TOWN OF MONROE
APPLICATION FOR PERMIT
INLAND WETLANDS COMMISSION
7 Fan Hill Road, Monroe, CT 06468
Tel. (203) 452-2809

FOR OFFICE USE ONLY:
Application Number _____
File Number: _____
Submittal Date: _____
Application Fee Collected _____
Public Hearing Fee Collected _____
Date of Receipt: _____
Extensions (cumulative ≤ 65 days) _____

Public Hearing Start:_____ End_____
Hearing: Start:_____ End_____
Deliberation: Start:_____ End_____
Approval Date:_____ Denial Date: _____
270 Days Up: _____ Permit Expiration: _____

As the applicant, it is your responsibility to provide the information the Commission needs in order to process your application and make a fair determination of the issues. If you fail to supply the information it may result in delay, a denial of your application or both. We recommend that you read the Inland Wetlands and Watercourses Regulations and that you request a meeting with the Land Use Department prior to submitting your application. There is no charge to the applicant for this meeting.

SECTION A: Information about the property

1. **Location of the Property**:
   Street Address: Todd Drive Assessor's Map Number: Multiple - Refer to Attachment A
   Parcel Number: Multiple - Refer to Attachment A
2. **Where is the property deed found in the Monroe Land Records?**
   Volume: Multiple - Refer to Attachment A Page: Multiple - Refer to Attachment A
3. **Is the property located within a public water supply watershed?**
   ☐ No
   ☒ Yes (***If " Yes, " the Applicant must send a copy of this application BY CERTIFIED MAIL ON OR BEFORE THE DATE OF THE APPLICATION to the Aquarion Water Company of Connecticut, 714 Black Rock Road, Easton, CT 06612, and the Commissioner of Public Health, 410 Capitol Avenue, Hartford, CT 06106; See Regulations Section 8.3).*** Refer to Attachment B for letter and receipts
4. **Is the property located within 500 feet of a town boundary?**
   ☐ No
   ☒ Yes ***(If" Yes ", the applicant must notify the Inland Wetland Agency of the adjacent municipality by certified mail and submit the receipt with this application).*** Refer to Attachment C for letter and receipts
5. **Is the property subject to an existing conservation easement?**
   ☒ No
   ☐ Yes ***(If" Yes ", the applicant must notify the party holding such restriction by certified mail no later than sixty days prior to the filing of this permit application, or submit a letter from the party holding the restriction verifying that the application is in compliance with the terms of the restriction; see Regulations Section 7.9c & 7.9d).***
6. **Is there a flood plain located on the property?**
   ☒ No
   ☐ Yes ***(If" Yes ", indicate elevation and location of flood plain on the submission plan).***
7. **Please attach a list of the names and mailing addresses of all landowners within 100 feet of the property.**

SECTION B: Information about the applicant

8. **Applicant's name and contact information:**
   Name: Town of Monroe
   Address: 7 Fan Hill Road
   Telephone: 203-452-2814 Fax:_____ Email: jdimeo@monroect.gov
9. **What is the Applicant's interest in the property?**
   ☐ Owner
   ☐ Option to purchase
   ☒ Other Owner of right-of-way and culvert

Application No._____ File No._____

Applicant's representative's name and contact information:

Name: James Dimeo, PE, Town Engineer
Business Name: Town of Monroe
Business Address: 7 Fan Hill Road, Monroe, CT 06468
Telephone: (203) 452-2814 Fax: _____ Email: jdimeo@monroect.gov

10. Engineer's name and contact information:

Name: Joseph Canas, PE, LEED AP, CFM
Business Name: Tighe & Bond
Business Address: 1000 Bridgeport Avenue, Shelton, CT 06484
Telephone: (203) 712-1109 Fax: _____ Email: jacanas@tighebond.com

11. Owner's name and contact information:

Name: James Dimeo, PE, Town Engineer Town of Monroe
Address: 7 Fan Hill Road, Monroe, CT 06468
Telephone: (203) 452-2814 Fax: _____ Email: jdimeo@monroect.gov

Owner's signature_____ (granting permission for submission of application by the applicant)

***Please note the following:**

If the applicant is not the current owner, this application must include the owner's signature or a written, witnessed consent to submit this application, signed and dated by the owner. Only the applicant and the agent listed on this application will receive copies of official action and correspondence. Refer to Attachment E

SECTION C: Information about the proposed activity

(Please attach additional sheets if necessary)

12. Select one or more of the following types of Application requested:

- [X] Regulated Activity
- [ ] Subdivision Report/Referral
- [ ] Renewal/Extension of Issued Permit Number _____
- [ ] Including Site Remediation
- [ ] Map Amendment
- [ ] Regulation Amendment

13. Describe the proposed activity covered by this application:

Replacement of a triple barrel culvert crossing that carries Harvey Pete Brook beneath Todd Drive. The existing culverts, 36" CMP, 30" RCP, and a 24" RCP are in poor condition. The replacement culvert, a 18' W x 5'H concrete box culvert has been designed in accordance with current USACE stream crossing criteria (1.2x bankfull width, minimum openness ratio, and simulated natural streambed floor), and includes new wingwalls. Construction will require a temporary 42" HDPE culvert for water handling purposes. Restoration plantings are also proposed. Temporary roadway widening to accommodate alternating one-way traffic over crossing.

14. List all activities which take place in regulated areas, including the upland review areas:

Removal of existing culvert, construction of new endwalls, construction of box culvert, regrading, slope stabilization, temp. roadway widening, placement of supplemental streambed material, installation & maintenance of sediment and erosion controls, installation and removal of temporary culvert for water handling.

Overall project site: 87,396 SF (2.006 ac) (within project limits)
Wetlands on the property: 10,282 SF (0.236 ac) (within project limits)
Upland review areas on the property: 64,930 SF (1.491 ac) (within project limits)

16. List the total area of the regulated areas to be altered:

Wetlands: 0.080 acres; 3,498 sq. ft.
Upland review areas (within 100 feet of a wetland or 150 feet of a watercourse): 1.491 acres; 64,930 sq. ft.

Total Regulated area to be altered (a + b above) for determination of fee: 1.571 acres; sq. ft. 68,428

17. What alternatives to the proposed regulated activity did you consider? Why did you choose the activity proposed in this application as opposed to the alternatives considered? (See Regulations *Section 7.5f)*

The existing culvert is failing, and needs to be replaced particularly for the residents on the east side of the cul-de-sac, whose only street access requires crossing over the stream. Refer to Attachment F - Alternatives Assessment.

18. List all measures of Low Impact Design/Development that have been incorporated into this application in order to minimize impact to wetlands.

The culvert has been designed in accordance with the USACE Stream Crossing Guidelines, significantly improving upon the existing crossing by providing additional width and clear span. Additionally, catch basin openings directly into the culvert have been removed, and a pair of catch basins at the low point have sumps to capture debris. The bottom of the proposed culvert will be a simulated streambed bottom with one foot of natural streambed material, as opposed to the hard bottom of the existing culverts barrels.

SECTION D: Determination of Application Fee

(See Regulations Section 19)

19. Select type of Application Fee (choose one):

- □ Residential Use = $300.00 .....
- □ Commercial Use = $500.00 .....
- □ Regulation Amendment = $500.00 .....
- □ Map Amendment = $150.00 .....
- □ Permit Modification = $100.00 .....
- □ Renewal/Extension of Issue Permit = $100.00 .....

20. Select the following additional fees that apply for regulated areas proposed to be disturbed:

Square Feet of Disturbed Area:

- □ Less than 1,000 square feet = $50.00 .....
- □ 1,000 to 5,000 square feet = $100.00 .....
- □ More than 5,000 square feet = $100.00 (base amount) .....

*(Plus $5.00 for every **additional** 5,000 square feet rounded up)*

Disturbed Area (Line 17c) (-) 5,000 sq.ft. (÷) 5,000 sq.ft. (x) $5.00 per sq.ft. rounded up...

21. Department of Environmental Protection State Surcharge $60.00

22. TOTAL APPLICATION FEE: ..... $ 0.00 (Municipal Projects Exempt)

****** Please note the Application Fees/State Fee must be payable to the Town of Monroe. Applicants paying with a personal check must include their driver's license number and telephone number on the check.***

SECTION E: Required support documents

(See Regulations Section 7)

Please indicate (check box) that the following documents have been included with the application:

23. Submit ten (10) copies of the following:

- ☒ Completed Inland Wetlands Application.
- ☒ A description of all filling and/or excavation activities within regulated areas (include estimates of quantity). Att. G
- ☒ A Soils Report by a Soil Scientist (include a sketch of flagged wetland areas within said report). Att. H
- ☒ A minimum of two alternative plans/sketches that were considered prior to choosing the proposed plans. Att. F narrative

N/A □ A report from the Monroe Health Department.

- ☒ A Wetlands Assessment Report. Att. H
- ☒ An area plan showing all abutting properties and applicable downstream drainage systems. Att. D

24. Submit seven **(7)** reduced copies of the following (all plans must be folded):

- ☒ Reduced copies, **18' x 24'**, of the site plan showing existing and proposed conditions in relation to the wetlands, watercourses and upland review areas. Please include a location map, delineate the 100-foot wetland setback (Upland review area) and/or the l50-foot watercourse setback (upland review area) in red, and incorporate an area plan showing all abutting properties and applicable downstream drainage systems. All plans must have a bar scale.

Application No._____File No._____

25. Submit three **(3)** copies of the following (all plans must be folded):

☒ Full size copies of the site plan, **24' x 36'**, showing existing and proposed conditions in relation to the wetlands, watercourses and upland review areas. Please include a location map, delineate the 100-foot wetland setback (Upland review area) and/or the l50-foot watercourse setback (upland review area) in red, and incorporate an area plan showing all abutting properties and applicable downstream drainage systems. All plans must have a bar scale.

26. Submit two (2) copies of the following:

☒ Drainage calculations, if applicable.

27. Submit one (1) copy of the following:

☒ A list of the names and mailing addresses of all abutting property owners. Att. D

☒ A completed **D.E.E.P** report form (available at the Inland Wetlands Office or on the Town Website at www.monroect.org/Town Hall Departments/Inland Wetlands/Applications & Forms). Att. I

☒ Verification in writing that all wetlands have been flagged and the property address/location is adequately delineated and/or marked at the property.

N/A (Municipal) ☐ A completed bond form listing all wetlands related work and protective measures for same (available at the Inland Wetlands Office or on the Town Website at www.monroect.org/Town Hall Departments/Inland Wetlands/Applications & Forms).

PLEASE INCLUDE TEN (10) COPIES OF ANY FUTURE SUPPORTING DOCUMENTATION SUBMITTED TO THE COMMISSION (Plans: 3 Full Size copies - 24' x 36', and 7 Reduced Size copies - 18' x 24'). Plans prepared by engineers, surveyors and architects must be signed and sealed. The Commission may request additional copies of the application or supporting documents at any time.

Title of original submission plan (include author and date) _____

Town of Monroe, Connecticut, Todd Drive Culvert Replacement, July 31, 2024, prepared by Tighe & Bond, Inc.

The undersigned applicant hereby consents for the owner, in the case where the applicant is not the owner, to necessary and proper access to the above mentioned property by the Inland Wetlands Commissioners, the Inland Wetlands Agent and other appropriate Town staff and/or authorized Town Consultants, at reasonable times, both before and after any permit has been granted or denied by the Commission, for the purpose of evaluating the application, monitoring compliance or correcting any violation of the Inland Wetlands and Watercourses Regulations brought about through actions or inactions of the applicant of permittee.

The undersigned warrants the truth of all statements contained herein and in all supporting documents according to the best of the applicant's knowledge and belief.

The undersigned applicant understands and agrees that the Commission may request additional information and it is the applicant's responsibility to provide this information in a timely fashion and to the Commission's satisfaction. If the information provided is incomplete or inaccurate, in the opinion of the Commission, the Commission may deny the application or request an extension to be granted by the Applicant in order to act within the legal time limits.

Type or Print the Name of the Applicant: James DiMeo

Signature of Applicant: James DiMeo

APPENDIX A

Attachment A
Location of the Property

The Town of Monroe proposes to replace the existing culverts beneath Todd Drive with a single box culvert. Work will principally occur within the Town's own right-of-way, but also extend onto adjacent private property. Easement negotiations are in progress.

The following private properties are partially within the limit of work to the purposes of regrading, temporary water handling, and the construction of the new culvert endwalls:

Property	Assessor Map	Parcel Number	Property Deed
5 Todd Drive	41	054-00	V1466, P0059
10 Todd Drive	41	060-00	V2039, P0097
15 Todd Drive	41	055-00	V2207, P0278
16 Todd Drive	41	059-00	V2202, P1028

APPENDIX B

22-1836-012-01
July 29, 2024

Aquarion Water Company of Connecticut
714 Black Rock Road
Easton, Connecticut 06612

Re: **Notice of Inland Wetlands Application**
Todd Drive Culvert Replacement
Town of Monroe

Dear Aquarion Water Company:

Tighe & Bond hereby provides notice that the Town of Monroe will be filing an application with the Town of Monroe Inland Wetlands Commission for the replacement of a triple barrel culvert system which conveys Harvey Pete Brook beneath Todd Drive. The existing culverts, a 36" corrugated metal pipe, and 24" and 36" reinforced concrete pipes are in poor condition. The new culvert will be a 18' wide, and 5' high concrete box culvert set with the lowest foot below grade and filled with natural streambed material. New concrete endwalls will be constructed for the new culvert.

This notice is provided because the work will occur within a public water supply watershed.

During construction, a temporary 42" bypass culvert will be used to direct stream flow around the work area. The bypass culvert will be removed when the new culvert is completed.

