in Rhode Island.[3]

To mitigate potential impacts to these species, Ms. Dickson recommended that areas disturbed during construction and located outside proposed pavement or wetland mitigation areas be planted with 'warm season grasses' (see Attachment B). Accordingly, this recommendation was incorporated into the permit applications and re-vegetation plan filed with DEP.

2.2 Plan Goals and Objectives

The grassland management plan described herein has been developed with consideration of the Federal Aviation Administration (FAA) Advisory Circular 150/5200-33B, *Hazardous Wildlife Attractants on or near Airports,* which states that "Land use practices that attract or sustain hazardous wildlife populations on or near airports can significantly increase the potential for wildlife strikes." In this light, the goal of this program is to provide safe operating conditions at Tweed-New Haven Airport while contributing to the conservation of listed grassland bird species. In this manner, the grassland management program strives to maintain appropriate habitat that is adequately and safely separated from airport operations

It is anticipated that the grassland management measures included herein will be used as **guidelines** for grassland management at the Airport. Thus, while the Plan allows for the management of grasslands, particular attention will be paid to the effect that higher grass heights may have on attracting other hazardous wildlife species such as deer, coyote, fox, raccoons, striped skunks, turkeys and raptors.

Accordingly, bird populations within the newly planted areas and especially off each new runway end will be monitored following project implementation, and increases in hazardous wildlife, bird strikes or other wildlife-related event (if any) will be documented. Assuming such increases are documented and, in turn, considered sufficient to warrant concern for aircraft/passenger safety, the Plan will be immediately modified and DEP so notified in an effort to establish and implement remedial measures satisfactory to both the DEP and Airport Authority.

---

[2] Bevier, Louis R., Ed. 1994. *The Atlas of Breeding Birds of Connecticut.* State Geological and Natural History Survey of Connecticut. Bulletin 113. Hartford, CT.

[3] Enser, Richard W. 1992 The Atlas of Breeding Birds in Rhode Island. RI Department of Environmental Management. Providence, RI

2.3 Grassland Management Plan Implementation

As described in the environmental permit applications filed with DEP, warm season grasses will be planted at multiple locations to be disturbed in conjunction with RSA and taxiway improvements. These sites will include an upland area adjacent to reconstructed/extended Taxiway 'B', disturbed uplands east and west of the Runway 20 safety area, the upland area to be disturbed immediately south and west of the Runway 2 safety area, and the runway safety areas, themselves.

In this regard, it should be noted that each safety area, measuring 500' wide by 1,000' long, alone will provide approximately 11.5 acres of grassland habitat and 23 acres overall. A listing of the warm season grasses to be planted is provided in Table II.

In keeping with DEP guidance, a seed mix consisting of 60% little bluestem, and 20% each of indiangrass and switchgrass will be planted in accordance with the listed considerations. The majority, if not all, areas planted with 'warm season grasses' also will be periodically mowed, as described below. In addition to enhancing airport safety conditions, periodic mowing also will enhance grassland habitat conditions onsite.

Figure 1 depicts these and other airfield areas with the following color-coded distinctions:

- Airfield Safety Area and Glideslope Critical Area for Proposed Project
- Airfield Non-Safety/ Non-Critical Areas for Proposed Project
- Existing Airfield Vegetation ed Areas not Disturbed by this Proposed Project
- Proposed Water bodyBody

It is important to note, however, that the post-construction management of lands disturbed in conjunction with RSA and taxiway improvements will be conducted in a manner that is anticipated to deter wildlife species known to be aviation hazards from critical operational areas, including those species listed in the previous section. In this regard, critical operational areas include the lands 250 feet on either side of the Runway 2/20 center line, lands adjacent and parallel to much of the reconstructed Taxiway 'B', and the actual runway safety areas. For the proposed project, these areas are shown and listed on Figure 1 as *Airfield Safety Area and Glideslope Critical Area for Proposed Project.* Each of these obstruction free zones is required for Airport compliance with the 14 CFR Part 139 certification criteria as established by the FAA. Accordingly, while planted with warm season grasses, these areas will be mowed on a regular basis, typically prior to grasses reaching a height of 4 – 6 inches (see Figure 1).

All other non-critical operational areas disturbed in conjunction with RSA and taxiway improvements only are expected to be mowed once annually, with mowing anticipated to occur in the late summer/early fall, but under no circumstances prior to September 1st during any given year. For the proposed project, these areas are shown and listed on Figure 1 as *Airfield*

Non-Safety/ Non-Critical Areas for Proposed Project. Depending upon climatic and vegetative growth conditions, however, an early spring mowing also may be implemented, but under no circumstances later than April 15th during any given year.

Ultimately, the Airport Manager will be responsible to maintain airfield vegetation in accordance with the grassland managementis plan. The Pplan will be distributed to Airport Operations personnel and Airport Maintenance personnel, including the Airport Rescue and Fire Fighting (ARFF) staff. The same group of personnel are aware of FAR Section 19 § 139.337 Wildlife Hazard Management, and will be trained on how to balance the requirements of aviation safety in 139.337 with the requirements of this plan. As stated in Section 2.2 - Plan Goals and Objectives, if future bird populations increase causing an increase in bird strikes (as documented through the ongoing monitoring of bird populationsplan), the Pplan will be modified and DEP notified in an effort to establish and implement remedial measures satisfactory to both the DEP and Airport Authority. The Airport Manager will be responsible to facilitate this process, and will solicit staff feedback on the bird population monitoring plan and resulting data on an annual basis. This measure will tie closely with the Airport's annual safety inspections such that maintaining airfield safety inspection logs will be part and parcel to maintaining this plan.

As described below, Plan implementation is anticipated to benefit the horned lark, as well as the grasshopper and Savannah sparrow and other grassland birds.

2.4 Discussion

2.4.1 Horned Lark

Based on the *Endangered and Threatened Species Series Fact Sheet* for the horned lark (DEP; December 1999), this species nests in "large, open areas that are barren, sandy, stony, or have sparse grass cover. In Connecticut, the horned lark nests on beaches and open areas, mostly along the coast. Breeding has also been documented in grassland areas at airports." As noted by Sample and Mossman (1997)[4], the horned lark is a "shortgrass species", preferring habitats with very short and sparse vegetation or bare soil, such as plowed agricultural fields, heavily grazed pasture, and dry prairies. Consequently, this species is expected to be most attracted to the regularly maintained portions of the overall airfield, i.e. locations where mowing is intended to discourage bird activity.

Regardless, mowing within critical operational areas is not anticipated to totally preclude the use of these areas by horned larks for feeding, or their potential nesting within non-critical areas where mowing will be limited. It should be noted, however, that according to the above-referenced DEP *Endangered and Threatened Species Series Fact Sheet*, "Horned larks are common migrants and winter visitors in Connecticut, but are rare nesters."

[4] Sample, David W. and Michael J. Mossman. 1997. *Managing Habitat for Grassland Birds: A Guide for Wisconsin.* WI Department of Natural Resources. Madison, WI.

TABLE 2-II
FAA APPROVED WARM SEASON GRASSES FOR THE ENHANCEMENT OF GRASSLAND BIRD HABITAT

Common Name	Scientific Name	Cultivar
little bluestem	*Schizachyrium scoparium*	'Aldous' or 'Cimarron'
big bluestem	*Andropogon gerardii*	'Niagra'
indiangrass	*Sorghastrum nutans*	'Rumsey'
switchgrass	*Panicum virgatum*	'Blackwell', 'Shelter' or 'Cave-in-Rock'
Bermudagrass	*Cynodon dactylon*	'Quickstand'

Seed mix ratios are variable. However, for Connecticut, a minimum of 60% little bluestem is preferred. A good sample seed mix is as follows:

60% little bluestem, 20% indiangrass, 20% switchgrass.

Big bluestem is an acceptable alternative to little bluestem for the dominant species in the chosen mix. When one of the bluestems is utilized as the dominant species the other grass species listed may be mixed in any ratio desired. Of these species, Bermudagrass is the least favored and should thus be used in the lowest percentage.

Other Considerations

Seeding Requirements:

- firm seed bed before and after planting
- use appropriate seed covering

Seed Bed Preparation:

- pH of 5.5-6.5
- soil temperature approximately 60° F
- planting depth: 1/4" -1/2"
- recommended use of 0-20-20 fertilizer, based on soil test; apply no nitrogen until the stand is established (late summer; use 20-40 lbs for half season)

When evaluating the stand, please note that many of these grasses do not reach their full growth until the second growing season.

Source: CT Department of Environmental Protection/Wildlife Division

2.4.2 Grasshopper and Savannah Sparrows

While also characterized as a "shortgrass species" by Sample and Mossman (1997), they note that the grasshopper sparrow requires some bare soil, but is "most common in habitats with relatively short (5 – 20 cm height-density [i.e. 2 – 8 inches]) vegetation and fairly diverse structure." In contrast, Sample and Mossman (1997) characterize the Savannah sparrow as a "midgrass species" and a "habitat generalist" that "Occurs in habitats with a broad range of vegetation structure; most common in fairly lush, short to medium height grasslands (e.g., hay, pasture). Often uses stiff-stemmed forbs for song perches."

These habitat characteristics are confirmed by Jones and Vickery in *Conserving Grassland Birds*, wherein the vegetative structure for grasshopper sparrows is described as "Short bunch grasses (ht.: 4 – 12") with minimal litter and grass cover, patches of bare ground, scattered tall forbs (ht.: 8 – 25") and short shrubs (ht.: 1 – 8") for song perches." With respect to Savannah sparrows, Jones and Vickery describe the requisite vegetative structure as "Mixed grass (ht.: 8 – 12") old hayfields >8 years old with relatively sparse ground cover, usually in lowlands with moist soil; prefer mosaic of grasses, sedges, and scattered broad-leaved forbs with <25% shrub cover."

The habitat requirements of these two sparrows is further confirmed by Sibley (2000)[5], who describes the habitat of grasshopper and Savannah sparrows as "tall, dense grass" and "a variety of grassy habitats", respectively.

Based on these habitat requirements, the limited mowing cycle associated with non-critical operational areas is expected to enhance the habitat viability of these areas for grasshopper and Savannah sparrows.

[5] Sibley, David A. 2000. *The Sibley Guide to Birds*. Alfred A. Knopf, Inc. New York, NY.

3.0 SUMMARY

The above-described Grassland Management Plan has been prepared in accordance with and is intended to comply with Special Condition #1 of the DEP permits and outlines a series of proposed measures associated with the maintenance of grassed areas resulting from implementation of the runway safety area and taxiway improvements at Tweed-New Haven Airport. As described herein, a mowing regime is proposed relative to locations to be disturbed in conjunction with RSA and taxiway improvements. These practices are anticipated to benefit such State-listed grassland birds as the horned lark, as well as the grasshopper and Savannah sparrow, and other grassland birds.

It is important to note, however, that **the goal of grassland management must be carefully balanced with the airport's primary goal of maintaining aviation safety.** It is within the context of aviation safety that this program is proposed.

TWEED
NEW HAVEN AIRPORT

ATTACHMENT AB

DEP CORRESPONDENCE REGARDING GRASSLAND MANAGEMENT

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

October 19,2001

Marshall W. Dennis
Wetlands & Wildlife, Inc.
409 Massachusetts Avenue, Suite 202
Acton, MA 01720

Re: Tweed-New Haven Airport

Dear Mr. Dennis:

The materials you provided to me regarding proposed runway modifications at Tweed-New Haven Airport address the mitigation needs for potential state-listed grassland bird impacts in a comprehensive way. Your are correct in your indication that use of the recommended seed mix may improve or actually enhance habitat available for these birds. There are two points, however that merit mention.

Mowing needs to comply with FAA regulations for the protection of aircraft safety zone, however a mowing schedule should be developed for Tweed-New Haven Airport which would limit mowing activity in non-critical areas during the birds' nesting period. A similar mowing agreement is currently in place at Bradley International Airport. I would be happy to work with DOT Aviation and Ports staff or airport personnel on such an agreement at the appropriate time.

One thing it is important to recognize about this group of grassland birds is that they are not "flocking" birds. They spend much of their time at ground level foraging and the reaction of many of them is to run when startled rather than fly. This behavior makes them much less likely to be a problem in terms of airstrikes. In addition, mowing these warm-season grasses at longer intervals generally discourages other birds such as Canada geese, starlings, and gulls. These species are all "flocking birds" and can pose significant threats to aircraft. As a result, management for many grassland birds not only benefits state-listed species, but can help an airport alleviate other wildlife-related problems.

The Wildlife Division would be happy to work with the airport on any bird-related concerns that arise in the future. Given the low population levels of state-listed grassland birds, these improvements are unlikely to attract huge numbers of grassland birds. A subsequent "reseeding to a less desirable seed mix" is not something the Division is likely to support unless all other options have been explored and the Division has made the determination that this is the best course of action. This type of decision cannot be made solely by airport staff. This significant habitat alteration would amount to a "taking" of species protected by the Connecticut Endangered Species Act.

Please feel free to contact me if you have additional questions regarding grassland bird management at airports.

Sincerely,

Jenny Dickson
Wildlife Biologist

cc: K.Zavoy

Attachment 2
2011 Updated Grassland Management Plan

155 Burr Street
Administration Building
New Haven, CT 06512
Phone: (203) 466-8833
Fax: (203) 466-1199

April 13, 2011

Mr. Kevin Zawoy
Environmental Analyst III
CT DEP
Office of Long Island Sound Programs
79 Elm Street
Hartford, CT 06106-5127
United States of America

RE: PERMIT # IW-2000-116, DIV-200003052, WQC-200003051
Grassland Management Plan (Original February, 2008)
UPDATE, November 2010

Dear Mr. Zawoy:

Thank you for taking the time to visit our airport on September 14th, 2010. During your visit and discussions with Mr. Marshall Dennis and Mr. Charles Kurtz, you expressed interest in the airport's current mowing procedures in both the airfield safety and non-safety/non-critical areas. The following discussion (as related to our February 2008 Grassland Management Plan) is intended to address your concerns.

As stated in the original February, 2008 Grassland Management Plan, filed with DEP in February 2008, certain procedures can and should be updated based on the observations of Airport staff as related to the the safety of the Airport. The 2008 plan outlines mowing procedures for the safety critical areas of the airport, reference Drawing No. 1 of the plan. The following discussion summarizes wildlife activities at the airport from April 2009 to present, or since the completion of runway safety area improvements at the south end of the airport.

The airport monitors wildlife on and near the airfield in accordance with 14 CFR Part 139 Section §139.337 Wildlife Hazard Management, and has developed and maintains their own specific Wildlife Hazard Management Plan. The plan places a particular emphasis on identification and abatement of wildlife hazards within the airfield environment. The plan ensures that the Airport will take immediate measures to identify and mitigate wildlife hazards whenever they are detected or whenever airport management has been advised that hazardous conditions exist. The plan outlines steps for monitoring, documenting, and reporting potential wildlife hazards and strikes at the Airport. Protocols for responding to hazardous wildlife situations are presented, including roles and responsibilities of airport personnel.

Pursuant to the plan, the Airport has encountered steady levels of wildlife hazard incidents which have been successfully mitigated through implementation of the plan. One of the most common hazards to airfield safety has been bird strikes. The airport finds it is necessary to maintain mowing procedures within safety critical areas, as shown on Drawing No.1 of the 2008 Grassland Management Plan. Within non-safety critical areas, Airport maintenance staff limits

mowing as much as practicable without allowing wildlife attractants to increase the frequency of potential bird strikes. However, in the event an increase in wildlife attractants (insects, vectors, herbivores, small and large mammals) is observed by airport staff, non-critical safety areas that abut critical areas are mowed. This further reduces the risk of wildlife hazards within both safety and non-safety critical areas. Conversely, when wildlife attractants are deemed to be at an acceptable and safe level, non-critical safety areas are mowed in accordance with the Grassland Management Plan.

This update is intended to supplement the 2008 plan for two reasons:

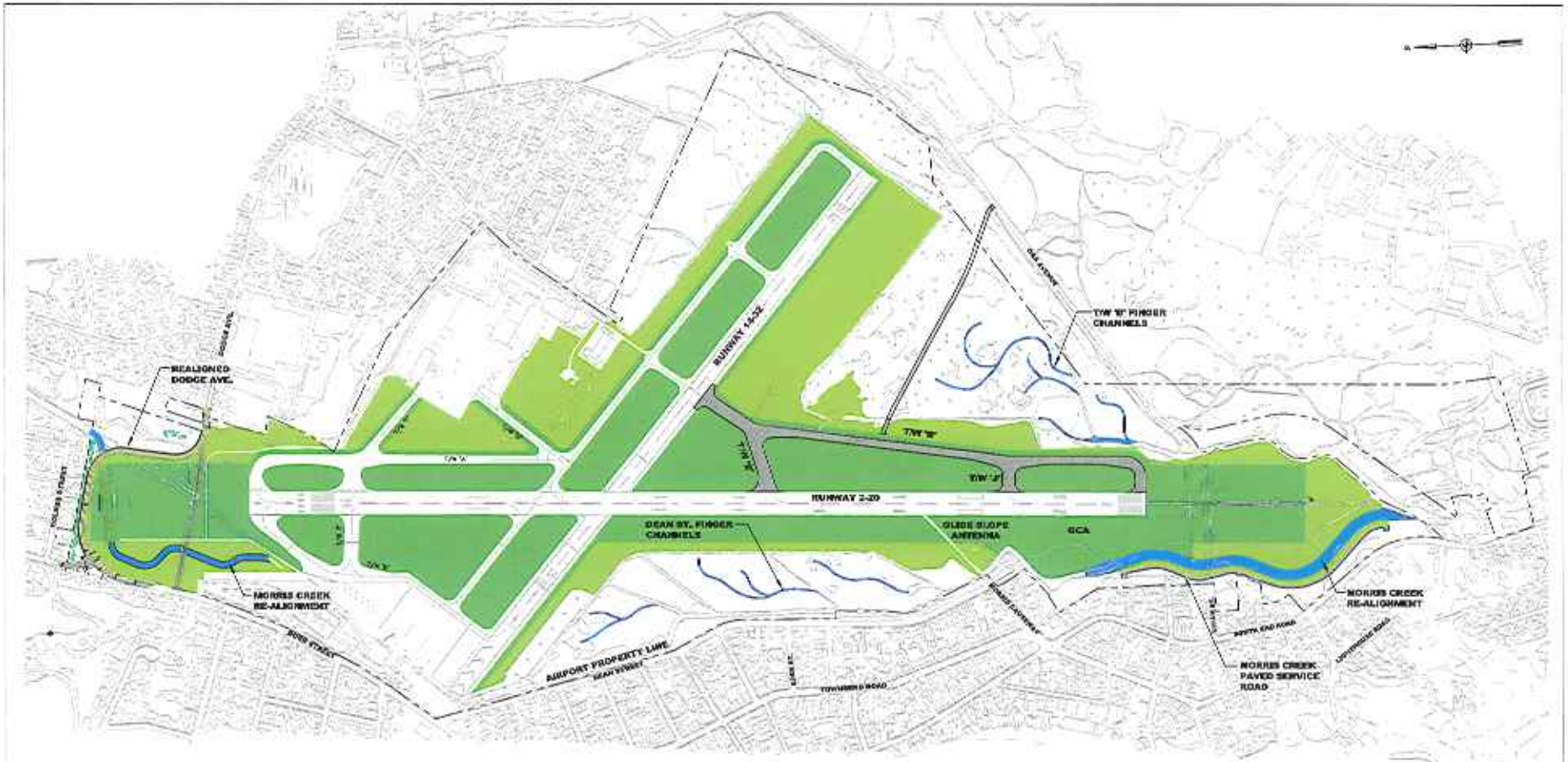
1) Inform CT DEP that the airport maintains the 2008 Grassland Management Plan through standard wildlife management procedures and standard grounds maintenance procedures. The plan illustrates the intended mowing areas and delineates these areas according to a purposeful balance between wildlife management and airport safety. These procedures are briefed at the airport on a quarterly basis and are made a part of standard training procedures for all airport staff.

2) Report that as much as practicable, the Airport is limiting mowing of non-safety critical areas in accordance with the 2008 plan. However, CT DEP should be aware that the plan was intended to serve as a set of guidelines and to be amendable, as needed, to ensure overall Airport safety. Therefore, the airport wishes to inform CT DEP that minor deviations the 2008 plan (mowing procedures in non-safety critical areas) have been deemed necessary in the past 18 months to maintain safe airfield operations. These occasions have been dealt with as exceptions to the plan, and have not permanently altered standard operating procedures. Further and potential future deviations will be handled on a case by case basis and will be managed with sensitivity towards the goals and objectives of the 2008 Grassland Management Plan.

Respectfully,

Lori Hoffman-Soares
Airport Manager

cc: M. Dennis, Wetlands & Wildlife Inc.
R. Furey, Hoyle Tanner & Associates, Inc.
D. Wilda, USDA



LEGEND

- AIRFIELD SAFETY AREA & GLIDESLOPE CRITICAL AREA
- AIRFIELD NON-SAFETY/NON CRITICAL AREAS
- MORRIS CREEK FINGER CHANNELS

DRAWING NO. 1

TWEED / NEW HAVEN REGIONAL AIRPORT
GRASSLAND MANAGEMENT PLAN
DECEMBER, 2010

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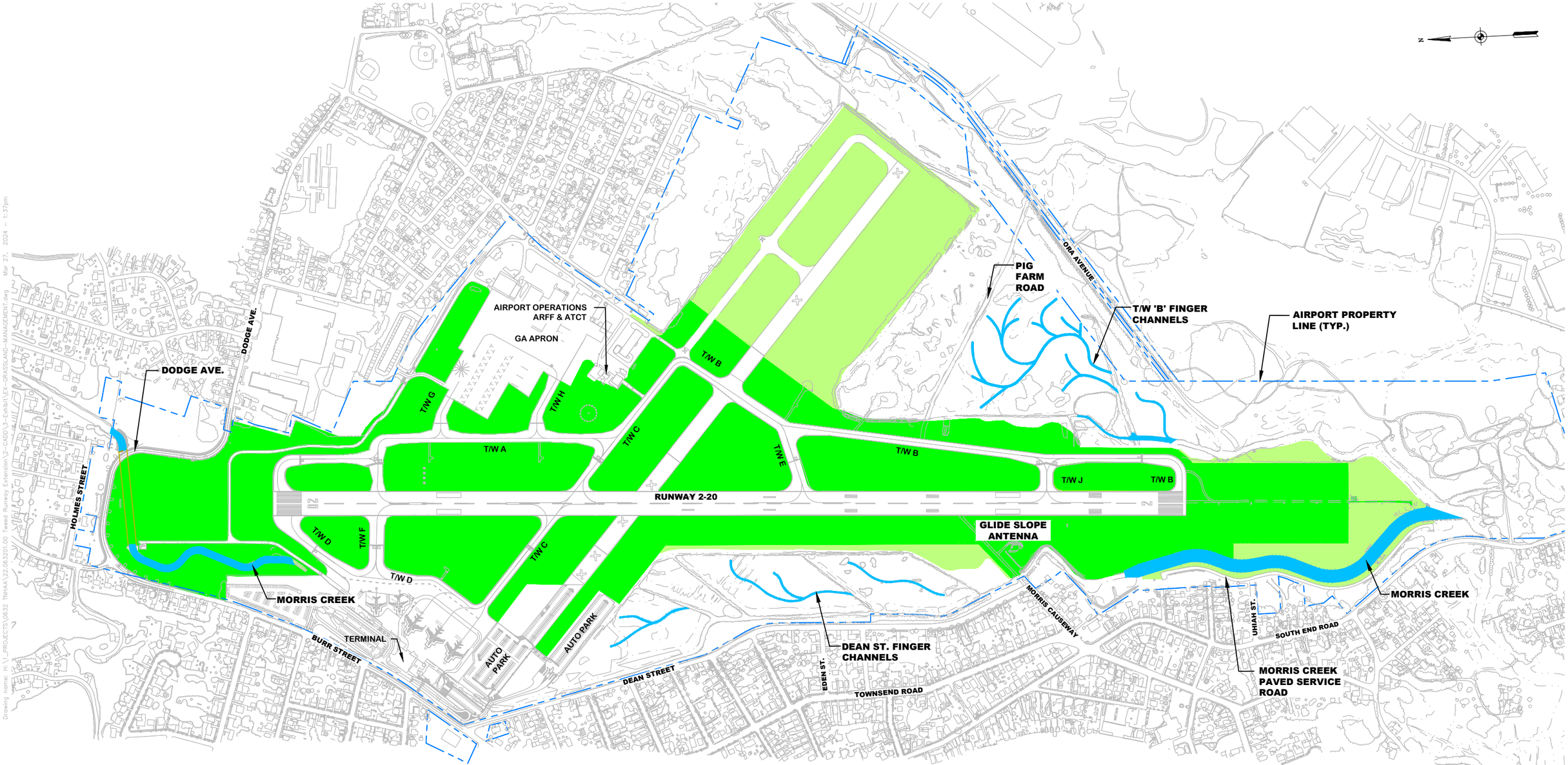
Attachment 3
Grassland Management Plan Sheet



LEGEND

MOWED REGULARLY TO MAINTAIN GRASS HEIGHT OF 4" TO 14".

MOWED ONCE A MONTH.

TWEED / NEW HAVEN REGIONAL AIRPORT
GRASSLAND MANAGEMENT PLAN

0 300 600

HOYLE TANNER

Drawing name: H:_PROJECTS\0632 TNHAA\23,063201.00 Tweed Runway Extension\3-CADD\3-Exhibit\SK-GRASSLAND-MANAGEMENT.dwg Mar 27, 2024 - 1:37pm

Attachment 4
2016 Wildlife Hazard Management Plan

TWEED-NEW HAVEN AIRPORT
WILDLIFE HAZARD MANAGEMENT PLAN



FAA APPROVED

APR 25 2016

LJD

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APR 2 5 2016

LD

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APR 25 2016

LJD

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NOV 05 2018

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19. WILDLIFE HAZARD MANAGEMENT PLAN 139.337

INTRODUCTION

Tweed-New Haven Regional Airport is located in southern Connecticut and is surrounded by various types of habitat that are prone to attracting numerous types of wildlife in varying sizes. Wildlife hazards at Tweed are both avian and mammalian, including turkey vultures, ospreys, red-tailed hawks, coyotes, and foxes, and especially white-tailed deer as evidenced by the deer strike in September 2012.

In addition to Tweed's proximity to marshes and wooded areas, it also lies near the Quinnipiac River, which serves as a food source for large birds like osprey, which can sometimes be seen flying overhead across the airfield carrying a fish. Moreover, the airport property contains within the perimeter fence large safety areas comprised of vast expanses of grass, which serve as an attractant to many varieties of smaller birds, some of which flock in large numbers.

This plan will serve as a guideline by which employees at Tweed and USDA WS will prevent, mitigate, and in some cases, depredate wildlife hazards on the airport property as they arise.

Purpose

This plan addresses the requirements of FAR Part 139.337, Wildlife Hazard Management, as requested by the Federal Aviation Administration, for Tweed-New Haven Regional Airport (HVN). This plan will be reviewed annually or more frequently as conditions merit, and shall be revised as necessary to keep the plan current. The plan establishes procedures for minimizing wildlife hazards to aircraft operations at Tweed-New Haven Regional Airport and requires immediate action be taken to alleviate wildlife hazards whenever they are detected. Procedures to immediately alleviate wildlife hazards include advisories to the Air Traffic Control Tower about hazards, runway sweeps to scare wildlife or depredation.

Acronyms

AMA	Airport Movement Area
AOA	Aircraft Operating Area
APHIS	Animal and Plant Health Inspection Services
ATCT	Air Traffic Control Tower
BASH	Bird/Wildlife Air Strike Hazard
CFR	Codes of Federal Regulation
CGS	Connecticut General Statues
CT DEEP WD	Connecticut Department of Energy &Environmental Protection, Wildlife Division
CT DW	Connecticut Division of Wildlife
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FOD	Foreign Object or Debris
HVN	Tweed-New Haven Regional Airport
IWDM	Integrated Wildlife Damage Management
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NWRC	Nation Wildlife Research Center

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T & E	Threatened and Endangered Species
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Services
WHA	Wildlife Hazard Assessment
WHMP	Wildlife Hazard Management Plan
WPP	Wildlife Patrol Personnel
WS	Wildlife Services

Definitions

Progressive management techniques: Part of an integrated wildlife management on the airfield. A stepped plan of harassment to depredation will occur using this method. First attempt at harassment will be chasing wildlife with vehicles/horn or sirens. Second attempt at harassment will be the use of pyrotechnics. Third will be lethal removal of wildlife by USDA WS.

Tweed: Tweed-New Haven Regional Airport

Wildlife Coordinator: the Assistant Airport Manager at Tweed-New Haven Airport will be responsible for various wildlife hazard management-related tasks and duties, including overseeing wildlife training and wildlife management operations at Tweed, and enforcement of this Plan.

Wildlife Hazard Working Group: The representatives from Tweed, USDA WS, and other necessary agencies that will take part in reviewing this Plan for any of the reasons listed in section FAR 139.337 (f)(6) of this Plan.

Wildlife Patrol Personnel: Persons to whom authority has been delegated to conduct harassment or removal of wildlife on Tweed-New Haven Regional Airport. This includes airport operations, USDA Wildlife Services, or a Private Contractor.

Wildlife Sweep: Survey of the airfield to look for the presence of wildlife.

Roles and Responsibilities: FAR 139.337 (f) (1)

A list of individuals having authority and responsibility for implementing each aspect of the plan

Wildlife Hazard Management Group

The Wildlife Hazard Management Group (WHMG) is responsible for reviewing the WHMP and providing input for the annual update of the plan. Not all members of the WHMG have a direct responsibility in the implementation of the WHMP; however, their presence ensures an airport wide understanding of the HVN Wildlife Hazard Management Program and it's associated-activities. The WHMG meets annually and is represented by:

Airport Manager

- Plays a large role in the implementation of the WHMP
- Responsible for the strategic direction of the airport WHMP

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Assistant Airport Manager

- Designated as the Wildlife Coordinator for Tweed-New Haven Airport
- Has oversight over the Wildlife Hazard Management Plan and responsible for implementing changes in the plan
- Reviews wildlife activity and logs periodically. Discusses any mitigation changes and recommendations with USDAWS

USDA WS Wildlife Biologist

- Monitor and control wildlife activity and attractants on and near the airport
- Provide operational and technical support to manage wildlife hazards
- Provide monthly reports summarizing wildlife observations and offering actions that may be taken to mitigate any identified issues
- Offer recommendations and assist in the implementation of management practices to alleviate or eliminate current, potential, and future wildlife hazards
- Ensure compliance with all applicable federal, state, and local environmental regulations regarding wildlife
- Facilitate the application of unique expertise and resources available through other USDA (WS) staff and management
- USDA WS biologist has provided the airport with a Wildlife Hazard Management Plan that was completed in December of 2009
- Facilitates the Tweed-New Haven Airport's cooperative service agreement with USDA listed in the appendices

Airport Operations

- Conduct airfield sweeps each shift and report wildlife issues to USDA wildlife biologist
- Respond to bird/aircraft strikes, gather information for FAA Form 5200-7, collect samples (as available), and submit reports to FAA strike database and if applicable, the Smithsonian Feather Identification Lab
- Disperse wildlife on the airport
- Conduct runway/taxiway sweeps and report any wildlife remains collected to USDA WS
- Attend required wildlife hazard management training provided by an FAA qualified airport wildlife biologist
- Responsible for the inspection of the wildlife perimeter fence as well as monitor vehicle movements in the AOA

Airport Maintenance

- Maintain airport property to reduce the number of wildlife attractants to the maximum extent practicable
- Report observed hazardous wildlife activity to Airport Operations
- Assist in the implementation of the WHMP through installation and maintenance of wildlife deterrents

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FAA ATCT/FAA Facilities

- Report any observed wildlife hazards to Airport Operations
- Gather information and notify pilots of any wildlife hazard on or around the airfield

While Airline/FBO Tenants do not participate in the Wildlife Hazard Management Group,

informational meetings regarding the HVN Wildlife Hazard Management Plan are held on an as needed basis. To ensure a successful management program, Airline/FBO Tenants share the following responsibilities.

Airline/FBO Tenants

- Ensure employees are aware of the wildlife program at HVN
- Assist in enforcing airport regulations regarding the feeding of wildlife, as well as any future regulations related to the management of hazardous wildlife
- Aid in directing flight crews to report any wildlife observations and hazards to Airport Operations

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Wildlife Hazard Assessment Actions: FAR 139.337 (f) (2)

Table 1: 2009 HVN WHA Priority List of Recommended Actions (f) (2)

WILDLIFE HAZARD ASSESSMENT RECOMMENDATIONS	COMMENTS	INITIATION DATE	TARGET DATE	STATUS
Continue to be aggressive in dispersing and removing hazardous wildlife		2009	Daily	Continuous
Remove abandoned equipment	Equipment and debris around the East ramp should be removed to reduce small mammal habitat	2009	Daily	Continuous
Remove large mammals	Zero tolerance for large mammals needs to be maintained	2009	Ongoing	Continuous
Grass management	Grass should be regularly mowed 7-14 inches to reduce seed production in order to reduce bird activity	2009	Daily	Continuous
Remove perches	Any large trees should be removed and place anti perching rods on the antennas and poles	2009	Ongoing	Continuous
Exclude buildings	The use of netting can be used to prevent birds from making nests. Retractable jet bridge should be removed	2009	Ongoing	Continuous
Construction of Wildlife Fence	The construction of a Wildlife Deterrence Fence will reduce large mammal population inside the airfield	2009	2014	Completed
Remove thin brushy and/or woody areas	Removal of thin brush and woody areas eliminates food and cover for all wildlife	2009	Daily	Continuous

FAR 139.337 (f) (2) (1) Wildlife Population Management

Tweed-New Haven Airport has variety of wildlife species that cause a great concern to the daily aircraft operations. The following wildlife species are the ones of greatest concern at Tweed-New Haven Airport based on the WHA that was conducted in 2009 by the USDA WS:

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European Starlings

European Starlings can form large flocks, which can range in the thousands. These birds are opportunistic feeders that can consume a variety of foods, including fruits, grains, weed, seeds, and insects. Grass height management is usually the best method of controlling populations and

serves as a long-term solution. Insect management using biological and chemical pesticides can aid in reducing Starling population.

Gulls

Gulls are commonly attracted to airports when food or water is available. Food sources may include refuse from dumpsters or nearby landfills, shellfish, earthworms, and insects. Airport infield, standing water, rooftops and light posts are ideal for loafing. Some of the effective methods to control gulls are to clean and contain trash area, prompt removal of animal carcasses from the airfield, elimination of standing water, and actively hazing and depredating.

Canada Geese

Canada Geese pose a great risk to aviation safety due to their size and also tend to travel in flocks. Geese prefer open grass where they can feed and see approaching predators. The best method for Canada Geese is the removal and exclusion of attractive habitat and agricultural crops. Pyrotechnics works well also against these birds and depredating to reinforce the pyrotechnics. Tweed-New Haven Airport practices a "zero tolerance" policy with these birds.

White Tailed Deer

The White tailed Deer is found throughout most of North America and may weigh from 50-400 pounds. Deer are generally crepuscular, active at dawn and dusk, or a nocturnal species. These animals feed on leaves, stems, fruits, nuts and agricultural crops. The most effective methods of controlling deer is exclusion by having a fence that us at least 10 feet tall with 3 wire strands. There is a "zero tolerance" on any large mammal that enters the airfield. USDA WS assists with by taking it lethally or herding it out of the airfield gates.

Crows

Crows are medium sized birds that can cause severe damage to aircraft. These birds are highly intelligent and social. Fortunately, they are somewhat adept when it comes to avoiding aircraft. This does not mean that they can be dismissed as hazard either. Managing the grass height and removing trees and roosting structures are effective methods for controlling crows. Crows are continuously dispersed and harassed using pyrotechnics and reinforced with lethal takes whenever is necessary.

Coyotes

The species of Coyote that has been observed at Tweed-New Haven Airport has been the Eastern Coyote. The Coyote resembles a medium sized German shepherd dog. A Coyote is a scavenger and will almost eat any animal or vegetable matter. They're known to hunt for rabbits and rodents. Exclusion and removal of Coyotes are the most effective methods to reduce risks. Proper fence maintenance is an important task in keeping these types of wildlife out the airfield. Any holes dug are quickly filled and a large section of our fence line has buried chain link skirts. Any sight of Coyotes prompts Airport Operations to contact WS for lethal take removal.

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FAA Part 139.337(f) (2) (2) Habitat Modification

2.2 Habitat Management:
Habitat management is the best long-term method for reducing wildlife hazards and bird strikes on or near an airport. Removing or modifying existing attractants such as food, water, and cover, the numbers of animals that pose a hazard to aircraft can be reduced. Care must be taken to manage habitat types in a manner that does not create new wildlife attractants or new wildlife problems. The goal is to try and make the airport less attractive to the species that are of greatest hazard to aircraft. Trained wildlife biologists have identified bird species using the airport and a habitat management program is used to discourage the birds that cause the most risk to aircraft. This may require the habitat to be managed in different ways at different times of the year depending on the species present.

2.2.1 Vegetation:
In general, the airport's current grassy areas are mowed regularly to maintain a WHA recommended height of 7-14 inches. Tweed Maintenance will be responsible for these mowing operations, as well as maintaining the fence line. The strategy allows easy visibility of birds and other hazards on the airfield, and prevents the grass from going to seed, which would attract more seed-eating birds and small mammals. The grass at Tweed-New Haven Regional Airport is mowed from spring through fall, with the first mowing activities beginning when the ground is firm enough to allow equipment access and sufficiently long to merit cutting. This grass-management scheme will be followed for all areas of the airfield with the following six exceptions:

Airport Maintenance will be responsible for clearing vegetation on both sides of the fence line, dependent on the weather. Vegetation at the fence line is part of exterior checks and a priority list item for wildlife mitigation. In preparation for operations to regrow grass, Tweed has consulted with USDA WS on which grass seed and it has been determined to be any variation of tall fescue.

In locations within wetlands, the access corridor has been reduced on one or both sides such that the access corridor only allows for clearing and vegetation removal via the use of small equipment and on foot. In upland areas, trees have been cut, the stumps ground to 4" below grade and the former stump area would be seeded. Trees and overhanging branches have been trimmed in all areas of fence installation to reduce the potential attraction for wildlife to use as assistance in crossing the fence.

In wetland areas, minimal impacts have occurred from vegetation removal and fence installation. In wetland areas, low bearing pressure (tracked) equipment was used to access the fence. Poles were pile-driven. All vegetation has been cut flush to the ground. Long-term vegetation management will occur within wetland areas along the fence corridor and will be conducted in a similar manner as initial removal using the least impacting methods. Clearing will be conducted with mowers, chain saws, line trimmers, by hand or with herbicides. This fence has been in place since the end of the calendar year 2013.

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Terrain improvements have been made at Tweed from the Runway 2/20 safety area construction. During this construction, the drainage canals of both safety areas were rerouted through the perimeter of the airfield. Two holding ponds were created in the safety area of Runway 20.

These shallow holding ponds are attractive bodies of water to waterfowl and wading birds. A portion of the drainage canal at the approach of Runway 20 was buried. The shallow stream that remains open is very attractive to waterfowl and wading birds due to the gradual slope of the ground, its proximity to short grass, and the long reeds and cattails used as cover for predatory wading birds.

2.2.2 Wetlands:

Intertidal and freshwater wetlands encompass much of Tweed, as shown in Figure 1, including one large contiguous wetland system that borders on or drains into Morris Creek. Wetland habitats present include tidal and freshwater marshes, freshwater scrub/shrub, and wooded swamp plant communities. Most of the wetlands lie to the west, east, and south of Runway 2/20. The wetlands to the south and west of Runway 2/20 were rehabilitated during the WHA to repair drainage canals, and to attempt to reduce the amount of *Phragmites* in the wetland. The flow of tidal waters into these wetlands is under the control of Tweed by means of a gate system. This was designed to increase the salinity of the wetlands in order to reduce *Phragmites* in the wetland and control flooding. These salt marsh habitats are some of the most productive in the world, rivaling rainforests. Excessive *Phragmites* growth chokes the productivity of the wetland.

2.2.3 Manmade Structures and Abandoned Aircraft:

Buildings and other structures on the airport provide perching, roosting, and nesting areas for birds. Starlings, rock pigeons, kestrels, sparrows, and gulls are frequently observed in or on these structures. Buildings such as hangars provide nest sites for pigeons, house sparrows, and starlings year-round. Bird droppings and nesting materials were observed in the retractable gangways and terminal buildings. Netting has been used in some of the terminal doorways to mitigate the perching and roosting of the above-mentioned birds. A pigeon trap has also been set up on the top of the terminal and administration buildings to reduce the number of pigeons that frequent the areas. Airport Operations will monitor these man-made structures for bird activity as part of their daily wildlife patrols.

2.2.4 Wildlife Fencing:

In order to reduce the possibility of wildlife on the airfield as much as possible, Tweed has erected a wildlife deterrent fence. Construction of this perimeter fence began in January 2014 and ended in May 2014. Approximately 13,145 linear feet of fence had been installed, with an the effective height of nine feet with eight feet of vertical fence fabric and three strands of out-facing barbed wire along the top. The two locations where this fence differs is around the long-term parking lot and behind the T-hangars, which is six feet tall. In upland locations, a three-foot fabric skirt has been buried on the exterior to discourage burrowing underneath the vertical fence, while in wetland areas the fence skirt has been removed due to permitting conditions from CTDEEP, OLISP and ACOE. In order to avoid such circumstances, the fence has been constructed within a varying-width corridor of approximately thirty (30) feet to allow room for access for inspection and maintenance. Where practicable and in upland and non-wetland buffer areas, a 15-foot access road has been constructed along one side of the fence to allow for vehicle monitoring.

The location of this fence is shown on Figure 1. The fence will be monitored on an ongoing basis by Airport Operations to maintain the integrity of the fence (i.e. checking for fallen trees on the fence, dig outs from animals, or damage from the general public such as holes being cut). Any of the existing fence that was used in the creation of this new perimeter fence, has been cleared

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of vegetation on both sides to a minimum width of 10 feet on the airfield side and a minimum of 5 feet and maximum of 10 feet on the outside, where possible, unless impeded by existing structures or property boundaries. Vegetation has been cleared on both sides of the fence and will be permanently maintained in upland areas by the airport maintenance department either by using small equipment or hand clearing in order to keep the fence visible and reduce maintenance.