The application is enclosed with this notification. Should you have any questions, please contact James Dimeo, PE, Town Engineer, Town of Monroe at (203) 452-2814, or jdimeo@monorect.gov.

Very truly yours,

TIGHE & BOND, INC.

Joseph Canas, PE, LEED AP, CFM
Principal Engineer

Enclosures: Application, Todd Drive Culvert Replacement
Copy: James Dimeo, PE, Town Engineer

J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Permitting\M1836-012 2024_07-29 letter aquarion re application.docx

22-1836-012-01
July 29, 2024

Ms. Manisha Juthani, MD, Commissioner
State of Connecticut
Department of Public Health
410 Capitol Avenue
Hartford, Connecticut 06106

Re: **Notice of Inland Wetlands Application**
Todd Drive Culvert Replacement
Town of Monroe

Dear Commissioner Juthani:

Tighe & Bond hereby provides notice that the Town of Monroe will be filing an application with the Town of Monroe Inland Wetlands Commission for the replacement of a triple barrel culvert system which conveys Harvey Pete Brook beneath Todd Drive. The existing culverts, a 36" corrugated metal pipe, and 24" and 36" reinforced concrete pipes are in poor condition. The new culvert will be a 18' wide, and 5' high concrete box culvert set with the lowest foot below grade and filled with natural streambed material. New concrete endwalls will be constructed for the new culvert.

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The application is enclosed with this notification. Should you have any questions, please contact James Dimeo, PE, Town Engineer, Town of Monroe at (203) 452-2814, or jdimeo@monorect.gov.

Very truly yours,

TIGHE & BOND, INC.

Joseph Canas, PE, LEED AP, CFM
Principal Engineer

Enclosures: Application, Todd Drive Culvert Replacement
Copy: James Dimeo, PE, Town Engineer

J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Permitting\M1836-012 2024_07-29 letter aquarion re application.docx

Town of Monroe

Properties within 100' of 5 Todd Dr

Legend

- Parcels
- Streetname
- Roadways
  - Local
  - Collector
  - Minor Collector
  - Minor Arterial
  - Major Collector
  - PA Other
  - PA Other Expwy
  - PA Interstate

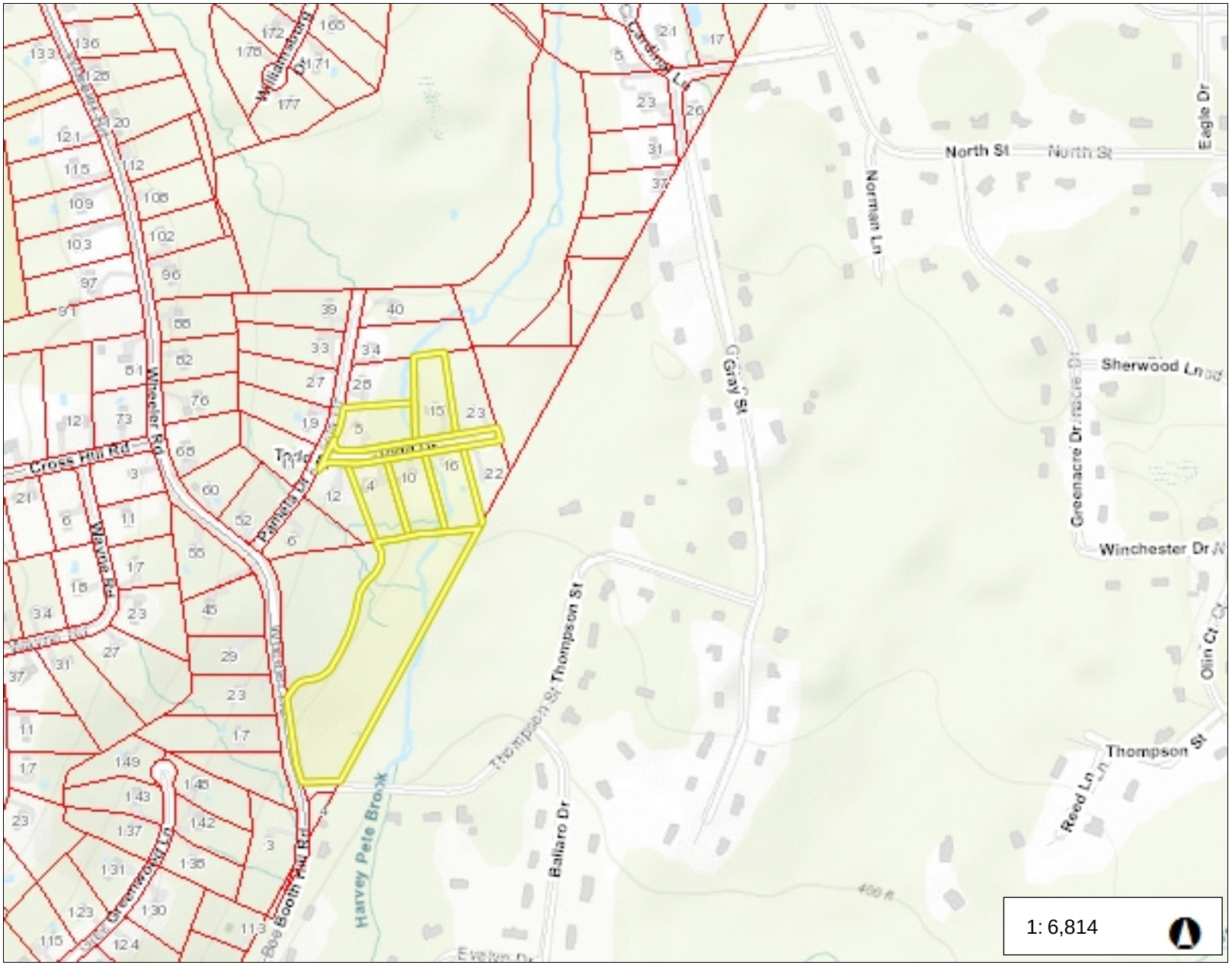
1,135.6 0 567.79 1,135.6 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

METROCOG
Connecticut Metropolitan Council of Governments

Town of Monroe

Properties within 100' of 10 Todd Dr



Legend

- Parcels
- Streetname
- Roadways
  - Local
  - Collector
  - Minor Collector
  - Minor Arterial
  - Major Collector
  - PA Other
  - PA Other Expwy
  - PA Interstate

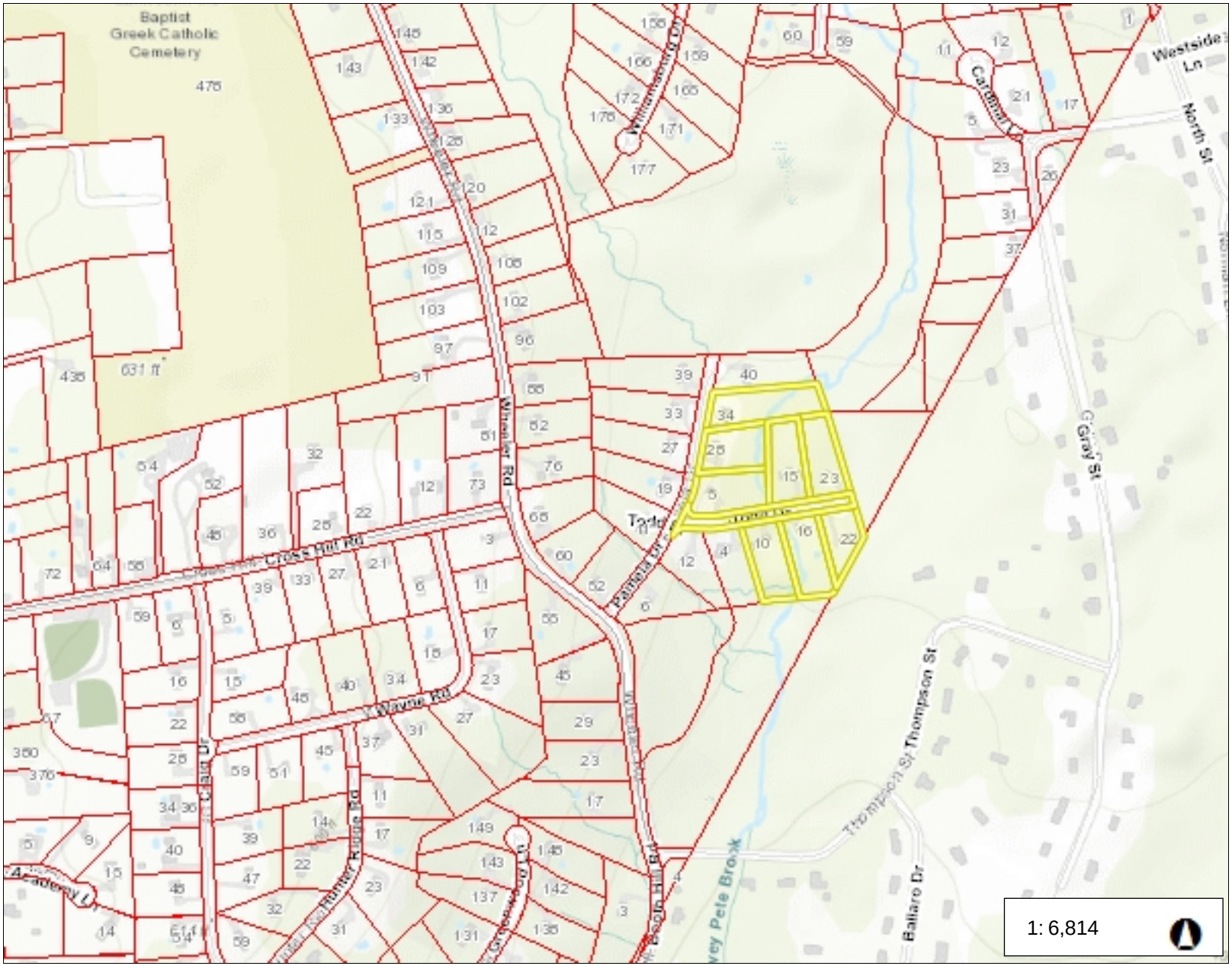
1,135.6 0 567.79 1,135.6 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

METROCOG
Connecticut Metropolitan Council of Governments

Town of Monroe

Properties within 100' of 15 Todd Dr



Legend

- Parcels
- Streetname
- Roadways
  - Local
  - Collector
  - Minor Collector
  - Minor Arterial
  - Major Collector
  - PA Other
  - PA Other Expwy
  - PA Interstate

1,135.6 0 567.79 1,135.6 Feet

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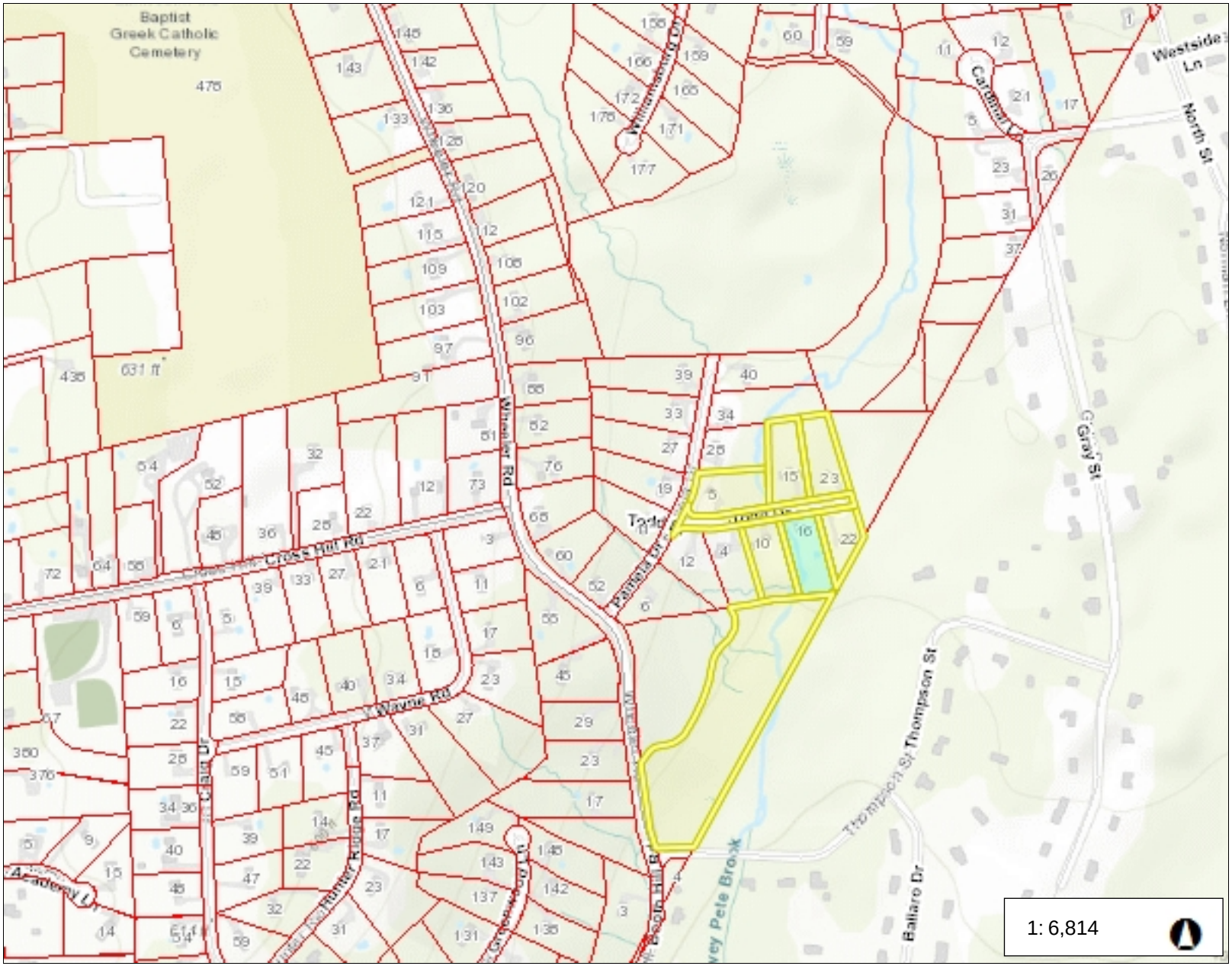
Created by Greater Bridgeport Regional Council

METROCOG
Connecticut Metropolitan Council of Governments

Town of Monroe

Properties within 100' of 16 Todd Dr



Legend

- Parcels
- Streetname
- Roadways
  - Local
  - Collector
  - Minor Collector
  - Minor Arterial
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  - PA Interstate

1,135.6 0 567.79 1,135.6 Feet

WGS_1984_Web_Mercator_Auxiliary_Sphere
Created by Greater Bridgeport Regional Council

METROCOG
Connecticut Metropolitan Council of Governments

APPENDIX C

22-1836-012-01
July 29, 2024

Inland Wetlands Commission
City of Shelton
54 Hill Street
Shelton, Connecticut 06484

Re: **Notice of Inland Wetlands Application**
Todd Drive Culvert Replacement
Town of Monroe

Dear Commissioners:

Tighe & Bond hereby provides notice that the Town of Monroe will be filing an application with the Town of Monroe Inland Wetlands Commission for the replacement of a triple barrel culvert system which conveys Harvey Pete Brook beneath Todd Drive. The existing culverts, a 36" corrugated metal pipe, and 24" and 36" reinforced concrete pipes are in poor condition. The new culvert will be a 18' wide, and 5' high concrete box culvert set with the lowest foot below grade and filled with natural streambed material. New concrete endwalls will be constructed for the new culvert.

This notice is provided because the work will within 500 feet of Monroe's boundary with the City of Shelton.

During construction, a temporary 42" bypass culvert will be used to direct stream flow around the work area. The bypass culvert will be removed when the new culvert is completed.

The application is enclosed with this notification. Should you have any questions, please contact James Dimeo, PE, Town Engineer, Town of Monroe at (203) 452-2814, or jdimeo@monorect.gov.

Very truly yours,

TIGHE & BOND, INC.

Joseph Canas, PE, LEED AP, CFM
Principal Engineer

Enclosures: Application, Todd Drive Culvert Replacement
Copy: James Dimeo, PE, Town Engineer

J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Permitting\M1836-012 2024_07-29 letter city of shelton re application.docx

APPENDIX D

Attachment D
Names and Mailing Addresses of Landowners

The following are landowners within 100’ of the proposed regulated activity and within 100’ of the properties impacted by the work:

Property	Assessor Map	Owner
4 Todd Drive	041-061	Brian Alan Peloquin 4 Todd Drive Monroe, CT 06468
5 Todd Drive	041-054	Fernando J. & Tiffany F. Pena 5 Todd Drive Monroe, CT 06468
10 Todd Drive	041-060	Rielle Giannino 10 Todd Drive Monroe, CT 06468
15 Todd Drive	041-055	Lisa Constantini 15 Todd Drive Monroe, CT 06468
16 Todd Drive	041-059	Zoey Villalba 16 Todd Drive Monroe, CT 06468
22 Todd Drive	041-058	Jeanette M. Benson 22 Todd Drive Monroe, CT 06468
23 Todd Drive	041-056	Alfonso M. Lara 23 Todd Drive Monroe, CT 06468
11 Pamela Drive	041-046	Antonio & Marissa Sallati 11 Pamela Drive Monroe, CT 06468
12 Pamela Drive	041-062	Kevin F. & Elizabeth J. Daly 12 Pamela Drive Monroe, CT 06468
19 Pamela Drive	041-047	Lori S. Coglitore James Peloquin 19 Pamela Drive Monroe, CT 06468
27 Pamela Drive	041-048	Margaret M. McEachern 27 Pamela Drive Monroe, CT 06468
28 Pamela Drive	041-053	Alex De Los Santos Alyssa Delucia 28 Pamela Drive Monroe, CT 06468

34 Pamela Drive	041-052	Gary Kunschaft 34 Pamela Drive Monroe, CT 06468
20 Wheeler Road	032-049	Aquarion Water Company of Connecticut 600 Lindley Street Bridgeport, CT 06606
0 Thompson Street Shelton	Shelton 108-24	Aquarion Water Company of Connecticut 600 Lindley Street Bridgeport, CT 06606
0 Thompson Street Shelton	Shelton 108-04	State of Connecticut 450 Capitol Avenue Hartford, CT 06106
0 Thompson Street Shelton	Shelton 120-1	Carl F. & Jeanette M. Benson 22 Todd Drive Monroe, CT 06468

Tighe&Bond

APPENDIX E

APPENDIX F

Attachment F
Alternatives Assessment

The proposed 18’ wide x 5’ high crossing represents the most feasible and prudent alternative considered with the least amount of environmental impact.

F.1 No-Build

The Town considered a no-build alternative, but it would do nothing to address the deterioration of the culverts, which would ultimately fail and leave four homes without access to the public road network. Therefore, the no-build alternative was not considered to be prudent due to health, safety, and welfare considerations.

F.2 Conducting the Activity in a Different Location

The proposed activity is a culvert replacement, and can therefore only occur at the location of the crossing without relocating the stream, which would result in a significantly larger area of disturbance. Therefore, conducting the activity in a different location was considered to be neither prudent nor feasible.

F.3 Narrower Crossing

The proposed crossing is 18’ wide. We note that since the existing stream channel bankfull width is 15 feet wide, the USACE stream crossing criteria requires the replacement crossing to span 1.2 times the channel bankfull width, which would be 18 feet. Therefore, the proposed crossing is the minimum width that meets the crossing requirements. If the crossing were to be less than 12 feet wide, there would be less hydraulic opening, meaning that it would not be able to pass the design flow, and would overtop more frequently, which is not desirable when the crossing is the only means of ingress and egress for some residents.

Tighe&Bond

APPENDIX G

Attachment G
Earthwork Summary

Table G-1
Earthwork Summary within Wetlands

Type	Cut cy	Fill cy	Total cy
General Excavation, Upstream	17	6	- 11
General Excavation, Downstream	10	5	- 5
Excavation for Streambed Material	25	0	- 25
New Streambed Material	0	50	+ 50
Concrete for Headwalls	0	120	+ 120
Crushed Stone beneath Headwalls	0	53	+53
Excavation for Headwalls	107	0	- 107
Excavation for Culvert	275	0	- 275
Riprap Apron	0	3	+ 3
Proposed Culvert	0	97	+ 97
Streambed Material in Culvert	0	34	+34
Total Permanent	**434**	**368**	**- 66 (cut)**
Temporary Fill for Roadway Bypass	0	390	+390
Riprap Armoring for Roadway Fill	0	59	+49
Total Temporary	**0**	**439**	**+439 (fill)**

Tighe&Bond

APPENDIX H

DAVISON ENVIRONMENTAL

10 Maple Street
Chester, CT 06412
860-803-0938
www.davisonenvironmental.com

Biodiversity Studies • Wetland Delineation & Assessment • Habitat Management • GIS Mapping • Permitting • Forestry

WETLANDS / WATERCOURSES DELINEATION REPORT

Date of Work: *7/3/2020*

Project Location: *Todd Drive, Monroe*

Client:
Mike Shevlin, Jr.
Shevlin Land Surveying, LLC

IDENTIFICATION OF WETLANDS AND WATERCOURSES RESOURCES

Wetlands and watercourses present on property? Yes ☒ No ☐

Wetlands:		Watercourses:		Identification Method:	
Inland Wetlands	☒	Perennial Streams	☒	Auger and Spade	☒
Tidal Wetlands	☐	Intermittent Watercourses	☐	Backhoe Pits	☐

Numbering Sequences:

1-3A	
4A-11	
12-23	
24-30	
31-38	

Wetland Plant Communities Present:

Forest ☒
Sapling/Shrub ☐
Wet Meadow ☐
Marsh ☐
Upland/Streamside ☒

Definitions and methodology for identification of state regulated wetlands & watercourses

Wetlands and watercourses are regulated in the State of Connecticut General Statutes, Chapter 440, sections 22a-28 to 22a-45. The Statutes are divided into the Inland Wetlands and Watercourses Act (sections 22a-36 to 22a-45) and the Tidal Wetlands Act (sections 22a-28 to 22a-35). Inland Wetlands "means land, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35, inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey, as may be amended from time to time, of the National Resources Conservation Service (NRCS) of the United States Department of Agriculture" section 22a-38(15). Watercourses "means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to sections 22a-28 to 22a-35, inclusive. Intermittent watercourses shall be delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: (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 particular storm incident, and (C) the presence of hydrophytic vegetation" section 22a-38(16). Tidal Wetlands are defined as "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 low lands 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 some, but not necessarily all of the following" (includes plant list) section 22a-29(2).

WETLAND SOIL TYPES

Wetland soils consist of the Ridgebury, Leicester and Whitman complex, as well as Aquents. Ridgebury, Leicester and Whitman is an undifferentiated mapping unit consisting of two poorly drained (Ridgebury and Leicester) and one very poorly drained (Whitman) soil developed on glacial till in depressions and drainageways in uplands and valleys. Their use interpretations are very similar, and they typically are so intermingled on the landscape that separation is not practical. The Ridgebury and Leicester series have a seasonal high water table at or near the surface (0-6") from fall through spring. They differ in that the Leicester soil has a more friable compact layer or hardpan, while the Ridgebury soils have a dense to very dense compact layer. The Whitman soil has a high water table for much of the year and may frequently be ponded.

Aquents is a miscellaneous land type used to denote man-made or man-disturbed areas that are wet. These soils have an aquic soil moisture regime and can be expected to support hydrophytic vegetation. Typically, these soils occur in places where less than 2 feet of earthen material have been placed over poorly or very poorly drained soils; areas where the natural soils have been mixed so that the natural soil layers are not identifiable; or where the soil materials have been excavated to the watertable.

NON-WETLAND SOILS

The non-wetland soils consist of Udorthents as well as the Canton and Charlton complex. Udorthents is a miscellaneous land type used to denote moderately well to excessively drained earthen material which has been so disturbed by cutting, filling, or grading that the original soil profile can no longer be discerned.

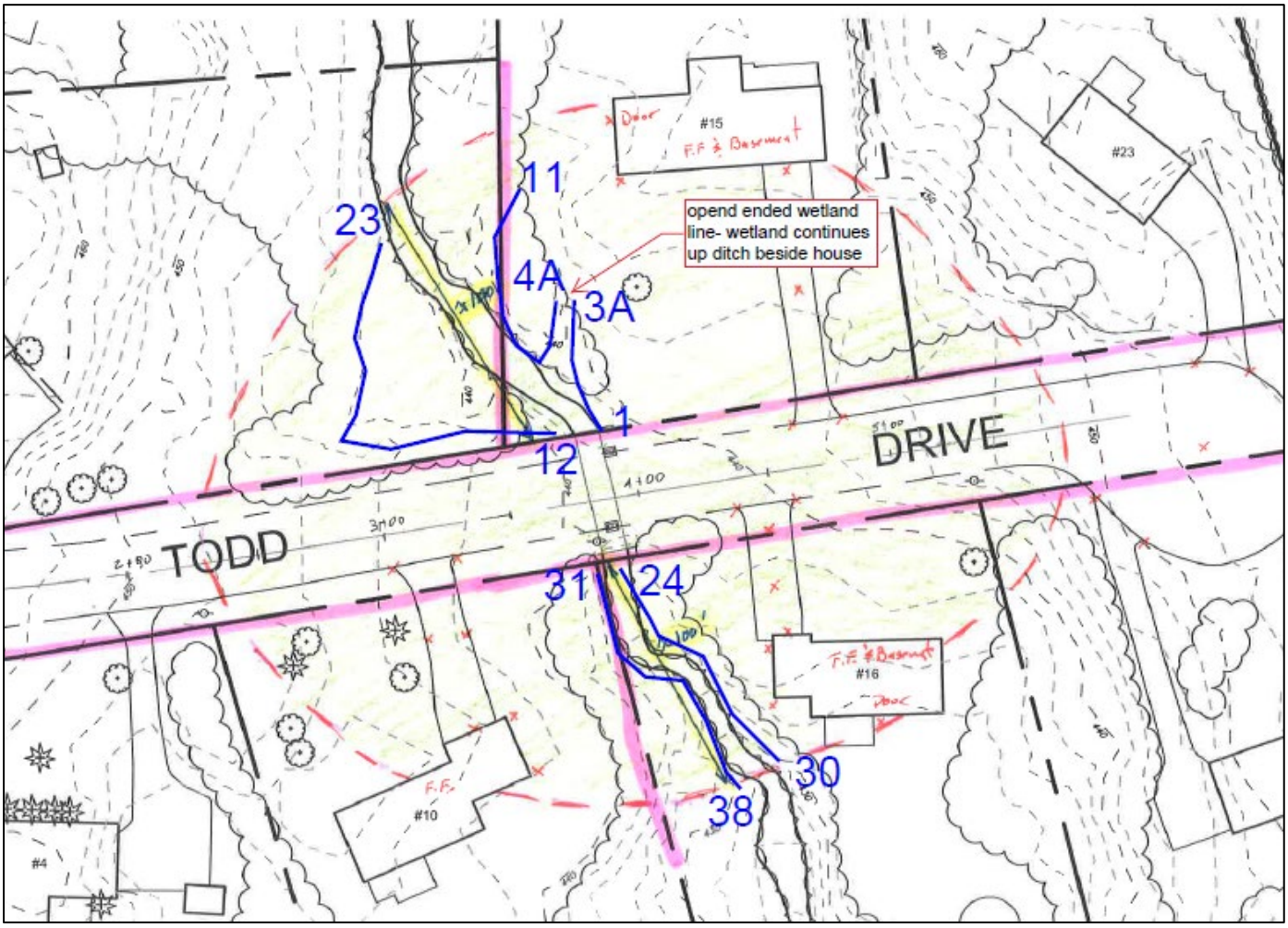
The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy glacial till. They are on nearly level to very steep glaciated plains, hills, and ridges. Permeability is moderately rapid in the solum and rapid in the substratum. The soils developed in a fine sandy loam mantle over acid sandy glacial till of Wisconsin age derived mainly from granite and gneiss and some fine-grained sandstone.