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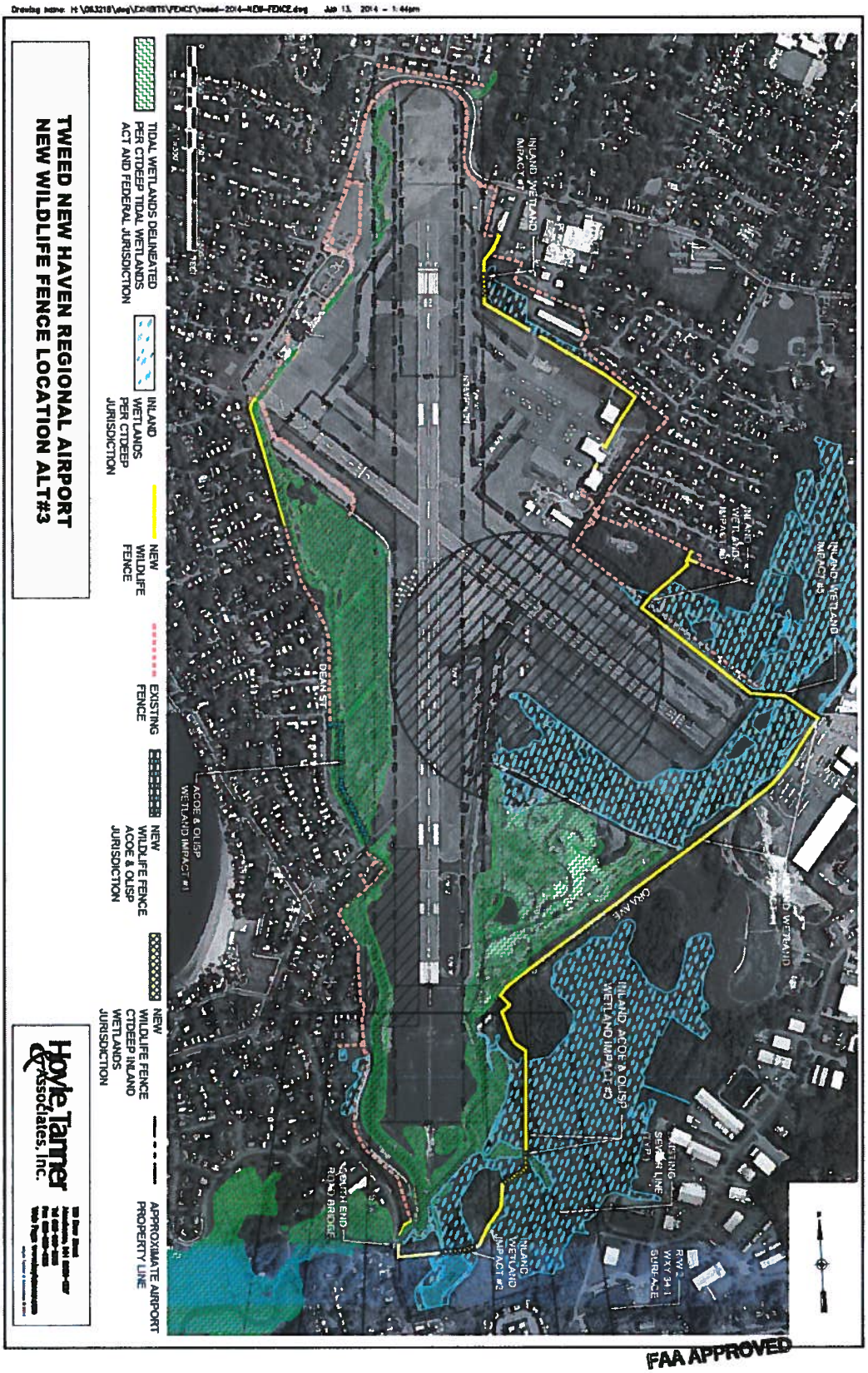
Figure 1: Location of New Wildlife Fence



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Laws and Regulations: FAR 139.337 (f) (3)

Federal, state and local governments administer laws and regulations that protect wildlife and their habitats. A number of laws and regulations affect wildlife management, and Tweed-New Haven Airport wildlife personnel will adhere to all applicable laws. State and federal permits are needed to operate a successful control program and will be obtained on a yearly basis by the Wildlife Coordinator or other designated official.

3.1 Federal Regulations

The U.S. Government has passed several statutes for the protection of wildlife including the Migratory Bird Treaty Act (MBTA), and the Lacey Act, the Endangered Species Act, Bald Eagle Protection Act, the National Environmental Policy Act, and the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA). These are the basis of most wildlife regulations that have been issued in the Codes of Federal Regulations (CFR). There are three sections that specifically address wildlife management: 50 CFR 10 (General Provisions), 50 CFR 13 (General Permit Procedures), and 50 CFR 21 (Migratory Bird Permits)—all are included as Appendices of the Wildlife Hazard Assessment.

Several agencies are responsible for implementing these regulations and many of these regulations affect wildlife management at airports. Federal wildlife laws are administered by the U.S. Fish and Wildlife Services (USFWS) and primarily involve migratory birds protected under the MBTA and all species protected under the Endangered Species Act.

3.2 Federal Permits

Tweed-New Haven Airport currently operates under Federal Fish and Wildlife Depredation Permit Number **MB670603-0.** This permit authorizes Tweed-New Haven Airport to kill a limited number of Canada Geese, Herring Gulls, Ring Billed Gulls, Great Backed Gulls, Laughing Gulls, Barn, Bank and Tree Swallows, American Black Ducks, Mallards, Hooded Merganser, Great Blue Herons, Great, Cattle, and Snowy Egrets, Double Crested-Cormorant, Mourning Doves, Horned Larks, Snow Bunting, Black and Turkey Vultures. Under the "emergency take" clause this permit authorizes Tweed-New Haven Airport to take any non-endangered and non-threatened species of migratory birds (such as an Osprey) when they are creating or about to create a hazard to aircraft. Tweed-New Haven Airport will exercise this option if necessary.

To avoid a lapse in permit, Tweed-New Haven Airport will maintain a current permit by submitting a written application at least 30 days prior to the expiration date of the permit (see 50 CFR § 13.22). If non-lethal harassment is not effective to reduce wildlife hazards, Tweed-New Haven Airport will seek authorization for additional species or additional takes by requesting Form 37 Migratory Bird Damage Project Report from USDA WS.

3.3 State Regulations

Connecticut State laws follow the Federal regulations for migratory bird species and further regulate actions concerning mammals and non-migratory birds (Department of Energy and Environmental Protection). The Connecticut Department of Energy and Environmental Protection is responsible for issuing state depredation permits (permits that allow for the take of birds and mammals to protect property, agriculture, and human health and safety).

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3.4 State Permits

Tweed-New Haven Airport possesses an Airport Depredation Permit, Permit Number 26-7, which is a standing permit to remove birds and mammals such as deer, coyotes and foxes. Raccoons, Opossums, and Skunks may be taken any time without a permit. Woodchucks are considered unprotected wildlife and may be also taken at any time without a permit. Tweed-New Haven Airport will request modification to species and Special Conditions on these permits as needed to accomplish other objectives in this Wildlife Hazard Management Plan.

A USFWS Depredation Permit will be kept current by the Airport Manager to allow the removal of Migratory Birds as listed in 50 CFR. USDA Wildlife Services is contacted annually to issue a Migratory Bird Damage Project Report (WS Form 37) recommending renewal of the permit and assists Tweed-New Haven Regional Airport Operations personnel in determining if any changes are warranted. Take of crows, red-winged blackbirds, brown-headed cowbirds and common grackles is covered under a Standing Depredation Order issued by the USFWS and no additional permitting is required to take these species when posing a hazard to aviation safety.

A Connecticut Department of Energy & Environmental Protection, Division of Wildlife Permit to take non-migratory birds and mammals also kept current. This permit allows for the take of deer, coyote, red and grey fox, turkey and other state managed species that pose a risk to aircraft.

Pigeons, starlings, house sparrows, Norway rats, and house mice have no federal or state protection and no permit is required for their lethal removal on the Airport.
See Appendices 1 and 2 for copies of the current depredation permits from the USFWS and the State of Connecticut.

Table 2. Wildlife Categories in Tweed-New Haven Airport and Permits for Lethal Control

Category	Species	State Permit	Federal Permit
Resident Game Birds	Turkey, Ruffed Grouse, Bobwhite Quail, Ring-necked Pheasants	Yes	No
Resident Non-Game Birds	Starlings, House Sparrows, Rock (feral) pigeons	No	No
Migratory game birds	Geese, Ducks, Snipe, Woodcocks, Rails, Gallinules	Yes	Yes
Migratory non-game birds	Raptors, Doves, Gulls, Songbirds, Swifts, Swallows, Shorebirds, Shorebirds, and Wading Birds	Yes	Yes
Depredation order birds	Crows, Red-winged blackbirds, brown headed cowbirds and Grackles	No	No
Mammals	White-tailed Deer, Black Bear, Red Fox, Gray Fox, Eastern Cottontail Rabbits, Eastern Gray Squirrels, Eastern Coyotes, Bobcats, Raccoons, Striped Skunks, Virginia Opossums, Muskrats, American Beavers, Fishers	Yes	No
Resident Non-game Mammals and Reptiles	Woodchucks, Porcupines, Red Squirrels, Snapping Turtles, Snakes	Yes	No
T & E Species (lethal & non-lethal control)		Yes	Yes
Feral/Free ranging domestic animals	Dogs, Cats, Livestock	No	No

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Resources to Implement Plan: FAR 139.337 (f) (4)

The Airport Operations department at Tweed is supplied with ground vehicles and pyrotechnics for use in dispersing wildlife. Additionally, some of the vehicles include after-market sirens and loudspeakers. Because Tweed employees are prohibited from using firearms, it maintains an agreement and contract with USDA WS who has its own supply of dispersal and resources to be used for lethal take. The pyro technics and launchers are stored in and kept in ATF approved containers for firearms.

Operations personnel are not equipped with any kind of pesticide or chemical to be used for wildlife control. Each Operations vehicle is equipped with appropriately stocked snarge kits. Each Operations vehicle is equipped with the following:

1. Snarge and wildlife strike report kit, including:
    a. Instructions for strike collection
    b. Field strike report
    c. Rubber gloves
    d. Small plastic bags
    e. Sterile swabs
    f. Alcohol pads
    g. Bird Identification Guide
2. Wildlife dispersal kit, including:
    a. Pyrotechnic launcher(s)
    b. Pyrotechnics ("bangers", "screamers", and primer caps)
    c. Ear and eye protection
    d. Approved ATF Container for the above items
3. A functioning horn
4. VHF and Motorola FM radio
5. Light beacon
6. Shovel
7. Broom

Procedures to be followed during air carrier operations FAR 139.337 (f) (5)

Designation of personnel responsible for implementing the procedures FAR 139.337 (f) (5) (1):

Trained Airport Operations Supervisors and Airport Operations Personnel
(Seven days per week, 24 hours per day)
USDA Wildlife Services Wildlife Biologist
(Periodic Visits, On request)

Provisions to conduct physical inspections of the aircraft movement area and other areas critical to successfully manage known wildlife hazards before air carrier operations begin FAR 139.337 (f)(5)(2):

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Airfield Inspections

Airport Operations personnel will monitor the entire AOA seven days per week for wildlife and attractants. Security inspections are made and include an inspection of the security fence line at

least once a week. Additionally, fence line inspections will be completed after, high winds, heavy rains, snow/ice events or any other unusual events. Inspections will be documented in the airport's Wildlife Observation and Control Log. Airport Operations personnel will conduct at least three full length inspections of each runway each day, including full-length inspections before any closed runway is reopened and after any wildlife is reported.

Wildlife Hazard Control Measures FAR 139.337 (f) (5) (3)

5.3.1 Aggressive Bird Dispersal and Removal

In reference to CFR 139.337(a) – Airport Operations will take immediate actions in addressing any wildlife hazards as they arise. Specifically, if any wildlife is observed on or in the vicinity of an active runway, Airport Operations will coordinate an immediate runway closure and will contact HVN ATC on the Local Tower frequency (124.8MHz). Airport Operations may also contact HVN ATC via the Airport Operations cell phone that is in possession of the on-duty Airport Operations Supervisor about any specific wildlife hazard details that deems the runway unsafe for aircraft operations. Prior to the Airport Operations vehicle entering the Runway(s) for dispersal and removal, the HVN ATC controller will verbally confirm that the Runway(s) is closed. The Runway(s) shall remain closed until all wildlife has been dispersed or removed to the satisfaction of the Duty Airport Operations Supervisor. Airport Operations will coordinate all other wildlife dispersals or removals on the airfield on either Ground Control frequency (121.700) or a phone call to the tower cab.

Airport Operations personnel will take an aggressive approach in dispersing birds, particularly waterfowl, gulls, crows, and starlings. Airport Operations personnel will conduct patrols several times each day during periods when European Starlings, Gulls, and Crows are likely to be present. The wetland areas and storm water channels in the airfield will be continually monitored throughout the year for the wildlife because waterfowl are routinely observed using the storm water ditches and wetlands. All birds using the storm water ditches and wetlands will be harassed with pyrotechnics until they leave airport property. The USDA WHA recommends the airport adopt a zero-tolerance policy for waterfowl (specifically Canada Geese) on the airport. During routine inspections or when observed anytime by Airport Operations personnel, Airport Operations may request for immediate assistance from USDA WS for the coordinated removal of wildlife. However, since USDA WS or private control operators are not located on the airport property 24/7, Airport Operations will attempt to harass the wildlife away from the airfield until their arrival, which can be approximately 2 hours. All wildlife observations and control measures will be logged by Airport Operations on the airport's Wildlife Observation and Control Log.

5.3.2 Large Mammal Removal

All deer, coyotes, and foxes observed inside the wildlife fence will be removed as practically as possible by either USDA WS or a private Nuisance Wildlife Control Operator. Airport Operations will maintain a "zero tolerance" policy for deer and other large mammals on the airfield because of their severe threat to aviation safety. The Assistant Airport Manager or Lead

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Operations Supervisor will notify necessary personnel when a lethal removal effort is being conducted to maintain safe shooting conditions.

Ways to communicate effectively between personnel conducting wildlife control or observing wildlife hazards and the air traffic control tower FAR 139.337 (f)(5)(4)

All Airport Operations vehicles are equipped with two-way radios for communication with the Air Traffic Control Tower. These vehicles are equipped with either a rotating or flashing beacon for visibility. All personnel assigned to these vehicles are trained in proper radio communication with the Air Traffic Control Tower and are familiar with aeronautical operations. In case of wildlife activity, Airport Operations will contact HVN ATC via the ground frequency or the FM radio and advise of the wildlife and its location. At this time, Airport Operations will ensure there is no impact to aircraft operations by communicating aircraft traffic information with the controller. After the aircraft traffic information has been verified, Airport Operations will commence harassing or depredating activities. When the harassing or depredating has been done, Airport Operations will notify HVN ATC that the wildlife dispersal has been completed. Airport Operations personnel will coordinate wildlife dispersal with the Air Traffic Control Tower as described in Section 139.337 (f) (5) (3). During non-tower hours, Airport Operations personnel will be monitoring and announcing AOA movements on CTAF frequency 124.8MHz.

Procedures to review and evaluate the Wildlife Hazard Management Plan every 12 consecutive months or following an event described in 14 CFR Part 139.337 f (6) (b)(1), (b)(2), and (b)(3)

The following are persons responsible for the review of the WHMP to be held at Tweed-New Haven Airport, and are collectively referred to as the Wildlife Hazard Management Group:

- Airport Manager
- Assistant Airport Manager
- Airport Operations Manager
- Airport Operations Supervisors
- Airport Operations Coordinators
- Airport Maintenance Supervisor

Supporting Agencies:

- Air Traffic Control Tower at Tweed-New Haven Airport
- U.S. Department of Agriculture, Wildlife Services

The WHMP will be reviewed and evaluated every 12 consecutive months or following a "triggering events" as listed below. The Airport Manager, Wildlife Coordinator, and Airport Operations Supervisors may evaluate and make changes to the plan more frequently if conditions warrant.

Triggering events that would require a review of the WHMP would include:

(1) An air carrier aircraft experiences multiple wildlife strikes;

(2) An air carrier aircraft experiences substantial damage from striking wildlife (substantial

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damage means damage or structural failure incurred by an aircraft that adversely affects the structural strength, performance, or flight characteristics of the aircraft and that would normally require major repair or replacement of the affected component; or

(3) An air carrier aircraft experiences an ingestion of wildlife. In the event of a triggering event such as the ones above, the airport will review and evaluate the plan with the WHMG.

To evaluate the effectiveness of the WHMP plan in reducing wildlife strike hazards, the WHMG will be using the following procedures:

- Conduct an annual review of the WHMP to determine if changes are needed.
- Review the WHMP for consistency with airport projects, particularly those involving habitat management.
- Participate in reviews of proposed land use changes for Tweed-New Haven Airport and the surrounding area to avoid the creation of hazardous wildlife attractants.
- Provide advice for Wildlife Patrol Personnel regarding wildlife species identification, accurate data collection, proper use of control techniques, and wildlife reporting.
- Review the wildlife strike history for the past year. Any new species appearing in the strike record will be evaluated for possible control procedures and appropriate habitat modifications. Wildlife strikes with previously identified species will also be reviewed.
- Compare the wildlife strike history with summaries of control efforts. Comparing the amount of control efforts for each of those species in the strike record will assist in determining the relative effectiveness of these efforts. More specifically, it should be determined whether control efforts are targeting those species causing strikes. Any new wildlife control procedures that haven been instituted will be added, and the appropriate methodology for implementing the procedure described.
- Compare wildlife use on the airfield before and after habitat modifications. On certain areas of the airfield where habitat attractants have been modified, an effort should be made to determine if the modification resulted in a decrease, increase, or no change in wildlife use. In some cases, habitat modification may result in the location becoming attractive to another species of hazardous wildlife. In these cases, appropriate alterations of the habitat will be considered.

Wildlife Hazards Management Training Program: FAR 139.337 (f) (7)

Mandatory initial and recurrent wildlife training will be completed by all persons with responsibilities in the plan at least once every 12 consecutive calendar months. The Assistant Airport Manager will ensure that all Airport Operations personnel have undergone and completed training before engaging in wildlife control. The wildlife hazard training conducted by a qualified wildlife biologist will consist of the following:

- Airport familiarization
- Survey of wildlife hazards to aviation

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- Review of strikes & control actions
- Review of WHA
- Review of WHMP
- Bird and mammal identification
- Pyrotechnics/ firearms training
- ATC communications protocol
- Description of available means of wildlife dispersal and proper technique for using them
- Familiarization with common species found at Tweed
- Familiarization with on-airport and surrounding geography with regards to what species can be expected to be seen
- Explanation of local, state, and federal laws, acts, and statutes regarding harassment and depredation of wildlife and protected species
- Familiarization with FAA definitions of "wildlife strikes" and the proper reporting and sample collection procedures

Wildlife Hazards at Airports Training Outline

- **Introduction – Wildlife Hazards at Airports "Why are we here?**

  History of wildlife-aviation problems
  Wildlife hazards to aviation
  Wildlife attractants
  Airports responsibilities

- **Hazardous Species**

  Airport environment
  Attractants on the airport
  Off-site attractants
  Seasonality of species

- **Rules, Regulations and Permits**

  Non-FAA laws and policies
  FAA regulations and advisories
  State laws and policies
  Local laws and ordinances

- **Basic Bird Identification**

  Field Gear
  Common birds
  Bird factors
  Environment/habitat
  Record keeping/surveys

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- **Wildlife Hazard Log and Strike Collection**

  Data Base
  Procedures for collection (hands on)
  Collection forms and documentation
  Reports
  Airman

- **Techniques to Manage Wildlife Hazards at Airports**

  Wildlife Hazards
  Proactive management
  Reactive management

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Appendix 1: Current Migratory Bird Depredation Permit

Permit Number: MB670603-0
Effective: 05/21/2018 Expires: 04/30/2019

Issuing Office:

Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Migratory Bird Permit Office
300 Westgate Center Drive
Hadley, MA 01035-0779
Tel: 413-253-8643 Fax: 413-253-8424
Email: permitsR5MB@fws.gov

CHIEF, MIGRATORY BIRD PERMIT OFFICE - REGION 5

Permittee:

TWEED-NEW HAVEN REGIONAL AIRPORT
ADMINISTRATION BLDG. - 2ND FLOOR
155 BURR STREET
NEW HAVEN, CT 06512
U.S.A.

Name and Title of Principal Officer:
FELIPE SURIEL - ASSISTANT AIRPORT MANAGER

Authority: Statutes and Regulations: 16 USC 703-712; 50 CFR Part 13, 50 CFR 21.41.

Location where authorized activity may be conducted:
WITHIN THE BOUNDARY OF TWEED-NEW HAVEN REGIONAL AIRPORT, NEW HAVEN, CT

Reporting requirements:

1) Annual Report is due with next renewal. Report forms can be found at: <http://www.fws.gov/migratory birde/mbpermits.html>.
2) Supplemental Report on the relative success of any trapping and relocation efforte per condition (K) of this permit is due with next renewal.

Authorizations and Conditions:

A. General conditions set out in Subpart B of 50 CFR 13, and specific conditions contained in Federal regulations cited above, are hereby made a part of this permit. All ectivities authorized herein must be carried out in accord with and for the purposes described in the application submitted. Continued validity, or renewal of this permit is subject to complete and timely compliance with all applicable conditions, including the filing of all required information and reports.

B. The validity of this permit is also conditioned upon strict observance of all applicable foreign, state, local tribal, or other federal law.

C. Valid for use by permittee named above

D. You are authorized to take, temporarily possess, and transport the migratory birds specified below to relieve or prevent injurious situations impacting public safety. All take must be done as part of an integrated wildlife damage management program that emphasizes nonlethal management techniques, where practical and effective. Lethal take is not to be the primary means of control. Active hazing, harassment or other non-lethal techniques must continue in conjunction with any lethal take of migratory birds. You may not use this authority for situations in which migratory birds are merely causing a nuisance.

(1) The following may be lethally taken:
- (a) FIFTY (50) EACH: Herring gulls, Great black-backed gulls, Ring-billed gulls, Laughing gulls, Barn swallows, Bank swallows, and Tree swallows;
- (b) FIFTY (50) American black ducks and Mallards, in any species combination;
- (c) FORTY (40) EACH: Horned larks and Snow buntings;
- (d) THIRTY (30) Canada geese;
- (e) TWENTY-FIVE (25) Mourning doves;
- (f) TWENTY (20) Great, Cattle, and Snowy egrets, in any species combination;

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(g) TEN (10) Black and Turkey vultures, in any species combination;
(h) TEN (10) EACH: Ospreys, and Hooded mergansers;
(i) FIVE (5) EACH: Great blue herons and Double-crested cormorants.

State Restrictions: No species may be taken which is State listed as Endangered, Threatened or Special Concern without prior authorization from the Connecticut Department of Environmental Protection Commissioner Tel: (860) 424-3011. Included on the State list, among other species, are Peregrine falcon, Short-eared owl, Northern harrier, Upland sandpiper and Grasshopper sperrow.

E. You are authorized in emergency situations only to take, trap, or relocate any migratory birds, nests and eggs, including species that are not listed in Condition D (except bald eagles, golden eagles, or endangered or threatened species) when the migratory birds, nests, or eggs are posing e direct threat to human safety. A direct threat to human safety is one which involves a threat of serious bodily injury or a risk to human life.

You must report any emergency take activity to your migratory bird permit issuing office by **EMAILING to permitsr5mb@fws.gov or FAXING to 413-253-8424** within 72 hours after the emergency take action. Your report must include the species and number of birds taken, the method of take, and a complete narrative description of the circumstances under which you determined an emergency existed. In doing so, you shall discuss species behaviors that created the hazard or risk being addressed; location of the birds relative to the aircraft or airport operations; duration of bird presence in the area where the emergency existed; timing and amount of practical non-lethal measures attempted prior to the lethal take, as well as results.

F. You are not authorized to take Double-crested cormorants or Double-crested cormorant nests as part of management ections to reduce presumed adverse impacts of Double-crested cormorants on sport fish populations.

G. You are authorized to salvage end temporarily possess migratory birds found dead or taken under this permit for (1) disposal, (2) transfer to the U.S. Department of Agriculture, (3) diagnostic purposes, (4) purposes of training airport personnel, (5) donation to a public charity (those suitable for human consumption), or (6) donation to a public scientific or educational institution as defined in 50 CFR 10.12. Any dead bald eagles or golden eagles salvaged must be reported within 48 hours to the National Eagle Repository at (303) 287-2110 and to the migratory bird permit issuing office by **EMAILING to permitsr5mb@fws.gov or FAXING to 413-253-8424**. The Repository will provide directions for shipment of these specimens.

H. You may not salvage and must immediately report to U.S. Fish and Wildlife Service Law Enforcement eny migratory birds that appear to have been poisoned, shot, or otherwise injured as the result of criminal activity.

I. You may use the following methods of take: (1) Shotguns (1a) other types of firearms by USDA only; (2) nets; (3) registered animal drugs (excluding nicarbazin), pesticides and repellents; (4) falconry abatement; and (5) legal lethal and live traps (excluding pole traps). Birds caught live may be euthenized or trensported and relocated to another site approved by the appropriate State wildlife agency, if required. When using firearms, you may use rifles or air rifles to shoot any bird when you determine that the use of a shotgun is inadequate to resolve the injurious situation. The use of any of the above techniques is at your discretion for each situation.

J. You may temporarily possess and stabilize sick and injured migratory birds and immediately transport them to a federally licensed rehabilitator for care.

K. The following subpermittees are authorized: Employees of Tweed-New Haven Regional Airport and employees of USDA, Wildlife Services. In addition, any other person who is (1) employed by or under contract to you for the activities specified in this permit, or (2) otherwise designated a subpermittee by you in writing, may exercise the euthority of this permit.

L. REPORTING: Along with the above Annual Report, you shall annually report on the relative success of any trapping and relocation efforts undertaken pursuant to Conditions D(2) and E of this permit. Such report shall at a minimum: include the dates and species for which trapping and relocation efforts occurred, whether or not successful; specify the number of trapping attempts for each species and an the relative effectiveness described in terms of both trapping success, relocation success, and number of birds that return to the Airport once relocated.

M. Your permit encompasses two calendar years. You are required to report the take associated with each calendar year on separate annuel reports. Annual reports can be found at <https://www.fws.gov/forms/3-202-9.pdf>.

M. You and any subpermittees must comply with the attached Standard Conditions for Migratory Bird Depredation Permits. These standard conditions are a continuation of your permit conditions and must remain with your permit.

O. A "No Feeding Policy" must be in place.

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Permit Number: MB670603-0
Effective: 05/21/2018 Expires: 04/30/2019

For Canada Geese Egg Addling or Nest Destruction you MUST register each year between January 1 and June 30 at: https://epermits.fws.gov/eRCGR. You must return to webaite and report your take before October 31 each year unless your state does not participate in this depredation, under 50 CFR 21.50.

For suspected illegal activity, immediately contact USFWS Law Enforcement at: Tolland, CT 860-871-8348

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Appendix 2: Current State of Connecticut Depredation Permit

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

AIRPORT DEPREDATION PERMIT 26-7

April 24, 2017

Ms. Diane Jackson
Airport Manager
Tweed-New Haven Regional Airport
155 Burr St.
New Haven, CT 06512

Dear Ms. Jackson:

Pursuant to section 26-7 of the Connecticut General Statutes, I hereby appoint you and the individuals listed below as Volunteer Assistants.

This Appointment is granted for the purpose of taking wildlife within the confines of the **Tweed-New Haven Regional Airport** in order to protect public safety. The taking of wildlife shall be consistent with wildlife hazard recommendations prepared by USDA Wildlife Services and shall be subject to the following conditions:

1. USDA APHIS Wildlife Services is appointed by the Commissioner of Energy & Environmental Protection to take wildlife within the airport property.
2. Additional authorization from the Commissioner is required to take any state listed endangered or threatened species. The taking of Federally listed species or migratory birds shall he subject to Federal regulatory authority.
3. Notwithstanding the provisions of paragraph 2, the airport is authorized to take wildlife posing a threat to airport operations.
4. Wildlife may be taken during the day or at night, however, the take of wildlife is not permitted on Sundays.
5. The method of take shall be consistent with the provisions of title 26 of the Connecticut General Statues. Any person who conducts trapping activities shall comply with Connecticut trapping certification requirements and all such trapping shall he in accordance with the Connecticut trapping laws and regulations in Connecticut General Statutes 26-72 and 26-66-5. No coyotes, foxes, skunks or raccoons may be relocated.
6. In the case of an imminent threat to public health or safety, notwithstanding the provision contained in condition #4, wildlife may be taken at any time, using any method consistent with professional wildlife management principles.
7. Deer suitable for human consumption shall be donated to the Hunters for the Hungry program. Deer that are not suitable for human consumption and other wildlife may be disposed of by burial on site or at a solid waste disposal facility (landfill or incinerator) provided that authorization is obtained from the permittee.
8. Immediately upon the taking of any deer such deer shall be: a) tagged with leg tags provided hy the Department of Environmental Protection and b) field dressed and stored in a cool location. The Department of Energy & Environmental Protection's Communication Center, which operates 24 hours a day, shall be notified of the tag numher(s) used by calling (860) 424-3333.
9. An annual report of all wildlife taken shall be filed with the Wildlife Division by January 15th for the previous calendar year.
10. This appointment shall expire December 31, 2020 and may be renewed upon request.

Should you have any questions regarding this Appointment please contact Ms. Laurie Fortin, Wildlife Biologist, DEEP, Wildlife Division at (860) 424-3963 or laurie.fortin@ct.gov.

Sincerely,

Susan K. Whalen

Susan K. Whalen
Deputy Commissioner

cc: Law Enforcement

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Appendix 3: Wildlife Control Log/Survey Sheet

WILDLIFE LOG

Date	Time	Count	Type Animal	Staff Initials	Action Taken	Location	Weather Conditions	Activity on Airfield (Grass Cutting etc.)	Direction of Flight	Additional Comments

WILDLIFE LOG

Date	Time	Count	Type Animal	Staff Initials	Action Taken	Location	Weather Conditions	Activity on Airfield (Grass Cutting etc.)	Direction of Flight	Additional Comments

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Appendix 4: Blank Strike Report Sheet

Form Approved OMB NO. 2120-0045
3/31/2010

U.S. Department of Transportation
Federal Aviation Administration

BIRD / OTHER WILDLIFE STRIKE REPORT

1. Name of Operator	2. Aircraft Make/Model	3. Engine Make/Model
4. Aircraft Registration	5. Date of Incident ____/____/____ Month Day Year	6. Local Time of Incident ☐ Dawn ☐ Dusk ___ HR ___ MIN ☐ Day ☐ Night ☐ AM ☐ PM
7. Airport Name	8. Runway Used	9. Location if En Route (Nearest Town/Reference & State)
10. Height (AGL)	11. Speed (IAS)	

12. Phase of Flight

- ☐ A. Parked
- ☐ B. Taxi
- ☐ C. Take-off Run
- ☐ D. Climb
- ☐ E. En Route
- ☐ F. Descent
- ☐ G. Approach
- ☐ H. Landing Roll

13. Part(s) of Aircraft Struck or Damaged

	Struck	Damaged		Struck	Damaged
A. Radome	☐	☐	H. Propeller	☐	☐
B. Windshield	☐	☐	I. Wing/Rotor	☐	☐
C. Nose	☐	☐	J. Fuselage	☐	☐
D. Engine No. 1	☐	☐	K. Landing Gear	☐	☐
E. Engine No. 2	☐	☐	L. Tail	☐	☐
F. Engine No. 3	☐	☐	M. Lights	☐	☐
G. Engine No. 4	☐	☐	N. Other: (Specify)	☐	☐

14. Effect on Flight

- ☐ None
- ☐ Aborted Take-Off
- ☐ Precautionary Landing
- ☐ Engines Shut Down
- ☐ Other: (Specify)

15. Sky Condition

- ☐ No Cloud
- ☐ Some Cloud
- ☐ Overcast

16. Precipitation

- ☐ Fog
- ☐ Rain
- ☐ Snow
- ☐ None

17. Bird/Other Wildlife Species

18. Number of birds seen and/or struck

Number of Birds	Seen	Struck
1	☐	☐
2-10	☐	☐
11-100	☐	☐
more than 100	☐	☐

19. Size of Bird(s)

- ☐ Small
- ☐ Medium
- ☐ Large

20. Pilot Warned of Birds ☐ Yes ☐ No

21. Remarks *(Describe damage, injuries and other pertinent information)*

DAMAGE / COST INFORMATION

22. Aircraft time out of service:	23. Estimated cost of repairs or replacement (U.S. $):	24. Estimated other Cost *(U.S. $) (e.g. loss of revenue, fuel, hotels):*
_____ hours	$	$

Reported by *(Optional)*	Title	Date

Paperwork Reduction Act Statement: The information collected on this form is necessary to allow the Federal Aviation Administration to assess the magnitude and severity of the wildlife-aircraft strike problem in the U.S. The information is used in determining the best management practices for reducing the hazard to aviation safety caused by wildlife-aircraft strikes. We estimate that it will take approximately 6 minutes to complete the form. The information collected is voluntary. Please note that an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number associated with this collection is 2120-0045. Comments concerning the accuracy of this burden and suggestions for reducing the burden should be directed to the FAA at: 800 Independence Ave SW, Washington, DC 20591, Attn: Information Collection Clearance Officer, ABA-20.

FAA Form 5200-7 (11-97) Supersedes Previous Edition — Electronic Version (Adobe) — * U.S. GPO: 1997-432-349/74201 — NSN: 0052-00-651-9005

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U.S. Department
of Transportation

Federal Aviation Administration

800 Independence Ave., S.W.
Washington, D.C. 20561

Official Business
Penalty for Private Use, $300

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 12438 WASHINGTON D.C.

POSTAGE WILL BE PAID BY FEDERAL AVIATION ADMINISTRATION

Federal Aviation Administration
Office of Airport Safety and Standards, AAS-310
800 Independence Avenue, SW
WASHINGTON, DC 20591

FOLD AND TAPE HERE

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Directions for FAA Form 5200-7
Bird/Other Wildlife Strike Report

1. Name of Operator - This can be an airline (abbreviations okay - UAL, AAL, etc.), business (Coca Cola), government agency (Police Dept., FAA) or if a private pilot, his/her name.
2. Aircraft Make/Model - Abbreviations are okay, but to include the model (e.g. B737-200).
3. Engine Make/Model - Abbreviations are allowed (e.g., PW 4060, GECT7, LYC 580).
4. Aircraft Registration - This means the N# (for USA registered aircraft).
5. Date of Incident - Give the local date, not the ZULU or GMT date.
6. Local Time of Incident - Check the appropriate light conditions and fill in the hour and minute local time and check AM or PM or use the 24 clock and skip AM/PM.
7. Airport Name - Use the airport name or 3 letter code if a US airport. If a foreign airport, use the full name or 3 letter code and location (city/country).
8. Runway used - Self explanatory.
9. Location if En Route - Put the name of the nearest city and state.
10. Height AGL - Put the feet above ground level at the time of the strike (if you don't know, use MSL and indicate this). For take-off run and landing roll, it must be 0.
11. Speed (IAS) - Speed at which the aircraft was traveling when the strike occurred.
12. Phase of Flight - Phase of flight during which the strike occurred. Take-off run and landing roll should both be 0 AGL.
13. Part(s) of Aircraft Struck or Damaged - Check which parts were struck and damaged. If a part was damaged but not struck indicate this with a check on the damaged column only and indicate in comments (#21) why this happened (e.g., the landing gear might be damaged by deer strike, causing the aircraft to flip over and damage parts not struck by deer).
14. Effect on Flight - You can check more than one and if you check (Other", please explain in Comments (#21).
15. Sky condition - Check the one that applies.
16. Precipitation - You may check more than one.
17. Bird/Other Wildlife Species - Try to be accurate. If you don't know, put unknown and some description. Collect feathers or remains for identification for damaging strikes.
18. Number of birds seen and/or struck - check the box in the Seen column with the correct number if you saw the birds/other wildlife before the strike and check the box in the Struck column to show how many were hit. The exact number, can be written next to the box.
19. Size of Bird(s) - Check what you think is the correct size (e.g. sparrow = small, gull = medium and geese = large).
20. Pilot Warned of Birds - Check the correct box (even if it was an ATIS warning or NOTAM).
21. Remarks - Be as specific as you can. Include information about the extent of the damage, injuries, anything you think would be helpful to know. (e.g., number of birds ingested).
22. Aircraft time out of service - Record how many hours the aircraft was out of service.
23. Estimated cost of repairs or replacement - This may not be known immediately, but the data can be sent at a later date or put down a contact name and number for this data.
24. Estimated other cost - Include loss of revenue, fuel, hotels, etc. (see directions for #23).
25. Reported by - Although this is optional, it is helpful if questions arise about the information on the form (a phone number could also be included).
26. Title - This can be Pilot, Tower, Airport Operations, Airline Operations, Flight Safety, etc.
27. Date - Date the form was filled out.

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Appendix 5: Current Cooperative Service Agreement with USDA WS

WS-ER (7/17)

Agreement No.: 09015
WBS Element:

COOPERATIVE SERVICE AGREEMENT
BETWEEN
TWEED-NEW HAVEN REGIONAL AIRPORT
AND
UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE (APHIS)
WILDLIFE SERVICES (WS)

ARTICLE 1

The purpose of this Cooperative Service Agreement is to cooperate in a wildlife damage management project, as described in the Work Plan to reduce the potential hazard to human health and safety, damage to aircraft, public and private property associated with wildlife strikes with aircraft and wildlife on airport property.

ARTICLE 2

APHIS WS has statutory authority under the Act of March 2, 1931 (46 Stat. 1468; 7 USCA 8351-7 USCA 8352) as amended, and the Act of December 22, 1987 (101Stat. 1329-331, 7 USCA 8353), to cooperate with States, local jurisdictions, individuals, public and private agencies, organizations, and institutions while conducting a program of wildlife services involving mammal and bird species that are reservoirs for zoonotic diseases, or animal species that are injurious and/or a nuisance to, among other things, agriculture, horticulture, forestry, animal husbandry, wildlife, and human health and safety.

ARTICLE 3

APHIS WS and Tweed-New Haven Regional Airport mutually agree:

1. The parties' authorized representatives who shall be responsible for carrying out the provisions of this Agreement shall be:

Tweed-New Haven Regional Airport:	John Picard Chairman Tweed-New Haven Airport Authority 155 Burr Street New Haven, CT 06512
APHIS WS:	Monte D. Chandler State Director, CT, MA, & RI USDA, APHIS, WS 463 West Street Amherst, MA 01002

2. To meet as determined necessary by either party to discuss mutual program interests, accomplishments, needs, technology, and procedures to maintain or amend the Work Plan (Attachment A). Personnel authorized to attend meetings under this Agreement shall be the Airport Manager of Tweed-New Haven Regional Airport or his/her designee, the State Director or his designee, and/or those additional persons authorized and approved by the Tweed-New Haven Regional Airport and the State Director.

3. APHIS WS shall perform services more fully set forth in the Work Plan, which is attached hereto and made a part hereof. The parties may mutually agree in writing, at any time during the term of this Agreement, to amend, modify, add or delete services from the Work Plan.

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ARTICLE 4

Tweed-New Haven Regional Airport agrees:

1. To authorize APHIS WS to conduct direct control activities to reduce potential human health and safety risks and property damage associated with wildlife strikes. These activities are defined in the Work Plan. APHIS WS will be considered an invitee on the lands controlled by Tweed-New Haven Regional Airport. Tweed-New Haven Regional Airport will be required to exercise reasonable care to warn APHIS WS as to dangerous conditions or activities in the project areas.

2. To reimburse APHIS WS for costs of services provided under this Agreement up to but not exceeding the amount specified in the Financial Plan (Attachment B). Tweed-New Haven Regional Airport will begin processing for payment invoices submitted by APHIS WS within 30 days of receipt. The Tweed-New Haven Regional Airport ensures and certifies that it is not currently debarred or suspended and is free of delinquent Federal debt.

3. To designate to APHIS WS the Tweed-New Haven Regional Airport authorized individual whose responsibility shall be the coordination and administration of activities conducted pursuant to this Agreement.

4. To notify APHIS WS verbally or in writing as far in advance as practical of the date and time of any proposed meeting related to the program.

5. APHIS WS shall be responsible for administration and supervision of the program.

6. There will be no equipment with a procurement price of $5,000 or more per unit purchased directly with funds from the cooperator for use solely on this project. All other equipment purchased for the program is and will remain the property of APHIS WS.

7. To coordinate with APHIS WS before responding to all media requests regarding this Cooperative Service Agreement and activities conducted by WS under the Work Plan (Attachment A).

8. To obtain the appropriate permits for removal activities for all wildlife species that poses a threat to aviation safety and list USDA, APHIS, Wildlife Services as subpermittees. The list contains, but is not limited to Connecticut state managed wildlife species; Eastern coyote, red fox, raccoon, white-tailed deer, wild turkey, and mute swan, and federally managed migratory bird species; herring gull, great black-backed gull, ring-billed gull, Canada goose, American black duck, mallard duck, hooded merganser, cattle egret, great egret, great blue heron, turkey vulture, mourning dove, and osprey. Permits for other wildlife species will be obtained as necessary.

9. To provide an indoor working space to complete necessary paperwork.

ARTICLE 5

APHIS WS Agrees:

1. To conduct activities at Tweed-New Haven Regional Airport as described in the Work and Financial Plans.

2. Designate to Tweed-New Haven Regional Airport the authorized APHIS WS individual who shall be responsible for the joint administration of the activities conducted pursuant to this Agreement.

3. To bill Tweed-New Haven Regional Airport for actual costs incurred by APHIS WS during the performance of services agreed upon and specified in the Work Plan. APHIS WS shall keep records and

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receipts of all reimbursable expenditures hereunder for a period of not less than one year from the date of completion of the services provided under this Agreement and Tweed-New Haven Regional Airport shall have the right to inspect and audit such records.

4. To coordinate with Tweed-New Haven Regional Airport before responding to all media requests regarding this Cooperative Service Agreement and activities conducted by WS under the Work Plan (Attachment A).

ARTICLE 6

This Agreement is contingent upon the passage by Congress of an appropriation from which expenditures may be legally met and shall not obligate APHIS WS upon failure of Congress to so appropriate. This Agreement may also be reduced or terminated if Congress only provides APHIS WS funds for a finite period under a Continuing Resolution.

ARTICLE 7

APHIS WS assumes no liability for any actions or activities conducted under this Cooperative Service Agreement except to the extent that recourse or remedies are provided by Congress under the Federal Tort Claims Act (28 U.S.C. 1346(b), 2401(b), and 2671-2680).

ARTICLE 8

Pursuant to Section 22, Title 41, United States Code, no member of or delegate to Congress shall be admitted to any share or part of this Agreement or to any benefit to arise therefrom.

ARTICLE 9

Nothing in this Agreement shall prevent APHIS WS from entering into separate agreements with any other organization or individual for the purpose of providing wildlife damage management services exclusive of those provided for under this agreement.

ARTICLE 10

Tweed-New Haven Regional Airport certifies that APHIS WS has advised the Tweed-New Haven Regional Airport that there may be private sector service providers available to provide wildlife management services that the Tweed-New Haven Regional Airport is seeking from APHIS WS.

ARTICLE 11

The performance of wildlife damage management actions by APHIS WS under this agreement is contingent upon a determination by APHIS WS that such actions are in compliance with the National Environmental Policy Act, Endangered Species Act, and any other applicable federal statutes. APHIS WS will not make a final decision to conduct requested wildlife damage management actions until it has made the determination of such compliance.

ARTICLE 12

This Cooperative Service Agreement may be amended at any time by mutual agreement of the parties in writing. Also, this Agreement may be terminated at any time by mutual agreement of the parties in writing, or by one party provided that party notifies the other in writing at least 120 days prior to effecting such action. Further, in the event the Tweed-New Haven Regional Airport does not provide necessary funds, APHIS WS is relieved of the obligation to provide services under this agreement.

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In accordance with the Debt Collection Improvement Act of 1996, the Department of Treasury requires a **Taxpayer Identification Number** for individuals or businesses conducting business with the agency.

Tweed-New Haven Regional Airport Taxpayer Identification Number (TIN) _____

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TWEED-NEW HAVEN REGIONAL AIRPORT:

BY: _____ _____

John Picard, Airport Authority Chairman — Date
Tweed-New Haven Regional Airport
155 Burr Street
New Haven, CT 06512

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
WILDLIFE SERVICES

BY: _____ _____

Monte D. Chandler, State Director — Date
USDA, APHIS, WS
463 West Street
Amherst, MA 01002

BY: _____ _____

Willie D. Harris — Date
Director, Eastern Region
USDA, APHIS, WS
920 Main Campus Drive, Suite 200
Raleigh, NC 27606

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ATTACHMENT A
WORK PLAN

Introduction

The U.S. Department of Agriculture (USDA) is authorized to protect American agriculture and other resources from damage associated with wildlife. The primary authority for Wildlife Services (WS) is the Act of March 2, 1931 (46 Stat. 1468; 7 U.S.C.426-426b) as amended, and the Act of December 22, 1987 (101Stat. 1329-331, 7 U.S.C. 426c). Wildlife Services activities are conducted in cooperation with other Federal, State and local agencies; private organizations and individuals.

The WS program uses an Integrated Wildlife Damage Management (IWDM) approach (sometimes referred to as IPM or "Integrated Pest Management") in which a series of methods may be used or recommended to reduce wildlife damage. IWDM is described in Chapter 1, 1-7 of the Animal Damage Control Program Final Environmental Impact Statement (USDA, 1994). These methods include the alteration of cultural practices as well as habitat and behavioral modification to prevent damage. However, controlling wildlife damage may require that the offending animal(s) are killed or that the populations of the offending species be reduced.