The Charlton series is a very deep, well drained loamy soil formed in friable till. They are nearly level to very steep soils on till plains and hills. Depth to bedrock and the seasonal high water table is commonly more than 6 feet.

NOTES:

Wetlands were delineated upstream and downstream of the existing culvert crossing. South of Todd Drive the delineated boundary consists of the top of the streambank (i.e., the ordinary high water mark). At several locations along the north side, there are small bordering wetlands. A sketch map illustrating the wetlands delineated is shown below. This map is intended for illustrative purposes only; the location and extent of wetlands is approximate.

WETLAND SKETCH MAP



Eric Davison
Certified Professional Wetland Scientist
Registered Soil Scientist

APPENDIX I

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

STATEWIDE INLAND WETLANDS & WATERCOURSES ACTIVITY REPORTING FORM

Pursuant to section 22a-39(m) of the General Statutes of Connecticut and section 22a-39-14 of the Regulations of Connecticut State Agencies, inland wetlands agencies must complete the Statewide Inland Wetlands & Watercourses Activity Reporting Form for **each** action taken by such agency.

This form may be made part of a municipality's inland wetlands application package. If the municipality chooses to do this, it is recommended that a copy of the Town and Quadrangle Index of Connecticut and a copy of the municipality's subregional drainage basin map be included in the package.

Please remember, the inland wetlands agency is responsible for ensuring that the information provided is **accurate** and that it reflects the **final** action of the agency. Incomplete or incomprehensible forms will be mailed back to the agency. Instructions for completing the form are located on the following pages.

The inland wetlands agency shall mail completed forms for actions taken during a calendar month no later than the 15th day of the following month to the Department of Energy and Environmental Protection (DEEP). Do **not** mail this cover page or the instruction pages. Please mail **only** the **completed** reporting form to:

DEEP Land & Water Resources Division
Inland Wetlands Management Program
79 Elm Street, 3rd Floor
Hartford, CT 06106

Questions may be directed to the DEEP's Inland Wetlands Management Program at (860) 424-3019.

This page is intentionally left blank.

INSTRUCTIONS FOR COMPLETING

THE STATEWIDE INLAND WETLANDS & WATERCOURSES ACTIVITY REPORTING FORM

Use a separate form to report EACH action taken by the Agency. Complete the form as described below.
Do NOT submit a reporting form for withdrawn actions.

PART I: Must Be Completed By The Inland Wetlands Agency

1. Choose the year and month the Inland Wetlands Agency took the action being reported. If multiple actions were taken regarding the same project or activity then multiple forms need to be completed.

2. Choose ONE code letter to describe the final action or decision taken by the Inland Wetlands Agency. Do NOT submit a reporting form for withdrawn actions. Do NOT enter multiple code letters (for example, if the same project or activity had both a permit issued and enforcement action, submit two forms for the two separate actions).

   A = A Permit Granted by the Inland Wetlands Agency (not including map amendments, see code D below)
   B = Any Permit Denied by the Inland Wetlands Agency
   C = A Permit Renewed or Amended by the Inland Wetlands Agency
   D = A Map Amendment to the Official Town Wetlands Map - or -
   An Approved/Permitted Wetland or Watercourse Boundary Amendment to a Project Site Map
   E = An Enforcement Action: Permit Revocation, Citation, Notice of Violation, Order, Court Injunction, or Court Fines
   F = A Jurisdictional Ruling by the Inland Wetlands Agency (activities "permitted as of right" or activities considered non-regulated)
   G = An Agent Approval pursuant to CGS 22a-42a(c)(2)
   H = An Appeal of Agent Approval Pursuant to 22a-42a(c)(2)

3. Check "yes" if a public hearing was held in regards to the action taken; otherwise check "no".

4. Enter the name of the Inland Wetlands Agency official verifying that the information provided on this form is accurate and that it reflects the FINAL action of the agency.

PART II: To Be Completed By The Inland Wetlands Agency Or The Applicant - If Part II is completed by the applicant, the applicant MUST return the form to the Inland Wetlands Agency. The Inland Wetlands Agency MUST ensure that the information provided is accurate and that it reflects the FINAL action of the Agency.

5. Enter the name of the municipality for which the Inland Wetlands Agency has jurisdiction and in which the action/project/activity is occurring.
   Check "yes" if the action/project/activity crosses municipal boundaries and enter the name(s) of the other municipality(ies) where indicated. Check "no" if it does not cross municipal boundaries.

6. Enter the USGS Quad Map name or number (1 through 115) as found on the Connecticut Town and Quadrangle Index Map (the directory to all USGS Quad Maps) that contains the location of the action/project/activity. USGS Quad Map information is available at: https://portal.ct.gov/-/media/deep/gis/resources/IndexNamedQuadTownpdf.pdf
   ALSO enter the four-digit identification number of the corresponding Subregional Drainage Basin in which the action/project/activity is located. If located in more than one subregional drainage basin, enter the number of the basin in which the majority of the action/project/activity is located. Town subregional drainage basin maps can be found at UConn CLEAR's website: https://media.clear.uconn.edu/data/watershed_maps/index.htm (no roads depicted) or at CTECO: http://www.cteco.uconn.edu/map_catalog.asp (depicts roads, choose town and a natural drainage basin map).

7. Enter the name of the individual applying for, petitioning, or receiving the action.

8. Enter the name and address or location of the action/project/activity. Check if the action/project/activity is TEMPORARY or PERMANENT in nature. Also provide a brief DESCRIPTION of the action/project/activity. It is always best to provide as much information as possible (for example, don't state "forestry," provide details such as "20 acre forest harvest, permit required for stream crossing.")

9. Carefully review the list below and enter ONLY ONE code letter which best characterizes the action/project/activity. All state agency projects must code "N".

A = Residential Improvement by Homeowner
B = New Residential Development for Single Family Units
C = New Residential Development for Multi-Family / Condos
D = Commercial / Industrial Uses
E = Municipal Project
F = Utility Company Project
G = Agriculture, Forestry or Conservation
H = Wetland Restoration, Enhancement, Creation
I = Storm Water / Flood Control
J = Erosion / Sedimentation Control
K = Recreation / Boating / Navigation
L = Routine Maintenance
M = Map Amendment
N = State Agency Project
P = Other (this code includes the approval of concept, subdivision or similar plans with no on-the-ground work)

10. Enter between one and four code numbers to best characterize the action/project/activity being reported. Enter "NA" if this form is being completed for the action of map amendment. You MUST provide code 12 if the activity is located in an established upland review area. You MUST provide code 14 if the activity is located beyond the established upland review area or no established upland review area exists.

1 = Filling
2 = Excavation
3 = Land Clearing / Grubbing (no other activity)
4 = Stream Channelization
5 = Stream Stabilization (includes lakeshore stabilization)
6 = Stream Clearance (removal of debris only)
7 = Culverting (not for roadways)
8 = Underground Utilities Only (no other activities)
9 = Roadway / Driveway Construction (including related culverts)
10 = Drainage Improvements
11 = Pond, Lake Dredging / Dam Construction
12 = Activity in an Established Upland Review Area
14 = Activity in Upland

Examples: Jurisdictional ruling allowing construction of a parking lot in an upland where the municipality does not have an established upland review area must use code 14, other possible codes are 2 and 10. Permitted construction of a free standing garage (residential improvement by homeowner) partially in an established upland review area with the remainder in the upland must use code 12 and 14, other possible codes are 1 and 2.

11. Leave blank for TEMPORARY alterations but please indicate action/project/activity is temporary under question #8 on the form. For PERMANENT alterations, enter in acres the area of wetland soils or watercourses altered. Include areas that are permanently altered, or are proposed to be, for all agency permits, denials, amendments, renewals, jurisdictional rulings, and enforcement actions. For those activities that involve filling or dredging of lakes, ponds or similar open water bodies enter the acres filled or dredged under "open water body." For those activities that involve directly altering a linear reach of a brook, river, lakeshore or similar linear watercourse, enter the total linear feet altered under "stream." Remember, these figures represent only the acreage altered, not the total acreage of wetlands or watercourses on the site. You MUST provide all information in ACRES (or linear feet as indicated) including those areas less than one acre. To convert from square feet to acres, divide square feet by the number 43,560. If this report is being completed for an agency jurisdictional ruling and detailed information is not available, provide an estimate. Enter zero if there is no alteration.

12. Enter in acres the area of upland altered as a result of an ACTIVITY REGULATED BY the inland wetlands agency, or as a result of an AGENT APPROVAL pursuant to CGS section 22a-42a(c)(2). Leave blank for TEMPORARY alterations but please indicate action/project/activity is temporary under question #8 on the form. Include areas that are permanently altered, or proposed to be permanently altered, for all agent approvals, agency permits, denials, amendments, renewals, jurisdictional rulings, and enforcement actions. You MUST provide all information in ACRES including those areas less than one acre. See directions above (#11) for conversion factor. If this report is being completed for an agent approval or an agency jurisdictional ruling and detailed information is not available, provide an estimate. Enter zero if there is no alteration.

13. Enter the acres that are, or are proposed to be, restored, enhanced or created for all agency permits, denials, amendments, renewals, jurisdictional rulings and enforcement actions. NOTE restored or enhanced applies to previously existing wetlands or watercourses. Created applies to a non-wetland or non-watercourse area which is converted into wetlands or watercourses. For created - question #10 must provide 12 and/or 14 as an answer, and question #12 must also be answered. You MUST provide all information in ACRES including those areas less than one acre. See directions above (#11) for conversion factor. Enter zero if there is no restoration, enhancement or creation.

PART III: To Be Completed By The DEEP - Please leave this area blank. Incomplete or incomprehensible forms will be mailed back to the inland wetlands agency.

Connecticut Department of
ENERGY & ENVIRONMENTAL PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

GIS CODE #: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
For DEEP Use Only

Statewide Inland Wetlands & Watercourses Activity Reporting Form

Please complete this form in accordance with the instructions on pages 2 and 3 and mail to:
DEEP Land & Water Resources Division, Inland Wetlands Management Program, 79 Elm Street, 3rd Floor, Hartford, CT 06106
Incomplete or incomprehensible forms will be mailed back to the inland wetlands agency.

PART I: Must Be Completed By The Inland Wetlands Agency

1. DATE ACTION WAS TAKEN: year: _____ month: _____
2. ACTION TAKEN (see instructions - one code only): _____
3. WAS A PUBLIC HEARING HELD (check one)? yes ☐ no ☐
4. NAME OF AGENCY OFFICIAL VERIFYING AND COMPLETING THIS FORM:
   (print name) _____ (signature) _____

PART II: To Be Completed By The Inland Wetlands Agency Or The Applicant

5. TOWN IN WHICH THE ACTIVITY IS OCCURRING (print name): Monroe
   does this project cross municipal boundaries (check one)? yes ☐ no ☒
   if yes, list the other town(s) in which the activity is occurring (print name(s)): _____, _____
6. LOCATION (see instructions for information): USGS quad name: Long Hill or number: 93
   subregional drainage basin number: 6025-03-1
7. NAME OF APPLICANT, VIOLATOR OR PETITIONER (print name): Town of Monroe
8. NAME & ADDRESS OF ACTIVITY / PROJECT SITE (print information): Todd Drive over Harvey Pete Brook
   briefly describe the action/project/activity (check and print information): temporary ☐ permanent ☒ description:
   Replacement of triple barrel culvert and headwalls
9. ACTIVITY *PURPOSE* CODE (see instructions - one code only): E
10. ACTIVITY *TYPE* CODE(S) (see instructions for codes): 9, 14, _____, _____
11. WETLAND / WATERCOURSE AREA ALTERED (see instructions for explanation, must provide acres or linear feet):
    wetlands: 0.080 acres open water body: 0 acres stream: 73 linear feet
12. UPLAND AREA ALTERED (must provide acres): 1.491 acres
13. AREA OF WETLANDS / WATERCOURSES RESTORED, ENHANCED OR CREATED (must provide acres): 0 acres

DATE RECEIVED:

PART III: To Be Completed By The DEEP

DATE RETURNED TO DEEP:

FORM COMPLETED: YES NO

FORM CORRECTED / COMPLETED: YES NO

9589 0710 5270 0970 0335 00

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

Hartford, CT 06106

OFFICIAL USE

Certified Mail Fee	$4.85
Extra Services & Fees (check box, add fee as appropriate)	
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$4.31
Total Postage and Fees	$9.16

PROSPECT, CT 06712 USPS AUG -7 2024 Postmark Here 08/07/2024

Sent To: CT Dept of Public Health
Street and Apt. No., or PO Box No.: 410 Capitol Ave
City, State, ZIP+4®: Hartford CT 06106

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 0970 0334 94

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
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For delivery information, visit our website at *www.usps.com®*.

Easton, CT 06612

OFFICIAL USE

Certified Mail Fee	$4.85
Extra Services & Fees (check box, add fee as appropriate)	
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$4.31
Total Postage and Fees	$9.16

PROSPECT, CT 06712 USPS AUG -7 2024 Postmark Here 08/07/2024

Sent To: Aquarion water
Street and Apt. No., or PO Box No.: 714 Black Rock Rd
City, State, ZIP+4®: Easton CT 06612

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

9589 0710 5270 0970 0334 70

U.S. Postal Service™
CERTIFIED MAIL® RECEIPT
Domestic Mail Only

For delivery information, visit our website at *www.usps.com®*.

Shelton, CT 06484

OFFICIAL USE

Certified Mail Fee	$4.85
Extra Services & Fees (check box, add fee as appropriate)	
☐ Return Receipt (hardcopy)	$0.00
☐ Return Receipt (electronic)	$0.00
☐ Certified Mail Restricted Delivery	$0.00
☐ Adult Signature Required	$0.00
☐ Adult Signature Restricted Delivery	$
Postage	$4.31
Total Postage and Fees	$9.16

PROSPECT, CT 06712 USPS AUG -7 2024 Postmark Here 08/07/2024

Sent To: Inland Wetlands Commission
Street and Apt. No., or PO Box No.: 54 Hill St
City, State, ZIP+4®: Shelton CT 06484

PS Form 3800, January 2023 PSN 7530-02-000-9047 See Reverse for Instructions

22-1836-012-01
July 29, 2024

Inland Wetlands Commission
City of Shelton
54 Hill Street
Shelton, Connecticut 06484

Re: **Notice of Inland Wetlands Application**
Todd Drive Culvert Replacement
Town of Monroe

Dear Commissioners:

Tighe & Bond hereby provides notice that the Town of Monroe will be filing an application with the Town of Monroe Inland Wetlands Commission for the replacement of a triple barrel culvert system which conveys Harvey Pete Brook beneath Todd Drive. The existing culverts, a 36" corrugated metal pipe, and 24" and 36" reinforced concrete pipes are in poor condition. The new culvert will be a 18' wide, and 5' high concrete box culvert set with the lowest foot below grade and filled with natural streambed material. New concrete endwalls will be constructed for the new culvert.

This notice is provided because the work will within 500 feet of Monroe's boundary with the City of Shelton.

During construction, a temporary 42" bypass culvert will be used to direct stream flow around the work area. The bypass culvert will be removed when the new culvert is completed.

The application is enclosed with this notification. Should you have any questions, please contact James Dimeo, PE, Town Engineer, Town of Monroe at (203) 452-2814, or jdimeo@monorect.gov.

Very truly yours,

TIGHE & BOND, INC.

Joseph Canas, PE, LEED AP, CFM
Principal Engineer

Enclosures: Application, Todd Drive Culvert Replacement
Copy: James Dimeo, PE, Town Engineer

J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Permitting\M1836-012 2024_07-29 letter city of shelton re application.docx

22-1836-012-01
July 29, 2024

Ms. Manisha Juthani, MD, Commissioner
State of Connecticut
Department of Public Health
410 Capitol Avenue
Hartford, Connecticut 06106

Re: **Notice of Inland Wetlands Application**
Todd Drive Culvert Replacement
Town of Monroe

Dear Commissioner Juthani:

Tighe & Bond hereby provides notice that the Town of Monroe will be filing an application with the Town of Monroe Inland Wetlands Commission for the replacement of a triple barrel culvert system which conveys Harvey Pete Brook beneath Todd Drive. The existing culverts, a 36" corrugated metal pipe, and 24" and 36" reinforced concrete pipes are in poor condition. The new culvert will be a 18' wide, and 5' high concrete box culvert set with the lowest foot below grade and filled with natural streambed material. New concrete endwalls will be constructed for the new culvert.

This notice is provided because the work will occur within a public water supply watershed.

During construction, a temporary 42" bypass culvert will be used to direct stream flow around the work area. The bypass culvert will be removed when the new culvert is completed.

The application is enclosed with this notification. Should you have any questions, please contact James Dimeo, PE, Town Engineer, Town of Monroe at (203) 452-2814, or jdimeo@monorect.gov.

Very truly yours,

TIGHE & BOND, INC.

Joseph Canas, PE, LEED AP, CFM
Principal Engineer

Enclosures: Application, Todd Drive Culvert Replacement
Copy: James Dimeo, PE, Town Engineer

J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Permitting\M1836-012 2024_07-29 letter aquarion re application.docx

22-1836-012-01
July 29, 2024

Aquarion Water Company of Connecticut
714 Black Rock Road
Easton, Connecticut 06612

Re: **Notice of Inland Wetlands Application**
Todd Drive Culvert Replacement
Town of Monroe

Dear Aquarion Water Company:

Tighe & Bond hereby provides notice that the Town of Monroe will be filing an application with the Town of Monroe Inland Wetlands Commission for the replacement of a triple barrel culvert system which conveys Harvey Pete Brook beneath Todd Drive. The existing culverts, a 36" corrugated metal pipe, and 24" and 36" reinforced concrete pipes are in poor condition. The new culvert will be a 18' wide, and 5' high concrete box culvert set with the lowest foot below grade and filled with natural streambed material. New concrete endwalls will be constructed for the new culvert.

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Very truly yours,

TIGHE & BOND, INC.

Joseph Canas, PE, LEED AP, CFM
Principal Engineer

Enclosures: Application, Todd Drive Culvert Replacement
Copy: James Dimeo, PE, Town Engineer

J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Permitting\M1836-012 2024_07-29 letter aquarion re application.docx

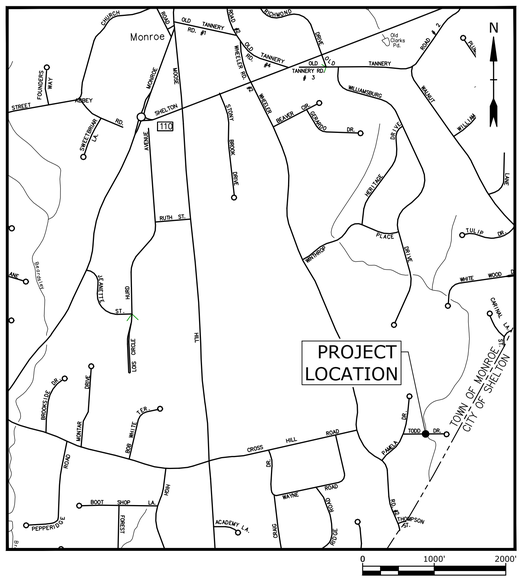
TOWN OF MONROE, CONNECTICUT

TODD DRIVE CULVERT REPLACEMENT

INLAND WETLANDS SUBMISSION

MAY 31, 2024

LIST OF DRAWINGS		
SHEET NO.	DRAWING NO.	DRAWING TITLE
GENERAL		
1	G-001	COVER SHEET
CIVIL		
2	C-001	GENERAL NOTES, LEGENDS ABBREVIATIONS, AND TYPICAL SECTIONS
3	C-002	EXISTING CONDITIONS PLAN
4	C-003	EXISTING CONDITIONS PLAN (ORTHOPHOTO)
5	C-004	BORING LOCATION PLAN
6	C-101	ALIGNMENT AND RIGHT-OF-WAY PLAN
7	C-201	ROADWAY CONSTRUCTION PLAN
8	C-210	CULVERT PLAN AND PROFILE
9	C-301	ROADWAY PROFILE
10	C-302	GRADING PLAN
11	C-303	GRADING ENLARGEMENT PLAN
12	C-401	SOIL EROSION AND SEDIMENT CONTROL PLAN PHASE 1
13	C-402	SOIL EROSION AND SEDIMENT CONTROL PLAN PHASE 2 AND 3
14	C-403	SOIL EROSION AND SEDIMENT CONTROL PLAN PHASE 4 AND 5
15	C-410	SOIL EROSION AND SEDIMENT CONTROL NOTES NARRATIVE AND DETAILS
16	C-411	SOIL EROSION AND SEDIMENT CONTROL DETAILS
17	C-501	DETAILS - 1
18	C-502	DETAILS - 2
19	C-503	DETAILS - 3
20	C-504	DETAILS - 4
21	C-505	DETAILS - 5
22	C-601	TEMPORARY ROADWAY WIDENING PLAN - PHASE 1
23	C-602	TEMPORARY ROADWAY WIDENING PLAN - PHASE 2
24	C-701	ROADWAY RESTORATION PLAN
25	C-702	RECOMMENDED PLANT LIST



LOCATION MAP
SCALE: 1" = 1000'

PREPARED BY:

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

PREPARED FOR:

TOWN OF MONROE
7 FAN HILL ROAD
MONROE, CONNECTICUT 06468

TERRY ROONEY, FIRST SELECTMAN

CHRISTOPHER NOWACKI, DIRECTOR, PUBLIC WORKS

JAMES DIMEO, PE, TOWN ENGINEER

COMPLETE SET 25 SHEETS

Last Saved: 4/30/2024
Plotted On: Jun 02, 2024 - 11:24am By: Canas
Tighe & Bond: J:\WM\1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-000-COVR.dwg

LEGEND

DESCRIPTION	EXISTING	PROPOSED
PROPERTY LINE		
RIGHT-OF-WAY LINE		
EASEMENT LINE		
LIMITS OF WORK		
INTERMEDIATE CONTOURS		
INDEX CONTOURS	25	25
SPOT GRADE	X 141.2	+ 32.0
MAGNITUDE & DIRECTION OF SLOPE		0.0%
STORM DRAIN	SD	SD
STORM UNDERDRAIN		UD
GRAVITY SANITARY SEWER	SS	SS
SANITARY SEWER FORCE MAIN	SFM	SFM
SANITARY SEWER LOW PRESSURE	SSLP	SSLP
SANITARY SEWER COMBINED	COMB	COMB
WATER SERVICE	W	W
POTABLE WATER	PW	PW
FIRE SERVICE		F
HIGH PRESSURE FIRE SERVICE		F-HP
UNDERGROUND ELECTRIC	E	E
PRIMARY ELECTRIC SERVICE	PE	PE
SECONDARY ELECTRIC	SE	SE
OVERHEAD ELECTRIC	OE	OE
TELEPHONE SERVICE	T	T
TEL-DATA SERVICE	T–D	T-D
COMMUNICATIONS SERVICE	T–C	T-C
CABLE TV SERVICE	CTV	CTV
GAS SERVICE	G	G
CHILLED WATER RETURN	CWR	CWR
CHILLED WATER SUPPLY	CWS	CWS
HOT WATER RETURN	HWR	HWR
HOT WATER SUPPLY	HWS	HWS
STEAM CONDENSATE	C	C
LOW PRESSURE STEAM	LPS	LPS
MEDIUM PRESSURE STEAM	MPS	MPS
HIGH PRESSURE STEAM	HPS	HPS
OXYGEN SERVICE		O
OVERHEAD UTILITY (UNSPECIFIED)	OHW	OHW
CURB		
EDGE OF PAVEMENT		
DIRT ROAD		
SIDEWALK		
RETAINING WALL		
STONE WALL		
FENCE - UNSPECIFIED	X	X
FENCE - CHAIN LINK		
FENCE - WOOD POST		
GUARDRAIL		
METAL BEAM RAIL		
TRAIN TRACKS		
STORM DRAIN STRUCTURES	MANHOLE D; CATCH BASIN CB	MANHOLE D; AREA DRAIN; CATCH BASIN CB
SANITARY SEWER MANHOLE	S	S
WATER SERVICE STRUCTURES	HYDRANT; MANHOLE W; VALVE	HYDRANT; MANHOLE W; VALVE
GAS SERVICE STRUCTURES	MANHOLE G; VALVE; GG	MANHOLE G; VALVE
ELECTRIC SERVICE STRUCTURES	UTILITY CO. POLE #; MANHOLE E; LIGHT	UTILITY CO. POLE #; MANHOLE E; LIGHT
TELECOMMUNICATIONS MANHOLE	T	T
TREELINE		
TREE	EVERGREEN; DECIDUOUS	EVERGREEN; DECIDUOUS

LEGEND

RESOURCE AREAS
VEGETATED WETLAND LIMIT
TOP OF BANK
MEAN ANNUAL HIGH WATER
LAND SUBJECT TO FLOODING
100-FOOT BUFFER ZONE
200-FOOT RIVERFRONT AREA
LOCAL RESOURCE AREA
LOCAL BUFFER ZONE - 1
LOCAL BUFFER ZONE - 2
WETLANDS WATER COURSE
WETLAND FLAG (WF)

LEGEND

DEMOLITION / GEOTECHNICAL
EROSION & SEDIMENT CONTROL
COFFERDAM
TURBIDITY CURTAIN
UTILITY TO BE ABANDONED
UTILITY TO BE DEMOLISHED
ITEM TO BE DEMOLISHED
TEST PIT
MONITORING WELL
BORING