Purpose

This Cooperative Service Agreement continues the existing agreement between APHIS WS and Tweed-New Haven Regional Airport with effective dates of June 30, 2018 to June 29, 2019. The purpose of this agreement is to cooperate in a wildlife damage management project, as described in the Work Plan to reduce the potential hazard to human health and safety, damage to aircraft, and personal property associated with wildlife strikes.

Planned USDA, APHIS, Wildlife Services Activities

Monitoring and control of wildlife for a period of twelve (12) months. Services include up to 22 daytime site visits, between 1 and 2 visits per month, to conduct operational control of wildlife, primarily birds, creating a hazard to aviation safety. Visits may be conducted at greater or lesser frequency depending on seasonal wildlife activity, weather conditions, and the needs of the airport. Additionally, APHIS WS will conduct up to twelve (12) night time site visits to conduct operational control of wildlife, primarily mammals, creating a hazard to aviation safety on a monthly basis. Night visits will be scheduled based on wildlife activity observed on the airfield by airport operations, APHIS WS personnel, and remote cameras.

The number of day and night visits may be adjusted to better address wildlife issues and meet the needs of the airport. If additional day visits are required or requested by Tweed-New Haven Regional Airport, three (3) day visits may replace one (1) night visit. Alternately, if additional night visits are required or requested, one (1) night visit may replace three (3) day visits. If more than 22 day and 12 night visits (or combination of visits as adjusted above) are required before the agreement ends on June 29, 2019, they may be requested by Tweed-New Haven Regional Airport in writing. E-mail is acceptable. These visits will be charged at a cost of $605.50 for each day visit and $1,572.50 for each night visit requested by the airport and conducted by Wildlife Services.

Methods to be used may include, but not be limited to vehicle chasing, pyrotechnics, trapping, toxicants, firearms, remote cameras, night vision, and infrared imaging equipment. Wildlife Services will coordinate with Tweed-New Haven Regional Airport personnel when scheduling and planning control activities. Additional site visits for control may be conducted at Wildlife Services discretion, as outside funding and scheduling allow.

If the airport is contacted by media or a member of the public, the airport may, at their discretion, forward any or all of these calls to WS Amherst office so information about the program can be distributed accordingly.

Effective Dates

The cooperative agreement shall become effective on June 30, 2018, and shall expire on June 29, 2019.

FAA APPROVED

NOV 05 2018

LJD

ATTACHMENT B
FINANCIAL PLAN

Personnel Costs	$19,158.31
Vehicle	$1,931.88
Supplies	$714.69
Equipment	$1,789.30
Subtotal (Direct Costs)	$23,594.18
Pooled Job Costs	$2,595.36
Indirect Costs	$3,810.46
TOTAL	**$30,000.00**

The distribution of the budget from this Financial Plan may vary as necessary to accomplish the purpose of this agreement, but may not exceed **$30,000.00.**

Financial Point of Contact

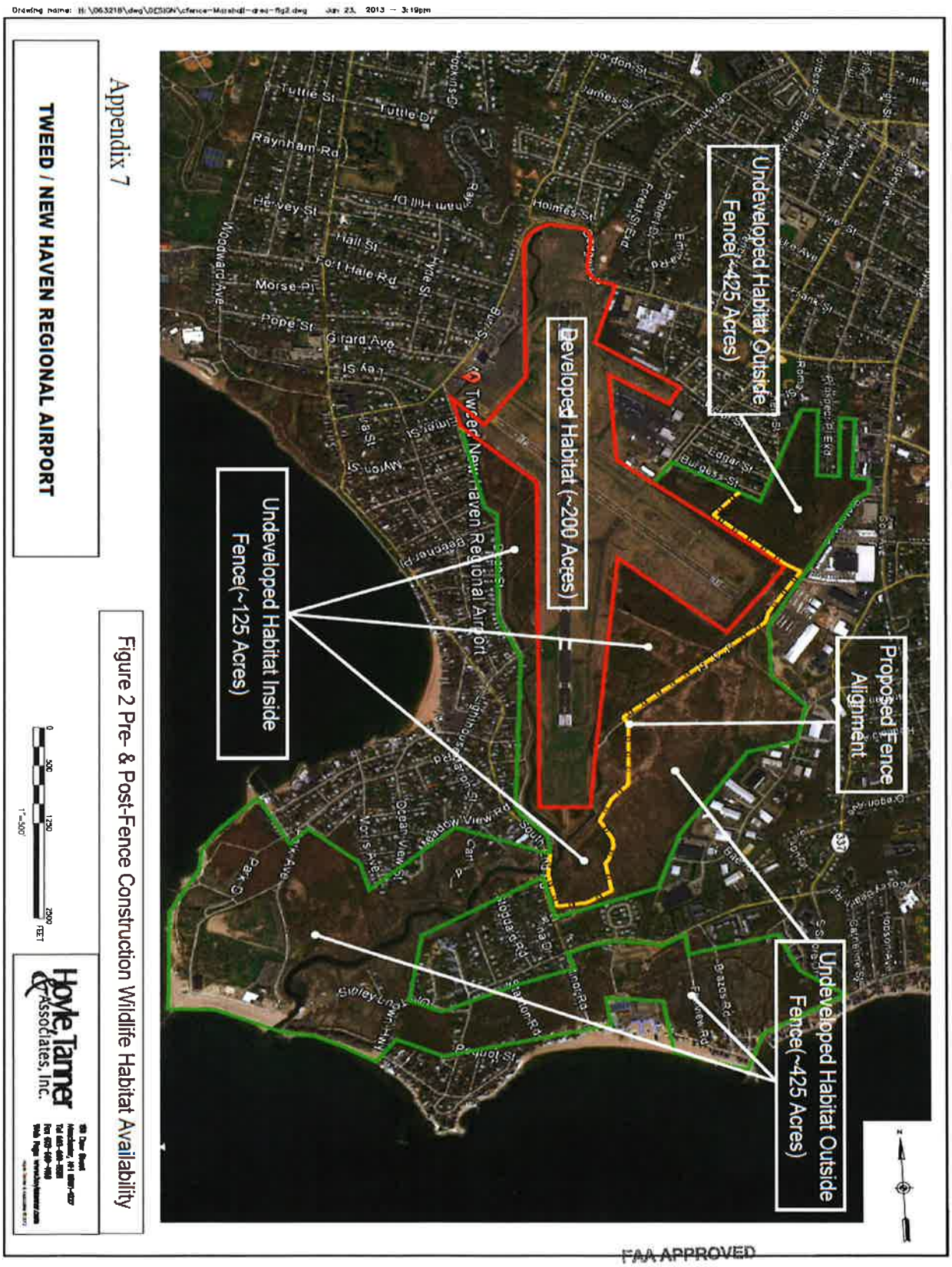
Cooperator:	Tim Larson Executive Director Tweed-New Haven Airport Authority	(203) 466-8833, x 110 Phone
APHIS, WS:	Dawn Wanczyk Budget Analyst	(413) 243-2503, x 3 Phone

FAA APPROVED

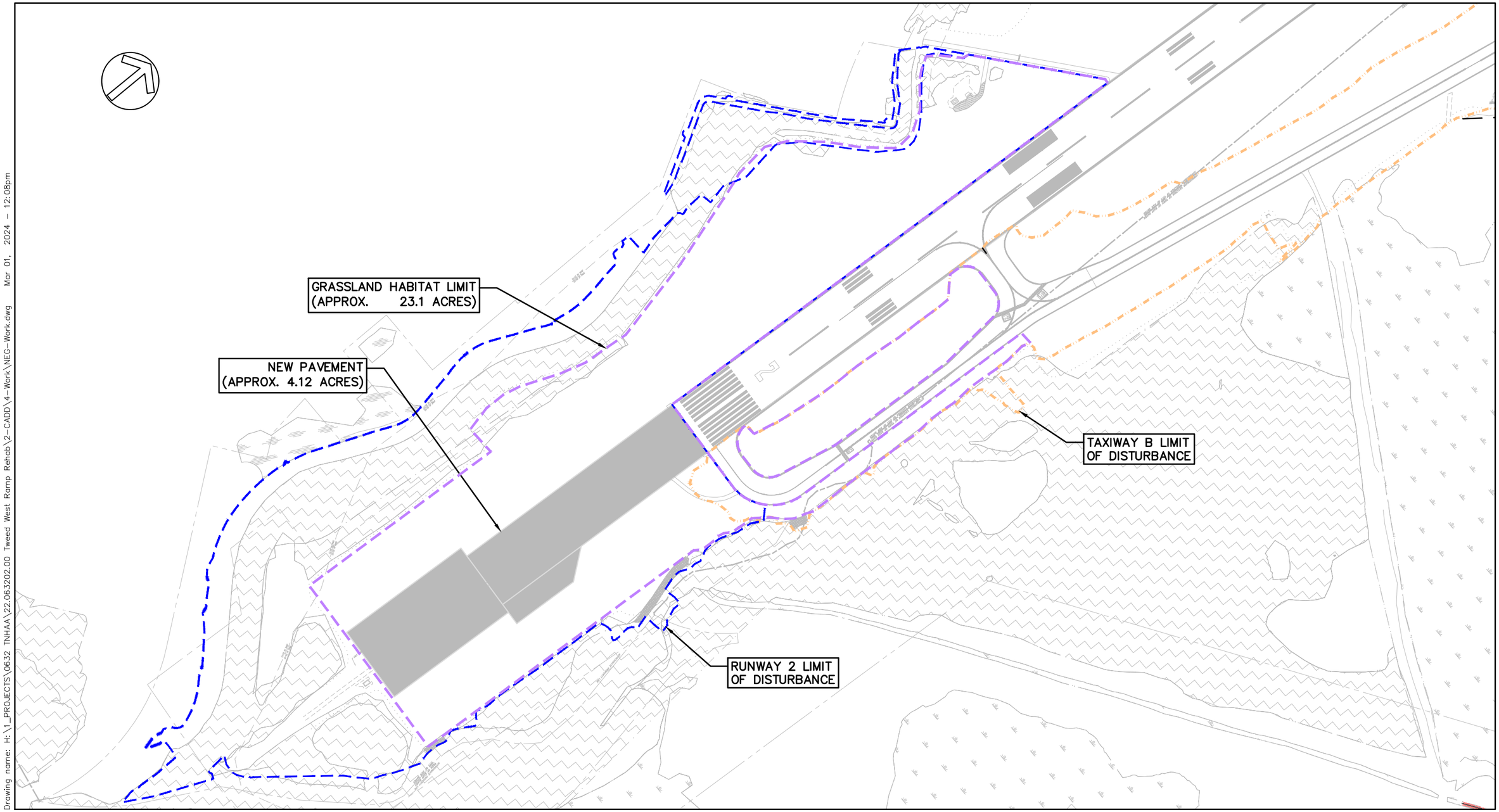
NOV 05 2018

LJD

Appendix 7: Pre- & Post-Fence Construction Wildlife Habitat



Attachment 5
Runway 2 Grasslands Plan



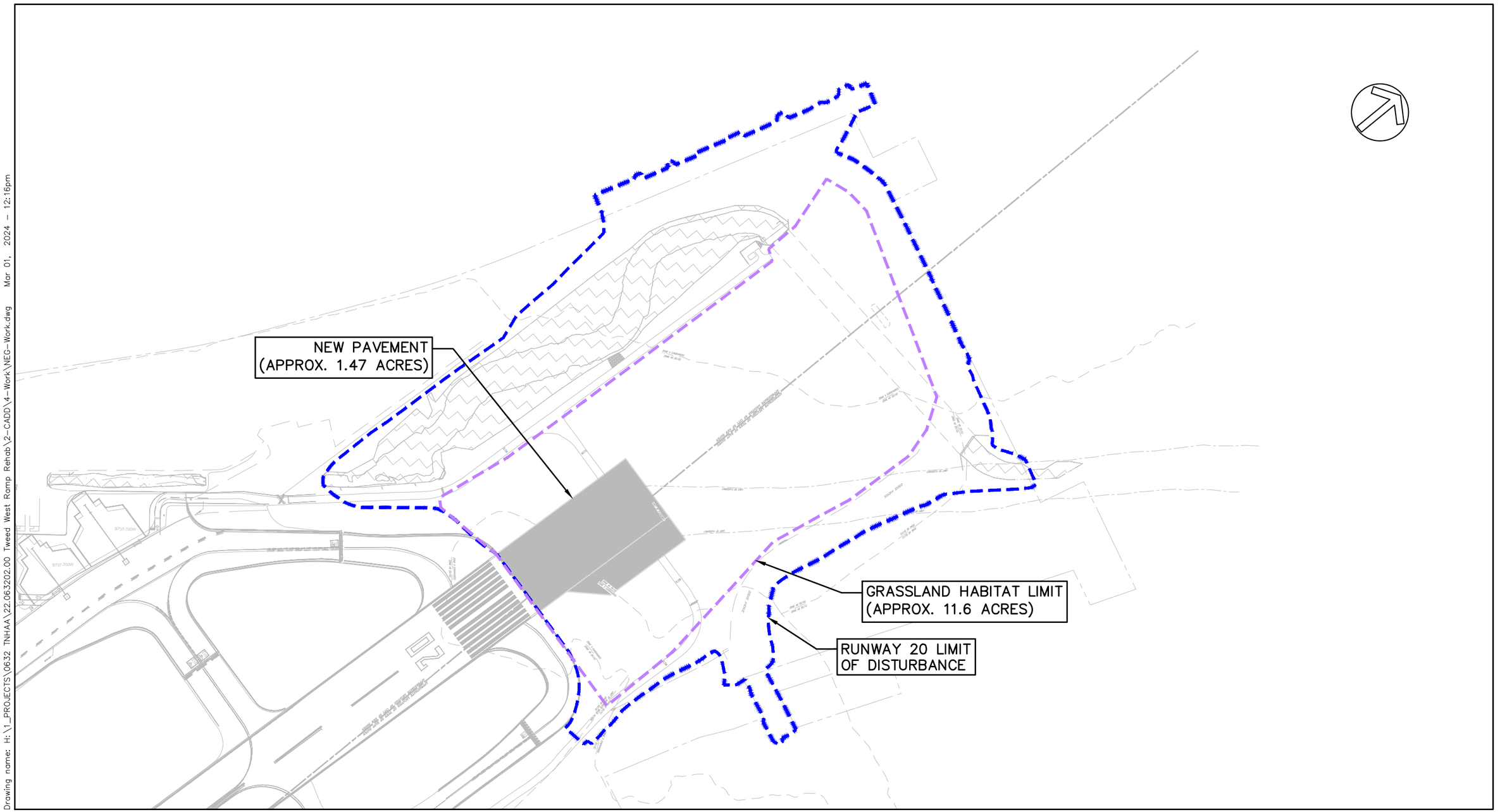
OLISP 20003049-KZ
RUNWAY 2/TAXIWAY B
GRASSLANDS

0 120 240

HOYLE TANNER

Drawing name: H:\1_PROJECTS\0632 TNHAA\22.063202.00 Tweed West Ramp Rehab\2-CADD\4-Work\NEG-Work.dwg Mar 01, 2024 - 12:08pm

Attachment 6
Runway 20 Grasslands Plan



OLISP 20003049-KZ
RUNWAY 20
GRASSLANDS

0 100 200

HOYLE TANNER

Drawing name: H:\1_PROJECTS\0632 TNHAA\22.063202.00 Tweed West Ramp Rehab\2-CADD\4-Work\NEG-Work.dwg Mar 01, 2024 - 12:16pm

Attachment 7
2022 NDDB Preliminary Determination Letter

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

March 3, 2022

Shawn Callaghan
FHI Studio INC
416 Asylum St
Hartford, Ct 06103
scallaghan@fhistudio.com

NDDB Preliminary NUMBER: 202201593

Project: Airport improvements including new terminal and runway extension; Tweed-New Haven Airport New Haven & East Haven 155 Burr St., New Haven, CT

Expiration: March 3, 2023

I have reviewed Natural Diversity Data Base (NDDB) maps and files regarding this project. According to our records, there are State-listed species (RCSA Sec. 26-306) documented within the proposed project area.

Grassland Birds
State Endangered birds horned lark (*Eremophila alpestris*) and grasshopper sparrow (*Ammodramus savannarum*), State Threatened Eastern meadowlark (*Sturnella magna*), State Species of Special Concern Savannah sparrow (*Passerculus sandwichensis*) and bobolink (*Dolichonyx oryzivorus*) occur within Tweed-New Haven Airport. Please comply with any pre-existing mitigation plans prepared to protect grassland birds for your property.

The horned lark, grasshopper sparrow, Savannah sparrow, bobolink and eastern meadowlark are considered to be grassland-obligate birds. They require open fields to breed, nest and forage in. Habitats preferred by these species include large grasslands, agricultural fields, and airports.

This Preliminary Site Assessment does not preclude the possibility that species not previously reported to the Natural Diversity Database may be encountered on the site. You are encouraged to report incidental observations to the Natural Diversity Database using the appropriate survey form and follow the instructions for submittal. We recommend field surveys be conducted in order to evaluate potential habitat and species presence. Field surveys should be performed by a qualified biologist with the appropriate scientific collecting permits at a time when these target species are identifiable. A report summarizing the results of such surveys should include:

- Survey date(s) and duration
- Site descriptions and photographs
- List of component vascular plant and animal species within the survey area (including scientific binomials)
- Data regarding population numbers and/or area occupied by State-listed species
- Detailed maps of the area surveyed including the survey route and locations of State listed species
- Assessment of impact by project activities

- Mitigation recommendations for any anticipated impacts
- Statement/résumé indicating the biologist's qualifications

The site surveys report should be sent to the CT DEEP-NDDB Program (deep.nddbrequest@ct.gov) for further review by program biologists.

For your planning purposes, the following general recommendations are useful for managing grassland birds at airports:

- Ground nesting birds found nesting at airfields should not pose a threat to aircraft because of their small size and low direct flight; in addition, managing for these species by leaving some areas un-mowed during the summer can help discourage large flocking birds that prefer fields of very short grass, such as gulls, crows, and Canada geese, and are more likely to damage aircraft.
- Restrict mowing during the breeding season on portions of airfield not directly adjacent to runways and taxiways.
- Maintain 50-foot mowed strips along taxiways and runways throughout the breeding season to discourage birds from nesting in these areas. Short grasses along runways can also help reduce insect populations that can cause problems to aircraft. Other mowed strips, such as along roadways, are used by upland sandpipers and other birds for feeding.
- Observe and mark locations of nesting birds and avoid mowing those areas until birds have fledged. This may be achieved by grounds maintenance personnel.
- Burning grasslands at airfields can be used as a management tool to benefit nesting birds. Taxiways and access roads at airports provide ideal firebreaks.
- The breeding season for these birds is approximately from late April through August. It is during this period that they are most susceptible to disturbances in their feeding and nesting habitat.

During project activities, the following recommendations will help protect grassland birds:

- Land disturbance activities including digging, ground clearing, heavy machinery driving staging, or ground trampling that will occur more than 100 feet into a grassland parcel or cut across parcels of grassland in a way that fragments grassland habitat patches should be done when grassland birds are not breeding. Breeding primarily takes place between **April 15- August 15**. Conducting land disturbance activities outside of the breeding season will avoid impact to the individuals.
- Any upland grassed areas that may be disturbed, should be reseeded using an FAA-approved mix of warm season grass species including:
    - Little bluestem (*Schizachyrium scoparium*)- "Aldous" or "Cimarron"
    - Big bluestem (*Andropogon gerardii*)- "Niagra"
    - Indiangrass (*Sorghastrum nutans*)- "Rumsey"
    - Switchgrass (*Panicum virgatum*) -"Blackwell", "Shelter", or "Cave in Rock"
    - Bermudagrass (*Cynodon dactylon*) -"Quickstand"
        - Seed mix ratios are variable, however for Connecticut a minimum of 60% little bluestem is preferred. Big bluestem is an acceptable alternative to little bluestem for the dominant species in the chosen mix. When one of the

bluestems is the dominant species the other grass species listed may be mixed in any ratio desired. Of these species, Burmudagrass is the least favored and should be used in the lowest percentage.

If schedules for planned work must occur **within breeding bird areas during the breeding season** apply the following protection measures to minimize impact to state listed birds:

- The proposed construction staging area and associated vehicles and equipment should be restricted to existing paved areas as much as possible.
- Beginning April 1- through duration of project: All grassy areas within a 50 foot buffer of planned work remain continuously mowed as short as possible to avoid attracting nesting birds into work zones.
- If vehicle access is required to cross grassy areas outside of work zones, designated paths and areas should be marked and kept mowed beginning April 1. Do not drive outside of designated work areas into grassy habitat, nesting birds will be crushed.
- Identify locations on the property where grassland habitat will remain unmowed between April 15- August 30 to mitigate for lost habitat during construction. These areas must provide adequate conditions for upland grassland habitat. Provide a map detailing these grassland mitigation areas to NDDB (deep.nddbrequest@ct.gov).
- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species as described above.

Natural Diversity Data Base information includes all information regarding critical biological resources available to us at the time of the request. This information is a compilation of data collected over the years by the Department of Energy and Environmental Protection's Bureau of Natural Resources and cooperating units of DEEP, independent conservation groups, and the scientific community. This information is not necessarily the result of comprehensive or site-specific field investigations. Consultations with the NDDB should not be substituted for on-site surveys required for environmental assessments. Current research projects and new contributors continue to identify additional populations of species and locations of habitats of concern, as well as, enhance existing data. Such new information is incorporated in the NDDB as it becomes available.

Please contact me if you have any questions (shannon.kearney@ct.gov). Thank you for consulting with the Natural Diversity Data Base and continuing to work with us to protect State-listed species.

Sincerely,

/s/ Shannon B. Kearney
Wildlife Biologist

From Robin Blum provided via email 4/25/2024
Notes – CT Grassland Bird Habitat Conceptual Plan
Submitted by Hoyle and Tanner to DEEP April, 2024

Memo includes:
Page 1
"it is understood that the area in question of 23 acres was intended to be comprised of the approximately 500'X1000' RW 2 Safety Area and the 500'X1000' RW 20 Safety Area. Permits IW-2000-116, DIV-200003052 and WQC-200003051 also have conditions relating to grassland habitat and planning."

Page 1
Describing the 2008 Plan:
"Notably, the 23-acre RSAs that were planted with warm season grasses were identified as, to address FAA requirements, being mowed between heights of 4-6 inches."

Page 2
Addressing the 2011 update
Further coordination with FAA resulted in a supplement to that plan, dated April 2011 that was developed in response to the continued wildlife hazard issues that the airport was facing as documented in their Wildlife Hazard Management Plan (Attachment 2). Specifically, areas that were initially identified as non-safety or non-critical areas that could be mowed once annually and not before September 1, were shifted to allow for mowing as needed to prevent seed growth and heights at which the grasses could be used for food or cover. This was in response to several wildlife hazard incidents, and ***it is crucial to future efforts that all parties recognize that the airport currently continues to follow this supplemented plan and mows all grassed areas as needed to keep grasses between 7"-14" to reduce the potential for grasses to attract wildlife, including grassland birds. See the Grassland Management Plan that has been updated to reflect this (Attachment 3).***

NDDB comment –

- The above-referenced Attachment 2 is the 'Updated Grassland Management Plan' and not the Wildlife Hazard Management Plan. It appears the Wildlife Hazard Management Plan documentation from this 2011-ish time period is not included in this package.
- The April 2011 'Updated Grassland Management Plan' (or supplement) included as Attachment 2 (referenced above as Attachment 3) consists of a memo provided to DEEP OLISP program. The memo references the airport's Wildlife Hazard Management Plan (this plan was not included with the memo), notes that wildlife hazard incidents have increased, and states that these increases have been managed through hazard plan implementation. The memo states that when wildlife attractants are deemed at a high level, non-critical safety areas abutting critical safety areas are mowed. When deemed at an acceptable level, the mowing regime in the 2008 plan is followed. Specifically:
  Minor deviations from the 2008 plan (mowing procedures in non-critical safety areas) have been deemed necessary in the last 18 months…. These occasions have been dealt with as exceptions to the plan and have not permanently altered standard operating procedures. Further and potential deviations will be handled on a case by case basis and will be managed with sensitivity towards the goals and objectives of the 2008 Grassland Management Plan.

- Was this change forwarded to the Wildlife Division?
- Was a copy of the Wildlife Hazard Management Plan provided to DEEP?
- Was detailed information regarding the increase in wildlife hazard incidents provided to DEEP?
- Hoyle and Tanner states that the airport currently continues to follow the supplemented plan and mows all grassed areas as needed to keep grasses at 7-14". Hoyle and Tanner offers that the 'updated Grassland Management Plan' reflects this. However, the current Hoyle and Tanner statement does not seem to match the intent of the supplemented plan, which states deviations from the plan are considered exceptions and they have not permanently altered standard operating procedure, and that further and potential deviations will be assessed on a case by case basis.

Page 2:
The FAA's FONSI for this project, dated December 2023, includes a requirement that the current Grassland Management Plan be updated, and that the airport maintain compliance with that plan.
NDDB comment – is Hoyle and Tanner currently working on this update to the Grassland Management plan? When is a draft version expected? Is this document considered the update to the Grassland Management Plan?

Page 2:
Describing existing grassland habitat
To date, as shown in the figures provided in Attachments 5 and 6, the areas around Runway 2 and Runway 20, including the corresponding RSAs and Taxiway Bravo that are currently managed grassland habitat are as follows:

Area	***Currently***	***Proposed Impact***	***Total after Completion***
Runway 20	*11.6 acres*	*1.5 acres*	*10.1 acres*
Runway 2 and TW B	*23.1 acres*	*4.1 acres*	*19 acres*
Total			***29.1 acres***

There is additional grassland habitat in areas between the taxiways and runways and along the length of both runways that is not included in this accounting exercise as this was designed to specifically address this prior permit condition, however, it is worth noting that the total area of grassland habitat within the airport is significantly higher than 23 acres.
NDDB comment –

- Attachments 5 and 6 do not delineate the areas which were originally planted, nor what was originally considered critical vs non-critical/non-safety but is now being mowed per the new management plan of 7-14". A map should be provided indicating where, if anywhere, the original Grassland Management Plan is being followed, since the 2011 update was indicated to be only on a case-by-case basis (as opposed to the table in the 2016 Wildlife Hazard Management Plan, which indicated that continuous mowing of all areas had been occurring since 2009). This map should incorporate the areas of disturbance of the current project as well.

Page 2

As noted in the EA and confirmed in the FONSI, while the construction of the proposed development will reduce grassland habitat within the airport, it will not significantly affect local or regional populations of wildlife species because those found on the Airport are mobile and adaptable to transition in adjacent habitats. Furthermore, the Project would adhere applicable conservation recommendations from CT DEEP as per their NDDB Preliminary Determination letter dated March 3, 2022 (Attachment 7) that notes that the applicant must comply with pre-existing mitigation plans prepared to protect grassland birds. The applicant feels like the site is currently, and will in the future condition, be in compliance with the existing permit requirements.

NDDB comments:

NDDB cannot make a finding of no impacts to listed species based on the fact that grassland bird species are mobile. Estimated habitat loss is approximately 5.6 acres.

Regarding NDD Preliminary Determination condition that notes the applicant must comply with pre-existing mitigation plans – This condition was written based on the information contained in the 2008 Grassland Management Plan. If considering the 2011 revision/supplement (NDDB has not been able to confirm that this was provided to NDDB), that still leaves NDDB with the impression that the 2008 mowing regime is the SOP and that the need for exceptions are evaluated on a case by case basis. This seems to conflict with information provided by the Wildlife Hazard Management Plan, as well as information provided in the April 2024 submission. Therefore, that statement, while applicable and appropriate, does not appear to be what is happening at the airport.

Page 3

Proposal to conduct grassland bird surveys

This survey would be offered as mitigation for the loss of grassland habitat due to the proposed development.

NDDB comment – NDDB welcomes grassland bird survey work to help inform current bird use of the airport grassland habitat. However, NDDB survey work and information gathering does not constitute mitigation for loss of habitat. There are no actions proposed to address the loss of habitat, nor is there any discussion of potential actions that could be taken based on potential survey results.

Page 3

Methodology:

NDDB comments: The methodology for the proposed surveys is appropriate...The first survey must be completed during the last two weeks of May, with follow-up surveys spaced by at least one week.

Attachment 4 – 2016 Wildlife Hazard Management Plan

Page 19-9, Table 1

WILDLIFE HAZARD ASSESSMENT RECOMMENDATIONS	COMMENTS	INITIATION DATE	TARGET DATE	STATUS
Grass management	Grass should be regularly mowed 7-14 inches to reduce seed production in order to reduce bird activity	2009	Daily	Continuous

NDDB comment: It appears from this documentation that the grassland mowing height has been regularly maintained at 7-14" since 2009, one year (and the first growing season?) after the implementation of the 2008 Grassland Management Plan.

Page 19-11

In general, the airport's current grassy areas are mowed regularly to maintain a WHA recommended height of 7-14 inches. Tweed Maintenance will be responsible for these mowing operations, as well as maintaining the fence line. The strategy allows easy visibility of birds and other hazards on the airfield, and prevents the grass from going to seed, which would attract more seed-eating birds and small mammals. The grass at Tweed-New Haven Regional Airport is mowed from spring through fall, with the first mowing activities beginning when the ground is firm enough to allow equipment access and sufficiently long to merit cutting. This grass-management scheme will be followed for all areas of the airfield with the following six exceptions:

NDDB note: the six exceptions do not include locations where grassland seed plantings occurred.

Depredation permit notes:

- Federal depredation permit allows take of horned lark but also notes that take of any State Listed species requires prior authorization by DEEP.
- State depredation permit notes additional authorization from Commissioner required to take state listed species. State depredation permit also notes that the airport is authorized to take species posing a threat to airport operations.

Questions and comments:

- If, since 2009, mowing has occurred as described in the 2016 Wildlife Hazard Management Plan, then it would seem that the 2008 Grassland Management Plan has not been followed beyond the planting/seeding. **Is this correct?**
- The 2011 Grassland Management Plan update/memo states that the Airport is mowing in accordance with the 2008 plan, but that minor deviations have been deemed necessary. These deviations have been dealt with as exceptions and have not altered SOP. Potential future deviations will be handled on a case-by-case basis. This information provided in 2011 is contradicted by the Wildlife Hazard Management Plan, which indicates that SOP since 2009 has been to mow to 7-14", and to mow regularly over the growing season.

  Hoyle and Tanner Grassland Bird Habitat Conceptual Management Plan dated April 8, 2024 references the 2011 update. Hoyle and Tanner state that the 2011 update was drafted to address continued hazards, and states that the airport currently follows the updated plan and mows all grassed areas as needed to keep grass between 7-14". This seems to be a contradiction of the 2011 supplement which notes that exceptions will be managed on a case-by-case basis.

Please confirm that the airport is mowing to 7-14" as standard operating procedure and therefore is not following the 2011 update.

May 17, 2024

Deb Coon
Hoyle, Tanner and Associates
150 Dow Street
Manchester, NH 03101

NDDB Request Additional Information
Project: Tweed New Haven Airport Runway Extension and Terminal Expansion
Filing ID 107828

Dear Ms. Coon,

As described in the NDDB review application, this project will involve the rehabilitation and extension of Runway 2-20, and the construction of a new east side passenger terminal and associated runways, parking lots, aprons and taxiways.

The following species have been documented within the vicinity of the work to be conducted:

Plants

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  - Habitat: Coastal grasslands; airports; open-canopy trailsides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  - Blooms June – July.
- Saltpond grass (*Leptochloa fusca ssp. fascicularis*) – State Endangered
  - Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  - Blooms and fruits August – November.
- Field paspalum (*Paspalum laeve*) – State Threatened
  - Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial Grassland/Outcrop; Grassland Subtype: Coastal Grassland.
  - Fruits August – October.
- Two-flowered Cynthia (*Krigia biflora*) – State Threatened
  - Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.

    - Blooms Jun.
- Hoary plantain (*Plantago virginica*) – State Special Concern
    - Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidc Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest.
    - Blooms/fruits May – June. Spring and early summer ephemeral, typically disappearing by late June.

State listed plant species surveys of the site should be performed by a qualified botanist or plant ecologist when these target plant species are identifiable. You may want your botanist to contact the NDDB program directly for more information regarding known plant locations. The report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs, and photographs of any state listed plant species found.
3. Descriptions of the identifying characters of the target listed species.
4. List of component species within the survey area (including scientific binomials).
5. Data regarding population numbers and/or area occupied by state listed plant species.
6. Detailed maps of the area surveyed including the survey route and locations of state listed species.
7. Habitat descriptions of the area surveyed.
8. Survey results and all observed state listed plant species must reported to the NDDB Program using an NDDB form at: https://portal.ct.gov/DEEP/Endangered-Species/Contributing-Data
9. If state listed plants are found within the project area or immediately adjacent to the project area, the report should include a conservation/protection plan with the following elements:
    a. Anticipated impacts to these state-listed species from this project.
    b. Any planned mitigation or management practices that will be employed to protect, avoid, and/or mitigate impacts to state listed plant species.
10. A Statement, CV or Resume of the botanist's or plant ecologist's qualifications to work with these species. Please ensure that your botanist or plant ecologist holds appropriate scientific collector's permit for this work.

Grassland Birds

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Horned lark (*Eremophila alpestris*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern

The Project is expected to impact 5.6 acres of grassland habitat.

NDDB received an application to review this project in 2022 (NDDB Preliminary Assessment 202201593). Our preliminary assessment letter included information for the above-referenced grassland bird species, including general recommendations for managing grassland birds at airports and noted that field surveys are

recommended. The preliminary assessment also instructed that the airport should comply with any pre-existing mitigation plans prepared to protect grassland birds on the property. NDDB did not receive any communication in response to the Preliminary Assessment and closed that review on March 3, 2023.

NDDB was provided a copy of the *Grassland Bird Habitat Conceptual Plan*, dated April 8, 2024; this document was prepared to address prior permitting requirements for grassland habitat within the airport boundary, document existing grassland habitat, and to propose a study of bird use and functionality of existing grassland habitat at the airport. Through review of this plan, NDDB concluded that changes to conditions outlined in the original 2008 *Grassland Management Plan* had been made in 2009 and 2011; specifically, beginning in 2009, the mowing regime agreed to in that plan was no longer being followed. NDDB provided comments responsive to this *Grassland Bird Habitat Conceptual Plan* via email on April 25, 2024.

Following the meeting between DEEP staff and Tweed-New Haven Airport representatives on April 29th, 2024, it was made clear that there is no remaining suitable grassland habitat on the property due to the mowing regime adopted in 2009. NDDB has been informed that the changes were implemented in response to airport hazard assessment and are not likely to be revised.

The *Grassland Bird Habitat Conceptual Plan* proposes to conduct grassland bird survey studies in order to understand grassland habitat conditions and use of the property. As NDDB has indicated via email comments and during subsequent meetings, NDDB welcomes this survey work as a valuable source of information, and we concur with the survey protocols proposed. However, survey work and information gathering alone does not constitute mitigation for loss of habitat resulting from project activities.

We have included the protection measures here as a reference in the event that it is deemed possible to allow habitat to regenerate on the property in the future. Barring that, these guidelines can be used as a starting point in the development of an off-site mitigation plan, as it seems unlikely that negative impacts to listed grassland bird species neither have been nor will be able to be minimized on the airport property. Since impacts to grassland birds have already been committed and earlier plan mowing regimes are not able to be implemented, **off-site mitigation should be pursued**.

Grassland Bird Protection Measures

The horned lark, grasshopper sparrow, Savannah sparrow, bobolink and eastern meadowlark are considered to be grassland-obligate birds. They require open fields to breed, nest and forage in. Habitats preferred by these species include large grasslands, agricultural fields, and airports. The breeding season for these birds is approximately from late April through August. It is during this period that they are most susceptible to disturbances in their feeding and nesting habitat.

To avoid impact to these species:

- Land disturbance activities including digging, ground clearing, heavy machinery driving staging, or ground trampling that will occur more than 100 feet into a grassland parcel or cut across parcels of grassland in a way that fragments grassland habitat patches should be done when grassland birds are not breeding. Breeding primarily takes place between April 15- August 15.
- Conducting land disturbance activities outside of the breeding season will avoid impact to the individuals.
- **Conduct project work between August 16- April 14.**

- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species including:
  - Little bluestem (*Schizachyrium scoparium*)- "Aldous" or "Cimarron"
  - Big bluestem (*Andropogon gerardii*)- "Niagra"
  - Indiangrass (*Sorghastrum nutans*) - "Rumsey"
  - Switchgrass (*Panicum virgatum*) - "Blackwell", "Shelter", or "Cave in Rock"
  - Bermudagrass (*Cynodon dactylon*) - "Quickstand"
- Seed mix ratios are variable, however for Connecticut a minimum of 60% little bluestem is preferred. Big bluestem is an acceptable alternative to little bluestem for the dominant species in the chosen mix. When one of the bluestems is the dominant species the other grass species listed may be mixed in any ratio desired. Of these species, Bermudagrass is the least favored and should be used in the lowest percentage.

If work cannot occur between months of August 16-April 14:

- The proposed construction staging area and associated vehicles and equipment should be restricted to existing paved areas as much as possible.
- Beginning April 1- through duration of project: All grassy areas within a 50-foot buffer of planned work remain continuously mowed as short as possible to avoid attracting nesting birds into work zones.
- If vehicle access is required to cross grassy areas outside of work zones, designated paths and areas should be marked and kept mowed beginning April 1. Do not drive outside of designated work areas into grassy habitat, nesting birds will be crushed.
- Identify locations on the property where grassland habitat will remain un-mowed between April 15 - August 30 to mitigate for lost habitat during construction. These areas must provide adequate conditions for upland grassland habitat. Provide a map detailing these grassland mitigation areas to Robin Blum (robin.blum@ct.gov).
- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species as described above.

Your request has been assigned the following number: **107828; please include this number on all correspondence regarding this request**.
Responsive information should be sent to:

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm St. 6th Floor
Hartford, CT 06106-5127
or submitted via email to: robin.blum@ct.gov

Please note that if the necessary information is not received by May 20, 2025, we will be unable to provide a determination. Materials already submitted will not be retained or returned. You will need to initiate a new review request by submitting a new and complete *Request for Natural Diversity Database (NDDB) State Listed Species Review* via DEEP's ezFile Portal. For more information and guidance on submitting a request for a Natural Diversity Data Base review visit our website. Feel free to contact me if you have further questions.

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm Street
Hartford, CT 06106-5127
(860) 424-4137
Robin.blum@ct.gov

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

July 31, 2024

Kim Peace
Hoyle, Tanner and Associates

Re: NDDB Filing 107828 – Runway Extension and Terminal Expansion. Summary of documents received to date and outstanding issues.

Kim,
In order to facilitate progress on the NDDB review for the above-referenced project, I have prepared the following list of documents and associated comments provided to NDDB thus far.

03/06/2024 – NDDB review request submitted
05/20/2024 - Technical RAI letter issued

Documentation provided to NDDB to date:

- NDDB Application material
- Grassland Bird Habitat Conceptual Plan
- Bird survey report
- Proposed on-site mitigation proposal

Note: Plant survey work is on-going and results have not yet been provided to NDDB.

<u>Grassland Bird Habitat Conceptual Plan</u>
Components:

1. Narrative summarizing history of grassland management and associated projects, proposal for grassland bird survey work.
   The narrative states that "There is additional grassland habitat in areas between the taxiways and runways and along the length of both runways that is not included in this accounting exercise as this was designed to specifically address this prior permit condition, however, it is worth noting that the total area of grassland habitat within the airport is significantly higher than 23 acres."
   NDDB is of the understanding that these areas, along with other grassland areas at the airport are subject to regular mowing from spring through fall (per the WHMP), and therefore does not function as habitat for grassland nesting birds.
2. Original 2008 Grassland Management Plan (prepared as part of permitting requirements associated with project activities)
   Grassland mowing language:
   …..non-critical operational areas disturbed in conjunction with RSA and taxiway improvements only are expected to be mowed once annually, with mowing anticipated to occur in the late summer/early fall, but under no circumstances prior to September 1st during any given year….
   Depending upon climatic and vegetative growth conditions, however, an early spring mowing also may be implemented, but under no circumstances later than April 15th during any given year.
   Mapping included.

The Plan notes that the goal of grassland management must be carefully balanced with the airport's primary goal of maintaining aviation safety.

3. 2011 Supplement to the 2008 plan. Developed in response to the continued wildlife hazard issues that the airport was facing as documented in their Wildlife Hazard Management Plan (year?). This document consists of a memo provided by Tweed Airport to Kevin Zawoy.
   - Non-safety critical areas – mowing limited as much as practicable without allowing wildlife attractants to increase the frequency of potential bird strikes. However, in the event an increase in wildlife attractants … non-critical safety areas that abut critical areas are mowed. Conversely, when wildlife attractants are deemed to be at an acceptable and safe level, non-critical safety areas are mowed in accordance with the Grassland Management Plan.
   - … the airport wishes to inform CT DEP that minor deviations the 2008 plan (mowing procedures in non-safety critical areas) have been deemed necessary in the past 18 months to maintain safe airfield operations. These occasions have been dealt with as exceptions to the plan, and have not permanently altered standard operating procedures. Further and potential future deviations will be handled on a case by case basis and will be managed with sensitivity towards the goals and objectives of the 2008 Grassland Management Plan.
4. Updated maps
5. 2016 Wildlife Hazard Management Plan
   Table 1 indicates that, since 2009, grass has been regularly mowed 7-14"

WILDLIFE HAZARD ASSESSMENT RECOMMENDATIONS	COMMENTS	INITIATION DATE	TARGET DATE	STATUS
Continue to be aggressive in dispersing and removing hazardous wildlife		2009	Daily	Continuous
Remove abandoned equipment	Equipment and debris around the East ramp should be removed to reduce small mammal habitat	2009	Daily	Continuous
Remove large mammals	Zero tolerance for large mammals needs to be maintained	2009	Ongoing	Continuous
Grass management	Grass should be regularly mowed 7-14 inches to reduce seed production in order to reduce bird activity	2009	Daily	Continuous

   Section 2.2.1 states that in general, the airport's current grassy areas are mowed regularly to maintain a WHA recommended height of 7-14 inches…The grass at Tweed-New Haven Regional Airport is mowed from spring through fall, with the first mowing activities beginning when the ground is firm enough to allow equipment access and sufficiently long to merit cutting.

NDDB notes that the mowing regime outlined in 2008 was modified in 2011 to be addressed on a case-by-case basis. This is contradicted by the 2016 Wildlife Hazard Management Plan, which states that regular spring through fall mowing began in 2009.

Wildlife Division was not notified of the mowing regime change described in this 2016 Wildlife Hazard Management Plan. Additionally, it remains unclear when this mowing regime was implemented – per WHMP, it was initiated in 2009, but this predates the 2011 update to the 2008 Grassland Management

Plan. Finally, NDDB can find no documentation that the submitted 2008 revision was ever approved by DEEP.

Bird Survey Report
Savannah sparrow documented on the property.

Proposed on-site mitigation map
Received by NDDB earlier this week. NDDB requests additional detail regarding this proposal; once received, NDDB will review and provide feedback.
High level concerns:

- In order for this to be taken under consideration, an appropriate mowing regime will need to be followed in perpetuity. It cannot be considered if the airport is unable to make this commitment.
- This will be reviewed only in conjunction with impacts from the current project and will not be sufficient to mitigate for deviations from earlier agreed-upon mowing regimes in other sections of the airport.

Next steps:

- As noted above, NDDB request additional detail regarding proposed on-site mitigation. Please describe the current state, proposed grassland habitat restoration and management activities, and proposed mowing regime. NDDB will review that material and provide feedback.
- Ongoing discussion – mitigation needed for mowing regime changes. An assessment of impacts resulting from mowing regime changes is needed in order to determine mitigation requirements. NDDB will work with Hoyle and Tanner to outline steps needed to make that assessment.
- Plant survey results will be provided to NDDB as available.

From:	Dickson, Jenny
To:	Peace, Kimberly R.; Blum, Robin; Fontanella, Camille; Caiola, Jeff; DEEP Nddbrequest; Toledo, Anna
Cc:	Michael Jones; Meade Hopkins; Coon, Deb L.; Justin Mondshine; Furey, Robert M.; Gonzalez, Nils E.; erothstein; Quaine, Cheryl J (FAA)
Subject:	RE: [External] RE: Tweed Airport RW Extension and Terminal - grassland mitigation
Date:	Wednesday, October 23, 2024 11:23:20 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png image008.png image009.png image012.png image017.png

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Kimberly,
I think it would be good for me to clarify how mitigation works for wildlife and plants; it does not follow a formula the way you may be used to for some wetland projects and as you've outline proportionally below.