ABBREVIATIONS

ABDN('D)	ABANDON(ED)
AC	ASBESTOS CEMENT PIPE
BC	BITUMINOUS CURB
BFP	BACK FLOW PREVENTOR
BIT	BITUMINOUS
BL	BASELINE
BLDG	BUILDING
BND	BOUND
BOC	BOTTOM OF CURB
BOT	BOTTOM
BS	BOTTOM OF STEP
BW	BOTTOM OF WALL
CATV	CABLE TELEVISION
CB	CATCH BASIN
CEM	CEMENT
CFS	CUBIC FEET PER SECOND
CI	CAST IRON PIPE
CL	CENTERLINE
CLF	CHAIN LINK FENCE
CO	CLEAN OUT
CONC	CONCRETE
CPP	CORRUGATED POLYETHYLENE PIPE
CY	CUBIC YARD
DH	DRILL HOLE
DI	DUCTILE IRON PIPE
DIA	DIAMETER
DMH	DRAIN MANHOLE
E	EAST
EF	EACH FACE
EG	EXISTING GRADE
EL/ELEV	ELEVATION
ELEC	ELECTRIC
EMH	ELECTRIC MANHOLE
EOP	EDGE OF PAVEMENT
EW	EACH WAY
EXIST	EXISTING
FES	FLARED END SECTION
FF	FINISH FLOOR
FM	FORCE MAIN
G	GAS
GG	GAS GATE
GPM	GALLONS PER MINUTE
GRAN	GRANITE
HC	HANDICAP
HDPE	HIGH DENSITY POLYETHYLENE
HMA	HOT MIX ASPHALT
HYD	HYDRANT
IN	INCHES
INV	INVERT
IP	IRON PIN
L	LENGTH OF CURB
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE

ABBREVIATIONS CONT'D

MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
MJ	MECHANICAL JOINT
N	NORTH
NITC	NOT IN THIS CONTRACT
NTS	NOT TO SCALE
N/A	NOT APPLICABLE
N/F	NOW OR FORMERLY
OC	ON CENTER
OCS	OUTLET CONTROL STRUCTURE
OH	OVERHEAD
PB	PLANT BED
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
PCPP	PERFORATED CORRUGATED POLYETHYLENE PIPE
PERF	PERFORATED
PI	POINT OF INTERSECTION
PRC	POINT OF REVERSE CURVATURE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	POINT OF TANGENCY
PVC	POLYVINYLCHLORIDE
PVMT	PAVEMENT
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REV	REVISION
ROW	RIGHT OF WAY
RT	RIGHT
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
S	SOUTH
SAN	SANITARY
SCH	SCHEDULE
SF	SQUARE FOOT
SMH	SEWER MANHOLE
SS	STAINLESS STEEL
STA	STATION
STL	STEEL
STRM	STORM
T	TANGENT LENGTH
TC	TOP OF CURB
TEL	TEL-DATA
TP	TEST PIT
TS	TOP OF STEP
TW	TOP OF WALL
TYP	TYPICAL
UP	UTILITY POLE
W	WATER
WG	WATER GATE
WV	WATER VALVE
XFMR	TRANSFORMER

UTILITY CONTACTS

ELECTRIC: EVERSOURCE
ROBERT MACEY
ROBERT.MACEY@EVERSOURCE.COM
(203) 845-3456

COMMUNICATIONS: CROWN CASTLE FIBER, LLC
ERIC CLARK
ERIC.CLARK@CROWNCASTLE.COM
(203) 649-3904

FRONTIER
LYNNE DELUCIA
LYNNE.M.DELUCIA@FTR.COM
(203) 238-5000

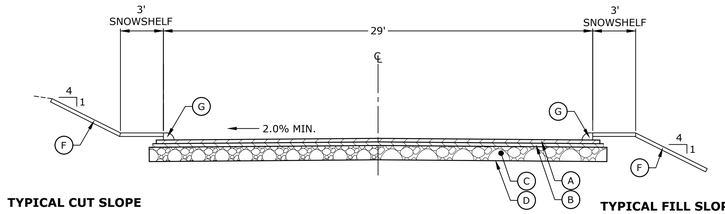
WILTEL COMMUNICATIONS
DAVID VEGA
DAVID.VEGA@CENTURYLINK.COM
(917) 207-4064

NATURAL GAS: EVERSOURCE
DAVID HATFIELD
DAVID.HATFIELD@EVERSOURCE.COM
(203) 592-3494

WATER: AQUARION WATER COMPANY OF CT
CARLOS VIZCARRANDO
CVIZCARRANDO@AQUARIONWATER.COM
(203) 337-5950

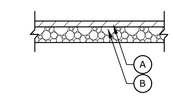
GENERAL NOTES

1. NOTIFY CALL BEFORE YOU DIG AT 1-800-922-4455 AND OTHER UTILITY OWNERS IN THE AREA NOT ON THE CALL BEFORE YOU DIG LIST AT LEAST 72 HOURS PRIOR TO ANY DIGGING, TRENCHING, ROCK REMOVAL, DEMOLITION, BORING, BACKFILLING, GRADING, LANDSCAPING, OR ANY OTHER EARTH MOVING OPERATIONS.
2. LOCATIONS OF EXISTING UTILITIES ARE APPROXIMATE. IN ADDITION, SOME UTILITIES MAY NOT BE SHOWN. DETERMINE THE EXACT LOCATION OF UTILITIES BY TEST PIT OR OTHER METHODS, AS NECESSARY TO PREVENT DAMAGE TO UTILITIES AND/OR INTERRUPTIONS IN UTILITY SERVICE. PERFORM TEST PIT EXCAVATIONS AND OTHER INVESTIGATIONS TO LOCATE UTILITIES, AND PROVIDE THIS INFORMATION TO THE ENGINEER, PRIOR TO CONSTRUCTING THE PROPOSED IMPROVEMENTS. LOCATE ALL EXISTING UTILITIES TO BE CROSSED BY HAND EXCAVATION.
3. NOT ALL OF THE UTILITY SERVICES TO BUILDINGS ARE SHOWN. THE CONTRACTOR SHALL ANTICIPATE THAT EACH PROPERTY HAS SERVICE CONNECTIONS FOR THE VARIOUS UTILITIES.
4. BOLD TEXT AND LINES INDICATE PROPOSED WORK. LIGHT TEXT AND LINES INDICATE APPROXIMATE EXISTING CONDITIONS.
5. TIGHE & BOND ASSUMES NO RESPONSIBILITY FOR ANY ISSUES, LEGAL OR OTHERWISE, RESULTING FROM CHANGES MADE TO THESE DRAWINGS WITHOUT WRITTEN AUTHORIZATION FROM TIGHE & BOND.
6. EXCAVATE ADDITIONAL TEST PITS TO LOCATE EXISTING UTILITIES AS DIRECTED OR APPROVED BY THE ENGINEER.
7. NOTIFY THE ENGINEER OF ANY UTILITIES IDENTIFIED DURING CONSTRUCTION THAT ARE NOT SHOWN ON THE DRAWINGS OR THAT DIFFER IN SIZE OR MATERIAL.
8. THE CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY; COORDINATION WITH THE OWNER, ALL SUBCONTRACTORS, AND WITH OTHER CONTRACTORS WORKING WITHIN THE LIMITS OF WORK, THE MEANS AND METHODS OF CONSTRUCTING THE PROPOSED WORK.
9. OBTAIN, PAY FOR AND COMPLY WITH PERMITS, NOTICES AND FEES NECESSARY TO COMPLETE THE WORK. ARRANGE AND PAY FOR NECESSARY INSPECTIONS AND APPROVALS FROM THE JURISDICTIONAL AUTHORITIES.
10. SHORE UTILITY TRENCHES WHERE FIELD CONDITIONS DICTATE AND/OR WHERE REQUIRED BY LOCAL, STATE AND FEDERAL HEALTH AND SAFETY CODES.
11. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO CONSTRUCTION. IF FIELD CONDITIONS ARE OBSERVED THAT VARY SIGNIFICANTLY FROM THOSE SHOWN ON THE DRAWINGS, IMMEDIATELY NOTIFY THE ENGINEER IN WRITING FOR RESOLUTION OF THE CONFLICTING INFORMATION.
12. PROTECT AND MAINTAIN ALL UTILITIES IN THE AREAS UNDER CONSTRUCTION DURING THE WORK. LEAVE ALL PIPES AND STRUCTURES WITHIN THE LIMITS OF THE CONTRACT IN A CLEAN AND OPERABLE CONDITION AT THE COMPLETION OF THE WORK. TAKE ALL NECESSARY PRECAUTIONS TO PREVENT SAND AND SILT FROM DISTURBED AREAS FROM ENTERING THE DRAINAGE SYSTEM.
13. NOTIFY THE ENGINEER IN WRITING OF ANY CONFLICT, ERROR, AMBIGUITY, OR DISCREPANCY WITH THE PLANS OR BETWEEN THE PLANS AND ANY APPLICABLE LAW, REGULATION, CODE, STANDARD SPECIFICATION, OR MANUFACTURER'S INSTRUCTIONS.
14. THE CONTRACTOR IS RESPONSIBLE FOR SUPPORT OF EXISTING UTILITIES AND REPAIR OR REPLACEMENT COSTS OF UTILITIES DAMAGED DURING CONSTRUCTION, WHETHER ABOVE OR BELOW GRADE. REPLACE DAMAGED UTILITIES IMMEDIATELY AT NO ADDITIONAL COST TO THE OWNER AND AT NO COST TO THE PROPERTY OWNER.
15. TAKE NECESSARY MEASURES AND PROVIDE CONTINUOUS BARRIERS OF SUFFICIENT TYPE, SIZE, AND STRENGTH TO PREVENT ACCESS TO ALL WORK AND STAGING AREAS AT THE COMPLETION OF EACH DAYS WORK.
16. NO OPEN TRENCHES WILL BE ALLOWED OVER NIGHT. THE USE OF ROAD PLATES TO PROTECT THE EXCAVATION WILL BE CONSIDERED UPON REQUEST, BUT BACKFILLING IS PREFERRED.
17. THE CONTRACTOR IS RESPONSIBLE FOR ALL NECESSARY TRAFFIC CONTROL/SAFETY DEVICES TO ENSURE SAFE VEHICULAR AND PEDESTRIAN ACCESS THROUGH THE WORK AREA, OR FOR SAFELY IMPLEMENTING DETOURS AROUND THE WORK AREA. PERFORM TRAFFIC CONTROL IN ACCORDANCE WITH THE CONTRACTOR'S APPROVED TRAFFIC CONTROL PLAN.
18. MAINTAIN EMERGENCY ACCESS TO ALL PROPERTIES WITHIN THE PROJECT AREA AT ALL TIMES DURING CONSTRUCTION.
19. WHEN WORKING IN THE ROAD, PROVIDE THE OWNER AND LOCAL FIRE/POLICE/SCHOOL AUTHORITIES A DETAILED PLAN OF APPROACH INDICATING METHODS OF PROPOSED TRAFFIC ROUTING ON A DAILY BASIS. PROVIDE COORDINATION TO ENSURE COMMUNICATION AND COORDINATION BETWEEN THE OWNER, CONTRACTOR AND LOCAL FIRE/POLICE/SCHOOL AUTHORITIES THROUGHOUT THE CONSTRUCTION PERIOD.
20. REMOVE AND DISPOSE OF ALL CONSTRUCTION-RELATED WASTE MATERIALS AND DEBRIS IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL LAWS.
21. THE TERM "DEMOLISH" USED ON THE DRAWINGS MEANS TO REMOVE AND DISPOSE OF IN ACCORDANCE WITH LOCAL, STATE, AND FEDERAL REQUIREMENTS.
22. THE TERM "ABANDON" USED ON THE DRAWINGS MEANS TO LEAVE IN PLACE AND TAKE APPROPRIATE MEASURES TO DECOMMISSION AS SPECIFIED OR NOTED ON THE DRAWINGS.
23. ALL PROPOSED WORK MAY BE ADJUSTED IN THE FIELD BY THE OWNER'S PROJECT REPRESENTATIVE TO MEET EXISTING CONDITIONS..
24. PIPE AND CULVERT LENGTHS MEASURED ALONG CENTERLINE, UNLESS OTHERWISE NOTED.