When we look at mitigation for grassland birds, we need to consider the natural history needs of the birds. They are not simply using a six-acre patch of grass. These birds need to find large open areas to even consider nesting—that is considered the "attraction area" or what it takes for them to even consider using a habitat block for nesting. The birds perceive the habitat as the entire airfield. If mitigation can occur on site, the balance of airfield is still available as that attraction area. Once you move offsite, you must provide a large enough attraction area to get them to even look at a site. The further you are from the original location or from a known population, the larger the area needs to be. This attraction area varies by grassland species. For upland sandpipers, it is 100 acres; grasshopper sparrows typically need 50 acres; species like Savannah sparrow are a bit more flexible and can make use of block in the 25 to 30-acre range. It is also about finding sites that are large enough for them to safely nest. Smaller blocks are much more susceptible to nest failure and we cannot accept mitigation areas that essentially become population sinks.

We have used the same process for all grassland bird mitigation projects for many decades. One example is the stadium at Rentschler Field. Much like Tweed, on site mitigation was not possible, the offsite mitigation area was not nearby, and while in the migratory flyway for the target grassland species, it did not have current nesting. It also had all three of the species I mentioned above. In that case, the offsite mitigation area was 200-acres and included a significant habitat enhancement component.

There has been extensive research on the habitat requirements and minimum acreage thresholds for grassland bird species. This chart created by Mass Audubon for their 2017 publication on *Best Management Practices for Grassland Birds* is a handy quick reference. Savannah sparrows fall between the requirements of bobolinks, the most tolerate of grassland obligates, and grasshopper sparrows, a close relative of Savannah sparrows.



Minimum field size (acres) for six grassland birds in the Northeast

For the reasons noted above, we will be looking for a minimum of 25 acres for offsite mitigation and may require more if the habitat needs enhancement, part of the soils are excessively wet, or areas of the parcel are not favorable for nesting by this species for some other reason. Please note that we will require documentation of current species use of the mitigation area to consider minimum acreage proposals.

If you have any additional questions, please let me know.

Jenny

Jenny Dickson, Certified Wildlife Biologist®
Director, Wildlife Division
Bureau of Natural Resources
Connecticut Department of Energy and Environmental Protection
79 Elm Street, 6th Floor, Hartford, CT 06106-5127
C:860-593-5588 | E: jenny.dickson@ct.gov
#RecoverWildlife

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Monday, October 21, 2024 5:41 PM
To: Blum, Robin <Robin.Blum@ct.gov>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>
Cc: Michael Jones <mjones@avports.com>; Meade Hopkins <mhopkins@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Justin Mondshine <justin@mitigationholdings.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; erothstein <erothstein@edesigndynamics.com>; Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Subject: RE: [External] RE: Tweed Airport RW Extension and Terminal - grassland mitigation

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Hello Robin and Jenny- while we understand the complexity of comparing mitigation plans for different species, we do need to have a more defined rationale behind CTDEEP's requirements to satisfy FAA requirements for providing funding for these mitigation activities. As discussed currently:

Off-site: 25 acres preservation/enhancement: 4 acres of grassland impact is a 6.25:1 ratio.
On-site: 6 acres of grassland creation: 4 acres of grassland impact is a 1.5:1 ratio.

Do you have comparable projects in CT where these ratios were required, or data on savannah sparrow that would justify these numbers?

Additionally, we completed a preliminary field assessment at the Warren site on Friday and the CTDEEP-approved ornithologists from eDesign identified savannah sparrows as currently using the site, see photo. We will follow up with the required species documentation form.

We are preparing a Draft Compensatory Mitigation Plan for the Warren site that will propose a mix of preservation and enhancement/restoration recommendations to enhance the conditions for savannah sparrow while protecting habitat for the state-listed kestrel.

Thank you-



Kimberly Peace
Vice President - Senior Environmental Coordinator at Hoyle Tanner
T: 603-460-5205 ° • **C**: 603-716-3343

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From: Blum, Robin <Robin.Blum@ct.gov>
Sent: Thursday, October 3, 2024 3:06 PM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>
Cc: Michael Jones <mjones@avports.com>; Meade Hopkins <mhopkins@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Justin Mondshine <justin@mitigationholdings.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; erothstein <erothstein@edesigndynamics.com>; Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Subject: RE: [External] RE: Tweed Airport RW Extension and Terminal - grassland mitigation

Hi Kim,
Regarding your question below (yellow highlight), the answer is a bit nuanced.

Given species requirements, 25-30 acres of grassland habitat would be suitable to meet the savannah sparrow needs and therefore sufficient for the impacts to species documented on the Tweed property. NDDB would prefer larger acreage if possible, given the distance between impact location and proposed Warren mitigation site; it would be considered a positive when NDDB is assessing the mitigation proposal. However, any proposed management intended to increase grassland acreage for grassland birds should not come at the expense of American kestrel documented to be nesting on the property. As assessment of the Warren property continues, keep in mind that NDDB would like to see as much acreage as possible for grassland birds balanced with the needs of kestrel and other listed species that may be on the property.

I hope this is helpful, and I understand that Tweed is reconsidering onsite options. Let me know if you have any questions.
Robin

Robin Blum
Supervising Wildlife Biologist
Bureau of Natural Resources, Wildlife Division
Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
p: 860.424.4137 | **m:** 860.876.9202 | robin.blum@ct.gov

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Ensuring a clean, affordable, reliable, and sustainable energy supply.

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From: Peace, Kimberly R. <kpeace@hoyletanner.com>

Sent: Friday, September 27, 2024 11:39 AM
To: Blum, Robin <Robin.Blum@ct.gov>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>
Cc: Michael Jones <mjones@avports.com>; Meade Hopkins <mhopkins@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Justin Mondshine <justin@mitigationholdings.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; erothstein <erothstein@edesigndynamics.com>; Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Subject: RE: [External] RE: Tweed Airport RW Extension and Terminal - grassland mitigation

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Robin, this is good news for our team- we look forward to further discussion on Monday. Can you please provide comment on the resumes that were sent for the eDesign team staff that will be assisting us in responding to the questions provided and developing a plan for the site? We would like approval of them soon so that we can move this work forward.

An important question still unanswered is the ultimate acreage to be provided- Robin you stated in the prior meeting that you felt like a 25-30 acres area of grassland habitat would be sufficient goal to offset the 5.6 acres of grassland habitat on the airport that will be paved as a result of the runway extension, in light of the avian surveys identifying Savannah sparrow as the primary target species. Please provide confirmation that this is the acreage goal - we recognize that this acreage would need buffer areas such that ultimately the parcel would be slightly larger than this.

Thank you-

Kimberly Peace
Vice President - Senior Environmental Coordinator at Hoyle Tanner
T: 603-460-5205 ° • **C**: 603-716-3343

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From: Blum, Robin <Robin.Blum@ct.gov>
Sent: Friday, September 27, 2024 11:24 AM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>
Cc: Michael Jones <mjones@avports.com>; Meade Hopkins <mhopkins@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Justin Mondshine <justin@mitigationholdings.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Coon, Deb L. <dcoon@hoyletanner.com>; erothstein <erothstein@edesigndynamics.com>; Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Subject: [External] RE: Tweed Airport RW Extension and Terminal - grassland mitigation

Hello Kim,
Please accept my apologies for the delay in responding. We have reviewed the MIH document and additional information regarding the proposed Warren property for off-site mitigation and offer the following feedback.
We will consider the parcel for off-site mitigation. The distance from the area of impact is a concern, but, if the proposed parcel can provide the correct habitat for the target species, and can incorporate appropriate ongoing habitat management, then distance from impact site will be less of a concern.

In order to further evaluate the parcel, we need detail regarding the following:

- How wet is the soil, does the soil allow for creating and maintaining the same type of grassland habitat as found in the airport impact area?
- When is the field hayed?
- As noted in your email below:
    - details regarding proposed management relative to creating/improving the parcel for the target bird species
    - Who will own the property and/or hold the easement?
    - Who will be responsible for managing property access?

Finally, NDDB has documented occurrence of breeding American kestrel on the property. Please address how habitat management for the target bird species will avoid negatively impacting kestrel habitat needs.

Note: NDDB does not have record submissions for bobolink, alder flycatcher, purple martin on this property. If those observation records are available, please have them submitted to the NDDB via the special animal survey form.

I expect we can have further discussion on this at Monday's meeting.
Thanks very much,
Robin

Robin Blum
Supervising Wildlife Biologist
Bureau of Natural Resources, Wildlife Division
Connecticut Department of Energy & Environmental Protection
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Department of Energy &
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| //////portal.ct.gov/DEEP

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Friday, September 6, 2024 3:30 PM
To: Blum, Robin <Robin.Blum@ct.gov>; Fontanella, Camille <Camille.Fontanella@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>
Cc: Michael Jones <mjones@avports.com>; Meade Hopkins <mhopkins@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Justin Mondshine <justin@mitigationholdings.com>; Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Coon, Deb L. <dcoon@hoyletanner.com>; erothstein <erothstein@edesigndynamics.com>; Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Subject: Tweed Airport RW Extension and Terminal - grassland mitigation

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Hello Robin, Jenny and Jeff-

As a follow-up to our meeting this week regarding the potential use of the Warren site for off-site grassland mitigation:

1. Robin stated she has concerns regarding the distance from the airport. Please let us know as soon as possible if this site is a viable option, or if it is rejected based on location.
2. If this site is deemed too far from the airport, please provide some future site search parameters for how far the site could be located. Land values increase substantially as you go farther south towards the airport, as you are aware, and are only part of the costs to completing the mitigation process.
3. If we have to find a different site, please provide the targeted acreage of grassland habitat to be developed/maintained on that desired site. Robin you stated in the meeting that you felt like a 25-30 acres area of grassland habitat would be sufficient goal to offset the 5.6 acres of grassland habitat on the airport that will be paved as a result of the runway extension, in light of the avian surveys identifying Savannah sparrow as the primary target species. Please provide confirmation that this is the acreage goal - we recognize that this acreage would need buffer areas such that ultimately the parcel would be slightly larger than this.
4. If this site is not deemed too far to be viable:
    a. we will pull in our team of grassland habitat experts from eDesign who will do an on-site evaluation into existing site conditions and a late fall avian survey – Robin I will vet their resumes and experience with you before they hit the field.
    b. they will work with us to develop a Management Plan for submittal to CTDEEP review that would include details on creation of additional grassland within the site by altering existing vegetation and soils, supplementing or restoring areas of current grassland that may not be suitable for long-term grassland growth with soils and plantings, and identification of steps to future monitoring, including

invasive species management and prevention of woody vegetation growth.

c. monitoring time frames and success criteria will also be established.
d. the Plan would also outline steps in the short and long-term that need to happen in order to obtain property control, including possible future management transition through a conservation easement with an NGO, likely Joshua's Trust, including commitment letters from parties involved.

I will be out of office next week. If you could please reply all with your response to these questions, we can keep this important piece of the permitting process moving forward.

Thank you-

HOYLE TANNER

Kimberly Peace
Vice President - Senior Environmental Coordinator at Hoyle Tanner
kpeace@hoyletanner.com

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From: Michael Jones
To: Peace, Kimberly R.
Cc: Furey, Robert M.
Subject: [External] FW: HVN - onsite grassland mitigation
Date: Wednesday, November 6, 2024 4:18:03 PM
Attachments: image001.png

Kimberly, please see below.

MJ

From: Tom Rafter <trafter@flytweed.com>
Sent: Wednesday, November 6, 2024 4:04 PM
To: Michael Jones <mjones@avports.com>
Cc: Malena Zanjani <mzanjani@flytweed.com>
Subject: FW: HVN - onsite grassland mitigation

Michael,
Can you please forward to appropriate HTA personnel?
Thanks
Tom

From: Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Sent: Wednesday, November 6, 2024 3:57 PM
To: Tom Rafter <trafter@flytweed.com>
Subject: RE: HVN - onsite grassland mitigation

Thanks for letting us know your decision. When you get the opportunity, will you inform the environmental team at Hoyle Tanner so they have that for their files?

Sincerely,
Cheryl Quaine
Environmental Program Manager
Federal Aviation Administration
Schedule | Mon-Thur

From: Tom Rafter <trafter@flytweed.com>
Sent: Wednesday, November 6, 2024 11:23 AM
To: Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Cc: Barker, Stephen (FAA) <Stephen.Barker@faa.gov>; Lesperance, Lisa (FAA) <lisa.lesperance@faa.gov>; Rich, David W (FAA) <David.W.Rich@faa.gov>; Chamberlain, David M (FAA) <David.M.Chamberlain@faa.gov>; Quam, Amy E (FAA) <Amy.E.Quam@faa.gov>; mjones@avports.com; Malena Zanjani <mzanjani@flytweed.com>; reed4223@sbcglobal.net
Subject: RE: HVN - onsite grassland mitigation

CAUTION: This email originated from outside of the Federal Aviation Administration (FAA). Do not click on links or open attachments unless you recognize the sender and know the content is safe.

Cheryl,
I concur that this site may be better suited for aeronautical use in the future, but would like to ensure the proposed offsite location is acceptable to FAA and eligible for funding.
Thank you.

Tom

From: Quaine, Cheryl J (FAA) <Cheryl.J.Quaine@faa.gov>
Sent: Wednesday, November 6, 2024 9:46 AM
To: Tom Rafter <trafter@flytweed.com>
Cc: Barker, Stephen (FAA) <Stephen.Barker@faa.gov>; Lesperance, Lisa (FAA) <lisa.lesperance@faa.gov>; Rich, David W (FAA) <David.W.Rich@faa.gov>; Chamberlain, David M (FAA) <David.M.Chamberlain@faa.gov>; Quam, Amy E (FAA) <Amy.E.Quam@faa.gov>
Subject: HVN - onsite grassland mitigation

Good morning Tom-

The FAA team has discussed the use of the 8.9 acres on airport property as potential grassland mitigation for the savannah sparrow. While the FAA does not feel the conversion of the area to grassland would be a wildlife hazard, we are concerned that giving up the parcel for aeronautical use may create restrictions on an airport that is experiencing growth. The FAA would like the Authority to thoroughly consider this option and its implications for aeronautical expansion. After you've considered the options, please let us know your intent in writing.



Sincerely,
Cheryl Quaine

Environmental Program Manager
Federal Aviation Administration
Schedule | Mon-Thur

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DRAFT MEETING SUMMARY

Attendees

Jenae Carraway (HTA) *jcarraway@hoyletanner.com*
Robert Furey (HTA) *rfurey@hoyletanner.com*
Nils Gonzalez (HTA) *ngonzalez@hoyletanner.com*
Kimberly Peace (HTA) kpeace@*hoyletanner.com*
Deb Coon (HTA) *dcoon@hoyletanner.com*
Eric Rothstein (eDesign) *erothstein@edesigndynamics.com*
Kyle Taylor (eDesign) *ktaylor@ edesigndynamics.com*
Jeff Caiola (CTDEEP) *Jeff.Caiola@ct.gov*
Robin Blum (CTDEEP) *Robin.Blum@ct.gov*
Anna Toledo (CTDEEP) *Anna.toledo@ct.gov*
Bruce Williams (CTDEEP) Bruce.Williams@ct.gov
Beatriz Milne (CTDEEP) *Beatriz.Miline@ct.gov*
Laura Robbins (CTDEEP) *Laura.Robbins@ct.gov*
Camille Fontanella (CTDEEP) *Camille.Fontanella@ct.gov*
Colin Clark (CTDEEP) *Colin.Clark@ct.gov*
Susan Jacobson (CTDEEP) *Susan.Jacobson@ct.gov*
Danielle Missell (CTDEEP) *Danielle.Misselle@ct.gov*
Jared Pritts (USACE) *jared.n.pritts@usace.army.mil*
Jeremy Nielson (AVPORTS) *jnielson@avports.com*
Michael Jones (AVPORTS) *mjones@avports.com*
Meade Hopkins (AVPORTS) *mhopkins@avports.com*
Diane Ifkovic (CTDEEP) *Diane.Ifkovic@ct.gov*
Cheryl Quaine (FAA) *Cheryl.J.Quaine@FAA.gov*
Sarah Barnum (BSC) *sbarnum@bscgroup.com*
Amanda DeCesare (WSP) Amanda.decesare@wsp.com

Meeting Objective: Monthly discussion with relevant permitting agency staff regarding permits for the project. *Agenda items in italics.*

1. *Wetland Mitigation*
    - *Draft Plans currently showing conservative 9.72 acres inland wetland impacts*
    - *Wetland Mitigation Plan drafted and under internal review: field data collected has been analyzed, proposed restoration approach and adaptive management strategies identified, additional wetland delineations occurred and reporting to be finalized*
        - *Adjustments to tide gate operations to allow flooding of marsh with saline water up to 2.5' elevation and retention of water levels for up to 6 hours*
        - *Tide Gate operational changes to current programming of SCADA system*
        - *Prior to storm events, tide gate will be switched to Watershed Drain Mode to allow for adjustments to prevent flooding of adjacent properties*
        - *Scheduled mowing 2X/yr, early summer and late fall, and removal of Phragmites biomass*
        - *Consistent monitoring by wetland scientist and adaptation as needed*
        - *Adaptive Management Plan- to be based on how close to coming to meeting Performance Standards, to include, in stepwise fashion: herbicide application to*

Phragmites, extended elevated water level duration, excavation of tide channels, manual excavation of Phragmites and addition of sand and plantings of Spartina.

- *Tide gate tested to determine operational approach is viable – confirmed, minor tide gate changes may be needed to obtain water levels to reach goals*
- *Financial commitment requirements and process to be discussed.*
- ***DEEP notes:*** Wetland mitigation 9.72 acres – wetlands 4, 5, 6 – wetlands mitigation study is in review internal with Hoyle Tanner. Plant species were not found in tidal mitigation areas.
- Adaptive Management plan is step wise - Phragmites inundation study shows that the salt marination will be possible with the tide gates. May need minor repair to tide gates. Removing phrag with mowing and removal, and, finally, herbicide.
- Financial mitigation commitment requirements – **set up separate meeting with USACE and DEEP and Tweed.** Federal jurisdiction is only for 5-6 acres, wetlands 4 &5. DEEP discourages submittal of incomplete applications because the 401 times out in one year.

2. *Grassland Mitigation*

- *Impact has been revised to approx. 4 acres*
- *On-site Mitigation deemed not viable*
- *Grassland Mitigation Plan in development for Off-site mitigation via Warren parcel*
- R. Blum stated they are waiting on receipt of additional site information to review for confirmation as to the adequacy of the off-site mitigation parcel, K. Peace stated she will work with eDesign team to provide.
- **DEEP Notes:**
- 4 acre impact- On-site mitigation was not deemed feasible.
- Warren Parcel – have delineated separate ecosystems on the parcel – grasslands, wet meadow, vernal pool, swamp, etc. Robin reminds that there are questions about the soils and Wildlife hasn't signed off on the suitability of this parcel yet. Will need management plan and conservation approach for the property. Hoyle will be providing two documents Grassland Mitigation Plan and the Tidal Mitigation Plan. **Side meeting with Elsa (consultant) and Robin - asap**
- Hoyle has collected seeds as part of Plant Mitigation Plan. Working with Native Plant Trust.
- Fisheries – working with Bruce Williams. Hoyle sent additional information. – Will want side meeting. 3 species in NDDB review are not actually present in the Morris Creek area. Restoring tidal flows to marsh will have benefits to fish resources. **Tide gate meeting – Kimberly will reach back out.**

3. *NDDB/Listed Plant Species*

- *Identified Paspalum within inland field wetland*
- *Seeds collected to be included as piece of Plant Mitigation Plan.*
- R. Blum asked if we have been coordinating with the Native Plant Trust since they are short staffed, and if we have difficulties to let her and Bill know. K. Peace stated she will check with BSC and keep CTDEEP informed.
- *Fisheries coordination initiated for species identified as potential within tidal mitigation area*

- B. Williams stated the three state-listed species on the NDDB report for the tidal mitigation areas will not be affected by the tidal mitigation project, and restoring tidal flows to the tidal marsh not likely to impact fisheries, however he would like to discuss the project further w/K. Peace in regard to non-listed fish species review and requested additional information on the tide gate operational changes. K. Peace will coordinate that.

4. *FEMA/CLOMR/Stormwater*

- *CLOMR Process reviewed and initiated.*
- *FEMA pending 2025 LOMR estimated to be issued January.*
- *Design drawings sent to CTDEEP/FEMA and comments received re: increase freeboard of terminal.*
- *Terminal design currently being revised to address requirement for BFE+2 conservative.*
- ***DEEP Notes:***
- FEMA/ CLOMR/ Stormwater - coordinating with New Haven and East Haven to sign CLOMR application. **Will submit to FEMA in January.**
- Terminal design being adjusted to be BFE +2. (Requirement is +1).
- FAA has jurisdiction for NEPA. USACE provides comment on FAA's NEPA decision. 404B1 is USACE's analysis to permit the least environmentally damaging alternative. Hope that the preferred options in NEPA aligns with 404B1.

5. *Schedule*

- *Design for RW and Terminal in progress, current design submittal 12/11*
- *Expected permit application submittal week of 12/16*

- J. Caiola expressed concern over receiving an incomplete application and meeting a 6-month review time. Once the application is submitted, it becomes public record and a part of the freedom of information act (FOIA) so the public can receive a copy of the application and comment on it as well as get their own specialists to refute any aspects of it. If the NDDB, etc. are approved ahead of time, it allows staff to focus more on the review process and will reduce receiving any comments/questions from the public about aspects of the application that haven't been officially approved by CTDEEP. J. Caiola can put a hold on reviews of any state project but he cannot put a hold on federal projects so if the application is submitted without the normal mitigation plans, etc. approved, it can add time to the review process and the public hearing process.
- L. Robbins stated they would typically not review an application without CTDEEP Determination number.
- Suggested that coordination with CTDEEP Wildlife to receive a Determination, and with CTDEEP Wetlands staff to receive confirmation on wetland mitigation plan, before submitting permit application would be better since any information submitted with the permit application will become available under FOIA and could be rebutted by public. CTDEEP staff will also have to take time to respond to FOIA requests that will take away from time reviewing the application.
- C. Fontanella said she is working with Tom Cavaliere and Andrew King responding to public information requests, to address Environmental Justice and to prep for adjudication.
- J. Caiola stated the 401 Water Quality Certification (WQC) has a federally-mandated 1 year timeline for CTDEEP to take action, he will look further into if that License can be applied for

separately from the CTDEEP Inland Wetland permit, and if the Inland Wetland Permit anticipated adequacy hearing, which may take several months or more, would also delay the WQC. If CTDEEP cannot act on the WQC in one-year, has to be denied.

- J. Caiola also stated this meeting would satisfy the WQC Pre-Filing meeting requirement.
- J. Pritts stated USACE has to have the 401 WQC and CZMA addressed before they can issue the 404 permit. The 401 WQC has to go to EPA for review for at least 30 days, and then possibly for 60 more days to neighboring states if there is a "may effect" determination. USACE cannot start the 404 review until the 401 is received from CTDEEP per 404b1.
- For USACE a mitigation statement could be used for public notification process.
- If further tide gate operations will be discussed with B. Williams, J. Caiola stated he and other permit specialists from CTDEEP will want to be included.
- **DEEP Notes**:
- See Sue Jacobson's notes. Added below for convenience
- *Design for RW and Terminal in progress, current design submittal 12/11*
- *Expected permit application submittal week of 12/16*
- Wetland and grassland mitigation plans have not yet been finalized. DEEP staff recommend holding off on application submission until the plans have been reviewed and conceptually approved by LWRD and Wildlife Division staff. When staff receive the applications with completed mitigation plans, public inquiries will be less time consuming. (The public will request copies of the application and an incomplete application will cause confusion.)
- Final NDDB Determination. L. Robbins stated they would typically not review an application without a final NDDB Determination. The final NDDB Determination would most likely include the grassland mitigation plan.
- 401 Water Quality Certification (WQC). J. Caiola expressed concern over receiving an incomplete application (without mitigation plans finalized) and meeting a federally-mandated one-year WQC review time. While state program applications can be placed on 'hold', the 401 cannot. The WQC would be denied if the state could not meet the one-year deadline. The Structures, Dredging and Fill and 401 applications do not need to be submitted and processed simultaneously. It was suggested that the WQC application not be submitted until the SDF application was ready for public notice. (This submission delay is common for Dam Safety and WQC applications.) J. Caiola stated this meeting would satisfy the WQC Pre-Filing meeting requirement.
- 404 WQC. J. Pritts stated USACE has to have the 401 WQC and CZMA addressed before they can issue the 404 permit. The 401 WQC has to go to EPA for review for at least 30 days, and then possibly for 60 more days to neighboring states if there is a "may effect" determination. When the Corps receives the application, they publish their notice if the application is complete or not. A mitigation statement could be used for this public notification process. (However, the state needs their applications to be complete prior to their public notice.)

- Public participation. A hearing request is anticipated. While most applications can be reviewed within a year, a hearing would impact this standard timeframe. Freedom of Information Act requests are also anticipated. The submission of complete applications will be less confusing to the public and generate less documentation for the hearing record.
- C. Fontanella said she is working with Tom Cavaliere and Andrew King responding to public information requests, to address Environmental Justice and to prep for adjudication.

- If further tide gate operations will be discussed with B. Williams, J. Caiola stated he and other permit specialists from CTDEEP will want to be included.

6. **Action Items:**
    1. **Camille will coordinate meeting regarding financial assurance with relevant parties from USACE and CTDEEP**
    2. **K. Peace will coordinate with B. Williams re: Fisheries Coordination, set up meeting, provide additional info on tide gate operations.**
    3. **Hoyle Tanner will coordinate with New Haven and East Haven for required signatures for the CLOMR application, anticipated January submittal.**
    4. **Hoyle Tanner will let CTDEEP and USACE know if permit submittal timeline will shift.**
    5. **Agreement on next monthly meeting Monday Dec 30, 2024. CTDEEP will have answer by then on how to proceed with WQC and timeline in regard to the anticipated adequacy hearing.**
    6. Side meeting with Elsa (consultant) and Robin Blum - asap

Re: FW: [External] NDDB 117005 Tweed Tide Gate Management - clarification needed

1 message

From: Toledo, Anna <Anna.Toledo@ct.gov>
Sent: Wednesday, February 19, 2025 12:00 PM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>
Cc: DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Blum, Robin <Robin.Blum@ct.gov>; Coon, Deb L. <dcoon@hoyletanner.com>
Subject: RE: [External] NDDB 117005 Tweed Tide Gate Management - clarification needed

Good morning,

I have listed our comments for the Grassland Bird Mitigation Plan below. If you have any questions that I can potentially address before Monday's meeting, please let me know.

As discussed last week, while we feel that the proposed Grassland Bird Habitat Mitigation Plan is most of the way there, we do have some comments and tweaks.

1. First, most pressingly, we would like impacts to Brown Thrasher (*Toxostoma rufum*) addressed in the report. Brown thrasher is already documented at this site and nests in shrubby habitat, utilizing shrubs, thickets and brush (especially hedgerows adjacent to open fields: a habitat type that is currently present on the property). According to the mitigation plan, invasive plants and woody vegetation will be removed within the designated grassland habitat, and saplings and shrubs will be removed along forest edges. We cannot approve measures to benefit one listed species at the expense of another.
2. We would like to see follow-up bird surveys conducted annually beginning in spring 2028 (two mowing/growing seasons after the mitigation work and adaptive management begins) through the end of the five-year mitigation plan to assess grassland bird usage of the habitat. We would expect the results of the bird surveys to be presented to NDDB no later than August 31, so that we can have time to review and comment on them before the year's adaptive management plan is finalized and put into play. These surveys would be in addition to the Annual Vegetation Surveys conducted during the September 1 – October 15 period of each fall.
3. The following mowing regime recommendations should be implemented in order to ensure no impacts to listed species already present.
    a. We would like to see a 1/3 – 1/3 – 1/3 mowing pattern within the grassland as opposed to the ½ - ½ proposed. This would allow for a more natural progression of habitat as well as maintain a truer habitat mosaic for the benefit of all species present which utilize the grassland.
    b. Avoid vehicular traffic from May 15 – September 15. Any access to the site during this period must be by foot.
    c. Mowing style: Avoid flail mower heads with guide bars that ride along the ground. Sickle bar mowers will have the least impact. In areas with more woody vegetation >1-2" diameter, Brontosaurus-style mowers will likely have the least impact on wildlife.
    d. Directionality – Start mowing from the center of the field and use a back-and-forth approach, or large circular pattern, to avoid concentrating fleeing animals where they may be killed or stranded. In addition, leave an unmowed 30 ft strip around the perimeter of the field and mow this area last.

i. If field is near stream: start mowing the side furthest from stream and work towards stream.

ii. If field is bordered by woodland: start mowing side furthest from woodland and work towards woodland.

iii. If field is bordered by road, start mowing next to the road and work your way across field.

e. Mower Speed – Mowing in low gear or at slow speeds will allow wildlife to react and move out of the field.

3. Finally, we would like to bring Joshua's Trust to the table to discuss ongoing vegetation management following the ownership conveyance in order to ensure that the grassland habitat is not overtaken by invasive/woody species after they begin managing the property. Mowing alone will not prevent this conversion.

Best,

Anna Toledo

Wildlife Biologist

Natural Diversity Database Program

Connecticut Department of Energy and Environmental Protection

79 Elm Street, Hartford, CT 06106-5127

P: 860.424.3164 | C: 203-615-3327 | E: anna.toledo@ct.gov



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Appendix B- Grassland Bird Survey 2024

BSC GROUP

MEMORANDUM

150 DOW STREET, MANCHESTER, NH 03101 - www.bscgroup.com

TEL 617-896-4300

To:	Kimberly Peace, Hoyle Tanner Project Manager	**Date:**	July 15, 2024
From:	Sarah Barnum, BSC RTE Specialist	**Proj. No.**	0101137.00
Re:	Results – 2024 Tweed New Haven Airport Grassland Bird Survey		

cc:

Survey Summary

CTDEEP, Wildlife Division, has indicated that for the proposed runway and terminal improvement project at Tweed New Haven Airport, there are concerns for impacts to the following species:

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Horned lark (*Eremophila alpestris*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern

A Breeding Bird Census (BBC) conducted at the airport May 30, June 11, and June 20, 2024, confirmed the presence of savannah sparrow.

Methods

A survey of grassland birds using the habitats in and around the Tweed New Haven Airport was conducted using a standard BBC approach[1], consisting of three visits at least one week apart during the breeding season. This approach was approved by CTDEEP. Surveys consisted of listening for and/or visually observing the birds present for five minutes at 13 designated survey points (see Attachment 1) and recording them on a data sheet. Survey points consisted of a 150 m radius plot centered on the observation point, with a minimum distance of 250m between observation points. For grassland point count surveys, survey points of a 100-meter radius plot centered on the observation point with a minimum distance of 250 meters between observation are generally recommended, but due to the shape and size of the airport, a 150 m plot provided the best coverage.

Surveys started a half hour before sunrise (between 04:48 and 04:53) and ended approximately 07:00 - 07:10. For each survey, the points were visited in the same order (13-10, 3-1, 9-8, 4-7; see Attachment 1). Each point was GPS located and care was taken that for each successive survey, the survey point was located at the same spot. The survey was conducted by someone qualified to identify New England birds by sight and sound, and the species recorded for the survey may have been identified by sight, sound, or both. Although a BBC type survey is intended to record the individual birds present in a location only once per survey repetition, birds do move and there is some potential that some individuals were counted twice.

Results

Surveys were conducted on May 30, June 10, and June 20. Weather conditions during the survey are summarized below, in Table 1. A total of 42 species and 579 individuals were recorded over the course of the three surveys. The species most commonly recorded were red-winged blackbird, European starling, and common grackle, all of which commonly use grassland habitats and often flock. The only target species recorded was the savannah sparrow. This

[1] Ralph, C. John; Sauer, John R.; Droege, Sam, technical editors. 1995. Monitoring Bird Populations by Point Counts. Gen. Tech. Rep. PSW-GTR-149. Albany, CA: Pacific Southwest Research Station, Forest Service, US. Department of Agriculture; 187 p.

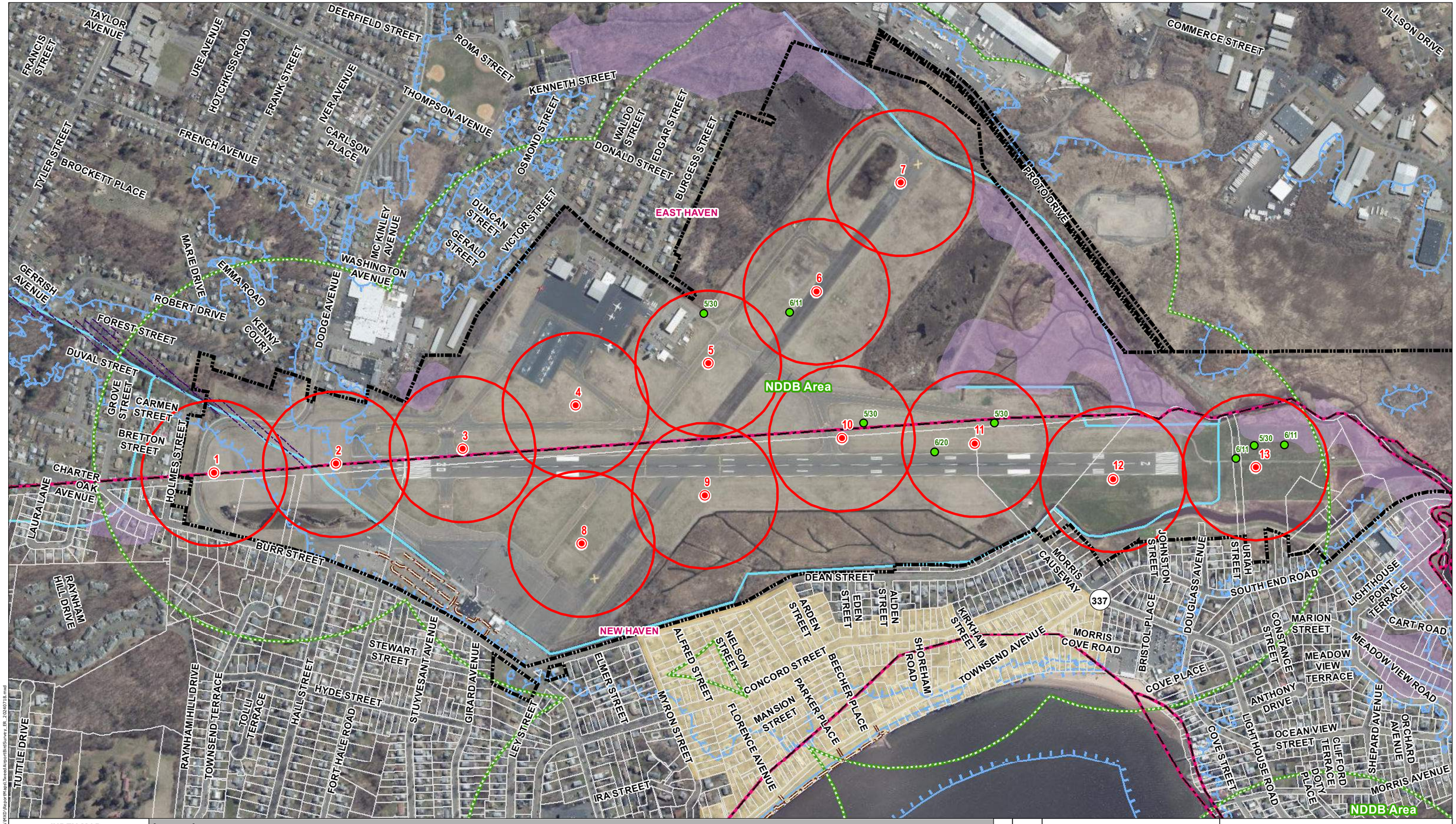
species was recorded the southerly portion of the airport on all survey repetitions, variously at Survey Points 5, 10, 11 and 13 on May 30, Survey Points 6 and 13 on June 11, and Survey Point 11 on June 20. (Attachment 1). Two separate individuals were recorded at Survey Point 13 on June 11. In addition to the species listed above, American robin, mourning dove, and killdeer were observed within the airport grasslands. All other species recorded during the survey were either using habitats adjacent to the airport grasslands (wetlands, shrubby areas, developed areas), or were flying over the airport. One other observation of note, holes excavated into one of the of the dirt stockpiles on the inactive NW/SE runway are consistent with the size/shape of an entrance to a belted kingfisher nest, and this species was observed flying over the airport on the third survey repetition. There was no indication that these holes currently lead to an active nest.

Table 1. Survey results by data of survey.

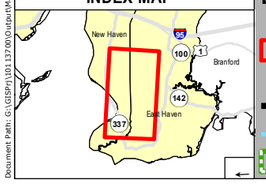
Survey Begin Time	4:51 AM	4:48 AM	4:48 AM
Survey End Time	7:08 AM	7:00 AM	7:00 AM
Sky Begin/End	Overcast/Light rain	Clear/Sunny	Clear/Sunny
Temp Begin/End (f)	57	56	67
Wind Speed Begin/End	5 mph-8 mph	6 mph	6 mph

Common Name	Scientific Name	May 30 Survey	June 11 Survey	June 20 Survey	Totals
American crow	*Corvus brachyrhynchos*	2	1	3	6
American goldfinch	*Carduelis tristis*	0	3	0	3
American robin	*Turdus migratorius*	11	16	10	37
Barn swallow	*Hirundo rustica*	3	2	8	13
Belted kingfisher	*Megaceryle alcyon*	0	1	1	2
Blue jay	*Cyanocitta cristata*	0	0	2	2
Canada goose	*Branta canadensis*	0	1	0	1
Carolina wren	*Thryothorus ludovicianus*	0	1	1	2
Chimney swift	*Chaetura pelagica*	5	6	4	15
Common grackle	*Quiscalus quiscula*	8	35	29	72
Common yellowthroat	*Geothlypis trichas*	4	5	3	12
Coopers hawk	*Accipiter cooperii*	0	0	1	1
Double-crested cormorant	*Phalacrocorax auritus*	3	1	0	4
Eastern kingbird	*Megaceryle alcyon*	1	0	0	1
European starling	*Sturnus vulgaris*	21	24	45	90
Fish crow	*Corvus ossifragus*	0	2	0	2
Gray catbird	*Dumetella carolinensis*	1	2	3	6
Great blue heron	*Ardea herodias*	0	3	0	3
Great crested flycatcher	*Myiarchus crinitus*	1	1	0	2
Herring gull	*Larus smithsonianus*	2	4	1	7
House finch	*Haemorhous mexicanus*	0	1	0	1
House sparrow	*Passer domesticus*	1	3	0	4
House wren	*Troglodytes aedon*	0	1	0	1
Killdeer	*Charadrius vociferus*	4	4	4	12
Mallard	*Anas platyrhynchos*	4	4	0	8
Marsh wren	*Cistothorus palustris*	3	7	7	17
Mourning dove	*Zenaida macroura*	1	5	3	9
Northern cardinal	*Cardinalis cardinalis*	1	7	8	16
Northern flicker	*Colaptes auratus*	0	1	2	3

Common Name	Scientific Name	May 30 Survey	June 11 Survey	June 20 Survey	Totals
Northern mockingbird	*Mimus polyglottos*	3	1	4	8
Northern rough-winged swallow	*Stelgidopteryx serripennis*	1	1	2	4
Osprey	*Pandion haliaetus*	1	2	3	6
Red bellied woodpecker	*Melanerpes carolinus*	0	1	0	1
Red-winged blackbird	*Agelaius phoeniceus*	30	27	37	94
Rock pigeon (Feral pigeon)	*Columba livia*	0	2	0	2
Savannah sparrow	*Passerculus sandwichensis*	4	3	1	8
Song sparrow	*Melospiza melodia*	10	16	16	42
Tree swallow	*Tachycineta bicolor*	0	4	8	12
Warbling vireo	*Vireo gilvus*	1	0	1	2
Willet	*Tringa semipalmata*	4	1	1	6
Willow flycatcher	*Empidonax traillii*	5	6	8	19
Yellow warbler	*Dendroica petechia*	6	12	5	23
	Total Individuals	**141**	**217**	**220**	**578**
	Total Species	**27**	**38**	**29**	**42**



INDEX MAP



Legend

- Survey Locations
- 150m Radius from Survey Locations
- Savannah Sparrow Observations
- Airport Property Boundary
- Watercourse (not delineated)
- Natural Diversity Database Area (December 2023)
- FEMA 100-Year Flood Zone
- FEMA Floodway
- Poorly Drained and Very Poorly Drained Soils
- Hiking Trail
- National Register Historic Districts
- Municipal Boundaries
- Parcel Boundary

N

1 inch = 600 feet

0 200 400 600 Feet

NO.	DATE	REVISIONS

Tweed Airport Grassland Bird Surveys
Environmental Resources Map

New Haven & East Haven, CT

Date: July, 2024

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THIS MAPPING PRODUCT HAS BEEN CREATED TO COMPLY WITH SUBMITTAL REQUIREMENTS TO OBTAIN CERTAIN REGULATORY APPROVALS AND, AS SUCH, THERE IS NO RELIANCE ON THE INFORMATION CONTAINED HEREIN FOR ANY OTHER PURPOSE.

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Appendix C- Herpetological Assessment

HERPETOLOGICAL ASSESSMENT

WARREN PARCEL, EASTFORD, CT (WINDHAM COUNTY)

July 2024

Prepared for Joshua's Trust by:

Hank J. Gruner, Herpetologist
60 Townsend Road
Andover, CT 06232

PROPERTY DESCRIPTION

The approximately 90-acre “Warren” parcel is located along Bungee Brook in Eastford, Connecticut (Windham County). The parcel consists of a mix of grassland and forested habitats and the property is currently managed for agricultural use, including, the production of hay, corn, and maple syrup. A key feature of the site is Bungee Brook and its associated floodplain which traverses the property.

SUMMARY

- The property supports a diverse array of contiguous upland and wetland habitat types that foster the potential for a high species diversity.

- Available habitat includes a high percentage of early successional stage grassland and wetland habitat types that are limited in statewide extent, and of conservation importance.

- Suitable habitat for the wood turtle, a species of high regional conservation priority currently under review for listing by the USFWS under the Endangered Species Act, occurs along Bungee Brook.

- The location of the property in relation to other protected parcels, including the Natchaug State Forest, provides an opportunity to build long-term ecological connectivity along the Bungee Brook riparian corridor.

ASSESSMENT METHODS
AMPHIBIAN AND REPTILE SPECIES OCCURRENCE

On May 24, 2024 I conducted a site walk accompanied by Bryan Avery, Land Protection Manager for Joshua's Trust, to assess the potential of habitat located on the property to support amphibian and reptile species of conservation importance. This assessment is based on a review of the upland and wetland habitats present, coupled with an analysis of wetland, surficial geology, and topographic maps, and aerial photographs of the site and its surrounding landscape.

Herpetological field surveys to detect the presence of individual species were beyond the scope of this assessment, however, the distribution and habitat use of amphibians and reptiles in the region is well-known (Klemens et al 2021). Direct observations and specimen records of amphibians and reptiles collected as part of this nearly three-decades long effort were utilized to compile species checklists based on the habitat present within, or immediately adjacent to the parcels (*see Table 1: Amphibians and Table 2: Reptiles*).

If a species was observed during the site walk it is noted as "confirmed." Specie's not observed are listed as "Probable" or "Possible" occurrence. Probable occurrence indicates that appropriate habitat is present and the species is widely distributed in similar habitat within the region. Possible occurrence indicates appropriate habitat is present, however, the species has a more restricted distribution within the region.

The species checklists are not broken down by habitat as many species of amphibians and reptiles seasonally disperse among different habitats to fulfill various life history functions such as; thermoregulation, feeding, hibernating/aestivating, or reproduction. Species checklists that are based on a broader ecosystem that encompass a diversity of inter-connected habitats are ecologically more appropriate. Where appropriate, the location of critical habitat types (e.g. vernal pools) and important species habitat associations are identified in the report narrative.

The checklists are annotated with references to individual species State conservation listings. These include, Connecticut's Endangered, Threatened and Special Concern species list (CTDEEP 2015a), and Connecticut's Wildlife Action Plan (CTDEEP 2015b). The CTWAP is currently under-going a 10-year review and changes in the listing status of some species is anticipated. Two turtles currently under review by the U.S. Fish and Wildlife Service for listing under the federal Endangered Species Act are also noted.

Table 1. Amphibian Species List

Common Name	Scientific Name	Occurrence	CT E/T/SC Listing[1]	CT WAP Listing[2]
AMPHIBIANS-SALAMANDERS				
Spotted salamander	*Ambystoma maculatum*	Probable		GCN Important
Marbled salamander	*Ambystoma opacum*	Possible		GCN Important
Northern dusky salamander	*Desmognathus fuscus*	Probable		GCN Important
Northern two-lined salamander	*Eurycea bislineata*	Probable		
Four-toed salamander	*Hemidactylium scutatum*	Possible		
Red-spotted newt	*Notophthalmus viridescens*	Possible		GCN Important
Eastern red-backed salamander	*Plethodon cinereus*	Probable		
AMPHIBIANS - FROGS				
American toad	*Anaxyrus americanus*	Probable		
Fowler's toad	*Anaxyrus fowleri*	Possible	Special Concern (proposed)	GCN Important
Gray treefrog	*Dryophytes versicolor*	Probable		GCN Important
American bullfrog	*Lithobates catesbeianus*	Confirmed		
Green frog	*Lithobates clamitans*	Confirmed		
Pickerel frog	*Lithobates palustris*	Probable		
Wood frog	*Lithobates sylvaticus*	Confirmed		GCN Important
Spring peeper	*Pseudacris crucifer*	Probable		

[1] List of Endangered, Threatened, and Special Concern species of Connecticut (2015a)
[2] Connecticut Wildlife Action Plan (2015b), CT Department of Energy and Environmental Prot

Table 2. Reptile Species List

Common Name	Scientific Name	Occurrence	CT E/T/SC Listing[1]	CT WAP Listing[2]
REPTILES - TURTLES				
Snapping turtle	*Chelydra serpentina*	Probable		
Painted turtle	*Chrysemys picta*	Confirmed		
Spotted turtle[3]	*Clemmys guttata*	Probable	Special Concern	GCN Very Important
Wood turtle[3]	*Glyptemys insculpta*	Probable	Special Concern	GCN Very Important
Eastern musk turtle	*Sternotherus odoratus*	Probable		
Eastern box turtle	*Terrapene carolina*	Possible	Special Concern	GCN Very Important
REPTILES - SNAKES				
Eastern wormsnake	*Carphophis amoenus*	Possible		

Northern black racer	*Coluber constrictor*	Possible		GCN Important
Northern ring-necked snake	*Diadophis punctatus*	Probable		
Eastern hog-nosed snake	*Heterodon platirhinos*	Possible	Special Concern	GCN Very Important
Eastern milksnake	*Lampropeltis triangulum*	Probable		
Northern watersnake	*Nerodia sipedon*	Probable		
Smooth greensnake	*Opheodrys vernalis*	Possible	Special Concern	GCN Important
DeKay's brownsnake	*Storeria dekayi*	Probable		
Red-bellied snake	*Storeria occipitomaculata*	Probable		
Ribbonsnake	*Thamhophis saurita*	Possible	Special Concern	GCN Very Important
Eastern gartersnake	*Thamnophis sirtalis*	Confirmed		

[1] List of Endangered, Threatened, and Special Concern species of Connecticut (2015a)
[2] Connecticut Wildlife Action Plan (2015b), CT Department of Energy and Environmental Protection
[3] Under review by the USWS for possible listing under the Federal Endangered Species Act

AMPHIBIAN AND REPTILE HABITAT

The following provides a brief discussion of the important habitat types for amphibians and reptiles on the property. *Figure 1 illustrates the approximate location of these habitats.*

Bungee Brook and Associated Floodplain Wetland Habitat

The Bungee Brook system supports a known population of wood turtles (*Glyptemys insculpta*), and the in-stream and surrounding floodplain and forested upland habitat present at the site are suitable to support over-wintering, seasonal basking, and foraging activity. Potential nesting habitat is limited to small patches of exposed sandy outwash immediately adjacent to the brook, primarily along the west bank, and sand deposits located within the confines of the brook proper. Disturbed soils associated with the corn field located in the southeast section of the property near the brook may also provide nesting habitat. It is worth noting that a small open sand pit located just to the northeast of the property on a separate private parcel may be utilized for nesting by turtles. Sand and gravel pits that are located within 1,000 feet of streams often attract numbers of female turtles due to the ideal nesting conditions created.

The wood turtle is a state-listed special concern species that is of high conservation priority in the Northeast region due to population declines and vulnerability to land use practices and changing climatic conditions (Jones et al 2015). The wood turtle is currently under review by the U.S. Fish and Wildlife Service for potential listing under the federal Endangered Species Act. This species warrants consideration in long-term planning and management of the site.

The floodplain surrounding Bungee Brook features a diversity of wetland habitats including: wet meadows, shrub swamp, forested swamp, temporary pools, and semi-

permanent channels. In addition to providing important habitat for wood turtles and a host of common species, these habitats are suitable for two state-listed reptiles, the spotted turtle (*Clemmys guttata*) and the ribbonsnake (*Thamnophis saurita*).

As a result of historic alteration (often associated with past agricultural practices) and reforestation, wet meadows, fens, and other open canopy wetlands have significantly declined in occurrence throughout the state. The property includes a high percentage of open canopy emergent wetlands, primarily associated with the Bungee Brook floodplain. These habitats warrant consideration in long term planning and management.

Inland Wetland and Vernal Pool Habitat

A small vernal pool is located within the mixed deciduous/coniferous forest along the northeastern border of the property. The pool lies within a narrow, intermittent drainage. Numerous wood frog (*Lithobates sylvaticus*) tadpoles were observed in the pool and spotted salamanders (*Ambystoma maculatum*) likely breed within the pool. Both species are obligate vernal pool-breeding amphibians. Any planned forest management should consider the presence of this pool and the community of amphibians that it supports.

The intermittent drainage area that the vernal pool lies within, as well as other intermittent streams and seepage areas within the forest, likely support populations of two stream salamanders, the dusky salamander (*Desmognathus fuscus*), and the two-lined salamander (*Eurycea bislineata*). Both salamanders are widespread throughout the region. Maintaining forest cover, and avoiding sediment input from nearby disturbance are the primary management goals for these species on the property.

A small pond draining into Bungee Brook is located east of the brook in the central portion of the property. The pond appears to be an impounded natural wetland with the placement of a culvert connecting the pond to the floodplain of the brook. The eastern portion of the pond grades into a shrub/forest swamp This wetland complex is suitable for a high diversity of amphibians and reptiles, including common species such as: the American bullfrog (*Lithobates catesbeianus*), gray treefrog (*Dryophytes versicolor*), painted turtle (*Chrysemys picta*), and northern watersnake (*Nerodia sipedon*), as well as less common species like the four-toed salamander (*Hemidactylium scutatum)*, and state-listed species, including, the spotted turtle and ribbonsnake.

Several vernal pool-breeding amphibians, including the wood frog, spotted salamander, and possibly the marbled salamander (*Ambystoma opacum*) likely breed within the shrub swamp. The vernal pool-shrub swamp breeding amphibian community should be considered as a single metapopulation for conservation and management purposes.

Upland Forest Habitat

The eastern half of the property consists of mixed deciduous (oak) – coniferous (white pine) forest. The forest provides important terrestrial habitat for many of the amphibians that utilize the vernal pool and shrub/forest swamp for reproduction, including, the wood

frog and spotted salamander. The forest also provides a contiguous dispersal corridor between the vernal pool and shrub swamp, facilitating metapopulation dynamics for the forest-wetland amphibian community. Implementing best management practices that take into consideration this amphibian community should be included for any planned forest management operations.

The forest provides suitable habitat for several species of snakes including, the red-bellied snake (*Storeria occipitomaculata*), northern black racer (*Coluber constrictor*), and northern ring-necked snake (*Diadophis punctatus*), among others. The forest-agricultural field ecotone (habitat transition zone) provides important seasonal habitat for many of these snakes.

Grassland Habitat

Approximately half of the property's acreage consists of managed agricultural fields. These predominantly consist of hay and corn crop. Corn fields provide minimal habitat value to most amphibians and reptiles. These values are limited to potential nesting sites for turtles, and the ecotonal transition habitat created between the fields and forests and/or wetlands.

Hayfields provide a much broader habitat use, especially when embedded within a matrix of forest and wetland habitats, which is the case here. They provide important early successional habitat for state-listed species including: wood turtles and smooth greensnakes (*Opheodrys vernalis*), as well as northern black racers, eastern gartersnakes (*Thamnophis sirtalis*), and pickerel frogs (*Lithobates palustrus*). Implementing best agricultural practices that take into consideration amphibians and reptiles should be considered, especially regarding mowing/vegetation management and chemical applications.

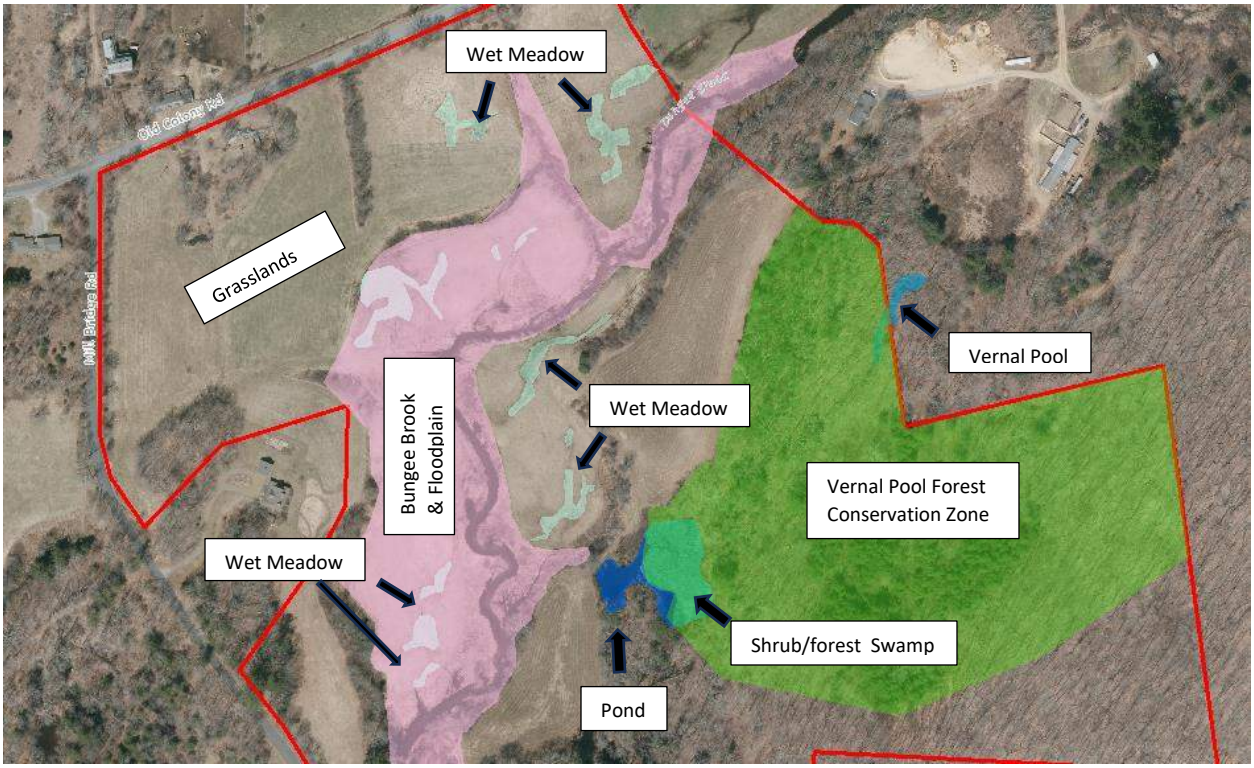

Figure 1: Bungee Brook and its associated flood plain, and upland and wetland habitats associated with amphibians and reptiles

ECOLOGICAL LANDSCAPE CONTEXT

Riparian corridors such as the Bungee Brook system, function as important ecological connectors across the landscape. Maintaining a diversity of intact terrestrial and upland habitats in association with these corridors is widely recognized as critical for maintaining ecosystem health and regional biological diversity. Long-term dispersal of individuals across the landscape is critical for maintaining the genetic health of populations, and for enabling populations to respond to changing environmental conditions. This may be especially important for the long-term viability of wood turtle populations as climate change modeling indicates that the suitability of river and stream habitat is shifting northward (Mothes et al 2020).

The property is adjacent to a significant amount of conserved land along Bungee Brook to the north. Conserving the property would further add to this acreage, and will also contribute to building ecological connectivity to the Natchaug State Forest which is located approximately 0.75 miles to the south. *Figure 2 provides an overview of the ecological landscape context of the property.*

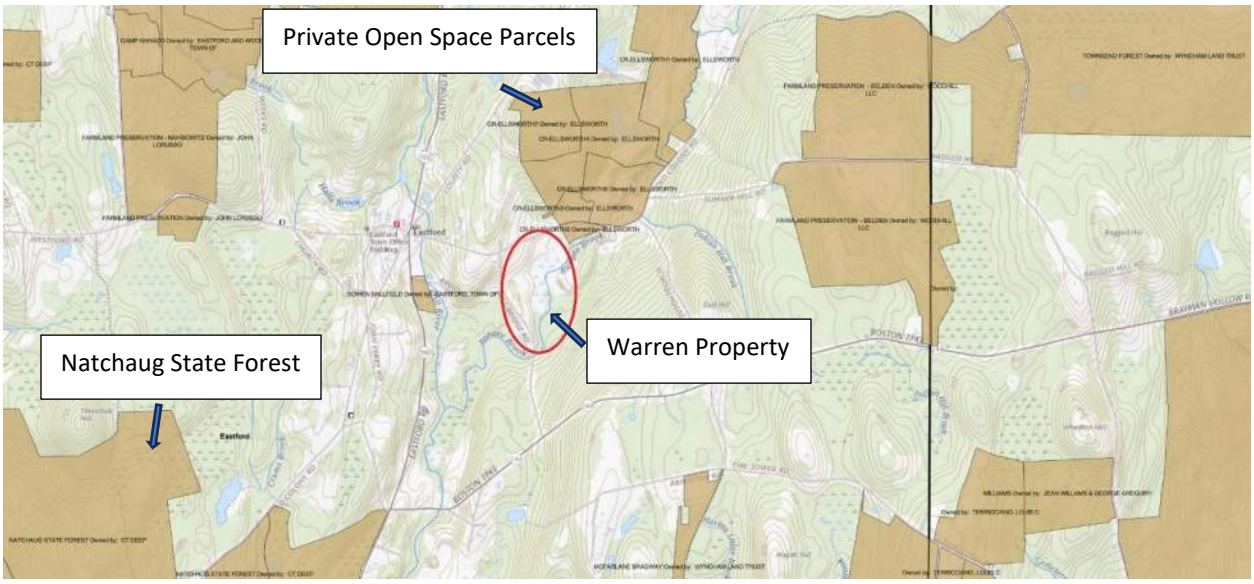

Figure 2: Location of the Warren property in relation to protected open space along the Bungee Brook system.

Based on a habitat assessment of the property and the potential occurrence of amphibian and reptile species associated with these habitats, the following three conservation priorities are recommended:

(1) Protect the ecological integrity of Bungee Brook and its associated floodplain habitat, with the wood turtle population as an important conservation target.

(2) Protect core amphibian vernal pool/wetland breeding and upland forest habitat, and maintain connectivity among these habitats.

(3) Manage the property for early successional grassland habitat, and promote the establishment of ecotonal transition habitat between the managed fields and adjacent forest and wetlands.

The following conservation and management actions are recommended to support these goals:

(1) Prevent inadvertent injury or mortality of individual wood turtles from mowing.
   a. If the primary management goal for the property is wildlife, mowing should only take place between October 15-March15, outside of the activity season (March 15-October 15).
   b. If the management goal is to balance hay production with wildlife conservation, mowing should take place between July 15-August 31 and consider the following practices
      i. Maintain a blade height of 6 inches or higher

ii. Directionally mow starting from the far edge of the field, or the field interior, and work towards the brook to allow turtles to move away
iii. Mow at a reduced speed to allow turtles to move way
iv. Maintain a 25-50 -foot buffer between from the brook/floodplain edge

(2) Employ best management practices as they relate to vernal pools/wetlands for any planned forest management applications. These should focus on protecting the vernal pool and shrub swamp basins, as well as protecting critical surrounding forest habitat, and maintaining connectivity between these wetland habitats. The following should be considered:
   a. Maintain unbroken forest connectivity between the vernal pool and shrub swamp/pond
   b. No disturbance or tree removal within 100 feet of the vernal pool or shrub swamp
   c. Maintain 50-75% forest cover in mature trees between 100-750 feet of the vernal pool
   d. If possible, conduct forestry operations during the winter months (November 1-February 15), ideally, when the ground is frozen.
   e. Fill-in or level any deep ruts created during operations to avoid creating egg deposition "sinks."

(3) Consider converting the field(s) planted in corn to hayfield or other grassland and maintain a 15-25 - foot buffer between the field and the forest/Brook.

(4) Avoid the use of pesticides as these may impact greensnakes.

Additional conservation and management recommendations that provide regional information on the habitat associations and requirements of amphibians and reptiles, possible threats to these habitats, and recommendations for managing lands in ways compatible with or beneficial to amphibians and reptiles can be found at: **Layout 1 (northeastparc.org)**

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**Note: Both the State "endangered species list" and "Wildlife Action" plan are currently under review.*

Appendix D- Letter from Conservation Biology Professor

UCONN
UNIVERSITY OF CONNECTICUT

8th August 2024

To whom it may concern:

I am writing in regard the hayfield property along Bungee Brook on Mill Bridge Road in Eastford, currently owned by Dale and Joanne Warren, and which Joshua's Trust is working to protect. Conservation interest in the site centers around the occurrence of state-listed species, potential to support additional species, and the general scarcity of protected grassland habitat in the region. Since several of the focal species are birds, I was asked by Joshua's Trust to visit the site and provide an assessment of its value.

I am a professor of conservation biology at the University of Connecticut, where I have taught conservation courses to both undergraduate and graduate students since 2003. I have lived in northeastern Connecticut for more than 25 years and have extensive knowledge of the state's birds and their conservation. For example, I am a lead investigator for the Connecticut Bird Atlas, which describes the distribution, abundance, and conservation status of all of the state's birds. I have also served on a wide variety of national and state-level committees and working groups focused on bird conservation, including those centered on grassland birds.

I visited the Eastford property on July 3rd of this year and spent several hours exploring the site. This visit confirmed the presence of bobolinks, a Species of Special Concern under the Connecticut Endangered Species Act. Bobolinks are also considered to be in trouble throughout New England due to hayfield management that routinely destroys nests and young birds. We saw several bobolinks, including at least one female that was acting in an agitated manner, indicative of a bird that had a nest in the field. The site is also clearly suitable for other state-listed bird species (e.g., American kestrel, alder flycatcher, brown thrasher), some of which have been reported on the property.

In discussing some of the management actions under consideration for the site – especially the removal of trees that bisect the fields, and sit on hilltops around the edges – it also became apparent that there is potential to attract nesting eastern meadowlarks. This potential is especially significant, as meadowlarks are one of the rarest nesting birds in the state, having suffered serious declines since the 1980s. For instance, during 4 years of statewide field surveys by hundreds of birders for the recent Connecticut Bird Atlas project, the species was confirmed to be nesting at only 5 sites in the state. Like bobolinks, meadowlark declines are associated with hayfield management, and the species is particularly vulnerable because it requires large patches of open grassland habitat. The ability to manage the site both by careful timing of any grass cutting, and by opening up the grassland via tree removal, presents a rare opportunity to benefit this species.

In addition to the benefits for rare grassland species, the combination of other habitats – wet meadow along the river, shrubby edges, etc. – will support a wide variety of other plant and wildlife species. In just the one morning I spent at the site, I saw 38 bird species – impressive given that my visit was timed quite late in the breeding season, limiting my capacity to obtain even a close-to-complete inventory of the nesting species. My understanding is that, in addition to the birds mentioned above, there are several other rare species of interest that occur at the site.

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Overall, it is clear that this is an important site to protect, and a rare opportunity to protect some key habitats that are in short supply both locally and regionally. Both the current landowners and Joshua's Trust have clearly thought hard about how to manage the site, and have a clear plan for both protecting what is already there, and enhancing the site's conservation value through management. They have also thought about ways to make the site accessible to the public (both an observation platform for birders and brook access for fishers are part of their plans), while ensuring protection of the site's key natural resources. As such, I would strongly endorse all efforts to make these plans come to fruition.

Yours sincerely,



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Professor, Conservation Biology
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Appendix E- Email from the President of Joshua's Trust

From: John Hankins <johnbhankins@hotmail.com>
Sent: Friday, April 4, 2025 7:02 AM
To: Peace, Kimberly R. <kpeace@hoyletanner.com>; Blum, Robin <Robin.Blum@ct.gov>; Toledo, Anna <Anna.Toledo@ct.gov>; DEEP Nddbrequest <DEEP.Nddbrequest@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>; Justin Mondshine <justin.mondshine@naturion.com>
Cc: Furey, Robert M. <rfurey@hoyletanner.com>; Gonzalez, Nils E. <ngonzalez@hoyletanner.com>; Michael Jones <mjones@avports.com>; Coon, Deb L. <dcoon@hoyletanner.com>; Julie McClelland <jmcclelland@v-1consulting.com>; erothstein <erothstein@edesigndynamics.com>; Kyle Taylor <ktaylor@edesigndynamics.com>
Subject: [External] Re: Tweed Airport Grassland Management Plan, Joshua's Trust

Hi Kim and Others: In response to your recent e-mail, I'm writing to confirm that Joshua's Trust is committed to the long-term management of the grassland section of the Warren property in Eastford for Savannah sparrow and other species of interest, including management of the site via periodic mowing and invasive species control as specified in the draft Grassland Management Plan. This commitment is subject to the execution of a long-term funding plan for the program by The New HVN LLC at a level and under terms that are acceptable to Joshua's Trust.

For those not familiar with our organization, Joshua's Trust was founded as a land trust in 1966 and has been actively protecting land and promoting conservation in a 14-town region in eastern Connecticut (including Eastford) since that time. We currently protect over 142 properties comprising over 5500 acres, either by conservation easement or fee ownership. Our staff of five includes a full-time Executive Director and a Stewardship Coordinator who will be the two individuals responsible for implementing the stewardship program at the Warren property. Our staff is supported by a Board made up of conservation-minded members of the communities we serve as well as a capable team of conservation experts and contractors with whom we work regularly. We are fully accredited by the Land Trust Alliance, a testament to our commitment to responsibly maintain the conservation values of the properties that we have been entrusted with in perpetuity.

John Hankins

President

Joshua's Trust

P.O. Box 4

Mansfield Ctr., CT 06250

Cell 860-539-2928

NEW HAVEN CT – THE TWEED NEW HAVEN AIRPORT AUTHORITY AND THE NEW HVN LLC

NDDB FILING NO. 107828 & 117005

Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Rare Plant Survey Report and Protection Plan

December/2024 – REVISED March 2025

New Haven County

PREPARED FOR

Tweed New Haven Airport Authority and The New HVN LLC
155 Burr St.
New Haven, CT 06512

PREPARED BY

BSC GROUP
150 Dow Street
Manchester, NH 03101

BSC Project No. 0100529.00

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1. Executive Summary

BSC Group, Inc. (BSC) conducted rare plant surveys for species listed as state special concern, threatened, or endangered as part of an environmental review required by the Connecticut Department of Energy & Environmental Protection (CTDEEP) and the Natural Diversity Data Base (NDDB) request number 202408268, filing numbers 107828 and 117005. This survey was conducted for Tweed New Haven Airport Authority and The New HVN LLC's Runway Extension, Terminal Expansion, Tuttle Brook, and Tide Gate Alteration Area projects. The property wide survey covered 233 acres and was conducted during proper flowering windows for the target species. Surveys were conducted between June 3 – 6, September 23 – 26, and October 16 – 17, 2024. Seven plant species required surveys in locations on the airfield and in the surrounding tide marsh. Two target species were observed during the 2024 survey. One of these species, field paspalum (*Paspalum laeve* var. *circulare*), will be impacted by the proposed projects.

For the survey conducted between October 16 - 17, a vegetative community and habitat suitability assessment was conducted in the Tide gate Alteration Area to estimate the likelihood of target species presence in selected locations. In addition to habitat assessments for specific species, the survey was broadened to include any plant species within the species' genera because the survey was conducted outside of the proper flowering window for most of the target species.

Project related land conversion alterations from terrestrial habitat (pervious) to pavement (impervious) will impact an estimated 2.51% to 3.53% of the extant field paspalum population. Other non-permanent impacts, such as turf to turf conversions have the potential to impact between 52.39% - 53.25% of the extant population.

The primary mitigation strategy for field paspalum is to change existing airport revegetation protocols after disturbance events. Hydroseeding with non-native species post-disturbance is having a dramatic effect on field paspalum in various locations across the airfield. Revegetation activities will be altered to not include seeds of any type for post-disturbance revegetation efforts in rare plant locations. An estimated extensive seed bank, that includes field paspalum, exists on site and future disturbance events will encourage natural germination and provide suitable conditions for field paspalum to persist with no conflict to Federal Aviation Administration (FAA) regulations regarding vegetation management.

As a secondary mitigation strategy for this species, seed collection was approved, conducted, and completed during the mature fruiting window in November 2024. If the primary mitigation strategy fails, transplanting field paspalum plugs from contract-grown seed collected in 2024 to revegetate the site would provide mitigation post construction.

Due to an increase of 3.8 acres to the proposed tide gate alteration impact areas after the 2024 field season, this report includes presumed presence mitigation strategies for seven state-listed species. The need to implement any of the suggested mitigation strategies will be verified by BSC Botanists during the 2025 field season.

2. Project Overview

2.1 General Site Characteristics

Tweed New Haven Airport, located at 155 Burr Street, New Haven, CT covers 394 acres at an elevation of 12 feet above mean sea level and has undergone significant changes to vegetative composition over the decades. The managed airfield portion of the property, including paved runways, totals 150 acres. Although developed and managed as an airfield for the past 84 years, based on current vegetation indicates that originally it was likely a coastal grassland and shrubland habitat. The areas surrounding the developed airfield have a diversity of habitats including North-Central Appalachian Acidic Swamp, North Atlantic Coastal Plain Hardwood Forest, Emergent Marsh, Tide Marsh, and Wet Meadow Shrub Marsh. Morris Creek borders the airport property to the south, east and west and flows into Long Island Sound to the southwest. The wetlands around the airfield have been altered by ditching and water fluctuations to the wetlands in this area are regulated with the use of a tide gate on Morris Creek, located off Cart Rd. owned by the Town of New Haven.

2.2 Airport Project Descriptions

To meet various needs for expansion and safety, Tweed New Haven Airport Authority and The New HVN LLC are proposing airport improvement projects that will alter existing conditions in portions of the airfield and surrounding tidal marsh. In total, four different project areas were assessed for potential impacts to rare plant species on the airport's property. The survey areas are titled Runway Extension, Terminal Expansion, Tuttle Brook, and Tide Gate Alteration Area and correspond to NDDB's Request filing numbers. Brief descriptions of each project are below.

The Runway Extension project will extend the existing paved Runway 2-20 640' feet to the south (2.47 ac of impact.) and 366' feet to the north (1.46 ac of impact). This expansion will allow larger aircraft to use the runways as well as increase safety for use by existing aircraft.

The Terminal Expansion Project will construct a new terminal on the eastern portion of the property to replace the existing terminal. The new terminal is proposed to alter approximately 40 acres of existing airport property. Alterations within this project's footprint will consist of paved parking lots, aprons, taxiways, and access driveways as well as a new six-gate terminal.

The Tuttle Brook survey area is a 6 acres area that was assessed due to proximity to the northern section of proposed runway extension. There are no major disturbances proposed for this section of the property.

The Tide Gate Alteration Area has proposed changes to existing tide gate operations on Morris Creek to the south by increasing water levels in the surrounding wetlands by 2.5 feet affecting approximately 34 acres of marsh habitat. In addition to the original 30 acres surveyed in 2024 an additional ~3.8 acres were added and will be surveyed in 2025. This alteration to tide water levels is proposed to assist in restoration of previously altered tidal wetland habitat by reducing infestation levels of invasive common reed (*Phragmites australis*).

In addition to the converted acreage listed above for the footprints of the Runway Extension and Terminal Expansion Projects, there are approximately 72 acres of proposed turf conversion. Turf conversion areas are proposed to undergo standard grading procedures which include stripping, screening, stockpiling, grading, top-soil replacement, and finally being seeded and mulched. These grading activities will occur in many of the unpaved, vegetated airfield areas as part of both the Runway Extension and Terminal Expansion Project alterations.

2.3 Required Rare Plant Surveys

To assist Tweed New Haven Airport Authority and The New HVN LLC with the conservation of rare plants potentially present at the site, BSC conducted rare plant surveys during the 2024 growing season on behalf of Hoyle Tanner. The proposed projects will alter various portions of the airfield as well as the surrounding tide marsh areas. For the purposes of rare plant surveys, the four projects were divided into two separate groups. These rare plant surveys support permitting related to these four projects for species listed as special concern, threatened, or endangered, by the State of Connecticut.

Group 1 consists of areas within the airfield portion of the property (~200 acres) and was comprised of the Runway Extension, Terminal Expansion and Tuttle Brook portions of the project areas. Areas in this group of projects are labeled identically to Tweed New Haven Airport's existing airfield location labels 1 – 23 (**Appendix A**). Plans for the proposed airport projects in Group 1 are available in **Appendix A** and identify six different proposed land conversion types within the existing airfield: Pavement to Turf (PTT), Pavement to Pavement (PTP), Turf to Pavement (TTP), Wetland to Turf (WTT), Turf to Turf (TTT), and Wetland to Pavement (WTP).The survey effort reviewed all areas where any of these six impact types will occur.

Group 2 consists of only the tide marsh areas outside the airfield (~30 acres) that will be impacted by the Tide Gate Alteration Area project. Surveys in Group 2 targeted only areas of proposed impact. Plans for the proposed airport project in Group 2 are available in **Appendix A** and depict the approximately 30 acres of existing tidal marsh that will be inundated on a regular basis when the maximum tidal elevation is raised to 2.5 feet due to alteration of existing tide gate operations.

The largest area of impact is within the airfield area due to TTP, WTP, and TTT land conversion types. These land conversions will alter the existing habitat for rare species present at the site by either converting pervious to impervious surfaces, or in the case of TTT land conversion, by replacing existing plant communities with disturbance and application of non-native or non-local ecotype seed.

After the initial 2024 field survey season, 3.8 acres of tide marsh restoration area was added to the tide gate alteration project. Details on the 2025 field survey and presumed presence plant protection plans for the seven species is in **Section 5.3**.

3. Methods

BSC's Botanists conducted meander-based surveys of all Group 1 project areas within the airfield and in the Group 2 portions of the surrounding tide marsh that will be inundated by the alteration of tide gate operations. The surveys were conducted by qualified BSC Botanists, and staff resumes are presented in **Appendix B**.

Survey windows were selected for target species based on historical flowering data available from Native Plant Trust, digital herbarium records from Pringle Herbarium, and iNaturalist observations (**Table 1**).

Table 1. Target Species, Survey Window and Survey Location

Common Name	Scientific Name	Survey Month	Survey Area
yellow thistle	*Cirsium horridulum*	June, October	Tuttle Brook, RE/TE/TG*
two-flowered cynthia	*Krigia biflora*	June, October	Tuttle Brook, RE/TE/TG*
hoary plantain	*Plantago virginica*	June, October	RE/TE/TG*
saltpond grass	*Leptochloa fusca* ssp. *fasciculata*	September, October	Tuttle Brook, RE/TE/TG*
field paspalum	*Paspalum laeve*	September, October	Tuttle Brook, RE/TE/TG*
swamp lousewort	*Pedicularis lanceolata*	October	RE/TE/TG*
New England blazing star	*Liatris novae-angliae*	October	RE/TE/TG*

*RE/TE/TG = Runway Extension/Terminal Expansion/Tide Gate Alteration Area

3.1 Tweed Projects Rare Plant Surveys

Group 1 survey areas were divided into survey units consistent with Tweed New Haven Airport's existing location identifiers, Sections 1 – 23 (**Appendix A**). Group 2 tide marsh survey areas were uniquely labeled Phragmites Patch (PP) 1 – 17 (**Appendix A**).

During the survey, positive or negative identification of any potential target species was confirmed with plant identification keys (Haines Flora Novae-Angliae[1]), 20X hand-lens, and a measurement caliper (mm). Observed target species were recorded using an Arrow Gold RTK GNSS receiver and Samsung Tablet GPS. Single plant occurrences (low-density) were temporarily marked with a pin flag, counted, photographed and GPSed. Larger populations (medium/high-density) were estimated by approximating the total number of individuals present in a dimensional portion of the area and visually applying that density estimate across the population's extent within each survey unit. Diagnostic photos of positively identified target species as well as representative habitat were recorded with an iPhone 11 and are presented in **Appendix D**. A botanical inventory of species for both native and non-native species observed during the surveys was recorded and is presented in **Appendix C**.

All surveys were conducted from 8 am to 4 pm, over 10 days for a total of 172-person survey hours. Weather during these surveys was mostly dry and sunny with daytime temperatures that ranged from 60 – 80 degrees Fahrenheit. During each survey window, BSC Botanists coordinated with and were escorted to survey areas within the airfield by Tweed Airport staff.

[1] Haines, A., Farnsworth, E., & Morrison, G. (2011). New England Wild Flower Society's Flora Novae Angliae: A Manual for the Identification of Native and Naturalized Higher Vascular Plants of New England. Yale University Press. http://www.jstor.org/stable/j.ctt1np7h4

3.2 Tide Gate Alteration Area Project Habitat Assessment

Survey areas for the tide marsh/wetland surrounding Tweed New Haven Airport airfield were determined using eDesign Dynamics shapefiles that defined areas of future water inundation where alterations to tide gate operations will raise water 2.5 feet above existing levels (**Appendix A**). Surveys of these identified areas were conducted to determine the presence or absence of target species, as well as assess the potential for suitable habitat for these species.

The Tide Gate Alteration Area portion of this survey was conducted outside the proper flowering window for most of the target species and therefore, search images for target species were broadened to the genus level to capture any congeners as well as target species. Since target species would not necessarily be in prime identifiable condition, this overly inclusive approach assured that any potential rare species were not overlooked. Per the request of CTDEEP, general habitat suitability for the target species in the tide marsh was assessed by observation of habitat suitability in select survey locations, based on the presence and density of invasive species, light, water availability, and thickness of common reed thatch. Representative photos of each survey section for the tide gate portion of the project were recorded in addition to any areas that had markedly low densities of invasive plants (**Appendix C**).

3.3 Seed Collection Protocols

During the September 2024 survey, BSC botanists positively identified an extensive population of field paspalum in the Terminal Expansion Area. Observation of this species and the proposed impacts in the Terminal Expansion Area prompted a discussion regarding seed collection as a potential mitigation strategy.

On November 5, 2024, with permission from Tweed New Haven Airport Authority, The New HVN LLC and CT State Botanist Bill Moorhead, BSC Junior Botanist Jonathan Kuziel collected visibly mature field paspalum seeds within the Terminal Expansion Area. Seed collection efforts followed the New England Plant Conservation Program (NEPCoP) Seed Collection Guidelines for the Native Plant Trust Seed Bank[2]. Collected seeds were confirmed to species, counted, recorded, and shipped by BSC Senior Botanist, Tom Groves to Nasami Farm in Whately, Massachusetts for long-term seed storage on November 19, 2024. Confirmation and receipt of seed shipment was received from Nasami Farm November 25, 2024.

[2] https://epuc.vermont.gov/?q=downloadfile/446955/150086

4. Results

4.1 Botanical Survey Results - Overview

Overall, 32% (46 species) of the 144 species observed and identified during June, September and October were non-native or invasive (**Appendix D**). The rare species occurrences and highest plant species diversity was observed in the open airfield area, along the edges of open habitat, and where the new terminal construction is proposed on the southeastern part of the property. Rare plant reporting forms have been submitted to DEEP via email and copies of the reports are included in **Appendix E.**

The vegetation of the tidal marsh surrounding the airfield is primarily composed of common reed, which varied in height from 15' feet tall, high-density monocultures, to 5' tall light to moderate densities. Within the salt marsh there is occasionally an upland island. The plant community composition of these upland areas is estimated to be 95% – 99% native plant species. Although these areas were outside of the tide gate alteration areas, they were noticed and noted during this portion of the survey effort. These uplands are primarily composed of an overstory of white oak (*Quercus alba*) and pin oak (*Quercus palustris*), a midstory of sweet pepperbush (*Clethera alnifolia*), and smooth arrowwood (*Viburnum dentatum*) and by sawbrier (*Smilax glauca*) in the understory.

4.2 Rare Plant Survey Results Summary

Two target species were observed during the 2024 surveys, and the observations are summarized in **Table 2** and discussed in detail below.

Table 2. Summary of Target Species and Survey Window, Effort and Results

2024 Survey Date	Botanists	Target Species	Weather	Survey Duration (Person Hours)	Summary of Survey Results	Population Estimate
June 6 - 9	T. Groves & O. Sena	*Krigia biflora* *Plantago virginica* *Cirsium horridulum*	Mostly sunny, temps in the 80s F	70	No Target Species Observed	N/A
September 23 - 26	T. Groves & J. Kuziel	*Paspalum laeve* *Leptochloa fusca* ssp. *fasciculata*	Mostly sunny temps in the 70s F	70	*Paspalum laeve* var. *circulare* *Leptochloa fusca* ssp. *fasciculata*	45,124 – 88,407 80 – 122
October 16 - 17	T. Groves & J. Kuziel	*Krigia biflora* *Plantago virginica* *Cirsium horridulum* *Paspalum laeve* *Leptochloa fusca* ssp. *fasciculata* *Pedicularis lanceolata* *Liatris novae-angliae*	Overcast /mostly sunny, temps in the 60s F	32	No Target Species Observed	N/A

4.3 Rare Plant Observations

Field paspalum (*Paspalum laeve* var. *circulare*) occurs throughout the upland and wetland portions of the airfield survey area in various densities. This species was observed in areas that will be disturbed by the Runway Extension project in Sections 1, 2, 3, 4, 6, 7, 8, and 9, Terminal Expansion Sections 10, 11, 12, 13 and 14, and Tuttle Brook Section 23 (**Appendix A**). The highest density areas of this species were observed in sections 15, 16, 17, 18 and 19. These high-density areas total approximately 19 acres and account for between 66.92% - 68.15% of the total extant population. These sections are primarily outside of the project impact limits except for 2 acres where turf to turf conversion is proposed on the western side of Section 18 (**Appendix A**).

Conservative estimates for the total population of this species in all locations across the site are between 45,124 and 88,407 individuals. Due to this species' slow growth after germination, it may take two to three years to reach maturity. Population estimates for this species have considered the potential for unidentifiable immature individuals' presence in the survey areas. All identifiable individuals were in flower or immature fruit at the time of the survey and mature fruit during the November 2024 seed collection.

No observations of field paspalum were recorded in the tide gate alteration area portion of this survey.

Saltpond grass (*Leptochloa fusca* var. *fasciculata*) was observed in two distinct locations. The first occurs in the parking area southwest of the Maintenance Building and 145 feet northwest of the continuation of Thompson Ave outside the project limits of disturbance (**Appendix A**). This plant population is estimated to be between 23 – 35 plants. The second population occurs midway on the property on an abandoned road 230 feet north of Pig Farm Road. The estimated size of this population is between 57 and 87 individuals. Neither of these areas are within the footprint of the proposed Airport projects, and therefore these plants will not experience any impact from these projects. At the time of the survey, all observed plants of this species were in immature fruit.

4.4 Field Paspalum Seed Collection

In November 2024, BNSC collected seeds as a secondary mitigation strategy for field paspalum in the Terminal Expansion project area. The seed collection effort successfully collected field paspalum seeds from 112 individual maternal lines (**Table 3**). Based on seed collection efforts, the average number of seeds collected per plant totaled 88. Based on the seed collection results and the estimated population size across the entire airport, the estimate of this population's 2024 seed production across the entire survey area is between 4 to 8 million seeds.

Table 3. Field Paspalum Seed Collection Results

Seed Collection Location	Number of Maternal Lines	Total Number of Collected Seed
Terminal Expansion Area	112	8,464

4.5 Observed Congeners

Observed congeners of target species and identifying characteristics of each species are summarized in **Table 4**. In survey locations where target species could occur, identification of any potential congener was identified to the species level. Four non-native congeners for two-flowered cynthia were observed within the airfield portion of the property, identified to species and ruled out as the target species. Slender bead grass (*Paspalum setaceum*) occurrences were infrequent but, in most cases, shared similar locations to field paspalum and was easily identified due to the slightly smaller fruits. Two congener species of yellow thistle were observed in very small populations within the area between the airfield and Morris Creek. Three congeners for hoary plantain were frequent and, in some cases, dominated the vegetation during the June survey. These other species were ruled out as the target species due primarily to a lack of pubescence on the stems and leaves (*P. lanceolata*) and bracts that conspicuously exceed the flowers and fruits (*P. aristata*).

Table 4. Observed Congener Species

Target Species	Congeners	Identifying Characteristics
Krigia biflora	*Hypochaeris radicata* (common cat's ear) *Pilosella caespitosa* (meadow hawkweed) *Pilosella officinarum* (mouse-eared hawkweed) *Pilosella piloselloides* (smooth hawkweed)	These congener species were distinguished by the cypselae beaked, the beak usually greater than ½ the length of the cypselae body to distinguish from *Hypochaeris* genus. To distinguish *Krigia* from the *Pilosella* genus, the target species is without a pappus, or with both scales and barbellulate bristles.
Paspalum laeve	*Paspalum setaceum* var. *muhlenbergii* (slender bead grass)	These congener species were distinguished by the spikelets measuring 1.8 – 2.5 mm long by 1.5 – 2 mm wide, paired at each node; with ligules 0.2 – 0.5 mm long and lower lemmas with a midvein.
Cirsium horridulum	*Cirsium arvense* (creeping thistle) *Cirsium vulgare* (bull thistle)	These similar species were distinguished from the target species by the presence of purple flowers, and capitula not closely invested by a series of narrow, spiny-marginated leaves that form a false involucre
Plantago virginica	*Plantago lanceolata (*ribwort plantain) *Plantago aristata* (bracted plantain)	Congeners for the target species were distinguished by the lack of a combination of hairy oblanceolate to obovate leaves, lobes of the corolla of carpel bearing, chasmogamous flowers erect after anthesis, closing over the fruit

4.6 Tide Gate Alteration Area – Initial Habitat Assessment

Tide gate alteration survey areas were divided into 17 units (PP 1- PP17), as depicted in the mapping provided in **Appendix A**.

During the Tide Gate botanical surveys, 50 plant species were observed, 81.25% were native (39 species) and 18.75% (11 species) were non-native or invasive. Although there was a greater number of native species, native species comprised only a small fraction of the total vegetative community observed during the survey. Common reed (*Phragmites australis*) dominates the available habitat in the Tide Gate Alteration Area and comprises an estimated 98% of the total vegetation present. **Table 5** below lists the dominant and non-dominant plant species observed at each survey location. Representative photos from each survey unit are presented in Attachment D.

There were no observations made of any target species in the tide gate alteration area during the October 2024 surveys. Due to a moderate to heavy density of common reed in this survey area, and the density of common reed thatch covering the soil, the habitat in the tide gate alteration area is unsuitable for any of the target species.

Observations of the cover type during the survey indicate that areas to be impacted by tide changes are currently 98% or more infested by common reed. Areas already experiencing more frequent tide influence currently are comprised of 99% saltmarsh cordgrass (*Sporobolus alterniflorus*). The areas currently experiencing consistent tide influence only comprise a small percentage of the total area surveyed.