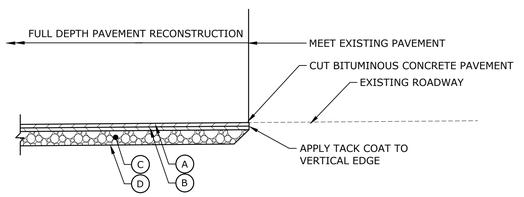
TYPICAL CUT SLOPE — TYPICAL FILL SLOPE

TYPICAL ROADWAY SECTION
SCALE: 1" = 5'



A - 3" HMA S0.5
B - 8" ROLLED GRAVEL SUBBASE

TEMPORARY PAVEMENT
NOT TO SCALE



A - 1-1/2" HMA S0.375
B - 2-1/2" HMA S0.5
C - 10" ROLLED GRAVEL SUBBASE
D - EXISTING SUBGRADE
F - PLACE 4" TOPSOIL AND ESTABLISH TURF
G - BITUMINOUS CONCRETE CURB

LONGITUDINAL SECTION
NOT TO SCALE

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

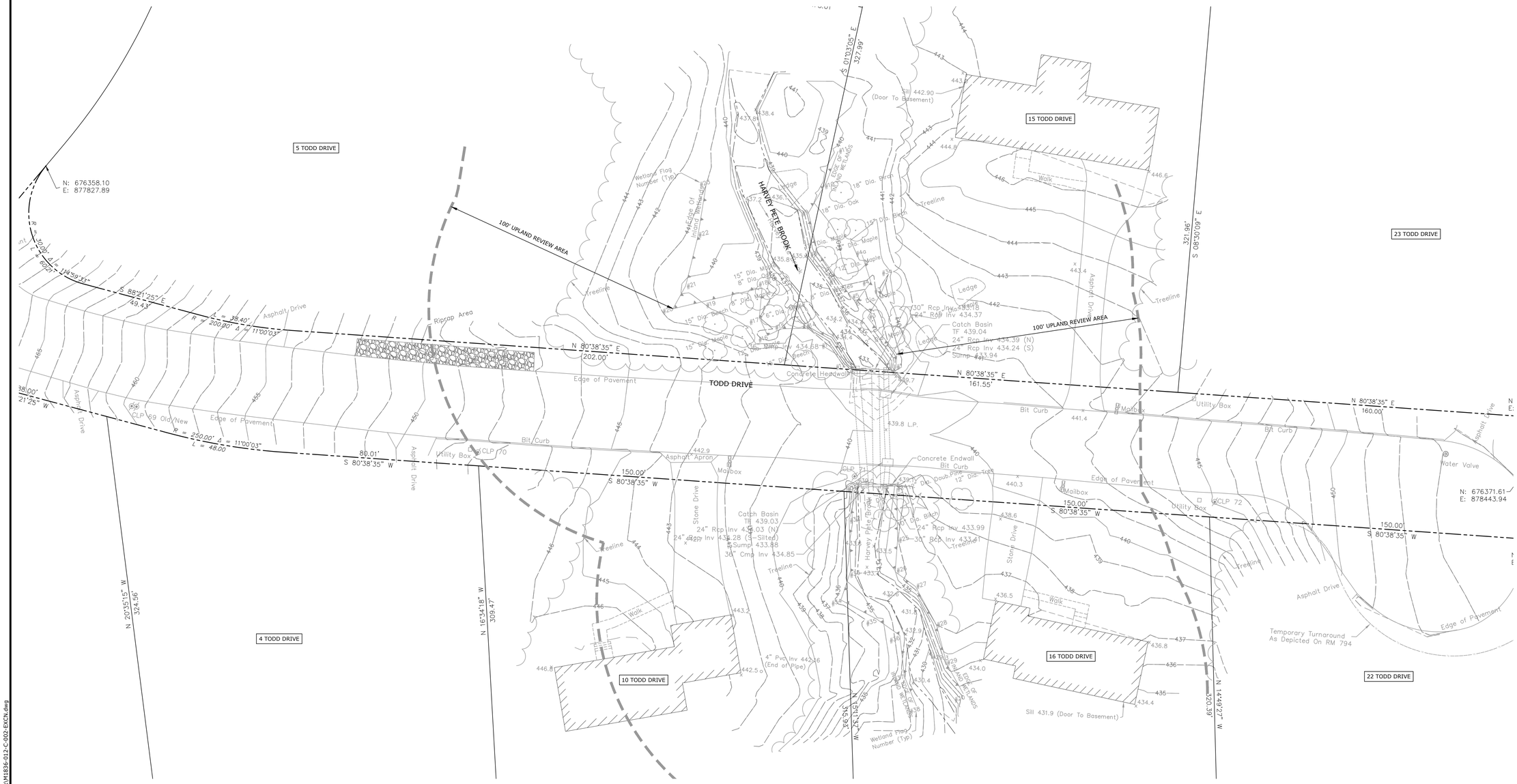
PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-001-GENR.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

GENERAL NOTES, ABBREVIATIONS, LEGENDS AND TYPICAL SECTIONS

SCALE: NO SCALE

C-001

Last Saved: 5/29/2024
Plotted On:Jun 02, 2024-11:24am By: Canas3
Tighe & Bond:J:\W\M1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-001-GENR.dwg



EXISTING CONDITIONS PLAN NOTES

1. PLANS BASED ON DRAWING ENTITLED "GENERAL LOCATION SURVEY, PREPARED FOR TOWN OF MONROE, TODD DRIVE, MONROE, CONNECTICUT," PREPARED BY SHEVLIN LAND SURVEYING, LLC, DATED JULY 28, 2020.
2. VERTICAL DATUM: NAVD88
3. HORIZONTAL DATUM: NAD83
4. INLAND WETLANDS IDENTIFIED BY DAVISON ENVIRONMENTAL IN JULY 2020. WETLAND FLAGS WERE LOCATED BY SHEVLIN LAND SURVEYING, LLC ON JULY 14, 2020.
5. NO SPECIAL FLOOD HAZARD AREAS EXIST WITHIN THE PROJECT SITE. REFER TO FEMA FIRM PANEL 09001C0279F, EFFECTIVE JUNE 18, 2010.

0 20' 40'
SCALE: 1" = 20'

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-002-EXCN.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

EXISTING CONDITIONS PLAN

SCALE: 1" = 20'

C-002

Last Saved: 2/29/2024
Plotted On:Jun 02, 2024-11:25am By: Canas3
Tighe & Bond:J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-002-EXCN.dwg

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

EXISTING CONDITIONS PLAN NOTES

1. PLANS BASED ON DRAWING ENTITLED "GENERAL LOCATION SURVEY, PREPARED FOR TOWN OF MONROE, TODD DRIVE, MONROE, CONNECTICUT," PREPARED BY SHEVLIN LAND SURVEYING, LLC, DATED JULY 28, 2020.
2. VERTICAL DATUM: NAVD88
3. HORIZONTAL DATUM: NAD83
4. INLAND WETLANDS IDENTIFIED BY DAVISON ENVIRONMENTAL IN JULY 2020. WETLAND FLAGS WERE LOCATED BY SHEVLIN LAND SURVEYING, LLC ON JULY 14, 2020.
5. NO SPECIAL FLOOD HAZARD AREAS EXIST WITHIN THE PROJECT SITE. REFER TO FEMA FIRM PANEL 09001C0279F, EFFECTIVE JUNE 18, 2010.

0 20' 40'
SCALE: 1" = 20'

INLAND WETLANDS SUBMISSION

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Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-002-EXCN.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

EXISTING CONDITIONS PLAN (ORTHOPHOTO)

SCALE: 1" = 20'

C-003

Last Saved: 2/29/2024
Plotted On:Jun 03, 2024-11:25am By: Canasj
Tighe & Bond:J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-002-EXCN.dwg

Tighe&Bond
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INLAND WETLANDS SUBMISSION

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Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

PLAN
SCALE: 1" = 30'

BORING LOCATION PLAN NOTES

1. PLANS BASED ON DRAWING ENTITLED "GENERAL LOCATION SURVEY, PREPARED FOR TOWN OF MONROE, TODD DRIVE, MONROE, CONNECTICUT," PREPARED BY SHEVLIN LAND SURVEYING, LLC, DATED JULY 28, 2020.
2. VERTICAL DATUM: NAVD88
3. HORIZONTAL DATUM: NAD83
4. INLAND WETLANDS IDENTIFIED BY DAVISON ENVIRONMENTAL IN JULY 2020. WETLAND FLAGS WERE LOCATED BY SHEVLIN LAND SURVEYING, LLC ON JULY 14, 2020.
5. NO SPECIAL FLOOD HAZARD AREAS EXIST WITHIN THE PROJECT SITE. REFER TO FEMA FIRM PANEL 09001C0279F, EFFECTIVE JUNE 18, 2010.

General Borings, Inc.
P. O. BOX 7135 PROSPECT, CT 06712

CLIENT: Tighe & Bond	PROJECT NAME: Todd Dr Culvert Replacement	SHEET 1 OF 1	SOIL ENGINEER
FOREMAN/DRILLER: Thomas McGovern	LOCATION: Monroe, CT		DESIGN ENGINEER
INSPECTOR:	GBI JOB NO. 219-23		
Surface Elevation:			
Date Started: 11/10/23	Date Finished: 11/10/23	Hole No. B-1	

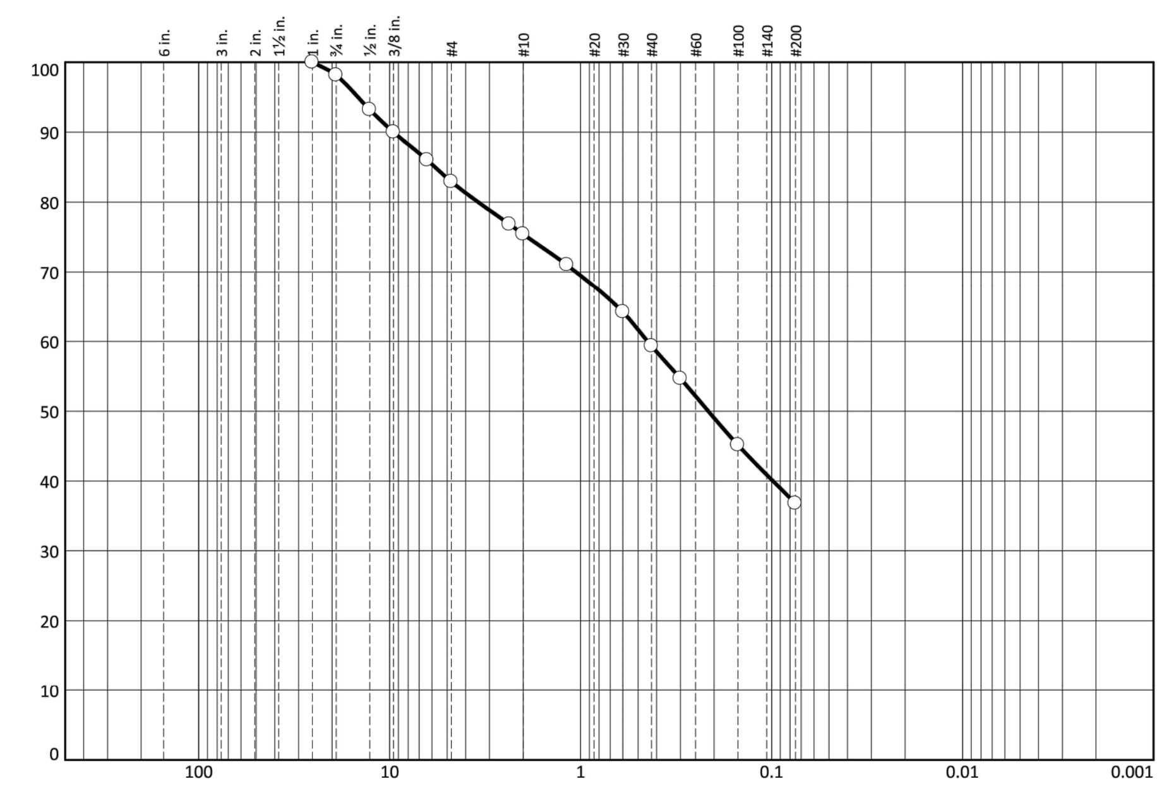
	S Auger / H Auger	Casing	Sampler	Core Bar	
TYPE		HA	S. S.		Line & Station
Size I. D.		3-1/4"	1-3/8"		Offset L R
Hammer			140 LBS.	Bit	N Coordinate
Fall			30"		E. Coordinate

Groundwater Observations: AT 7.0 AFTER 0.0 HRS; AT AFTER HRS

DEPTH	Casing blows per foot	Sample Depth in Feet From - To	NO.	PEN. IN	REC. IN	TYPE	Blows 0-6	6-12	12-18	18-24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											.6'	7" Blacktop
		1.0-3.0	1	24	20	SS	7	9	13	18		1) Medium-Top 6" Brown fine-medium SAND, trace coarse-fine gravel, trace silt. Middle 4" Dark gray fine-medium SAN little silt. Bottom 10" Brown silty fine SAND, tra mica. (FILL)
5		5.0-7.0	2	24	10	SS	6	6	18	19	7.0'	
		7.0-8.8	3	21	12	SS	19	33	50	50/3	SAND GRAVEL	2) Medium-Dark gray brown fine-medium SAND, little silt, little fine-coarse gravel. (FILL)
10		10.0-10.7	4	8	5	SS	30	50/2				3) Very dense-Top 7" Same as above Bottom 5" Brown fine-medium SAND, little silt, fine-coarse gravel, mica, weathered rock, wet.
15											14.0' EOB	4) Very dense-Brown fine-medium SAND, little silt, trace fine gravel, weathered rock. Auger refusal at 14.0'
20												END OF BORING 14.0'
25												
30												
35												
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet
Feet in Earth 14 Feet in Rock 0 No. of Samples 4 **Hole No.** B-1
SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON
PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.ASTM Method Used: C136

% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	1.8	15.3	7.5	16.1	22.5	36.8	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1	100.0		
3/4	98.2		
1/2	93.2		
3/8	90.0		
1/4	86.0		
#4	82.9		
#8	76.8		
#10	75.4		
#16	71.0		
#30	64.2		
#40	59.3		
#50	54.7		
#100	45.1		
#200	36.8		

* (no specification provided)

Soil Description
Brown Silty Sand with Gravel

Atterberg Limits
PL= NP LL= NV PI= NP

Coefficients
D_{90}= 9.5439 D_{85}= 5.7752 D_{60}= 0.4460
D_{50}= 0.2144 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification
USCS= SM AASHTO= A-4(0)

Remarks
Hole B-1 5'-9"

Source of Sample: Todd Drive Monroe
Sample Number: 23-3973
Date: 11/28/2023

COASTAL MATERIALS TESTING LAB, LLC
West Haven, Connecticut
Client: General Boring, Inc.
Project: Various
Project No: 22-1452 **Figure**

Tested By: Shehzad Ahmad **Checked By:** Salah Al-Bakri

BORING B-1

General Borings, Inc.
P. O. BOX 7135 PROSPECT, CT 06712

CLIENT: Tighe & Bond	PROJECT NAME: Todd Dr Culvert Replacement	SHEET 1 OF 1	SOIL ENGINEER
FOREMAN/DRILLER: Thomas McGovern	LOCATION: Monroe, CT		DESIGN ENGINEER
INSPECTOR:	GBI JOB NO. 219-23		
Surface Elevation:			
Date Started: 11/10/23	Date Finished: 11/10/23	Hole No. B-2	