Table 5. Tide Gate Alteration Survey Locations and Observed Vegetation

Location	Dominant Vegetation	Non-Dominant Vegetation
PP1	common reed (*Phragmites australis)*	climbing hempvine (*Mikania* scandens) multiflora rose (*Rosa multiflora*) poison ivy (*Toxicodendron radicans),* saltmarsh cordgrass (*Sporobolus alternifolorus*) Callery pear (*Pyrus calleryana*) small white aster (*Symphyotrichum racemosum*)
PP2	common reed (*Phragmites australis*)	climbing hempvine (*Mikania scandens)* poison ivy (*Toxicodendron radicans*) sawbrier (*Smilax glauca*) blackberry (*Rubus* ssp.) multiflora rose (*Rosa multiflora*)
PP3	common reed (*Phragmites australis*)	multiflora rose (*Rosa multiflora*) honeysuckle (*Lonicera* ssp.) groundsel tree (*Baccharis halimifolia*)
PP4	common reed (*Phragmites australis*)	groundsel tree (*Baccharis halimifolia*)
PP5	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*) groundsel tree (*Baccharis halimifolia*)
PP6	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)
PP7	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*) groundsel tree (*Baccharis halimifolia*)
PP8	common reed (*Phragmites australis*)	fat-hen (*Atriplex prostrata*) saltgrass (*Distichlis spicata*) saltmeadow rush (*Juncus gerardii*) groundsel tree (*Baccharis halimifolia*) Carolina sea-lavender (*Limonium carolinianum*) Virginia glasswort (*Salicornia depressa*)
PP9	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)
PP10	common reed (*Phragmites australis*)	groundsel tree (*Baccharis halimifolia*)

Location	Dominant Vegetation	Non-Dominant Vegetation
		showy goldenrod (*Solidago speciosa*) Oriental bittersweet (*Celastrus orbiculatus*) autumn olive (*Elaeagnus umbellata*)
PP11	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)
PP12	common reed (*Phragmites australis*)	poison ivy (*Toxicodendron radicans*) pin oak (*Quercus palustris*) groundsel tree (*Baccharis halimifolia*) saltgrass (*Distichlis spicata*) seaside goldenrod (*Solidago sempervirens*) shining sumac (*Rhus copallinum*)
PP13	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*) groundsel tree (*Baccharis halimifolia*) woolly sedge (*Carex pellita*) swamp rose mallow (*Hibiscus moscheutos*)
PP14	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)
PP15	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)
PP16	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)
PP17	common reed (*Phragmites australis*)	saltmarsh cordgrass (*Sporobolus alterniflorus*)

5. Discussion: Impact Analysis and Mitigation Strategies

5.1 Impacts of the Proposed Projects

The proposed Runway Extension, Terminal Expansion and Tuttle Brook area projects are estimated to impact between 2.51% and 3.53% of the total field paspalum population present within the survey area. The largest impact on this population will be in the Terminal Expansion Area where approximately 40 acres of conversion from pervious surface to impervious surface is planned (WTP, TTR, WTR, WTT, and TTP) (**Appendix A**). This conversion from existing terrestrial habitat to pavement will eliminate the possibility for this species to persist in this location in the future.

Table 6 below summarizes the estimate impacts to field paspalum populations by impact type based on low and high plant number counts. TTT land conversion will impact approximately 49.72% - 49.88% of the entire population across the airport if the disturbed areas are reseeded with non-native species. During the September survey, the BSC botanist noted that areas where hydroseeding was successfully used to revegetate previously disturbed areas, field paspalum was only present in small numbers, if present at all **(Appendix D)**. Where field paspalum densities were the highest, a distinct line between previously hydroseeded areas and areas where hydroseeding either failed or was not used as a soil stabilization technique was evident (**Appendix D**).

The remaining 46.76% - 47.59% of the field paspalum population falls outside the project work limits and will not be affected by any land conversion activities.

Table 6. Field Paspalum Impact Table

Project Area*	Land Conversion Type**	Population Estimate (Low)	Impact Percentage	Population Estimate (High)	Impact Percentage
TE, RE	Turf to Pavement (TTP)	1,045	2.32%	1,533	1.73%
TE	Wetland to Pavement (WTP)	12	0.03%	28	0.03%
TE	Wetland to Rooftop (WTR)	6	0.01%	18	0.02%
TE, RE	Multiple Conversion Types	525	1.16%	645	0.73%
TE	Wetland to Turf (WTT)	3	0.01%	8	0.01%
	Subtotal	**1,591**	**3.53%**	**2,232**	**2.51%**
	Land Conversion Type*	**Population Estimate (Low)**	**Impact Percentage**	**Population Estimate (High)**	**Impact Percentage**
TE, RE	Turf to Turf (TTT)	22,425	49.70%	44,085	49.87%
TE, RE	Pavement to Turf (PTT)	8	0.02%	13	0.01%
	Subtotal	**22,433**	**49.72%**	**44,098**	**49.88%**
	Land Conversion Type*	**Population Estimate (Low)**	**Impact Percentage**	**Population Estimate (High)**	**Impact Percentage**
N/A	No Impacts***	21,100	46.76%	42,077	47.59%
	Subtotal	**21,100**	**46.76%**	**42,077**	**47.59%**
	Grand Total	**45,124**	**100%**	**88,407**	**100%**

*RE/TE/TG = Runway Extension/Terminal Expansion/Tide Gate Alteration Area
**Land Conversion Types Pavement to Pavement (PTP) and Turf to Rooftop (TTR) are eliminated from Table 6 due to PTP current state as impervious surface and TTR proposed within the footprint of other impactful land conversion types.
*** "No Impacts" is defined as an area outside of the project limits where field paspalum was observed but will not experience impacts as part of this project.

5.2 Plant Protection Plan - Proposed Mitigation Strategies

Due to the observed negative impact of hydroseeding using non-native species on the existing field paspalum population, it is recommended that seeding of any kind be abandoned as a revegetation strategy on the airfield at any location where this rare species occurs. Otherwise, TTT conversions have the potential to reduce field paspalum populations dramatically if hydroseeding with non-native species is used following the construction phase of this project. There are 8 specific locations where both TTT and PTT land conversion is proposed, and field paspalum is present. These locations (see Rare Plants Map in **Appendix A**), totaling 31 acres, will be allowed to revegetate naturally from the existing seed bank (**Table 7**). Promoting the growth of field paspalum in these areas will compensate for plants lost to the footprint of the new terminal. Based on the average seed count per individual plant collected during the 2024 seed collection, it is conservatively estimated that 4 to 8 million seeds are present across the survey area. Specifically in the proposed TTT land conversion areas, the estimate is 1.89 – 3.75 million seeds (**Table 7**). Only 1.18% of the available seed bank in these TTT areas would need to germinate to replace the number of individuals potentially lost in the Terminal Expansion Area.

Compensation for plants lost to the footprint of the new terminal can also be provided if areas where PTT conversions remove pavement are allowed to revegetate naturally. If erosion controls are required to satisfy BMPs, a biodegradable, stable, product like BioNet Biodegradable Erosion Control Blankets will be used to stabilize soil and limit erosion to meet Federal Aviation Administration (FAA) regulations without the use of non-native or non-local ecotype seed stock. These small areas of PTT conversion are proposed in Tweed New Haven Airport airfield Sections 1 – 4, 6 – 9, 14 – 15, 18, 20 – 21 and 23. The approximate size of these specific PTT conversions where rare plants occur totals 1.44 acres. Refer to **Appendix A** for maps of these locations.

To retain the seed bank present for the TTT land conversion portion of this project, segregation of topsoil in each TTT area will be necessary to retain any potential field paspalum seeds present. At the completion of construction, the topsoil will be returned to each area where grading has occurred. With the estimated number of seeds present at each location there will be enough seed present to revegetate these areas without the introduction of foreign seed material.

Future monitoring of these sites is recommended for five years to determine if natural revegetation of field paspalum is occurring in select areas where TTT land conversion disturbed the soil. If field paspalum recruitment is low in years post-construction, seeds collected during the 2024 growing season will be contract grown and transplanted onto the sites (31 acres) of previous occurrence.

Due to the number of field paspalum individuals that will be permanently impacted by land conversions in the Terminal Expansion Area, seed collection was approved, conducted, and completed during the mature fruiting window in November 2024. If the primary mitigation strategy fails, transplanting field paspalum plugs from contract-grown seed collected in 2024 to revegetate the site would provide a secondary mitigation measure post construction. In the Terminal Expansion Area, the number of field paspalum individuals permanently impacted by the various land conversion types represents 2.51% - 3.53% of the total population present across the entire survey area. Seed collection activities from the Terminal Expansion Area are estimated to be 3.7X to 5.3X the number of plants represented by the potential taking of this species (**Table 7**).

Monitoring of the mitigation areas will occur annually until one of the two following criteria is met. Stipulation one, the population has exceeded a 3:1 ratio based on the highest total impact numbers to this species (44,098) i.e. a total repopulation estimate of the converted areas exceeds 132,294. Or stipulation two, the area has been monitored for five years without sufficient recruitment to meet stipulation one. This situation triggers a request for the 2024 collected seed to be grown by Native Plant Trust and replacement plugs of this species are planted into the 8 conversion areas.

Table 7. Field Paspalum Natural Revegetation Locations in TTT Areas

Tweed Airfield Section*	Acres	Impact Population Estimate (low)	Impact Population Estimate (high)	Estimated Seed Bank**
20	1.88	54	108	4,752 – 9,504
1	2.11	93	203	8,184 – 17,864
2	3.92	263	629	23,144 – 55,352
3	0.13	7	21	616 – 1,848
18	6.09	10,550	21,075	928,400 – 1,854,600
9 & 15	6.38	10,107	20,184	889,416 – 1,776,192
8	7.82	177	276	15,576 – 24,288
7	2.66	100	180	8,880 – 15,840
Totals	30.99	21,351	42,676	1.89 mil – 3.75 mil

**Refer to Appendix A for location specifics.*

*** Estimated based on average seed per maternal line of 8*

5.3 Presumed Presence Plant Protection Plan

Due to alterations in the original ratio for the proposed tide gate alteration area, 3.8 acres of additional tide marsh creation area remains to be surveyed. For the purposes of impact mitigation and this report, the presence of all the target species is presumed in the survey areas until the 2025 confirmation survey proves otherwise. The presented mitigation strategies will be implemented upon the infield observation of the species.

Rare plant surveys for the specific locations are scheduled for the spring of 2025. Surveys for these remaining areas will be conducted in a similar manner to the other tide marsh creation areas. Meander based surveys for seven target plant species will be conducted to evaluate the three project impacts areas (**Appendix A**). Habitat and vegetation data will be collected to assess the likelihood of rare species presence. Plants observed in the survey locations will be identified to the species level when possible. Any observed plant species that is identifiable only to the genus level and the target species can't be ruled out, will have an additional confirmation survey scheduled and conducted during the appropriate flowering window.

For reference, in **Table 8** below are the positive identification and seed collection windows for each target species.

Table 8. Presumed Presence Mitigation Identification Periods

Presumed Presence Target Species		Identification Periods		
		Vegetative	Flowering	Seed Collection
PrPr 1 - 3	yellow thistle (*Cirsium horridulum)*	April 1 – May 1	June 1 – July 15	June 30 – July 15
	two flowered cynthia (*Krigia biflora*)	April 15 – May 15	June 1 – June 30	June 15 – July 15
	saltpond grass (*Leptochloa fusca ssp. fascicularis*	June 15 – 30	July 1 – Aug 1	Oct 1 – Nov 1
	field paspalum (*Paspalum laeve*)	Aug 15 – Sept 1	Sept 1 – Nov 1	Sept 10 – Oct 11
	swamp lousewort (*Pedicularis lanceolata*)	April 15 – July 15	Aug 1 – Oct 1	Oct 15 – Nov 1
	New England blazing star (*Liatris novae-angliae*)	May 1 – Sept 15	Aug 1 – Sept 30	Oct 1 – Nov 1
	hoary plantain (*Plantago virginica*)	May 1 – June 1	June 1 – July 15	Sept 1 – Nov 1

Seed Collection, Storage, and Propagation

Mitigation strategies for the seven target species will <u>all</u> involve seed collection. Seed collection will serve as a backup strategy to any of the other proposed mitigation approaches reflected in each respective rare species mitigation section. Seed collection will be conducted at the appropriate time for mature seed, dependent on species and coordinated with the Tweed New Haven Airport Authority and The New HVN LLC Staff. Collected seeds will be sorted, counted and labeled according to Native Plant Trust NEPCoP Seed Collection Protocols and stored with NASAMI Farm for propagation.

Presumed Presence Mitigation Strategies by Species

Yellow thistle (E) – This perennial will be transplanted if observed within the additional survey areas. Transplanting this species will include a site assessment of the current location, associated species, elevation, soil type, moisture content and habitat characteristics to determine the best transplant location site on airport property. The ideal site will have similar biotic and abiotic factors and additionally be buffered from any present or future project impact area.

The selected transplant location may require habitat management or invasive plant management to improve site conditions for this species.

Transplanting will be conducted to maintain as much of the root ball around the plant as possible. Maintaining this soil will reduce plant stress and capture a portion of any existing seedbank.

Two flowered cynthia (T) – As a perennial species, transplanting any observed individuals to a similar location based on collected in situ habitat characteristics to include associated species, elevation, soil type, moisture content and habitat characteristics will be used to locate a suitable transplanting location that is buffered from any present or future project impacts.

The ideal site may require habitat management or invasive plant management to create suitable conditions for this

species.

Saltpond grass (E) – If this species is observed in any of the 2025 survey locations, individuals will be transplanted 200 feet north of Pig Farm Road to an area where a subpopulation is already known to occur. This area has existing available habitat and is protected from airport project impacts. Before transplanting, invasive species management will be conducted in this area to reduce coverage of (*Artemesia* sp.), Japanese knotweed (*Reynoutria japonica*) and aggressively growing native horseweed (*Erigeron canadensis*).

Transplanting will be conducted to maintain as much of the root ball around the plant as possible. Maintaining this soil will reduce plant stress and capture a portion of any existing seedbank.

Field paspalum (T) – Observed individuals of this species will be transplanted to non-impacted locations 200 feet north of Pig Farm Road where a subpopulation of this species is already known to occur. Prior to transplantation, invasive species management will be conducted in this area to reduce coverage of mugwort (*Artemesia* sp.), Japanese knotweed (*Reynoutria japonica*) and aggressively growing native horseweed (*Erigeron canadensis*).

Transplanting will be conducted to maintain as much of the root ball around the plant as possible. Maintaining this soil will reduce plant stress and capture a portion of any existing seedbank.

Swamp lousewort (T) – If this species is observed a meter-by-meter plot will be created around any individual or population. Both vegetative and abiotic factors within the plot will be recorded and used to determine a suitable transplanting location elsewhere on the Tweed New Haven Airport Authority and The New HVN LLC Property. A suitable new location for transplants will have a similar host vegetation, especially to include similar species composition and densities of graminoids and composites.

Transplanting will be conducted to maintain as much of the root ball around the plant as possible. Maintaining this soil will reduce plant stress and capture a portion of any existing seedbank. Additionally, this will retain any potential host species for the transplants.

New England blazing star (SC) – If this species is observed, individuals will be transplanted to non-impacted locations. The area 200 feet north of Pig Farm Road where other rare plants occur has available suitable sandy exposed habitat. Prior to transplantation, habitat management of this area for invasive and non-native species as well as aggressively growing horseweed (*Erigeron canadensis*) and any successional woody stems will be implemented to increase available habitat and decrease competition for the transplants.

Transplanting will be conducted to maintain as much of the root ball around the plant as possible. Maintaining this soil will reduce plant stress and capture a portion of any existing seedbank. Additionally, this will retain any potential host species for the transplants.

Hoary plantain (SC) - If this species is observed, individuals will be transplanted to non-impacted locations. The area 200 feet north of Pig Farm Road where other rare plants occur has available suitable sandy exposed habitat. Prior to transplantation, habitat management of this area for invasive and non-native species as well as aggressively growing horseweed (Erigeron canadensis) and any successional woody stems will be implemented to increase available habitat and decrease competition for the transplants.

Transplanting will be conducted to maintain as much of the root ball around the plant as possible. Maintaining this soil will reduce plant stress and capture a portion of any existing seedbank. Additionally, this will retain any potential host species for the transplants.

Rare Plant Recruitment Ratio

To gauge success or failure of any mitigation area where plants were transplanted from the additional 3.8 acres of tide gate alteration area, a recruitment ratio commensurate with the conservation status of each species will be used as a guideline. The two special concern (SC) species, New England blazing star and hoary plantain, will have a recruitment ratio of 1:1.5. For the three threatened (T) species, two-flowered cynthia, field paspalum and swamp lousewort, will have a recruitment ratio of 2:1. Finally, for the two endangered species, yellow thistle and saltpond grass will have a recruitment ratio of 3:1. Calculation of these ratios will include transplanted individuals, naturally germinating and propagated specimens.

To reach the desired recruitment ratio more quickly, it is recommended that Native Plant Trust begin the propagation process for any species where seed is collected and is also transplanted in the fall of 2025. The initiation of

germination protocols in the fall of 2025 will allow for the reintroduction of propagated plants to the transplant location by the fall of 2026. The number of plugs needed to meet the corresponding ratio will be determined by the total number of transplanted individuals.

Long-Term Monitoring and Management

Monitoring of transplant areas will take place during the appropriate identification windows for each species. Individuals that are transplanted or propagated will have unique labels to indicate its origin – transplant, propagated or natural. Monitoring is recommended to occur in any transplant location for up to five years. If at any time during these five years the population fails to meet the required species recruitment ratio, additional plants will be requested to be grown by Native Plant Trust for further transplantation.

Adaptive management during these five years may be required to alter, expand, or manage the selected transplant site to enhance available habitat for the transplants if population numbers are declining.

6. Appendices

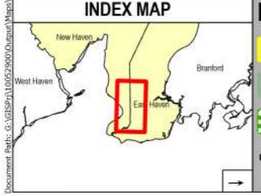
A. Project Maps

A1. Overview and Existing Conditions Map

A2. Rare Plant Map



INDEX MAP



Legend

- Tweed Airport Sections
- Approximate Wetland (not delineated)
- Natural Diversity Database Area (June 2024)
- Airport Property Boundary

N

1 inch = 600 feet

0 300 600 Feet

NO.	DATE	REVISIONS

Tweed Airport Runway Extension/Terminal Expansion
A1 - Overview & Existing Conditions Map

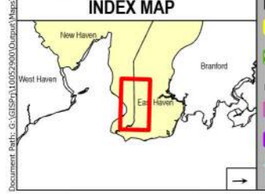
Date: March, 2025

BSC GROUP
BUILD | SUPPORT | CONNECT

THIS MAPPING PRODUCT HAS BEEN CREATED TO COMPLY WITH SUBMITTAL REQUIREMENTS TO OBTAIN CERTAIN REGULATORY APPROVALS AND, AS SUCH, THERE IS NO RELIANCE ON THE INFORMATION CONTAINED HEREIN FOR ANY OTHER PURPOSE.



INDEX MAP



Legend

- Tweed Airport Sections
- Natural Diversity Database Area (June 2024)
- Airport Property Boundary
- Tidegate Alteration Survey Area
- Additional Tidegate Alteration Survey Area (to be completed Spring 2025)
- Rare Plant Survey Area

Rare Plant Locations

- Field paspalum (Paspalum laeve) Point
- Saltpond grass (Leptochloa fusca ssp. fascicularis) Point
- Field paspalum (Paspalum laeve) Line
- Field Paspalum (Paspalum laeve) Area

Land Conversions

- Pavement to Turf
- Pavement to Pavement
- Turf to Pavement
- Wetland to Turf
- Turf to Turf
- Wetland to Pavement

N

1 inch = 600 feet

0 300 600 Feet

NO.	DATE	REVISIONS

Tweed Airport Runway Extension/Terminal Expansion
A2 - Rare Plants Map

Date: March, 2025

BSC GROUP
BUILD | SUPPORT | CONNECT

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THIS MAPPING PRODUCT HAS BEEN CREATED TO COMPLY WITH SUBMITTAL REQUIREMENTS TO OBTAIN CERTAIN REGULATORY APPROVALS AND, AS SUCH, THERE IS NO RELIANCE ON THE INFORMATION CONTAINED HEREIN FOR ANY OTHER PURPOSE.

B. BSC Botanist Resumes

BSC GROUP



Tom Groves

Senior Botanist

YEARS OF EXPERIENCE

11

EDUCATION

Framingham University
B.S. Wildlife Biology (2014)

University of Massachusetts, Lowell
B.A. English Writing (2006)

REGISTRATIONS

Supervisory Pesticide Applicators License

- NH S-2229958

Pesticide Applicators License

- MA #AL-0052105
- VT #1208-4955

CERTIFICATIONS

OSHA 10-Hour Construction Safety and Health

CERP Society of Ecological Restoration

AFFILIATIONS

- New England Botanical Society Field Trip Program Coordinator, 2024 - Present
- New England Botanical Society Member, 2020 – Present
- Native Plant Trust Plant Conservation Volunteer, 2014 – Present

MEET TOM

Tom is an observant botanist dedicated to learning as much as he can about New England's natural habitats, ecosystems, and most importantly, plants. Over the past 10 years, Tom has been privileged enough to spend most of his time in the varied habitats of New England observing the habitats and flora. This natural habitat immersion and dedicated observation time have helped hone his ability to find rare plants and see the small differences in cryptic and often overlooked species. Tom has been providing ecological restoration advice to national wildlife refuges, state biologists, NRCS, and private landowners in Massachusetts, New Hampshire, and Vermont for the past decade.

Prior to BSC, Tom was responsible for planning, managing, and executing 1,400 acres of habitat restoration work annually on behalf of a Vermont-based forestry company. As a Senior Botanist with BSC Group, Tom has been leading rare plant surveys, ecological restoration mitigation strategies, and permitting of ecological projects with clients like National Grid, Eversource, and Bradley International Airport. Additionally, Tom was a BSC team member working with the City of Stamford, CT to map and prepare invasive management strategies to assist the city in meeting ecological restoration goals.

TOM IS A BOTANIST WHO IS FOREVER INTRIGUED BY THE WORLD AROUND HIM, EXCITED BY NATURAL HABITATS, AND OBSERVANT OF ALL THE SPECIAL COMPONENTS OF THE BIODIVERSITY IN NEW ENGLAND.

PROJECT EXPERIENCE HIGHLIGHTS

Eversource, 400/500 Lines Rebuild Project (Zone 5 of the ECT Program), Ledyard and Preston, CT
Senior Botanist

Oversaw the Atlantic White Cedar mitigation portion of this project including fencing, planting, long-term monitoring, reporting, and vegetation management to ensure compliance with Water Quality Certification (WQC) guidelines.

National Grid, Eversource, and Rhode Island Energy Rare Plant Surveys and Mitigation Guidance for Various Utility Projects
Senior Botanist

Perform rare plant surveys for transmission line companies in Vermont, New Hampshire, Massachusetts, Connecticut, and Rhode Island. Plan, identify, map, and report on rare plants as well as invasive populations in priority habitats in these New England states for reporting to Natural Heritage Programs to support utility line projects.

Bradley International Airport (BDL) Taxi Way Expansion Project, Windsor, CT
Senior Botanist

Surveyed, assessed, and reported on the quality of sand barren habitat in project expansion areas. Data was collected, mapped and a habitat restoration plan was prepared to provide the best ecological restoration options for rare species including lepidopterans, plants, and provide ecological recommendations to BDL and Natural Diversity Data Base (NDDB).

New England Power Company A1/B2 ACR Project Vernon, VT
Senior Botanist

Surveyed, collected seed, and provided recommendations to Vermont Agency of Natural Resources on transplanting of impacted rare plant species within the ROW.

Green Mountain National Forest, Mary Beth Deller, Vermont
Invasive Plant Specialist/Botanist

Provide expert recommendations on prioritization of invasive species treatment areas as well as provide appropriately timed treatments and reports.

Parker River & Great Bay National Wildlife Refuge, Nancy Pau, Portsmouth, NH & Newburyport, MA
Invasive Plant Specialist/Botanist

Work with MA Fish and Wildlife to advise, prepare, and execute invasive plant management practices in the NWRs.

E5/F6 Transmission Line Rare Plant Surveys, National Gride, Various Locations in MA
Lead Botanist

Conducted surveys of rare plants within priority habitat on National Grid ROW.

New England Power Company 3315 PIT/Footer Repair Project Monroe/Littleton, NH
Senior Botanist

Provided rare plant survey work for transmission line projects. Observed and reported a new station for *Carex castanea* (S1).

Eversource 1773 PINCO Rare Plant Survey Wethersfield, CT
Senior Botanist

Provided rare plant survey expertise and mitigation strategies for Eversource. Observed and reported new populations of *Carex typhina* within floodplain habitat.

National Grid, Y151 Transmission Line Rare Plants Surveys, Pelham, NH
Senior Botanist

Botanist for survey of rare plants with Marleigh Sullivan within priority habitat along multiple sections of Y151 ROW in Pelham, NH.

EDUCATOR EXPERIENCE

University of New Hampshire Cooperative Extension
Senior Botanist/Educator

Continuing education instructor for extension office on timber stand improvement and integrated pest management strategies.

Antioch University
Senior Botanist/Educator

Instructor for master's degree program on invasive plants and management strategies.

Rhode Island Nursery and Landscape Association
Senior Botanist/Educator

Continuing education instructor for Introduction to Botany and invasive plant management

University of Rhode Island Cooperative Extension
Senior Botanist/Educator

Continuing education instructor for invasive plant identification and invasive plant management.

Reported New Populations of Rare Plants (S1/S2)

- *Doellingeria infirma* – Southington, CT 2024
- *Collinsonia canadensis* –Bennington and Rutland Counties 2022
- *Silene ovata* – Asheville, NC 2021
- *Cypripedium parviflorum var. pubescens* – Cornish, NH 2022
- *Lupinus perennis* – Hudson, NH 2023
- *Viola adunca* – Royalston, MA 2023
- *Carex castanea* – Grafton County, NH 2023
- *Pycnanthemum virginianum* – Charlestown, NH 2023
- *Silene stellata* –Stamford, CT 2023

- *Carex typhina* –Wethersfield, CT 2023
- *Gentianopsis crinita* –Lebanon, NH 2023
- *Hackelia virginiana* –Lebanon, NH 2023
- *Viola lanceolata* –Vernon, VT 2023
- *Polygala polygama* –Vernon, VT 2023
- *Pycnanthemum torrei* – Pelham, NH 2023

New Populations of Uncommon Plants (S3)

- *Celsastrus scandens* – Swanton, VT 2020
- *Spiranthes lucida* – Manchester, VT 2022
- *Dirca palustris* – Arlington, VT 2022
- *Triosteum perfoliatum* – Cullowhee, NC 2022
- *Mimulus alatus* – Stamford, CT 2023

AWARDS

- Native Plant Trust - 2014 Marylee Everett Conservation Fellowship
- The Wildlife Society - 2013 Scholarship Awardee for 2-week long Wildlife Techniques course with Castleton State College and VT Fish & Wildlife
- New England Botanical Society - 2022 Les Mehrhoff Botanical Research Award

TABLE 1. RARE PLANTS

Task/Location	Date(s)	Clients	Description	Target Species (bolded species = those observed during survey)
W149 Transmission Line Rare Plant Surveys Walpole, Charlestown, Claremont, Lebanon, Cornish, Hanover, NH	June – September 2023	National Grid	Botanist for survey of rare plants with Marleigh Sullivan within priority habitat along length of W149 ROW in various New Hampshire towns.	▪ **Licorice goldenrod (*Solidago odora*)** ▪ **Climbing fumitory (*Adlumia fungosa*)** ▪ **Virginia mountain mint (*Pycnanthemum virginianum*)** ▪ **Virginia stickseed (*Hackelia* virginiana)** ▪ **Virginia waterleaf (*Hydrophyllum* virginianum)** ▪ **Fringed gentian (*Gentianopsis crinita*)** ▪ **White bear sedge (*Carex albursina*)**
Y151 Transmission Line Rare Plant Surveys Pelham, NH	June – September 2023	National Grid	Botanist for survey of rare plants with Marleigh Sullivan within priority habitat along multiple sections of Y151 ROW in Pelham, NH.	▪ **Bird's foot violet (*Viola pedata*)** ▪ **Licorice goldenrod (*Solidago odora*)** ▪ **Torrey's mountain mint (*Pycnanthemum torrei*)** ▪ **Clasping milkweed (*Asclepias amplexicaulis*)** ▪ **Red three awn (*Aristida longespica* var. geniculata)** ▪ **Common star-grass (*Hypoxis hirsuta*)** ▪ **Late purple American aster (*Symphyotrichum patens*)** ▪ **Anemone meadowrue (*Thalictrum thalictroides*)** ▪ **Wild lupine (*Lupinus perennis*)** ▪ **Eight flowered six weeks grass (*Vulpia octoflora*)**
A1/B2 Rare Plant Survey, Seed Collection and Transplanting Vernon, VT	September 2023	New England Power	Botanist for survey of ROW for known population of *Bartonia virginica* for population assessment, inventory, and seed collection prior to construction phase of transmission line rebuild project. Also found additional S1/S2 species previously unknown to this location. Transplanting of S1 *Viola lanceolata* has been permitted to take place Fall 2024.	▪ **Virginia screwstem (*Bartonia virginica*)** ▪ **Lance-leaved violet (*Viola lanceolata*)** ▪ **Racemed milkwort (*Polygala polygama*)**
I135/J136 Transmission Line Ashburnham, MA	May 2023	National Grid	Botanist for survey with Matt Hickler of ROW for rare plants in priority habitat along sections of ROW.	▪ **American twinflower (*Linnaea borealis*)** ▪ **Sand violet (*Viola adunca*)** ▪ Bartram's Shadbush *(Amelanchier bartramiana*) ▪ Pod-grass (*Scheuchzeria palustris*)
D21 Transmission Line Fall River, MA	August 2023	National Grid	Botanist for survey with Matt Charpentier (Oxbow Associates) of ROW for rare plants in priority habitat along sections of ROW.	▪ **Stiff yellow flax (*Linum medium* var. *texanum*)** ▪ **Philadelphia panic grass (*Panicum philadelphicum var. philadelphicum*)** ▪ **Long-leaved redtop-panic grass (*Coleataenia longifolia*)** ▪ Weak rush (*Juncus debilis*)

E5/F6 Transmission Line Rare Plant Surveys Shelburne, Conway, Deerfield, Sunderland, Shutesbury, Ware, West Brookfield, and Buckland, MA	July 2023	National Grid	Lead Botanist for surveys of rare plants withing priority habitat on National Grid ROW.	▪ **American bittersweet (*Celastrus scandens*)** ▪ **American ginseng (*Panax quinquefolius*)** ▪ **Musk monkeyflower (*Erythranthe moschata*)** ▪ Nodding chickweed (*Cerastium nutans*) ▪ Fragile rock-brake (*Cryptogramma stelleri*) ▪ Giant St. John's wort (*Hypericum ascyron*) ▪ Mountain alder (*Alnus viridis*) ▪ Pale green orchid (*Platanthera flava* var. *herbiola*) ▪ Appalachian bristle-fern (*Crepidomanes intricatum*) ▪ Climbing fumitory (*Adlumia fungosa*)
3315 Transmission Line Rare Plant Survey Monroe/Littleton, NH	June – September 2023	National Grid	Lead Botanist for surveys of rare plants withing priority habitat on National Grid ROW.	▪ **Chestnut sedge (*Carex castanea*)** ▪ **Brook lobelia (*Lobelia kalmii*)** ▪ American spurred gentian (*Halenia deflexa*) ▪ Fen grass-of-parnassus (*Parnassia glauca*) ▪ Loesel's wide-lipped orchid (*Liparis loeselii*) ▪ Small dropseed (*Sporobolus neglectus*)
Rare Plant & Habitat Surveys Bradley International Airport Windsor Locks, CT	August 2023	Hoyle & Tanner	Lead Botanist for surveys of rare plants and characterization and assessment of sand barren habitat for rare insect species for runway and taxi way expansion areas.	▪ Low frostweed (*Crocanthemum propinquum*) ▪ Davis' sedge (*Carex davisii*) ▪ Sickle-leaved golden-aster (*Pityopsis falcata*) ▪ Host Plant Surveys ▪ **Blueberries (*Vaccinium spp.*)** ▪ **Cherries (*Prunus spp.*)** ▪ **Rose *(Rosaceae spp.*)**
1773 Line ACR/OPGW Rare Plant Survey Wethersfield, CT	August 2023	Eversource	Lead Botanist for surveys of rare plants within priority habitat on Eversource ROW.	▪ **Cattail sedge (*Carex typhina*)**
1820/1830/1620 TTRP Rare Plant Survey Southington, CT	August 2024	Eversource	Lead Botanist for surveys of rare plants within priority habitat on Eversource ROW.	▪ **Appalachian stiff aster (*Doellingeria infirma*)** ▪ **Purple milkweed (*Asclepias purpurascens*)**

TABLE 2. OTHER PLANT VEGETATION SURVEYS/MONITORING

Project/ Location	Dates/Frequency	Client	Task	Description
400/500 Transmission Line Atlantic White	April – October 2023	Eversource	Planting, Fencing Installation and Monitoring	Oversaw selections, planting, fencing, competing vegetation management and monitoring of 1 acre of restoration planting

Cedar Restoration Project Ledyard, CT				of Atlantic White Cedars for mitigation.
Invasive Plant Mapping and Management Plan Stamford, CT	July 2023	City of Stamford, CT	Invasive species mapping and management plan recommendations	Worked with a team of individuals from BSC to strategize, organize and execute invasive species mapping for all CT listed species in 30+ parks city wide.

BSC GROUP



Jonathan
Kuziel

Associate Project Manager
Senior Wetland Scientist

YEARS OF EXPERIENCE

7

EDUCATION

BS Biology & Chemistry Minor, Southern Connecticut State University, 2013

CERTIFICATIONS

- Pesticide Operation
- OSHA 10
- Wetland Delineation Certification
- General Forestry Pest Control
- AIM Certification
- Metro-North Contractor Employee Safety Training and Class C Electrical Training
- Amtrak Contractor Orientation

AFFILIATIONS

- Association of Massachusetts Wetland Scientists - Member
- Massachusetts Association of Conservation Commissions – Member
- Connecticut Power and Energy Society - Member

MEET JONATHAN

Jonathan is a Senior Wetland Scientist with a wide range of experience in botanical science, collaborating with professional scientists, and a particular interest/focus in taxonomy. Jonathan has over seven years of professional experience in plant identification and habitat surveys. A few of his more notable experiences include working at the New York Botanical Gardens (NYBG) as a Research Assistant and conducting vegetation surveys for the Bureau of Land Management (BLM). Jonathan is classically trained in plant taxonomy/systematics and obtained his Assessment Inventory and Monitoring certificate back in 2017 from the BLM.

Specifically, Jonathan has three years of Mitigation experience spanning two hydro-geographic regions (The Alluvial Floodplain of the Connecticut River and the First Bottom Wetlands of the Mississippi Alluvial Valley). Jonathan participated in the wetland mitigation project of a 330-acre Wildlife Sanctuary located in Longmeadow, MA and additionally a 1,200-acre true hydrological restoration of the Avoca Island Mitigation Bank located in Morgan City, LA.

JONATHAN HAS THREE YEARS OF MITIGATION EXPERIENCE SPANNING TWO HYDRO-GEOGRAPHIC REGIONS (THE ALLUVIAL FLOODPLAIN OF THE CONNECTICUT RIVER AND THE FIRST BOTTOM WETLANDS OF THE MISSISSIPPI ALLUVIAL ALLEY).

PROJECT EXPERIENCE HIGHLIGHTS

400/500 Line Rebuild (Atlantic White Cedar Restoration)
Senior Wetland Scientist

Participated in the restoration of an Atlantic White Cedar (AWC) grove. The Atlantic White Cedar wetland groves are considered critical habitat in the state of CT. Therefore, mitigation plans to enhance and enlarge the existing stand were needed to offset the impacts. Gridling and subsequent planting (AWC saplings) are among the mitigation measures implemented. Direct responsibilities included habitat assessment/surveying, As-built mapping. supervising vegetation crews, proper implementation of permit conditions, and restoration monitoring.

V148S Line (ACR) Rare Plant Survey- Lincoln RI
Senior Wetland Scientist

Lead in a rare plant survey for targeted species including the daisy-leaved moonwort (Botrychium matricariifolium), orange fruited horse-gentian (Triosteum aurantiacum) and state listed slender-leaved agalinis (Agalinis tenuifolia).

CT – 32 Vegetation Management Project, Hurd State Park, East Haddam, CT
Senior Wetland Scientist

Assisted in a rare plant survey for targeted species registered on CT's endangered list. Previously known locations were surveyed to approximate existing populations to preserved during vegetation management on 3 acres of existing ROW. Areas identified were flagged in the field and mapped with ArcGIS. The two targeted species included mountain sandwort (Minuartia glabra) and hyssop/helmet skullcap (Scutellaria integrifolia). Also was on site to monitor as BSC Botanist and ensured all NDDB and State Licenses conditions were achieved during tree cutting.

21C1 Distribution line in Montague and Greenfield, MA
Senior Wetland Scientist

Assisted in a rare plant survey in a cross-country ROW designated as priority habitat. Using the NHESP's State-Listed Species Habitat Assessment and Survey Guidelines a slow meander-based field survey was conducted within proposed work limits. Population size, associated habitat, and evidence of past disturbances for each rare plant population were among the required observations. Targeted species included American Bittersweet (Celastrus scandens), Michaux's Sandwort (Minuartia michauxii), and Mountain Alder (Alnus viridis ssp.crispa) were observed.

1773 Line ACR in Wethersfield, CT
Senior Wetland Scientist

Assisted in a rare plant survey for targeted species registered on CT's endangered list. Previously known locations were surveyed to approximate existing populations to preserved during transmission line construction. Areas identified were flagged in the field and mapped with ArcGIS. The two targeted species included northern arrowhead (*Sagittaria cuneata) and cattail sedge (*Carex typhina).

Stanford Invasive Species Survey - Total of 32 Parks Surveyed
Senior Wetland Scientist

Assisted in surveying approximately 32 City Parks in Stanford, Connecticut. This involved conducting a slow, meandering survey in both managed and unmanaged areas. The physiographic regions covered a range from the coastline to inland areas, including habitats such as wetlands, stream banks, and upland forested areas. As part of my role, I also participated in data collection and organization.

WETLAND DELINEATIONS, CT

TRRP CT- 09 Wetland Delineation – Linear Project (Transmission line) ~40 miles, New Milford, Brookfield, Bethel, Danbury, Redding, Southbury, Newtown, CT October 2022
Senior Wetland Scientist

Principal delineator in an edge-to-edge delineation within the Right-of-Way, as defined by the specifications of hydric soils outlined in the CT Inland Wetlands & Water Course Act. Leading the delineations involves employing the ACOE wetland manual methodology to define the boundaries of wetlands entering the Right-Of-Way. Techniques encompass the identification of hydric and non-hydric soils using hand augers and shovels, along with recording dominant vegetation and hydrological indicators. Additionally, the delineation of surface waters, encompassing water bodies, rivers, and streams, entails the application of ACOE Ordinary High Water Mark methodologies.

TRRP CT-26 Wetland Delineation – Linear Project (Transmission line) ~38 miles, Bloomfield, Windsor, South Windsor, East Hartford, Manchester, Hartford January 2023
Senior Wetland Scientist

Principal delineator in an edge-to-edge delineation within the Right-of-Way, as defined by the specifications of hydric soils outlined in the CT Inland Wetlands & Water Course Act.
Leading the delineations involves employing the ACOE wetland manual methodology to define the boundaries of wetlands entering the Right-Of-Way. Techniques encompass the identification of hydric and non-hydric soils using hand augers and shovels, along with recording dominant vegetation and hydrological indicators. Additionally, the delineation of surface waters, encompassing water bodies, rivers, and streams, entails the application of ACOE Ordinary High Water Mark methodologies.

TRRP CT-20 Wetland Delineation – Linear Project (Transmission line) ~35 miles, Ridgefield, Redding, Weston, Wilton, Norwalk, Bridgeport, Trumbull, Stratford, Milford March 2023
Senior Wetland Scientist

Principal delineator in an edge-to-edge delineation within the Right-of-Way, as defined by the specifications of hydric soils outlined in the CT

Inland Wetlands & Water Course Act.
Leading the delineations involves employing the ACOE wetland manual methodology to define the boundaries of wetlands entering the Right-Of-Way. Techniques encompass the identification of hydric and non-hydric soils using hand augers and shovels, along with recording dominant vegetation and hydrological indicators. Additionally, the delineation of surface waters, encompassing water bodies, rivers, and streams, entails the application of ACOE Ordinary High Water Mark methodologies.

1773 Line ACR & OPGW Installation Project Wetland Delineation- Linear Project (Transmission line) ~ 12 miles, Berlin, Rocky Hill, Wethersfield, Hartford December 2023
Senior Wetland Scientist

Principal delineator in delineation within the Right-of-Way, as defined by the specifications of hydric soils outlined in the CT Inland Wetlands & Water Course Act.
Leading the delineations involves employing the ACOE wetland manual methodology to define the boundaries of wetlands entering the Right-Of-Way. Techniques encompass the identification of hydric and non-hydric soils using hand augers and shovels, along with recording dominant vegetation and hydrological indicators. Additionally, the delineation of surface waters, encompassing water bodies, rivers, and streams, entails the application of ACOE Ordinary High Water Mark methodologies.

WETLAND DELINEATIONS, RI

S171/T172 Lighting Mitigation Wetland Delineations- Linear Project (Transmission line) Unknown miles - Warwick, West Warwick, Cranston, Johnston, Smithfield, North Smithfield. November 2023
Senior Wetland Scientist

Principal delineator in an edge-to-edge delineation within the Right-Of-Way. RI refers to the ACOE wetland manual and delineation is conducted accordingly.
Leading the delineations involves employing the ACOE wetland manual methodology to define the boundaries of wetlands entering the Right-Of-Way. Techniques encompass the identification of hydric and non-hydric soils using hand augers and shovels, along with recording dominant vegetation and hydrological indicators. Additionally, the delineation of surface waters, encompassing water bodies, rivers, and streams, entails the application of ACOE Ordinary High Water Mark methodologies.

WETLAND DELINEATIONS, MA

E5/F6 ACR Project Wetland Delineation – Linear Project (Transmission line) Unknown miles - Shelburne, Buckland, Conway, Deerfield, Sunderland, Leverett, Shutesbury, Pelham, Belchertown, Ware, West Brookfield, North Brookfield, East Brookfield, Spencer, Leicester, Auburn, Millbury, January 2024
Senior Wetland Scientist

Principal delineator in an edge-to-edge delineation within the Right-Of-Way. MA defers to their Massachusetts Handbook for delineation of Bordering Vegetated Wetlands.
Leading the delineations involves employing the MA manual for BVW methodology to define the boundaries of wetlands entering the Right-Of-Way. Techniques encompass the identification of hydric and non-hydric soils using hand augers and shovels, along with recording dominant vegetation and hydrological indicators. Additionally, the delineation of surface waters, encompassing water bodies, rivers, and streams, entails the application of the Mean Annual High Water Mark methodologies specific to MA.

PROJECT MANAGEMENT

3557 Line Asset Condition Replacement Project- Eversource (Linear Project) South Windsor, CT
Project Manager/Environmental Construction Monitor

Responsibilities included the preparation of permitting assessment and risk assessment forms for individual projects. I took the lead in wetland delineations and was accountable for obtaining permits for the installation and replacement of the new structure. In addition, I conducted weekly construction compliance inspections to ensure that the work adhered to the requirements of the Orders of Conditions. Tracking work progress during both construction and restoration phases of multiple projects, I also coordinated progress updates and scheduling with clients and subcontractors.

MT Washington Telephone Pole Replacement, Eversource (Linear Project) Washington, MA April 2023
Project Manager/Environmental Construction Monitor

Responsibilities included the preparation of permitting assessment and risk assessment forms for individual projects. I took the lead in wetland delineations and was accountable for obtaining permits for the installation and replacement of the new structure. In addition, I conducted weekly

construction compliance inspections to ensure that the work adhered to the requirements of the Orders of Conditions. Tracking work progress during both construction and restoration phases of multiple projects, I also coordinated progress updates and scheduling with clients and subcontractors.