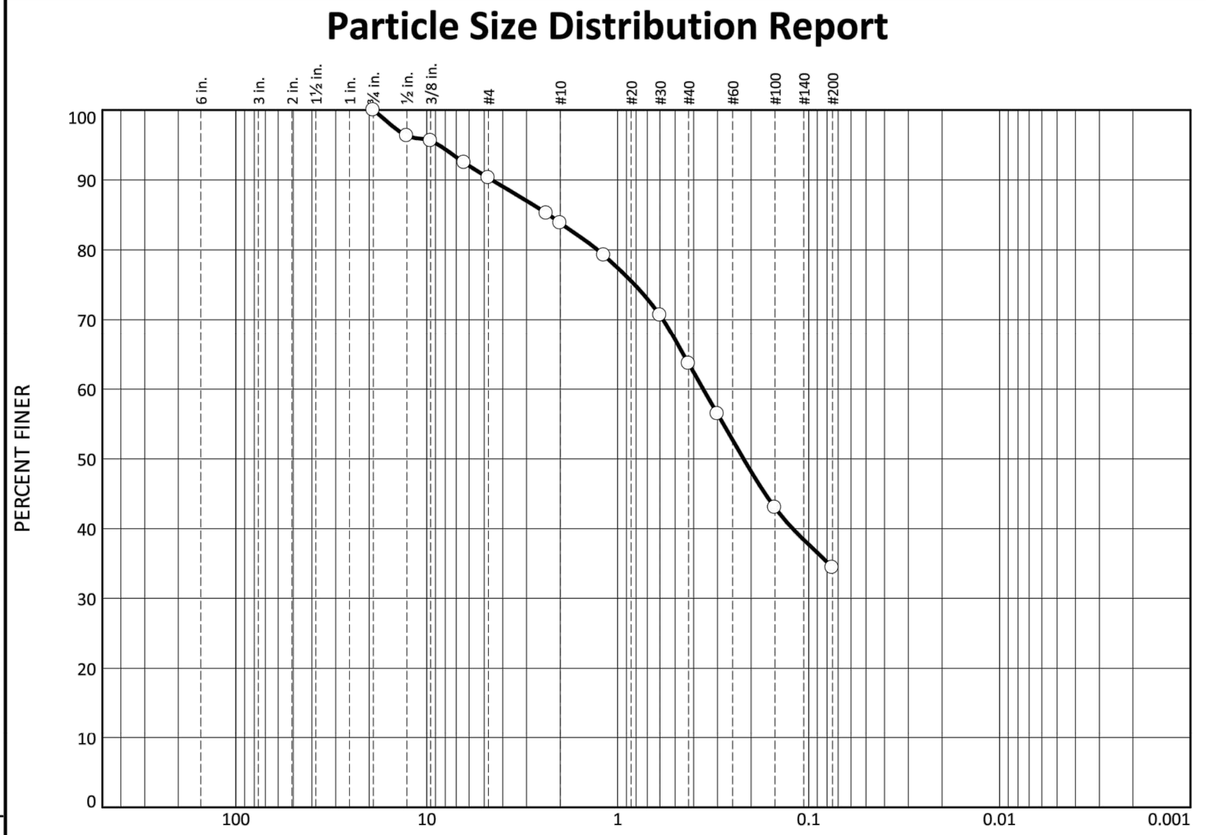
	S Auger / H Auger	Casing	Sampler	Core Bar	
TYPE		HA	S. S.		Line & Station
Size I. D.		3-1/4"	1-3/8"		Offset L R
Hammer			140 LBS.	Bit	N Coordinate
Fall			30"		E. Coordinate

Groundwater Observations: AT 6.0 AFTER 0.0 HRS; AT AFTER HRS

DEPTH	Casing blows per foot	Sample Depth in Feet From - To	NO.	PEN. IN	REC. IN	TYPE	Blows 0-6	6-12	12-18	18-24	STRATA CHANGE: DEPTH, ELEV.	FIELD IDENTIFICATION OF SOIL, REMARKS (INCL. COLOR, LOSS OF WASH WATER, ETC.)
											.7'	8" Blacktop
		1.0-3.0	1	24	14	SS	11	13	22	50	FILL	1) Dense-Brown to gray-brown fine-medium SAND, little fine-coarse gravel, little silt. (boulder fragments)
5		5.0-7.0	2	24	17	SS	7	6	13	21	7.5'	2) Medium-Gray-brown fine-medium SAND, little silt, (FILL)
		7.0-8.4	3	17	17	SS	27	32	50/5		SAND	3) Very dense-Top 6" Gray to brown fine-medium SAND, little silt, (FILL) Bottom 11" Brown fine-coarse SAND, trace silt, trace fine gravel, mica.
10		10.0-11.3	4	16	12	SS	36	45	50/4		SAND GRAVEL	4) Very dense-Brown fine-medium SAND, little silt, little fine-coarse grave mica. Auger grinding 11.5'-15.0'
15		15.0-15.1	5	1	1	SS	50/1				15.5' EOB	5) Very dense-ROCK fragments. Auger refusal at 15.5'
20												END OF BORING 15.5'
25												
30												
35												
40												

From Ground Surface to Feet Used in. Casing Then in. Casing For Feet
Feet in Earth 15.5 Feet in Rock 0 No. of Samples 5 **Hole No.** B-2
SAMPLE TYPE CODING: SS = DRIVEN C = CORE A = AUGER U = UNDISTURBED PISTON
PROPORTIONS USED: TRACE = 1-10% LITTLE = 10-20% SOME = 20-35% AND = 35-50%

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.ASTM Method Used: C136

% +3"	% Gravel Coarse	% Gravel Fine	% Sand Coarse	% Sand Medium	% Sand Fine	% Fines Silt	% Fines Clay
0.0	0.0	9.7	6.5	20.2	29.2	34.4	

SIEVE SIZE OR DIAMETER	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
3/4	100.0		
1/2	96.3		
3/8	95.6		
1/4	92.5		
#4	90.3		
#8	85.2		
#10	83.8		
#16	79.2		
#30	70.6		
#40	63.6		
#50	56.4		
#100	43.0		
#200	34.4		

* (no specification provided)

Soil Description
Brown Silty Sand

Atterberg Limits
PL= NP LL= NV PI=

Coefficients
D_{90}= 4.5611 D_{85}= 2.2938 D_{60}= 0.3567
D_{50}= 0.2190 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification
USCS= SM AASHTO= A-2-4(0)

Remarks
Hole B-2 5'-9"

Source of Sample: Todd Drive Monroe
Sample Number: 23-3974
Date: 11/28/2023

COASTAL MATERIALS TESTING LAB, LLC
West Haven, Connecticut
Client: General Boring, Inc.
Project: Various
Project No: 22-1452 **Figure**

Tested By: Shehzad Ahmad **Checked By:** Salah Al-Bakri

BORING B-2

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-004-BORE.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

BORING LOCATION PLAN

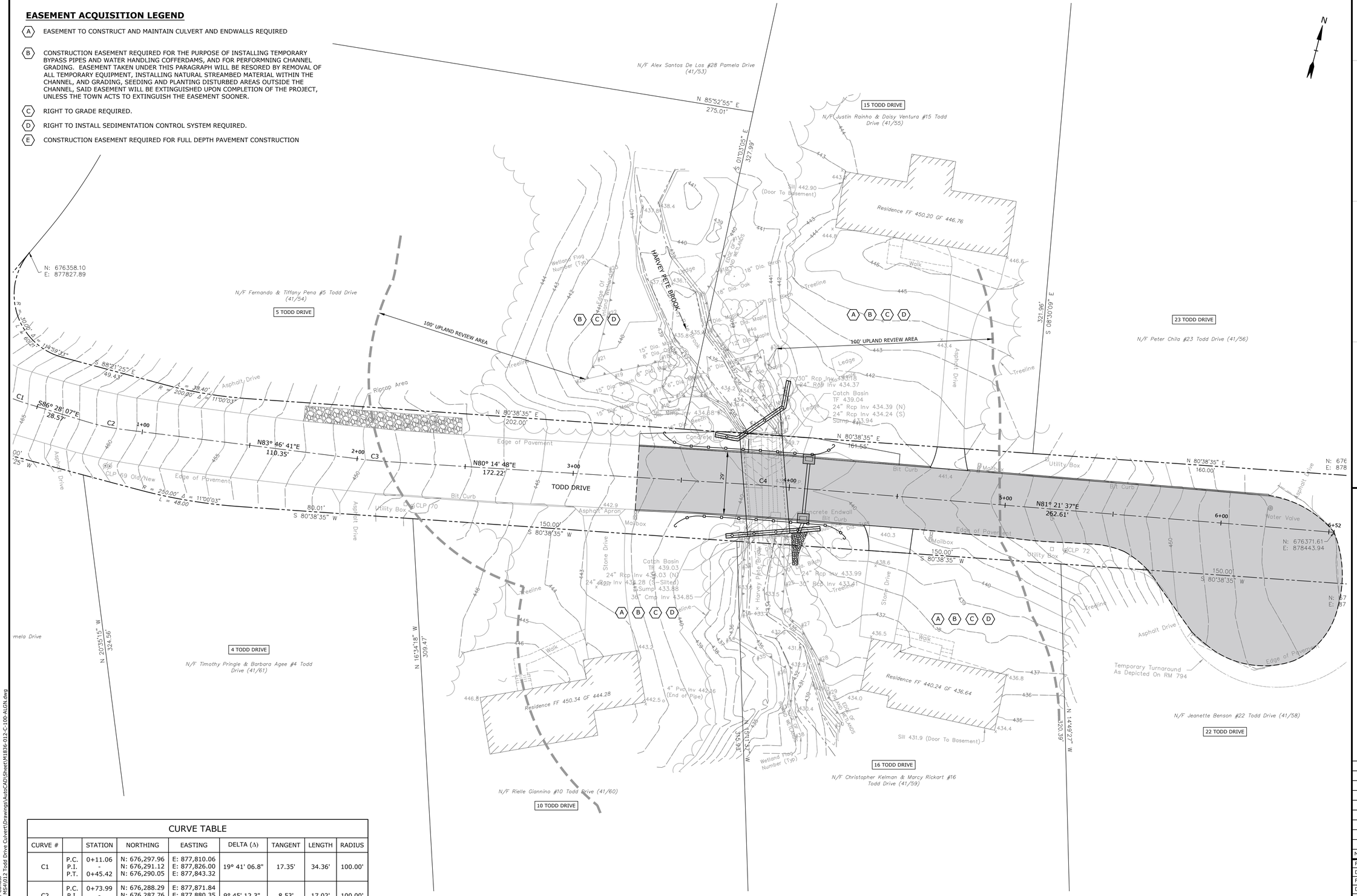
SCALE: 1" = 30'

C-004

Last Saved: 2/29/2024
Plotted On:Jun 02, 2024-11:26am By: Canas]
Tighe & Bond:J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-004-BORE.dwg

EASEMENT ACQUISITION LEGEND

- (A) EASEMENT TO CONSTRUCT AND MAINTAIN CULVERT AND ENDWALLS REQUIRED
- (B) CONSTRUCTION EASEMENT REQUIRED FOR THE PURPOSE OF INSTALLING TEMPORARY BYPASS PIPES AND WATER HANDLING COFFERDAMS, AND FOR PERFORMNING CHANNEL GRADING. EASEMENT TAKEN UNDER THIS PARAGRAPH WILL BE RESORED BY REMOVAL OF ALL TEMPORARY EQUIPMENT, INSTALLING NATURAL STREAMBED MATERIAL WITHIN THE CHANNEL, AND GRADING, SEEDING AND PLANTING DISTURBED AREAS OUTSIDE THE CHANNEL, SAID EASEMENT WILL BE EXTINGUISHED UPON COMPLETION OF THE PROJECT, UNLESS THE TOWN ACTS TO EXTINGUISH THE EASEMENT SOONER.
- (C) RIGHT TO GRADE REQUIRED.
- (D) RIGHT TO INSTALL SEDIMENTATION CONTROL SYSTEM REQUIRED.
- (E) CONSTRUCTION EASEMENT REQUIRED FOR FULL DEPTH PAVEMENT CONSTRUCTION



CURVE TABLE								
CURVE #		STATION	NORTHING	EASTING	DELTA (Δ)	TANGENT	LENGTH	RADIUS
C1	P.C. P.I. P.T.	0+11.06 - 0+45.42	N: 676,297.96 N: 676,291.12 N: 676,290.05	E: 877,810.06 E: 877,826.00 E: 877,843.32	19° 41' 06.8"	17.35'	34.36'	100.00'
C2	P.C. P.I. P.T.	0+73.99 - 0+91.02	N: 676,288.29 N: 676,287.76 N: 676,288.69	E: 877,871.84 E: 877,880.35 E: 877,888.84	9° 45' 12.3"	8.53'	17.02'	100.00'
C3	P.C. P.I. P.T.	2+01.37 - 2+13.69	N: 676,300.65 N: 676,301.32 N: 676,302.36	E: 877,998.54 E: 878,004.66 E: 878,010.74	3° 31' 52.1"	6.16'	12.33'	200.00'
C4	P.C. P.I. P.T.	3+85.91 - 3+89.80	N: 676,331.54 N: 676,331.86 N: 676,332.16	E: 878,180.47 E: 878,182.39 E: 878,184.31	1° 06' 48.1"	1.94'	3.89'	200.00'

Tighe&Bond
1000 Bridgeport Avenue
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INLAND WETLANDS SUBMISSION

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Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