1635 Line Assess Condition Replacement Project, Eversource (Linear Project), South Windsor, CT August 2023

Project Manager/Environmental Construction Monitor

As a Project Manager and Environmental Construction Monitor, my responsibilities included the preparation of permitting assessment and risk assessment forms for individual projects. I took the lead in the wetland. In addition, I conducted weekly construction compliance inspections to ensure that the work adhered to the requirements of Eversource BMP. Tracking work progress during both construction and restoration phases of multiple projects, I also coordinated progress updates and scheduling with clients and subcontractors.

PRIOR TO BSC, JONATHAN'S PROJECT EXPERIENCE INCLUDES:

Avoca Island, Avoca Island Heritage Bank, Morgan City, LA 2021

Wetland Plant Ecologist

Phase 1 of Avoca Island Mitigation Bank is a 500-acre wetland restoration in the Lower Atchafalaya Basin. Avoca Island plays a vital role in surge protection and storm abatement by buffering powerful storms entering from the Gulf of Mexico. Responsibilities included preliminary assessments, monitoring, construction of the bank, drafting As-Built reports and assisting in writing the Mitigation Banking Instrument (MBI) for Phase 2.

LSU Mitigation Bank, ESP and SLR, St. Gabriel, LA 2020

Wetland Plant Ecologist

LSU Mitigation Bank is a 1,000-acre wetland mitigation project in the Lake Ponchartrain Basin involving a unique collaboration between investors and the University with the intentions to create educational and research opportunities. Responsibilities included implementing and conducting hydrological monitoring, wetland delineations, habitat assessments, and drafting the Prospectus.

Blouin Mitigation Bank, Raceland, LA 2020

Wetland Plant Ecologist

Phase 1 and 2 of the Blouin Mitigation Bank is a 500-acre converted farmland within the Terrebonne Basin. Its unique location in the watershed allows large volumes of agricultural runoff to be retained and filtered before entering local ground water supplies. Phase 1 and 2 construction was completed in the winter of 2021. Responsibilities included vegetation surveys, planting crew operations, drafting As-Built reports and surveying drainage features.

Lowland Mitigation Bank, Lafourche, LA 2020

Wetland Plant Ecologist

Lowland is in the initial stages of becoming a MB. It is over 500-acres of prior converted farmland within the Barataria basin. Preliminary data collection includes hydrological monitoring, habitat assessments and feasibilities, wetland delineations, and drafting Prospectus.

Bayou Thornton Mitigation Bank, St. Francisville, LA 2020

Wetland Plant Ecologist

Bayou Thornton is a 230-acre wet farmland situated between the natural levees of the Mississippi and Atchafalaya Rivers. This MB included re-establishment and enhancement areas of degraded habitat. My involvement came 2 years after post construction and focused on obtaining the success criteria needed for additional credit releases. Responsibilities included completing the First Year Success Monitoring Report and subsequential adaptive management required by ACOE to achieve successful rates. Some tasks included drafting Adaptive Management Report, planting crew operations, florist mapping, and follow up monitoring and reports.

Fannie Stebbins, The Nature Conservancy, Longmeadow, MA 2019

Wetland Plant Ecologist

This project comprised of a 330-acre degraded floodplain adjacent to the Connecticut River. This restoration project included 7 abandoned agricultural fields and their surrounding flood plain forest. Responsibilities included supervising field crews during restoration activities, nursery coordination, creation of conceptual plans, florist mapping and drafting the As-Built Report.

Juniper Point Rd, Branford, CT 2019

Wetland Plant Ecologist

Saltwater marsh restoration involving 5 acres of highly degraded habitat surrounded by developments. This wetland's values and functions were important to the surrounding developments which included runoff detention, filtration, and

storm surge abatement. Responsibilities included invasive plant management, monitoring, and mapping plant communities. Additionally, restoration efforts included operating Low Ground Pressure vehicles, mowing equipment, and delivering chemical controls to fully restore the area to natural condition.

BSC GROUP



Olivia
Sena

Ecologist

YEARS OF EXPERIENCE

2

EDUCATION

BS, Environmental Science
University of Vermont

CERTIFICATIONS

- OSHA 10 Hour
- CGP Site Inspector Certificate
- Metro-North Railroad Contractor

MEET OLIVIA

Olivia is an Ecologist in the Ecological Services Department of BSC's Glastonbury office. She assists with various natural resource assessments such as wetland delineations, vernal pool surveys, invasive and rare plant surveys, and acoustic bat surveys. In addition, she performs construction monitoring and assists with project reporting and permitting.

OLIVIA ASSISTS WITH VARIOUS NATURAL RESOURCE ASSESSMENTS SUCH AS WETLAND DELINEATIONS, VERNAL POOL SURVEYS, INVASIVE AND RARE PLANT SURVEYS, AND ACOUSTIC BAT SURVEYS.

PROJECT EXPERIENCE HIGHLIGHTS

National Grid, E5F6 Transmission Line Wetland Delineation, Western-Central MA
Field Assistant/GPS
Responsible for accurate mapping of wetland delineation boundaries on Trimble GPS unit throughout entire Right-of-Way corridor in accordance with Massachusetts WPA standards.

Eversource, 1773 Line Wetland Delineation, Berlin, Rocky Hill, Wethersfield CT
Field Assistant/GPS
Responsible for accurate mapping of wetland delineation boundaries on Trimble GPS unit for 12-mile Right-of-Way corridor in accordance with USACE standards.

City of Stamford, Invasive Species Survey, Stamford CT
Field Staff
Assisted with 10-day effort to identify and map invasive plant species populations across 38 city parks totaling 448 acres.

National Grid, E131 Transmission Line Acoustic Bat Survey, Western MA, and Southern VT
Field Staff
Carried out installation, maintenance, and retrieval of acoustic bat monitors along approximately 10 miles of the E131 Transmission Line.

Eversource, CT-26 Vernal Pool Evaluation, Bloomfield, South Windsor, Manchester CT
Field Assistant/GPS

Responsible for accurate mapping of vernal pool boundaries on Arrow GPS unit and assessment of biological and hydrological features including identification of vernal pool indicator species.

National Grid, E205E/W Line Rare Plant Survey, Rowe, and Greenfield MA
Field Assistant/GPS

Assisted with accurate identification and mapping of rare plant populations on Arrow GPS unit. Work was performed at two structures and their associated access along a 200 ft wide transmission line corridor.

Eversource, East Road Reconductor Project, Richmond MA
Environmental Compliance Monitor

Responsible for weekly construction compliance inspections over a three-month period to ensure pole replacement and reconductoring work was performed in accordance with Eversource Best Management Practices and the Order of Conditions issued by the Conservation Commission.

PRIOR TO JOINING BSC, OLIVIA CONTRIBUTED TO THE FOLLOWING PROJECTS:

GLORIA Yellowstone Survey, Betty Ford Alpine Gardens and Colorado Natural Heritage Program, WY
Conservation Intern

Assisted with a week-long backcountry sampling effort for Yellowstone's Global Observation Research Initiative in Alpine Environments (GLORIA) site. Followed detailed survey protocol to identify plant species richness, cover, and dominance along an elevational gradient.

VHB, South Burlington, VT
Environmental Science Intern

Assisted with wetland delineations, invasive species population monitoring, and wildlife habitat surveys throughout Vermont for a variety of clients in the energy and transportation sectors.

C. Plant Species Inventory

Non-Native Species

Scientific Name	Common Name
Aira praecox	early hair grass
Amorpha fruticosa	false indigo bush
Anthoxanthum odoratum	sweet vernal grass
Bromus commutatus	meadow brome
Centaurea jacea	brown knapweed
Centaurea stoebe	spotted knapweed
Cirsium arvense	creeping thistle
Cirsium vulgare	common thistle
Convolvulus arvensis	field bindweed
Digitaria ischaemum	smooth crabgrass
Cyperus brevifolius	shortleaf spikesedge
Festuca myuros	rattail sixweeks grass
Froelichia gracilis	slender snakecotton
Holcus lanatus	velvet grass
Hypericum perforatum	common St. John's wort
Hypochaeris radicata	common cat's ear
Kummerowia striata	Japanese clover
Leontodon saxatilis	hairy hawkbit
Leucanthemum vulgare	oxeye daisy
Lolium prenne	perennial ryegrass
Lotus tenuis	narrow-leaf bird's-foot trefoil
Melilotus officinalis	yellow sweet clover
Myosostis stricta	blue forget-me-not
Phragmites australis	common reed
Pilosella caespitosa	meadow hawkweed
Pilosella officinarum	mouse-eared hawkweed
Pilosella piloselloides	smooth hawkweed
Plantago arenaria	branched plantain
Plantago lanceolata	ribwort plantain
Potentilla argentea	silvery cinquefoil
Potentilla recta	sulphur cinquefoil
Puccinellia distans	European alkali grass
Pyrus calleryana	Callery pear
Ranunculus acris	meadow buttercup
Rubus laciniatus	cutleaf blackberry
Schoenoplectiella mucronate	bog bulrush
Scleranthus annuus	annual knawel
Scorzoneroides autumnalis	autumn hawkbit
Securigera varia	purple crownvetch
Sedum sarmentosum	stringy stonecrop
Senecio vulgaris	common groundsel
Spergularia rubra	red sand spurrey
Stellaria graminea	lesser stichwort
Trifolium campestre	hop trefoil
Vicia tetrasperma	smooth tare
Vincetoxicum rossicum	European swallow-wort

Native Species

Scientific Name	Common name
Acalypha rhomboidea	common copperleaf
Ambrosia trifida	giant ragweed
Andropogon virginicus	broomsedge bluestem
Aristida oligantha	oldfield three-awn
Atriplex prostrata	fat-hen
Baccharis halimifolia	eastern false willow
Betula populifolia	gray birch
Bidens cernua	nodding beggarticks
Carex annectens	yellow-fruited sedge
Carex blanda	eastern woodland sedge
Carex comosa	bristly sedge
Carex debilis	white-edge sedge
Carex granularis	limestone meadow sedge
Carex intumescens	bladder sedge
Carex longii	green and white sedge
Carex pellita	woolly sedge
Carex scoparia	pointed broom sedge
Carex stricta	tussock sedge
Carex swanii	Swan's sedge
Chamaecrista nictitans	sensitive pea
Chamaecrista fasciculata	partridge pea
Clethera alnifolia	sweet pepperbush
Cyperus erythrorhizos	redroot flatsedge
Cyperus esculentus	yellow nutsedge
Cyperus strigosus	straw-colored flatsedge
Desmodium species	tick-trefoil
Dichanthelium clandestinum	deertongue
Dichanthelium dichotomiflorum	smooth witchgrass
Dichanthelium microcarpon	small fruited witchgrass
Distichlis spicata	saltgrass
Echinochloa muricata	rough barnyard grass
Eleocharis obtusa	blunt spikerush
Erigeron annuus	annual fleabane
Elymus virginicus	Virginia wild-rye
Eupatorium pilosum	rough boneset
Euthamia graminifolia	flat-topped goldenrod
Galium palustre	common marsh-bedstraw
Helianthus giganteus	giant sunflower
Hibiscus moscheutos	swamp rose mallow
Hypericum gentianoides	pineweed
Hypericum prolificum	shrubby St. John's wort
Ilex verticillata	winterberry holly
Juncus acuminatus	tapered rush
Juncus gerardi	saltmeadow rush
Juncus tenuis	slender path rush
Juniperus virginiana	eastern redcedar
Leersia oryzoides	rice cutgrass
Lepidium virginicum	Virginia pepperweed
Lespedeza capitata	round-headed bush-clover
Limonium carolinianum	Carolina sea-lavender
Lindernia dubia var. *anagallidea*	slender false pimpernel
Ludwigia alternifolia	seedbox
Mikania scandens	climbing hempvine
Morella pensylvanica	Northern bayberry

Scientific Name	Common name
Muhlenbergia schreberi	nimblewill
Nuttallanthus canadensis	blue toadflax
Panicum virgatum	switchgrass
Paspalum laeve var. *circulare*	field paspalum
*Paspalum pubiflorum**	four-rowed bead grass
Paspalum setaceum var. *muhlenbergii*	slender bead grass
Penstemon digitalis	foxglove beardtongue
Persicaria species	smartweed
Pilea fontana	springs clearweed
Plantago aristata	bracted plantain
Plantago lanceolata	ribwort plantain
Ranunculus sceleratus	cursed crowfoot
Rhus copallinum	shining sumac
Rosa virginiana	Virginian rose
Rubus flagellaris	common dewberry
Sagittaria species	arrowhead species
Salicornia depressa	Virginia glasswort
Schizachyrium scoparium	little bluestem
Schoenoplectus tabernaemontani	soft-stemmed bulrush
Scirpus pendulus	nodding bulrush
Silene antirrhina	sleepy catchfly
Sisyrinchium angustifolium	narrow-leaved blue-eyed grass
Smilax glauca	sawbrier
Solidago nemoralis	field goldenrod
Solidago sempervirens	Northern seaside goldenrod
Sorghastrum nutans	indian grass
Spergularia marina	saltmarsh sand spurry
Sporobolus alterniflorus	saltmarsh cordgrass
Sporobolus michauxianus	prairie cordgrass
Sporobolus pumilus	marsh hay cordgrass
Sporobolus vaginiflorus	poverty dropseed
Strophostyles helvola	trailing fuzzy-bean
Suaeda calceoliformis	horned seablite
Symphyotrichum patens	late purple aster
Symphyotrichum pilosum	hairy white oldfield aster
Symphyotrichum racemosum	small white aster
Symphyotrichum subulatum	annual saltmarsh aster
Symphyotrichum tenuifolium	perennial saltmarsh aster
Toxicodendron radicans	easter poison ivy
Tradescantia ohiensis	Ohio spiderwort
Utricularia gibba	humped bladderwort
Verbena hastata	blue vervain
Viburnum dentatum	smooth arrowwood
Viola lanceolata	white bog violet

D. Survey Photos

BSC GROUP



Photo 1: Typical airfield vegetative community and habitat during the June 2024 survey window.



Photo 2: Tweed Airport fulfilled BSC's request to stop mowing three weeks in advance of each survey time period. During the June surveys the height of the vegetation was upwards of 24" tall.



Photo 3: Two of the four congener species observed for target species *Krigia biflora* (two-flowered cynthia). On the left *Pilosella caespitosa* (meadow hawkweed) and on the right *Pilosella officinarum* (mouse-eared hawkweed).



Photo 4: Other congener species for two-flowered cynthia included on the right *Hypochaeris radicata* (common cat's-ear) and on the left, *Pilosella piloselloides* (smooth hawkweed).

BSC GROUP



Photo 5: Congener species for hoary plantain, ribwort plantain (*Plantago lanceolata)*, has wide smooth leaves. This non-native species was dominant throughout the survey areas.



Photo 6: An additional congener species for hoary plantain observed during the Tweed Airport surveys, bracted plantain (*Plantago aristata*) was ruled out as the target species by the narrow, lanceolate leaves.

BSC GROUP



Photo 7: The southern Runway Extension Area (Tweed Airport Section 6) during the June 2024 survey. This area is dominated by non-native species, primarily species of clover *(Trifolium*).



Photo 8: A congener for target species *Cirsium horridulum* (yellow thistle), *Cirsium arvense* (creeping thistle) primarily observed along the southern portions of the southern Runway Extension area (Tweed Airport Section 6).



Photo 9: The area of highest plant diversity was observed within the Terminal Expansion Area (Tweed Airport Sections 11 – 14). This photo (Tweed Airport Section 13) depicts a high-density area of both the typical blue *Sisyrinchium angustifolium* (narrow-leaved blue-eyed grass) as well as a population of the white form. Additional species observed were *Juncus tenuis* (slender path rush), *Carex longii* (green and white sedge), and *Viola lanceolata* (white bog violet). Species only observed in Tweed Airport Section 11 were *Carex granularis* (limestone meadow sedge) and *Scirpus pendulus* (nodding bulrush).



Photo 10: Field paspalum (*Paspalum laeve* var. *circulare*) observed over much of the Tweed Airport property during the September 2024 survey.

BSC GROUP



Photo 11: Congener species for field paspalum, slender bead grass (*Paspalum setaceum* var. *mulhenbergii*) was infrequent when observed, but was observed intermixed with target species populations.



Photo 12: The Terminal Expansion Area (Tweed Airport Section 11). Areas to the southwest of the pavement where 500 – 600 individual plants of field paspalum occurs and where Turf to Pavement (TTP) land conversion is proposed.

BSC GROUP



Photo 13: This single occurrence of *Paspalum pubiflorum* var. *glabrum* was observed in a Turf to Turf (TTT) conversion section of Tweed Airport Section 18. This is a species not recognized in the New England flora, but herbarium records indicate another observation of this species in 1967 at the Pine Hills Field Station in Simsbury, CT.



Photo 14: Tweed Airport Section 18 - shown here is an example of a Turf to Turf (TTT) land conversion area. In this unit, a clear line between previously seeded areas and areas that revegetated naturally were observed in multiple locations in addition to this section. Areas where a re-seeding protocol was not followed or the seeding attempt failed, had very high-density populations of field paspalum. In this photo, brown area to the left is high-density field paspalum and green area to the right was successfully hydroseeded with other species of plant seed.



Photo 15: Similar to Photo 13, this is the northeast edge of Tweed Airport Section 15. A similar example of seeding with non-native plant seeds and an area where the existing seed bank germinated into high density field paspalum.



Photo 16: *Leptochloa fusca* var. *fasciculata* pictured here, was observed in two locations within the Tweed Airport property.



Photo 17: The first population of saltpond grass was observed at the end of an old "dump" road adjacent to the airfield. In the background of this photo and a threat to the population is Japanese knotweed (*Reytournia japonica*) and mugwort *(Artemesia spp.).* White pin flags indicate individual plants.



Photo 18: Another photo of the dump road showing bare, sandy ground with encroaching invasive species in the background.

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Photo 19: Tide Gate Alteration Area PP1 – common reed is in high density in this area.



Photo 20: Tide Gate Alteration Area PP2 – common reed is in high density in this area.



Photo 21: Tide Gate Alteration Area PP3 – common reed is in high density in this area with the occasional upland that has a more native vegetative mix.



Photo 22: Tide Gate Alteration Area PP4 – occasionally observed was a pocket with lower density common reed and more native species represented.



Photo 23: Tide Gate Alteration Area PP5 – where common reed wasn't the dominant vegetation, saltmarsh cordgrass was observed to be the dominant vegetation. These were often areas already experiencing more frequent inundation from tidal fluctuations.



Photo 24: Tide Gate Alteration Area PP6 – common reed is in high density in this area, but similar to Photo 24, saltmarsh cordgrass was occasionally found in high-density pockets where water levels were intermittently higher.



Photo 25: Tide Gate Alteration Area PP7 – one of the smaller survey areas, this section was primarily dominated by common reed but also autumn olive and multiflora rose.

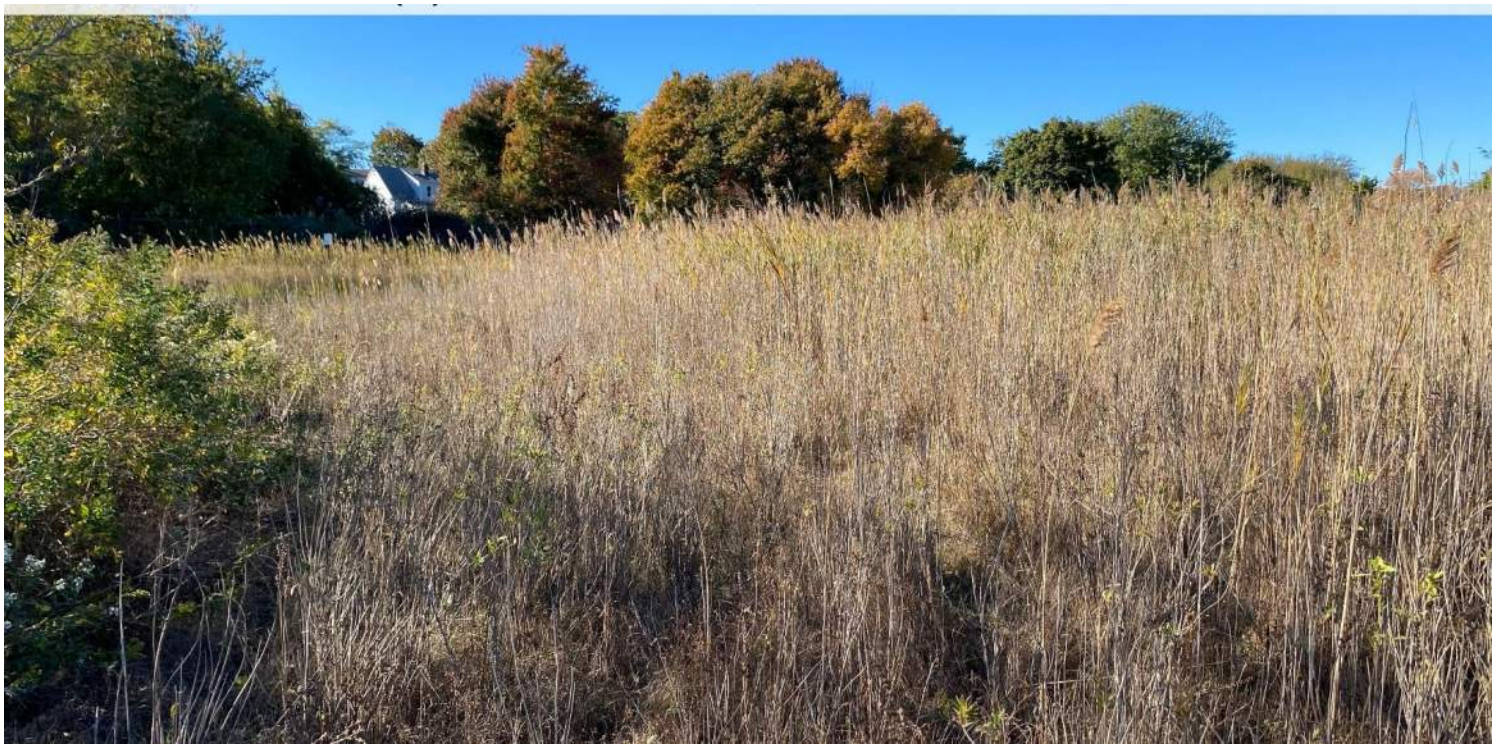

Photo 26: Tide Gate Alteration Area PP8 – plant species in this area were indicative of tide marsh vegetation. Native species present in this location were saltgrass (*Distichlis spicata*), perennial and annual saltmarsh asters (*Symphotrichum tenuifolium* and *S. subulatum*), horned seablight *(Suaeda calceoliformis*) and Virginia glasswort (*Salicornia depressa*)



Photo 27: Tide Gate Alteration Area PP9 – this location was the closest survey area to the actual tide gate. In this location vegetation was either dominated by common reed or saltmarsh cordgrass.



Photo 28: Tide Gate Alteration Area PP10 – this area was primarily on the western side of Morris Creek. Only small portions of this area were not dominated by common reed. This photo shows an area dominated by common reed with a patch of saltmarsh cordgrass in the center.



Photo 29: Tide Gate Alteration Area PP11 – common reed dominated this survey location with little to no other plant species present even along open edges of the survey location.



Photo 30: Tide Gate Alteration Area PP12 – the majority of the marsh was dominated by common reed with an occasional upland island that was dominated by native species such as white oak (*Quercus alba)* and sweet pepperbush (*Clethera alnifolia*).

BSC GROUP



Photo 31: Tide Gate Alteration Area PP13 – this area southwest of Pig Farm Rd. was also dominated by common reed with the occasional open area dominated by saltmarsh cordgrass.



Photo 32: Tide Gate Alteration Area PP14 – wetlands in this area were dominated by common reed but the adjacent upland habitat had stands of black gum (*Nyssa sylvatica*) as seen here.



Photo 33: Tide Gate Alteration Area PP15 – typical through much of the Tide Gate Alteration survey areas was common reed 12 – 15 feet tall and extremely dense.



Photo 34: Tide Gate Alteration Area PP16 – the southern edge of this area along Uriah St., was dominated by invasive species such as multiflora rose and common reed. Occasionally, observed were patches of saltmarsh cordgrass but few other native species.



Photo 35: Tide Gate Alteration Area PP17 – An observation of a non-native species with few other historic New England observations. Bog bulrush (*Schoenoplectiella mucronata*) is a plant species native to Eurasia, Africa and Australia with the closest recent observations on Long Island, NY.

E. Rare Plant Reporting Forms

OFFICE USE ONLY		EO#:
SNAME:	SITE:	SURVEY DATE:
	TOWN:	ENTERED BY:

■ New record
■ Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above or email to deep.nddbrequest@ct.gov

***SPECIES SCIENTIFIC NAME:** Paspalum laeve var. circulare **Element Occurrence (EO) #** (if known)**:**

REPORTER INFORMATION	
Name(s): Tom Groves, Senior Botanist BSC Group & Jon Kuziel, Botanist BSC Group	
Address: 150 Dow St. Manchester, NH 03101	Telephone No: 978-888-3718
	E-mail address: tgroves@bscgroup.com

SURVEY/SITE INFORMATION	
Site Name: Tweed Airport	Survey Date(s): September 23 - 26, 2024
Town(s): New Haven, CT	County: New Haven

Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found).

Parking is at 20 Thompson Ave. New Haven, CT. Access to the site will have to be coordinated with Tweed Airport staff.

GPS Coordinates		**Method Used to Determine Coordinates:**	
Latitude Various	N	■ GPS Unit	GPS Make/Model: Arrow Gold
Longitude: Various	W	☐ Mapping Software	Software:
Coordinate system (NAD83 preferred):		☐ Online Maps	Online site:

POPULATION DATA

Population Size	
Actual No. Observed	
Estimated No./Range	44,000 - 88,000

What was counted?
(e.g. stems, clumps, floating masses, etc.)
clumps

Population Area	
Length (units)	
Width (units)	
Area (units)	~200 acres

Evidence of disease, predation or injury? ☐ Yes ☐ No Explain:

Phenology			
	% In leaf		% Mature fruit
	% In flower bud		% Seed dispersing
	% In flower		% Dormant
100	% Immature fruit		% Senescent

Age Structure	
	% Seedlings
	% Immature
100	% Mature (established)
	% Senescent
☐	Age structure unknown

Vigor
☐ Very feeble
☐ Feeble
■ Normal
■ Vigorous
☐ Exceptionally vigorous

Comments on above:

The population of Paspalum laeve var. circulare is spread across the airfield in varying densities. The highest densities are north and west of the Operations Building. Coordinates for the Operations Building are (41.265536, -72.884939)

HABITAT

Aspect		Slope	Light	Topographic Position	Moisture
☐ N	☐ NE	■ 0-3%	■ Open	☐ Crest	☐ Permanently Inundated
☐ E	☐ NW	☐ 3-8%	☐ Partial	☐ Upper Slope	☐ Seasonally Inundated/Exposed
☐ S	☐ SE	☐ 8-15%	☐ Filtered	☐ Mid-Slope	☐ Tidally Inundated/Exposed
☐ W	☐ SW	☐ 15-35%	☐ Shade	☐ Lower-Slope	☐ Saturated (Hydric)
■ Flat		☐ 35% - vertical		■ Bottom	☐ Moist (Mesic)
	º re true N	Measured (º or %):		Other:	■ Dry-Mesic
	º re mag N	Horizontal shape (as for next item):			■ Dry-Xeric
		Vertical shape (ie. Convex, concave, straight, variable):			Other:

Elevation: 3 to 15 ■ feet ☐ meters

Soil/substrate name/description(give source): Udorthents-Urban land complex (CT.gov)

Estimated # of acres of potential habitat in the immediate area: ~200 acres

Evidence of disturbance: ☐ fire ☐ logging ☐ disease ☐ insect damage ☐ windthrow ☐ invasives

Comments: There is evidence that hydroseeding with non-native species post-disturbance at the airport is decreasing the population of this species. Invasive species are also present.

Associated natural/plant communities:

Grassland/sand plain species

Associated plant species (separated strata, e.g. tree, shrub, herb layers):

Paspalum setaceum var. muhlenbergii, Chamaecrista nictitans, Chamaecrista fasciculata, Sorghastrum nutans, Silene antirrhina, Lespedeza capitata

IDENTIFICATION

Photograph taken?	■ Yes	☐ No	Photo ID:	
Specimen taken*	☐ Yes	■ No	If yes, provide:	Collector: Repository: Collection #:
Identification problems?	☐ Yes	■ No	Explain:	

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: Tweed Airport/Town of New Haven

Owner aware of EO? ■ Yes ☐ No ☐ Unknown Owner protecting EO? ☐ Yes ☐ No ☐ Unknown

Threats to EO:	Reseeding protocols with non-native seed and non-native invasive species
Conservation/ management needs:	Refer to Report
Research needs:	Refer to Report

SUPPORTING DOCUMENTS (please attach)

■ Sketch map (showing finer detail than topo or aerial photo)
■ Aerial photo map
☐ Topographic map, or street or parcel map
☐ Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
■ Photos ■ GPS/GIS data ☐ Field notes ☐ Route of survey map

OFFICE USE ONLY		EO#:
SNAME:	SITE:	SURVEY DATE:
	TOWN:	ENTERED BY:

■ New record
■ Update

RARE PLANT SURVEY FORM

Natural Diversity Data Base
Connecticut Department of Environmental Protection
79 Elm Street, 6th Floor
Hartford, CT 06106-5127

Please complete this form to the best of your ability.
Submit survey forms, maps, and all supporting documents to the address above or email to deep.nddbrequest@ct.gov

***SPECIES SCIENTIFIC NAME:** Leptochloa fusca var. fasiciculata **Element Occurrence (EO) #** (if known)**:**

REPORTER INFORMATION	
Name(s): Tom Groves, Senior Botanist BSC Group & Jon Kuziel, Botanist BSC Group	
Address: 150 Dow St. Manchester, NH 03101	Telephone No: 978-888-3718
	E-mail address: tgroves@bscgroup.com

SURVEY/SITE INFORMATION	
Site Name: Tweed Airport	Survey Date(s): September 23 - 26, 2024 and October 16 - 17, 2024
Town(s): New Haven, CT	County: New Haven

Directions to plant population, including best parking and access points. Please attach a map with boundaries drawn around observed plant populations (or surveyed area if plants not found).

Parking is at 20 Thompson Ave. New Haven, CT. Access to the site will have to be coordinated with Tweed Airport staff. Coordinates below are for the center of the subpopulations.

Subpopulation 1: 41.265070, -72.884426
Subpopulation 2: 41.260906, -72.885628

GPS Coordinates		**Method Used to Determine Coordinates:**	
Latitude Refer to Coordinates Above	N	■ GPS Unit	GPS Make/Model: Arrow Gold
Longitude: Refer to Coordinates Above	W	☐ Mapping Software	Software:
Coordinate system (NAD83 preferred): WGS84		☐ Online Maps	Online site:

POPULATION DATA

Population Size	
Actual No. Observed	
Estimated No./Range	80 - 122

What was counted?
(e.g. stems, clumps, floating masses, etc.)
clumps

Population Area	
Length (units)	
Width (units)	
Area (units)	1,179 sq ft

Evidence of disease, predation or injury? ☐ Yes ☐ No Explain:

Phenology			
	% In leaf		% Mature fruit
	% In flower bud		% Seed dispersing
	% In flower		% Dormant
100	% Immature fruit		% Senescent

Age Structure	
	% Seedlings
	% Immature
100	% Mature (established)
	% Senescent
☐	Age structure unknown

Vigor
☐ Very feeble
☐ Feeble
■ Normal
☐ Vigorous
☐ Exceptionally vigorous

Comments on above:

HABITAT

Aspect		Slope	Light	Topographic Position	Moisture
☐ N	☐ NE	■ 0-3%	■ Open	☐ Crest	☐ Permanently Inundated
☐ E	☐ NW	☐ 3-8%	☐ Partial	☐ Upper Slope	☐ Seasonally Inundated/Exposed
☐ S	☐ SE	☐ 8-15%	☐ Filtered	☐ Mid-Slope	☐ Tidally Inundated/Exposed
☐ W	☐ SW	☐ 15-35%	☐ Shade	☐ Lower-Slope	☐ Saturated (Hydric)
■ Flat		☐ 35% - vertical		■ Bottom	☐ Moist (Mesic)
	º re true N	Measured (º or %):		Other:	☐ Dry-Mesic
	º re mag N	Horizontal shape (as for next item):			■ Dry-Xeric
		Vertical shape (ie. Convex, concave, straight, variable):			Other:

Elevation: 6 to 11 ■ feet ☐ meters

Soil/substrate name/description(give source): Udorthents-Urban land complex (CT.gov)

Estimated # of acres of potential habitat in the immediate area: 2 - 5

Evidence of disturbance: ☐ fire ☐ logging ☐ disease ☐ insect damage ☐ windthrow ■ invasives

Comments: Subpop 1 is within the parking area for airport maintenance vehicles and experiencing repeated disturbance. Subpop 2 is close to infestations of mugwort, knotweed and

Associated natural/plant communities:

Disturbed areas of marshes, sand flats, construction sites, ditches and gravel roadsides

Associated plant species (separated strata, e.g. tree, shrub, herb layers):

Echinochloa species, Symphyotrichum pilosum, Andropogon virginicus,

IDENTIFICATION

Photograph taken?	■ Yes	☐ No	Photo ID:	
Specimen taken*	☐ Yes	■ No	If yes, provide:	Collector: Repository: Collection #:
Identification problems?	☐ Yes	■ No	Explain:	

*DEP Scientific Collection Permit is needed to collect specimens

CONSERVATION

Owner info: Tweed Airport/Town of New Haven

Owner aware of EO? ■ Yes ☐ No ☐ Unknown Owner protecting EO? ☐ Yes ☐ No ☐ Unknown

Threats to EO:	Invasive species are currently encroaching on the available habitat primarily mugwort and Japanese knotweed.
Conservation/ management needs:	Refer to Report
Research needs:	Refer to Report

SUPPORTING DOCUMENTS (please attach)

■ Sketch map (showing finer detail than topo or aerial photo)
■ Aerial photo map
☐ Topographic map, or street or parcel map
☐ Cross section of topography/habitat (include scale, direction, element position, description, and sub-occurrence ID[s], if needed)
■ Photos ■ GPS/GIS data ☐ Field notes ☐ Route of survey map

F. NDDB Responses

May 17, 2024

Deb Coon
Hoyle, Tanner and Associates
150 Dow Street
Manchester, NH 03101

NDDB Request Additional Information
Project: Tweed New Haven Airport Runway Extension and Terminal Expansion
Filing ID 107828

Dear Ms. Coon,

As described in the NDDB review application, this project will involve the rehabilitation and extension of Runway 2-20, and the construction of a new east side passenger terminal and associated runways, parking lots, aprons and taxiways.

The following species have been documented within the vicinity of the work to be conducted:

Plants

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  - Habitat: Coastal grasslands; airports; open-canopy trailsides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  - Blooms June – July.
- Saltpond grass (*Leptochloa fusca ssp. fascicularis*) – State Endangered
  - Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  - Blooms and fruits August – November.
- Field paspalum (*Paspalum laeve*) – State Threatened
  - Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial Grassland/Outcrop; Grassland Subtype: Coastal Grassland.
  - Fruits August – October.
- Two-flowered Cynthia (*Krigia biflora*) – State Threatened
  - Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.

    - Blooms Jun.
- Hoary plantain (*Plantago virginica*) – State Special Concern
    - Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidc Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest.
    - Blooms/fruits May – June. Spring and early summer ephemeral, typically disappearing by late June.

State listed plant species surveys of the site should be performed by a qualified botanist or plant ecologist when these target plant species are identifiable. You may want your botanist to contact the NDDB program directly for more information regarding known plant locations. The report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs, and photographs of any state listed plant species found.
3. Descriptions of the identifying characters of the target listed species.
4. List of component species within the survey area (including scientific binomials).
5. Data regarding population numbers and/or area occupied by state listed plant species.
6. Detailed maps of the area surveyed including the survey route and locations of state listed species.
7. Habitat descriptions of the area surveyed.
8. Survey results and all observed state listed plant species must reported to the NDDB Program using an NDDB form at: https://portal.ct.gov/DEEP/Endangered-Species/Contributing-Data
9. If state listed plants are found within the project area or immediately adjacent to the project area, the report should include a conservation/protection plan with the following elements:
    a. Anticipated impacts to these state-listed species from this project.
    b. Any planned mitigation or management practices that will be employed to protect, avoid, and/or mitigate impacts to state listed plant species.
10. A Statement, CV or Resume of the botanist's or plant ecologist's qualifications to work with these species. Please ensure that your botanist or plant ecologist holds appropriate scientific collector's permit for this work.

Grassland Birds

- Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
- Horned lark (*Eremophila alpestris*) – State Endangered
- Eastern meadowlark (*Sturnella magna*) – State Threatened
- Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
- Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern

The Project is expected to impact 5.6 acres of grassland habitat.

NDDB received an application to review this project in 2022 (NDDB Preliminary Assessment 202201593). Our preliminary assessment letter included information for the above-referenced grassland bird species, including general recommendations for managing grassland birds at airports and noted that field surveys are

recommended. The preliminary assessment also instructed that the airport should comply with any pre-existing mitigation plans prepared to protect grassland birds on the property. NDDB did not receive any communication in response to the Preliminary Assessment and closed that review on March 3, 2023.

NDDB was provided a copy of the *Grassland Bird Habitat Conceptual Plan*, dated April 8, 2024; this document was prepared to address prior permitting requirements for grassland habitat within the airport boundary, document existing grassland habitat, and to propose a study of bird use and functionality of existing grassland habitat at the airport. Through review of this plan, NDDB concluded that changes to conditions outlined in the original 2008 *Grassland Management Plan* had been made in 2009 and 2011; specifically, beginning in 2009, the mowing regime agreed to in that plan was no longer being followed. NDDB provided comments responsive to this *Grassland Bird Habitat Conceptual Plan* via email on April 25, 2024.

Following the meeting between DEEP staff and Tweed-New Haven Airport representatives on April 29th, 2024, it was made clear that there is no remaining suitable grassland habitat on the property due to the mowing regime adopted in 2009. NDDB has been informed that the changes were implemented in response to airport hazard assessment and are not likely to be revised.

The *Grassland Bird Habitat Conceptual Plan* proposes to conduct grassland bird survey studies in order to understand grassland habitat conditions and use of the property. As NDDB has indicated via email comments and during subsequent meetings, NDDB welcomes this survey work as a valuable source of information, and we concur with the survey protocols proposed. However, survey work and information gathering alone does not constitute mitigation for loss of habitat resulting from project activities.

We have included the protection measures here as a reference in the event that it is deemed possible to allow habitat to regenerate on the property in the future. Barring that, these guidelines can be used as a starting point in the development of an off-site mitigation plan, as it seems unlikely that negative impacts to listed grassland bird species neither have been nor will be able to be minimized on the airport property. Since impacts to grassland birds have already been committed and earlier plan mowing regimes are not able to be implemented, **off-site mitigation should be pursued**.

Grassland Bird Protection Measures

The horned lark, grasshopper sparrow, Savannah sparrow, bobolink and eastern meadowlark are considered to be grassland-obligate birds. They require open fields to breed, nest and forage in. Habitats preferred by these species include large grasslands, agricultural fields, and airports. The breeding season for these birds is approximately from late April through August. It is during this period that they are most susceptible to disturbances in their feeding and nesting habitat.

To avoid impact to these species:

- Land disturbance activities including digging, ground clearing, heavy machinery driving staging, or ground trampling that will occur more than 100 feet into a grassland parcel or cut across parcels of grassland in a way that fragments grassland habitat patches should be done when grassland birds are not breeding. Breeding primarily takes place between April 15- August 15.
- Conducting land disturbance activities outside of the breeding season will avoid impact to the individuals.
- **Conduct project work between August 16- April 14.**

- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species including:
  - Little bluestem (*Schizachyrium scoparium*)- "Aldous" or "Cimarron"
  - Big bluestem (*Andropogon gerardii*)- "Niagra"
  - Indiangrass (*Sorghastrum nutans*) - "Rumsey"
  - Switchgrass (*Panicum virgatum*) - "Blackwell", "Shelter", or "Cave in Rock"
  - Bermudagrass (*Cynodon dactylon*) - "Quickstand"
- Seed mix ratios are variable, however for Connecticut a minimum of 60% little bluestem is preferred. Big bluestem is an acceptable alternative to little bluestem for the dominant species in the chosen mix. When one of the bluestems is the dominant species the other grass species listed may be mixed in any ratio desired. Of these species, Bermudagrass is the least favored and should be used in the lowest percentage.

If work cannot occur between months of August 16-April 14:

- The proposed construction staging area and associated vehicles and equipment should be restricted to existing paved areas as much as possible.
- Beginning April 1- through duration of project: All grassy areas within a 50-foot buffer of planned work remain continuously mowed as short as possible to avoid attracting nesting birds into work zones.
- If vehicle access is required to cross grassy areas outside of work zones, designated paths and areas should be marked and kept mowed beginning April 1. Do not drive outside of designated work areas into grassy habitat, nesting birds will be crushed.
- Identify locations on the property where grassland habitat will remain un-mowed between April 15 - August 30 to mitigate for lost habitat during construction. These areas must provide adequate conditions for upland grassland habitat. Provide a map detailing these grassland mitigation areas to Robin Blum (robin.blum@ct.gov).
- Any upland grassed areas that may be disturbed during the course of the project, should be reseeded using an FAA-approved mix of warm season grass species as described above.

Your request has been assigned the following number: **107828; please include this number on all correspondence regarding this request**.
Responsive information should be sent to:

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm St. 6th Floor
Hartford, CT 06106-5127
or submitted via email to: robin.blum@ct.gov

Please note that if the necessary information is not received by May 20, 2025, we will be unable to provide a determination. Materials already submitted will not be retained or returned. You will need to initiate a new review request by submitting a new and complete *Request for Natural Diversity Database (NDDB) State Listed Species Review* via DEEP's ezFile Portal. For more information and guidance on submitting a request for a Natural Diversity Data Base review visit our website. Feel free to contact me if you have further questions.

Robin Blum
Wildlife Division- Natural Diversity Data Base
79 Elm Street
Hartford, CT 06106-5127
(860) 424-4137
Robin.blum@ct.gov

September 24, 2024

Deb Coon
Hoyle, Tanner, and Associates
150 Dow Street
Manchester, NH 03101

Project: Tweed New Haven Runway Extension and Terminal Expansion – Tide Gate Alteration
NDDB 202408268 Request for Additional Information
Filing ID: 117005
Expiration date: September 24, 2025

Dear Deb Coon,

We have received and reviewed the materials submitted pursuant to a Natural Diversity Data Base review request for Tide Gate Alteration at Tweed Airport, New Haven project. According to our records, populations of State listed species have been documented in the vicinity of the project area.

Plants:

- Yellow thistle (*Cirsium horridulum*) – State Endangered
  Habitat: Coastal grasslands; airports; open-canopy trail sides and roadsides; inner salt marsh borders; *Juniperus-Panicum virgatum* communities, scrub communities, and forest edges bordering salt marshes.
  Blooms: June, July
- Salt pond grass (*Leptochloa fusca ssp. Fascicularis*) – State Endangered
  Habitat: Coastal, in brackish ponds and shores of "salt ponds", borders of salt and brackish marshes, sandy depressions in coastal grasslands and sandy roadsides that are flooded by the highest mesohaline or polyhaline spring tides of the year. Populations found inland growing along highways are not believed to be of native Connecticut provenance.
  Blooms and fruits August - November
- Field paspalum (*Paspalum laeve*) - State Threatened
  Habitat: Mostly near the coast, extending inland in the Connecticut River towns only as far as Cromwell and Glastonbury, and disjunct as a historic in Franklin. Hydric to moderately well drained fields, meadows, grasslands, floodplain grasslands and meadows, thickets, and shores, seasonally flooded and exposed open-canopy vernal pools. Utility ROWs, airports near the coast. Tolerant of mowing, at least at some sites. Critical Habitats include: Alluvial grassland/Outcrop, Grassland Subtype; Coastal Grassland.
  Fruits August – October
- Swamp lousewort (*Pedicularis lanceolata*) – State Threatened
  Habitat: Moist fields, swamp edges, wet ground, wet meadows, open swamps, stream edges, fresh tidal wetlands.
  Blooms mid-August, September
- Two-flowered cynthia *(Krigia biflora*) - State Threatened
  Habitat: Dry to wet meadows, fields, rocky woods, and roadsides.
  Blooms June
- Hoary plantain (*Plantago virginica*) – State Special Concern

Habitat: Dry acidic or basic, rocky, sandy, or gravelly soil. Pastures, grasslands, floodplain levee and stream bank forests, roadsides, low traprock outcrops in old fields, calcareous (high-pH) open woodlands, dry fields, gravel banks, traprock ridges. Critical Habitats: Subacidic Rocky Summit/Outcrop; Subacidc Rocky/Summit Outcrops (probably); Floodplain Forest, High Floodplain Subtype; Dry Circumneutral Forest. Blooms/fruits May-June. Spring and early summer ephemeral, typically disappearing by late June.

- New England blazing star (*Liatris novae-angliae*) – State Special Concern
  Habitat: Sandplains, dry fields, sandy sea beaches, rock outcrops, sandy or rocky roadsides.
  Blooms Aug, September

State listed plant species surveys of the site should be performed by a qualified botanist or plant ecologist when these target plant species are identifiable. You may want your botanist to contact the NDDB program directly for more information regarding known plant locations. The report summarizing the results of such surveys should include:

1. Survey date(s) and duration.
2. Site descriptions and photographs, and photographs of any state listed plant species found.
3. Descriptions of the identifying characters of the target listed species.
4. List of component species within the survey area (including scientific binomials).
5. Data regarding population numbers and/or area occupied by state listed plant species.
6. Detailed maps of the area surveyed including the survey route and locations of state listed species.
7. Habitat descriptions of the area surveyed.
8. Survey results and all observed state listed plant species must reported to the NDDB Program using an NDDB form at: https://portal.ct.gov/DEEP/Endangered-Species/Contributing-Data
9. If state listed plants are found within the project area or immediately adjacent to the project area, the report should include a conservation/protection plan with the following elements:
   a. Anticipated impacts to these state-listed species from this project.
   b. Any planned mitigation or management practices that will be employed to protect, avoid, and/or mitigate impacts to state listed plant species.
10. A Statement, CV or Resume of the botanist's or plant ecologist's qualifications to work with these species. Please ensure that your botanist or plant ecologist holds appropriate scientific collector's permit for this work.

Please send the survey report to deep.nddbrequest@ct.gov and robin.blum@ct.gov. Please note that incomplete reports may be rejected.

Fish:

- Sand tiger shark (*Carcharias taurus*) – State Special Concern
- Atlantic seasnail (*Liparis atlanticus*) – State Special Concern
- Radiated shanny (*Ulvaria subbifurcata*) – State Special Concern

Contact a DEEP Fisheries Biologist for more information regarding potential impacts to listed fish species. You may need to submit a fisheries consultation form.

Birds:

In Connecticut, grasslands are among the most threatened and rare habitats. There are seven species of breeding grassland birds and that require grasslands as their primary habitat that are state listed in Connecticut. Most of Connecticut's grasslands would revert to forest without active management. Increasing development pressures on Connecticut's most important grassland habitats, exacerbates this loss of habitat

through natural succession. Traffic and construction in suitable habitat should be avoided during sensitive timeframes.

Grasshopper sparrow (*Ammodramus savannarum*) – State Endangered
Most sensitive to disturbance: May 1- August 30. This species will benefit from protection and management of large patches of grassland of 30 acres or more.

Eastern meadowlark (*Sturnella magna*) – State Threatened
Most sensitive to disturbance between May 1- August 15. This species will benefit from protection and management of large patches of grassland of 15 acres or more.

Savannah sparrow (*Passerculus sandwichensis*) – State Special Concern
Most sensitive to disturbance between April 1- August 30. This species will benefit from protection and management of large patches of grassland of 10 acres or more.

Bobolink (*Dolichonyx oryzivorus*) – State Special Concern
Most sensitive to disturbance between May 1- August 30.
This species will benefit from protection and management of large patches of grassland of 5 acres or more.

NDDB program staff is currently working with Tweed Airport and consultants regarding proposed actions to address impacts to grassland birds under the auspices of the Runway Extension and Terminal Expansion project. Any potential negative impacts to listed grassland bird species from the proposed Tide Gate Alteration project activities will be addressed through mitigation under that project. A Final Determination for the Tide Gate Alteration project will not be issued until grassland bird mitigation has been finalized.

Robin Blum
Supervising Wildlife Biologist
CT DEEP – Natural Diversity Database
Robin.blum@ct.gov

G. Agency Communication

Tom Groves

From: Moorhead, William <William.Moorhead@ct.gov>
Sent: Thursday, October 31, 2024 1:07 PM
To: Tom Groves
Cc: Sarah Barnum; Peace, Kimberly R.; Michael Piantedosi (mpiantedosi@nativeplanttrust.org)
Subject: RE: Paspalum laeve var. circulare HVN Seed Collection Authorization

Tom,

This authorization is satisfactory to NDDB.

Bill Moorhead
Botanist/Plant Community Ecologist
Natural Diversity Data Base
Wildlife Division
Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
p: 860.424.3861 | **c:** 860.876.9393 | william.moorhead@ct.gov

Conserving, improving, and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

| portal.ct.gov/DEEP

From: Tom Groves <tgroves@bscgroup.com>
Sent: Thursday, October 31, 2024 11:21 AM
To: Moorhead, William <William.Moorhead@ct.gov>
Cc: Sarah Barnum <SBarnum@bscgroup.com>; Peace, Kimberly R. <kpeace@hoyletanner.com>
Subject: Paspalum laeve var. circulare HVN Seed Collection Authorization

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Good Afternoon Bill,

Please see the permission email below from Airport Manager of Tweed Airport in New Haven, CT for seed collection of *Paspalum laeve* var. *circulare* as part of the terminal expansion project mitigation strategy.

If you could send a confirmation email with your sign-off on this approval, I will set up a date next week for the seed collection activities.

Thanks so much and I hope you have a good day,

Tom Groves

Tom Groves, CERP (he, him)
Senior Botanist, Ecologist

150 Dow Street / Manchester, NH 03101
O: 617-896-4300 / C: 978-888-3718
tgroves@bscgroup.com
www.bscgroup.com

BSC GROUP

From: Jeremy Nielson <jnielson@avports.com>
Sent: Thursday, October 31, 2024 9:57 AM
To: Tom Groves <tgroves@bscgroup.com>
Cc: Tom Rafter <trafter@flytweed.com>; Malena Zanjani <mzanjani@flytweed.com>; Michael Jones <mjones@avports.com>; Furey, Robert M. <rfurey@hoyletanner.com>; ngonzalez@hoyletanner.com; Peace, Kimberly R. <kpeace@hoyletanner.com>; Scott Johnson <sjohnson@v-1consulting.com>; Levi Gealy <lgealy@v-1consulting.com>; Jake Townsand <jtownsand@v-1consulting.com>; Felipe Suriel <fsuriel@avports.com>; Meade Hopkins <mhopkins@avports.com>
Subject: HVN Seed Collection Authorization

On behalf of the Tweed New Haven Airport Authority, this email grants permission for BSC Group Botanists Tom Groves and Jon Kuziel to collect *Paspalum laeve* var. *circulare* seeds during the 2024 growing season as part of the Terminal and Runway Extension Projects. It is understood that seeds will be stored with Native Plant Trust NASAMI Farm, and collected according to their rare plant seed collection protocols.

If you have any questions or concerns, please contact me directly. Felipe Suriel will serve as your point of contact to coordinate your visit. He can be reached at 203-314-9259.

Sincerely,

_____

M. Jeremy Nielson | CM, ACE

COO | Airport Manager

Avports HVN | Tweed New Haven Airport

o: 203-469-5650 | c: 475-355-5124

HVN is operated by Avports under the authority of the Tweed New Haven Airport Authority.

Tom Groves

From: Tom Groves
Sent: Tuesday, November 26, 2024 12:21 PM
To: Kate Wellspring
Cc: Michael Piantedosi
Subject: RE: Paspalum laeve var. circulare Seed Collection Tweed Airport New Haven, CT

That's great Kate! Thanks for letting me know. I'm in talks right now with CTDEEP and NDDB to determine what the mitigation strategy will be at the site. Once I know that, I'll know if it's a long term storage or a more short term one. I've cc'd Michael here again in the hopes of touching base with him and getting those two contracts set up for the seed banking.

Thank you for all you do, and I hope you have a nice Thanksgiving,

Tom Groves

Tom Groves, CERP (he, him)
Senior Botanist, Ecologist

150 Dow Street / Manchester, NH 03101
O: 617-896-4300 / C: 978-888-3718
tgroves@bscgroup.com
www.bscgroup.com

BSC GROUP

From: Kate Wellspring <kwellspring@nativeplanttrust.org>
Sent: Monday, November 25, 2024 12:13 PM
To: Tom Groves <tgroves@bscgroup.com>
Subject: Re: Paspalum laeve var. circulare Seed Collection Tweed Airport New Haven, CT

Hi Tom,

I just picked up the Paspalum collection, safe and sound. Nice to see that you were able to harvest so many seeds.
When you work out the contract details with Michael, you two can decide whether this is for a relatively short window of storage, or a longer one. When we store collections for the longer term (usually >2 years), we often ask contract collectors if we can split their collection into two halves: one half we store in our own facilities at Native Plant Trust, and the other would go to an off-site storage facility.
This is generally known as "safety duplication storage", the idea being that if a natural disaster struck one seed bank facility, the other half of the collection would still be safe at the second one.
When working with contract collectors, we generally ask them if they would like their seeds to be stored in this way, or if they prefer that they stay together within the Native Plant Trust seed bank.
Either way is fine, though I suppose it's worth knowing that if half of the collection were to be sent off-site, it may take longer to recall those seeds if and when you would like them back. You can Michael and discuss the particulars and let me know.

Best wishes,
Kate

On Wed, Nov 20, 2024 at 4:19 PM Tom Groves <tgroves@bscgroup.com> wrote:

> Hey Kate,
>
> Attached is a spreadsheet for the seed count and packet identification that should be arriving at the PO Box any day. Let me know if you have any questions.
>
> Thanks,
>
> Tom
>
> **Tom Groves, CERP** (he, him)
>
> Senior Botanist, Ecologist
>
> 150 Dow Street / Manchester, NH 03101
>
> O: 617-896-4300 / C: 978-888-3718
>
> tgroves@bscgroup.com
>
> www.bscgroup.com
>
> BSC GROUP
>
> ---
>
> **From:** Tom Groves
> **Sent:** Tuesday, November 19, 2024 5:25 PM
> **To:** Kate Wellspring <kwellspring@nativeplanttrust.org>
> **Cc:** Michael Piantedosi <mpiantedosi@nativeplanttrust.org>
> **Subject:** RE: Paspalum laeve var. circulare Seed Collection Tweed Airport New Haven, CT
>
> That's great thanks Kate! I'm also psyched you liked the stickers! I sent you another big package today with Paspalum laeve var. circulare seeds from Tweed Airport (another project I'm working on the mitigation plan for.) Michael and I will have to set up a contract for the seed banking of these as well. Michael – reach out when you can to discuss and finalize these two projects on both our ends.

Here's the tracking # for the Paspalum seeds – USPS 958887109528001441274l

Thanks for all you all do!

Tom

Tom Groves, CERP (he, him)

Senior Botanist, Ecologist

150 Dow Street / Manchester, NH 03101

O: 617-896-4300 / C: 978-888-3718

tgroves@bscgroup.com

www.bscgroup.com

BSC GROUP

From: Kate Wellspring <kwellspring@nativeplanttrust.org>
Sent: Tuesday, November 12, 2024 11:13 AM
To: Tom Groves <tgroves@bscgroup.com>
Cc: Michael Piantedosi <mpiantedosi@nativeplanttrust.org>
Subject: Re: Paspalum laeve var. circulare Seed Collection Tweed Airport New Haven, CT

Hi Tom,

Just wanted to let you know that I received the Viola seeds today.

The stickers are excellent, by the way. Thanks :)

Kate

On Thu, Oct 31, 2024 at 1:38 PM Tom Groves <tgroves@bscgroup.com> wrote:

Hello Kate!

I've been emailing with Michael (cc'd here) about some seed banking services for two projects I've been working on. Michael said it would be fine for me to send along the seeds I'll need banked to you at NASAMI but to give you a heads up first. The projects I'll be sending seed for are as follows:

1. A1/B2 Transmission Line Vernon, VT (*Viola lanceolata)* – seeds have already been collected and sorted – this is the same project and client (NEP) that I sent you seeds of *Bartonia virginica* and *Crocanthemum bicknellii* from last season.
2. Tweed Airport New Haven, CT (*Paspalum laeve* var. *circulare*) – seeds will be collected on 11/5/24

I will send each species in separate packages and will work out the contract details with Michael over the next couple of weeks. I will send the seeds out and email you tracking numbers as soon as I have them. Please let me know if you have any questions and thanks for everything you all do!

Talk to you soon,

Tom Groves

Tom Groves, CERP (he, him)

Senior Botanist, Ecologist

150 Dow Street / Manchester, NH 03101

O: 617-896-4300 / C: 978-888-3718

tgroves@bscgroup.com

www.bscgroup.com

BSC GROUP

From: Michael Piantedosi <mpiantedosi@nativeplanttrust.org>
Sent: Thursday, October 31, 2024 1:15 PM
To: Tom Groves <tgroves@bscgroup.com>
Cc: Moorhead, William <William.Moorhead@ct.gov>; Sarah Barnum <SBarnum@bscgroup.com>; Peace, Kimberly R. <kpeace@hoyletanner.com>
Subject: Re: Paspalum laeve var. circulare Seed Collection Tweed Airport New Haven, CT

Hi Tom,

Good to hear from you. Please do send the Paspalum seeds once you have them to Kate at Nasami, and if you can send her a quick email regarding when to expect the seeds we should have no problem getting them processed and ready for freezing relatively quickly. We can work on a contract template in the meantime (estimate for short-term storage would be the same as last agreement, I believe). Thanks for reaching out.

Best,

Michael

On Thu, Oct 31, 2024 at 1:02 PM Tom Groves <tgroves@bscgroup.com> wrote:

> Good Afternoon Michael,
>
> I hope you're doing well since the last time we spoke about seed collections and seed banking for some Vermont species. I've recently been performing rare plant surveys at Tweed Airport in New Haven, CT for airport improvement projects they've proposed. I observed a massive population of *Paspalum laeve var. circulare* on the property and have been working with Bill Moorhead and the airport to gain permission to collect seeds in impacted areas for long-term seed storage. Part of what I'll need to do is send the collected seed to NASAMI Farm for seed banking, do you need me to set up a seed banking contract with you similar to how we proceeded last year? I'm happy to get that together and out but in the meantime, if I collect seeds next week (since the window is closing) would I be able to send them to Kate Wellspring at NASAMI with a note and get them in the freezer ASAP?
>
> This is the permission received from the airport and I've cc'd Bill Moorhead here who is in the loop on the details and asked for you all to be looped in as well.

Subject: HVN Seed Collection Authorization

On behalf of the Tweed New Haven Airport Authority, this email grants permission for BSC Group Botanists To
and Runway Extension Projects. It is understood that seeds will be stored with Native Plant Trust NASAMI Fa

If you have any questions or concerns, please contact me directly. Felipe Suriel will serve as your point of c

Sincerely,

_____

M. Jeremy Nielson | CM, ACE

COO | Airport Manager

Avports HVN | Tweed New Haven Airport

o: 203-469-5650 | c: 475-355-5124

HVN is operated by Avports under the authority of the Tweed New Haven Airport Authority.

Please let me know if you have any questions or if you'd like to discuss on the phone I can be available.

Thanks for your time, I appreciate it!

Tom Groves

Tom Groves, CERP (he, him)

Senior Botanist, Ecologist

150 Dow Street / Manchester, NH 03101

O: 617-896-4300 / C: 978-888-3718

tgroves@bscgroup.com

www.bscgroup.com



From:	Moorhead, William
To:	Blum, Robin
Subject:	FW: Tweed New Haven Airport Requested Clarification for Paspalum
Date:	Thursday, April 17, 2025 9:35:07 AM
Attachments:	image001.png image002.png image003.png image004.png image005.png image006.png image007.png image008.png

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See below is the email from Tom Groves that finishes up the before after Paspalum area question.

Bill Moorhead
Botanist/Plant Community Ecologist
Natural Diversity Data Base
Wildlife Division
Connecticut Department of Energy & Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
p: 860.424.3861 | **c:** 860.876.9393 | william.moorhead@ct.gov

Connecticut
Department of Energy &
Environmental Protection

Conserving, improving, and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

| portal.ct.gov/DEEP

From: Tom Groves <tgroves@bscgroup.com>
Sent: Thursday, April 10, 2025 9:14 AM
To: Moorhead, William <William.Moorhead@ct.gov>
Subject: Tweed New Haven Airport Requested Clarification for Paspalum

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Good Afternoon Bill,

It was nice to speak with you last week. I reviewed the total area of *Paspalum* impact in the new Terminal area at Tweed Airport. The estimated impact areas/take areas will be no more than for the big polygons is roughly 0.6 ac. So adding in the single occurrence plants it's maximum of 1 acre of direct *Paspalum* impacts. The proposed mitigation for this species to segregate topsoil and allow the Turf to Turf conversion areas to naturally revegetate totals 31 acres. Let me know if you need any other information for this.

Thank you,

Tom

Tom Groves, CERP (he, him)
Senior Botanist, Ecologist

150 Dow Street / Manchester, NH 03101
O: 617-896-4300 / C: 978-888-3718
tgroves@bscgroup.com
www.bscgroup.com

BSC GROUP

ATTACHMENT 23 – FISHERIES CONSULTATION FORM

Connecticut
Department of Energy & Environmental Protection
Bureau of Natural Resources
Fisheries Division

DEEP Fisheries Consultation Form

To the Applicant - Prior to the submission of your license application to the Connecticut Department of Energy & Environmental Protection (DEEP) Water Planning and Management Division (WPMD) or Land and Water Resources Division (LWRD) or Water Permitting and Enforcement Division (WPED), please complete Part I below and e-mail the following to deep.inland.fisheries@ct.gov:

1. this completed DEEP *Fisheries Consultation Form*;
2. a site location map,
3. a PDF version of the proposed project plans including a site survey of existing conditions (if available), and
4. photos of the site.

Fisheries Division staff will contact you if further details are needed. Once the Fisheries Division staff returns the completed form to you, please include the form, and any signed plans (if applicable) in your license application submittal to DEEP.

Part I: Applicant and Site Information (*to be completed by APPLICANT)*

1. Applicant/Registrant Information

Name: Tweed New Haven Airport
Mailing Address: 155 Burr Street
City/Town: New Haven State: CT Zip Code: 06512
Business Phone: 203-4695650 Ext.: _____
Contact Person: Jeremy Nielson Phone: Ext: _____
E-mail Address: JNielson@avports.com

2. Engineer/Surveyor/Agent Information (list as applicable)

Name: Hoyle, Tanner & Associates, Inc.
Mailing Address: 150 Dow Street
City/Town: Manchester State: NH Zip Code: 03101
Business Phone: 6034605205 Ext.: _____
Contact Person: Kimberly Peace Phone: 6037163343 Ext: _____
E-mail Address: kpeace@hoyletanner.com
Service Provided: Design Engineering & Permitting

3. Site Location:

Name of Site: Tweed New Haven Airport
Address of Site or Location Description: 155 Burr Street
City/Town: New Haven State: CT Zip Code: 06512
Parcel Location/Tax Assessor's Reference: Map 120 Block 1409 Lot 001
Name of Stream or Waterbody: Morris Creek, Tuttle Brook and tidal wetlands associated

4. **Activity:** Check the box best describing your activity: (check all that apply):

- ☐ new public/fishing access;
- ☐ new docks and marinas on tidal rivers;
- ☒ coastal/tidal dredging projects;
- ☒ activities in inland/non-tidal waterbodies and watercourses;
- ☐ maintenance dredging
- ☐ beach nourishment
- ☐ cofferdam installation
- ☐ conducting construction activity within a 100-foot buffer of a Cold Water Stream Habitat
- ☐ work within LIS Blue Plan area
- ☐ Other
- ☐ withdrawal of water from a non-tidal/inland river, stream, pond or lake;
- ☐ withdrawal of water from a wetland, marsh, swamp, or bog hydrologically connected to a non-tidal/inland river, stream, pond or lake;
- ☐ withdrawal of groundwater from stratified drift deposits hydrologically connected to a non-tidal/inland river, stream, pond or lake.

Note: Fisheries consultation is **not required** for docks and marinas on Long Island Sound.

Part I: Applicant and Site Information (*to be completed by APPLICANT) (continued)*

5. **DEEP Pre-application Contact:** Indicate name of permit analyst or engineer, if applicable.
   Jeff Caiola & Robin Blum

6. **Project Description:** Provide or attach a brief, but thorough, description of the project including any measures to protect, enhance or restore fish populations:

The project proposes to rehabilitate and extend Runway 2-20, construct a new east side passenger terminal and associated roadways, parking lots, aprons and taxiways. Included with the project is a plan to restore 30 acres of historically impacted tidal wetlands around the airport as a form of mitigation to offset wetland impacts. The NDDB review attached is associated with review of these tidal areas to be restored. Restoration efforts will initially include alteration of the existing tide gate at Morris Creek to allow for longer and deeper salinity events within the tidal channels to effectively drown Phragmites and allow for conversion to a more natural Spartina-dominated salt marsh. Removal of standing Phragmites will also occur to promote this conversion. If this initial effort is not deemed to meet the success criteria within a 2-3 year period, other efforts will include plantings, alteration of existing tidal channels and/or creation of additional tidal channels in the marshes, and soil manipulation as needed. The water levels in the marshes are currently controlled by a tide gate at Morris Creek downstream of the airport that was installed to prevent flooding of the neighborhoods along the southwest side of the airport.

Attached are: an aerial figure denoting areas of impact for the Runway extension, drainage improvements and east terminal areas as well as the tidal mitigation areas, the NDDB submission, and the NDDB response. We can provide wetland delineation reports for tidal wetlands that contain photos in subsequent emails due to size. There are no plans created for the tidal marsh restoration at this time.

Part II: Fisheries Determination *(To be completed by DEEP Fisheries Staff only)*

To Fisheries Staff - This completed consultation form is required to be submitted as part of an application to DEEP. The application has not yet been submitted to DEEP. Please review the enclosed materials and determine whether the project will significantly impact any fisheries or fisheries habitat. You may provide comments or recommendations regarding the proposal. Send this completed form to the applicant and copy the DEEP analyst, if known, or the applicable WPMD/LWRD/WPED Supervisor. If the proposed work **WILL** significantly impact any fisheries and/or habitat or if you have any comments or concerns regarding the regulatory review for this project, contact the DEEP analyst, if known, or the applicable WPMD/LWRD/WPED Supervisor.

DEEP FISHERIES DIVISION DETERMINATION

Date Consultation Form received: 11/01/24

Please check applicable boxes and return the completed Consultation Form to the applicant:

- ☐ I have determined that the work described in Part I of this form and attachments **WILL NOT** significantly impact any fisheries and/or habitat;
- ☑ I have determined that the work described in Part I of this form and attachments **WILL NOT** significantly impact any fisheries and/or habitat **if the below Recommendations are followed**; and/or,
- ☐ I have determined that the work described in Part I of this form and attachments **WILL NOT** significantly impact any fisheries and/or habitat **if the design features shown on the attached plans are incorporated**. Fisheries staff to sign and date plans and return to the applicant with the completed Consultation Form.

COMMENTS/RECOMMENDATIONS (or check here if these are attached following this page: ☑):

See attached sheet

"By entering my name below, I agree that I am providing my legal signature, and am legally bound by the determination above."

Bruce H Williams	**12/30/24**
Signature of Fisheries Division Staff	Date
Bruce H Williams	**Senior Fisheries Biologist**
Print Name of Fisheries Division Staff	Title

Coon, Deb L.

From: Williams, Bruce <Bruce.Williams@ct.gov>
Sent: Thursday, March 20, 2025 12:18 PM
To: Peace, Kimberly R.
Cc: Jacobson, Susan; Goclowski, Matthew R; Coon, Deb L.; Blum, Robin; Caiola, Jeff; Dickson, Jenny
Subject: RE: [External] RE: Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project- DRAFT Pre-application Information

Hi Kimberly,
The proposed creation of an additional 3.6 acres of tidal wetlands will not create any additional fisheries concerns. If needed I can update my original fisheries consultation, but I think this email should suffice.

Thanks,

Bruce

Bruce Williams
Senior Fisheries Biologist
Diadromous Fish and Habitat Conservation and Enhancement Programs
Bureau of Natural Resources – Fisheries Division
Connecticut Department of Energy & Environmental Protection
Marine Headquarters – P.O. Box 719 / 333 Ferry Road
Old Lyme, CT 06371
p: *860.447.4317* | ***c:*** *860.876.9140* | ***e***: bruce.williams@ct.gov

Connecticut
Department of Energy &
Environmental Protection

Conserving, improving, and protecting our natural resources and environment;
Ensuring a clean, affordable, reliable, and sustainable energy supply.

portal.ct.gov/DEEP

From: Peace, Kimberly R. <kpeace@hoyletanner.com>
Sent: Thursday, March 20, 2025 9:37 AM
To: Williams, Bruce <Bruce.Williams@ct.gov>
Cc: Jacobson, Susan <Susan.Jacobson@ct.gov>; Goclowski, Matthew R <Matthew.Goclowski@ct.gov>; Coon, Deb L. <dcoon@hoyletanner.com>; Blum, Robin <Robin.Blum@ct.gov>; Caiola, Jeff <Jeff.Caiola@ct.gov>; Dickson, Jenny <Jenny.Dickson@ct.gov>
Subject: RE: [External] RE: Tweed New Haven Regional Airport Runway Extension and Terminal Expansion Project- DRAFT Pre-application Information

EXTERNAL EMAIL: This email originated from outside of the organization. Do not click any links or open any attachments unless you trust the sender and know the content is safe.

Hi Bruce, at DEEP's request we have added approximately 3.6 acres of tidal wetland creation to the Wetland Mitigation Plan, see figure attached for those locations. We do not anticipate that this would result in a change in

your response, however we want to provide you with the opportunity to review this change and, if needed, update your comment memo that will be used in the permit application to support the NDDB Determination.

Please let me know if you want to discuss this further or have questions, thank you.

Kimberly Peace
Vice President - Senior Environmental Coordinator at Hoyle Tanner
She/Her/Hers
kpeace@hoyletanner.com

T: 603-460-5205 ° • **C**: 603-716-3343
Hoyle Tanner • 150 Dow Street Manchester, NH 03101 • hoyletanner.com

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36 acres of expected *Spartina alterniflora* conversion (28.5 acres required)



LEGEND

Expected areas of *Spartina alterniflora* conversion

Existing areas of *Spartina alterniflora*

Memo

To: Kimberly Peace, Vice President, Senior Environmental Coordinator at Hoyle Tanner

From: Bruce Williams, Senior Fisheries Biologist, CTDEEP Fisheries Division

CC: Elsa Loehmann, P.E. eDesign Dynamics, Matt Goclowski, Supervising Fisheries Biologist

Date: 02/05/25

Re: Response to memorandum from eDesign Dynamics on the proposed Tweed New Haven Runway Extension and Terminal Expansion Wetland Mitigation Plan

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After reviewing the memorandum from eDesign Dynamics and consulting with other CTDEEP Fisheries staff, it is the opinion of the Fisheries Division that the assertions made in the memo understate the value of the fisheries resources of the Morris Creek watershed. Elsa Loehmann stated that, “the upstream environment beyond the tide gate does not provide viable habitat for local populations of the species of interest”. The total drainage area upstream of the tide gate covers an area of approximately 4.1 square miles. The fisheries habitat of Morris Creek directly upstream of the tide gate is not substantially different from the habitat downstream of the gate. The creek maintains a minimum channel width of 50 feet for at least 0.34 miles upstream of the gate and Tuttle Brook maintains a minimum channel width of 50 feet for a distance of approximately 0.32 miles upstream from its confluence with Morris Creek. The Fisheries Division is interested in all fish species, but there are species of specific interest to recreational anglers. Between 1990 and 1996 the DEEP Fisheries Division Marine Recreational Angler Survey conducted creel surveys of anglers fishing the lower sections of Morris Creek, mostly from Lighthouse Road and Sibley Lane. A total of 58 interviews were conducted and the reported catches included the following species, ranked from most abundant to least abundant:

1. Striped Bass
2. Bluefish
3. Winter Flounder
4. Summer Flounder
5. Tautog
6. Atlantic Menhaden
7. Scup
8. Weakfish
9. American Eel

Many of these species, probably excluding Tautog and Scup, would seasonally utilize habitat upstream of the tide gate if given the opportunity.

The Fisheries Division also understands that the upper marshes near the airport and Tuttle Brook have been heavily impacted by development, but to claim that, “neither Tuttle Brook nor the adjacent marshes provide suitable upstream habitat for sustaining local fish populations” is highly speculative and not supported by data. Tuttle Brook upstream of Dodge Avenue has a drainage area of 2.24 square miles and an estimated Q75 for the month of May of 2.47 cfs. It would be unusual for a watercourse of this size not to support fish of any species.

Recommendations for Tide Gate Management

The current configuration of the tide gate has one sluice gate on the north and south sides of the channel and three flapper gates in the middle. Based on details provided in the memorandum from eDesign Dynamics, dated January 22, 2025, the proposed design involves replacement of the existing flapper gates with an additional sluice gate. Typically the best option for fish passage would be to replace the flapper gates with self-regulating tide gates (SRTG). SRTGs are adjusted to remain open during a portion of the flood tide, providing fish passage during both the ebb tide and a percentage of the flood tide. Sluice gates are less desirable due to the reluctance of some species to pass through submerged orifices and the velocity barriers that can occur during some stages of the tide, but are generally an improvement over flapper style gates. In this particular case, the constraints of needing to raise water levels for marsh restoration while still providing flood protection for the airport and surrounding community impact the feasibility of self-regulating tide gates as a design alternative. They would not provide the ability to make the fine adjustments in upstream water elevations required for marsh restoration. The replacement of the three flapper gates with a sluice gate will benefit fish passage in Morris Creek watershed and the proposal has the support of the Fisheries Division.

ATTACHMENT 27 – USACE CONSULTATION FORM

Per correspondence with Jared Pritts, USACE, the applicants were informed this consultation form is no longer required.

ATTACHMENT 28 – USACE ENG FORM 4345

U.S. Army Corps of Engineers (USACE)

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

For use of this form, see 33 CFR 325. The proponent agency is CECW-COR.

Form Approved - OMB No. 0710-0003 Expires: 2027-03-31

The public reporting burden for this collection of information, OMB Control Number 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR APPLICATION TO THE ABOVE EMAIL.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Jeremy Middle - Last - Nielson	First - Kimberly Middle - R Last - Peace
Company - Tweed New Haven Airport Authority	Company - Hoyle, Tanner & Associates, Inc.
E-mail Address - JNielson@avports.com	E-mail Address - kpeace@hoyletanner.com
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address- 155 Burr Street	Address- 150 Dow Street
City - New Haven State - CT Zip - 06512 Country - USA	City - Manchester State - NH Zip - 03101 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax
N/A 203-469-5650	N/A 603-460-5205 603-669-4168

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Kimberly Peace to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

SIGNATURE OF APPLICANT — DATE: 4/22/2025

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Tweed New Haven Airport Runway Extension and Terminal Expansion

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Morris Creek/Tuttle Brook, freshwater and tidal wetlands	Address 155 Burr Street
15. LOCATION OF PROJECT	City - New Haven State- CT Zip- 06512
Latitude: ◦N 41.262128° Longitude: ◦W -72.885851°	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID 120-1409-001 / 28-900-100 Municipality East Haven / New Haven

Section - Township - Range -

U.S. Army Corps of Engineers (USACE)

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

For use of this form, see 33 CFR 325. The proponent agency is CECW-COR.

Form Approved - OMB No. 0710-0003 Expires: 2027-03-31

The public reporting burden for this collection of information, OMB Control Number 0710-0003, is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or burden reduction suggestions to the Department of Defense, Washington Headquarters Services, at whs.mc-alex.esd.mbx.dd-dod-information-collections@mail.mil. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. PLEASE DO NOT RETURN YOUR APPLICATION TO THE ABOVE EMAIL.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned. System of Record Notice (SORN). The information received is entered into our permit tracking database and a SORN has been completed (SORN #A1145b) and may be accessed at the following website: http://dpcld.defense.gov/Privacy/SORNsIndex/DOD-wide-SORN-Article-View/Article/570115/a1145b-ce.aspx

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Michael Middle Last - Jones	First - Kimberly Middle - R Last - Peace
Company - The New HVN LLC	Company - Hoyle, Tanner & Associates, Inc.
E-mail Address - mjones@avports.com	E-mail Address - kpeace@hoyletanner.com
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address- 45025 Aviation Drive, Suite 100	Address- 150 Dow Street
City - Dulles State - VA Zip - 20166 Country - USA	City - Manchester State - NH Zip - 03101 Country - USA
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business c. Fax	a. Residence b. Business c. Fax
N/A 203-466-4882	N/A 603-460-5205 603-669-4168

STATEMENT OF AUTHORIZATION

11. I hereby authorize, Kimberly Peace to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Michael Jones — SIGNATURE OF APPLICANT

Apr 22, 2025 — DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)

Tweed New Haven Airport Runway Extension and Terminal Expansion

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Morris Creek/Tuttle Brook, freshwater and tidal wetlands	Address 155 Burr Street
15. LOCATION OF PROJECT	City - New Haven State- CT Zip- 06512
Latitude: ◦N 41.262128° Longitude: ◦W -72.885851°	

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)

State Tax Parcel ID 120-1409-001 / 28-900-100 Municipality East Haven / New Haven

Section - Township - Range -

17. DIRECTIONS TO THE SITE

From the North, Follow I-91 S to Main Street Anx in New Haven. Exit from I-95 N, Head southwest on I-91 S, Use the left lane to merge onto I-95 N, Take the exit toward Main Street Anx, Continue onto Main Street Anx, Turn right onto Townsend Ave, Turn left onto Fort Hale Rd, Turn right onto Burr St, Turn left into Airport.

18. Nature of Activity (Description of project, include all features)

Tweed New Haven Airport (HVN) proposes the extension of Runway 02-20, drainage improvements and the replacement of the existing West Terminal with a new terminal ("East Terminal") on previously disturbed land on the east side of the Airport property. Additional elements associated with the East Terminal include associated roadways, parking lots, aprons and taxiways. Enhancement of tidal wetlands and creation of new tidal wetland areas is included as proposed Permittee-Responsible-Mitigation (PRM) as part of the project. See attached Executive Summary and Narrative for additional details.

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purpose of the project is to provide airfield and terminal area facilities to accommodate existing and reasonably foreseeable aircraft operations and passenger volumes. The Airport Authority's goal is to ensure that Tweed New Haven Airport (HVN) can efficiently meet current and future aviation needs by improving airside and landside operations. HVN needs to strive for better utilization of available land (currently underutilized) to support existing tenants and airport dependent users. The project would improve the operational flexibility resulting in a more efficient and sustainable airport and provide better landside access through non-residential areas avoiding the New Haven and East Haven neighborhoods.

The goal of the project is to enhance efficiency and terminal area capacity and alleviate the operational constraints at HVN while ensuring the Airport continues to develop in order to provide an airport facility that reliably and safely offers consistent and adequate level of service for the forecasted demand. The project would allow HVN to respond effectively and efficiently to current needs, future changes, and air service improvements in southern Connecticut. Specifically, the Project would address operational constraints through the runway extension and replacement of the existing terminal with a new East Terminal. This would include associated landside (parking and roadways) infrastructure and aircraft parking areas in a manner that efficiently utilizes the available land within the airport developed footprint.

Work will begin in Spring of 2026 and take approximately 2 years to complete.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Wetlands will be filled to allow for construction of the new terminal, parking lots, access road and causeway. See Executive Summary and Narrative and project plans attached.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
refer to project plans attached		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres refer to Attachment 16 Impact Table

or

Linear Feet

23. Description of Avoidance, Minimization, and Compensation (see instructions)

The proposed 28.5 acres of tidal wetland enhancement will be credited toward mitigation at a 5:1 ratio, offsetting 5.7 acres of impact. Proposed creation is 3.61 acres. to offset remaining impacts, exceeding the USACE requirements. refer to the attached Executive Summary and Narrative for full description of alternative analysis, avoidance and minimization, and the Attachment 17 Mitigation Plan.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- 6 South End Rd

City - East Haven State - CT Zip - 06512

b. Address- Uriah Street

City - New Haven State - CT Zip - 06512

c. Address- South End Road

City - New Haven State - CT Zip - 06512

d. Address- 51 South End Rd

City - New Haven State - CT Zip - 06521

e. Address- Morris Cswy

City - New Haven State - CT Zip - 06521

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
CT DEEP	Inland Wetlands				
CT DEEP	Tidal Wetlands				
CT DEEP	Flood Mgmt Cert				

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
			4/11/2025

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

USACE Permit Eng_Form_4345

Final Audit Report 2025-04-22

Created:	2025-04-22
By:	Merritt Nielson (jnielson@avports.com)
Status:	Signed
Transaction ID:	CBJCHBCAABAAkIRUrk0CP2s4f82ZSuUSmJ9l7oZ8uP14

"USACE Permit Eng_Form_4345" History

Document created by Merritt Nielson (jnielson@avports.com)
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2025-04-22 - 5:05:11 PM GMT

Document e-signed by Michael Jones (mjones@avports.com)
Signature Date: 2025-04-22 - 5:05:30 PM GMT - Time Source: server

Agreement completed.
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TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 41 – APPLICANT COMPLIANCE FORM

Connecticut Department of Energy & Environmental Protection

Applicant Compliance Information

DEEP ONLY
App. No. _____
Co./Ind. No. _____

Applicant Name: Tweed New Haven Airport Authority

Mailing Address: 155 Burr Street

City/Town: New Haven State: CT Zip Code: 06512

Business Phone: 203-469-5650 ext.:

Contact Person: Jeremy Nielson Phone: 203-469-5650 ext.

*E-mail: jnielson@avports.com

If you answer *yes* to any of the questions below, you must complete the Table of Enforcement Actions on the reverse side of this sheet as directed in the instructions for your permit application.

A. During the five years immediately preceding submission of this application, has the applicant been convicted in any jurisdiction of a criminal violation of any environmental law?

☐ Yes ☒ No

B. During the five years immediately preceding submission of this application, has a civil penalty been imposed upon the applicant in any state, including Connecticut, or federal judicial proceeding for any violation of an environmental law?

☐ Yes ☒ No

C. During the five years immediately preceding submission of this application, has a civil penalty exceeding five thousand dollars been imposed on the applicant in any state, including Connecticut, or federal administrative proceeding for any violation of an environmental law?

☐ Yes ☒ No

D. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal court issued any order or entered any judgement to the applicant concerning a violation of any environmental law?

☐ Yes ☒ No

E. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal administrative agency issued any order to the applicant concerning a violation of any environmental law?

☐ Yes ☒ No

Connecticut Department of Energy & Environmental Protection

Applicant Compliance Information

DEEP ONLY
App. No. _____
Co./Ind. No. _____

Applicant Name: The New HVN LLC

Mailing Address: P.O. Box 16860

City/Town: Washington State: DC Zip Code: 20041-6860

Business Phone: 203-466-4882 ext.:

Contact Person: Michael Jones Phone: 203-466-4882 ext.

*E-mail: mjones@avports.com

If you answer *yes* to any of the questions below, you must complete the Table of Enforcement Actions on the reverse side of this sheet as directed in the instructions for your permit application.

A. During the five years immediately preceding submission of this application, has the applicant been convicted in any jurisdiction of a criminal violation of any environmental law?

☐ Yes ☒ No

B. During the five years immediately preceding submission of this application, has a civil penalty been imposed upon the applicant in any state, including Connecticut, or federal judicial proceeding for any violation of an environmental law?

☐ Yes ☒ No

C. During the five years immediately preceding submission of this application, has a civil penalty exceeding five thousand dollars been imposed on the applicant in any state, including Connecticut, or federal administrative proceeding for any violation of an environmental law?

☐ Yes ☒ No

D. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal court issued any order or entered any judgement to the applicant concerning a violation of any environmental law?

☐ Yes ☒ No

E. During the five years immediately preceding submission of this application, has any state, including Connecticut, or federal administrative agency issued any order to the applicant concerning a violation of any environmental law?

☐ Yes ☒ No

TWEED NEW HAVEN REGIONAL AIRPORT (HVN) RUNWAY EXTENSION AND TERMINAL EXPANSION PROJECT - INLAND WETLANDS/WATERCOURSES AND WQC & TIDAL WETLANDS AND WQC APPLICATION

ATTACHMENT 42 – APPLICANT BACKGROUND INFORMATION FORM

Connecticut Department of
Energy & Environmental Protection

Applicant Background Information

Check the box by the entity which best describes the applicant and complete the requested information. **You must choose one of the following:** corporation, limited liability company, limited partnership, general partnership, voluntary association and individual or business type. Be sure to include the signatory authority or authorized representative certifying the application.

☐ Corporation

☐ Check the box if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information.

1. Parent Corporation
   - Name:
   - Mailing Address:
   - City/Town: State: Zip Code:
   - Business Phone: ext.:
   - Contact Person: Phone: ext.
   - E-mail:
2. Subsidiary Corporation:
   - Name:
   - Mailing Address:
   - City/Town: State: Zip Code:
   - Business Phone: ext.:
   - Contact Person: Phone: ext.
   - E-mail:
3. Directors:
   - Name:
   - Mailing Address:
   - City/Town: State: Zip Code:
   - Business Phone: ext.:
   - E-mail:
4. Officers:
   - Name:
   - Mailing Address:
   - City/Town: State: Zip Code:
   - Business Phone: ext.:
   - E-mail:

Applicant Background Information (continued)

☒ **Limited Liability Company**

☐ Check the box if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information.

1. List each member.

Name: **The New HVN LLC**
Mailing Address: P.O. Box 16860
City/Town: Washington State: DC Zip Code: 20041-6860
Business Phone: 203-466-4882 ext.:
E-mail: mjones@avports.com

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
E-mail:

2. List any manager(s) who, through the articles of organization, are vested the management of the business, property and affairs of the limited liability company.

Name: **Jorge Roberts**
Mailing Address: P.O. Box 16860
City/Town: Washington State: DC Zip Code: 20041-6860
Business Phone: 703-902-2900 ext.:
E-mail: jroberts@avports.com

Name: **Matt Shelby**
Mailing Address: P.O. Box 16860
City/Town: Washington State: DC Zip Code: 20041-6860
Business Phone: 703-902-2900 ext.:
E-mail: mshelby@avports.com

Name: **Michael Jones**
Mailing Address: 155 Burr St.
City/Town: New Haven State: CT Zip Code: 06512
Business Phone: 203-466-4882 ext.:
E-mail: mjones@avports.com

Applicant Background Information (continued)

☐ **Limited Partnership**

☐ Check the box if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information.

1. General Partners:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

2. Limited Partners:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Applicant Background Information (continued)

☐ **General Partnership**

☐ Check the box if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information.

1. General Partners:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
Contact Person: Phone: ext.
E-mail:

Applicant Background Information (continued)

☐ **Voluntary Association**

☐ Check box if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information.

1. List authorized persons of association or list all members of association.

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
E-mail:

Name:
Mailing Address:
City/Town: State: Zip Code:
Business Phone: ext.:
E-mail:

☒ **Individual or Other Business Type**

☐ Check the box, if additional sheets are necessary. If so, label and attach additional sheet(s) to this sheet with the required information.

1. Name: Tweed New Haven Airport Authority
Mailing Address: 155 Burr Street
City/Town: New Haven State: CT Zip Code: 06512
Business Phone: 203-469-5650 ext.:
E-mail: jnielson@avports.com

2. State other names by which the applicant is known, including business names.
Name: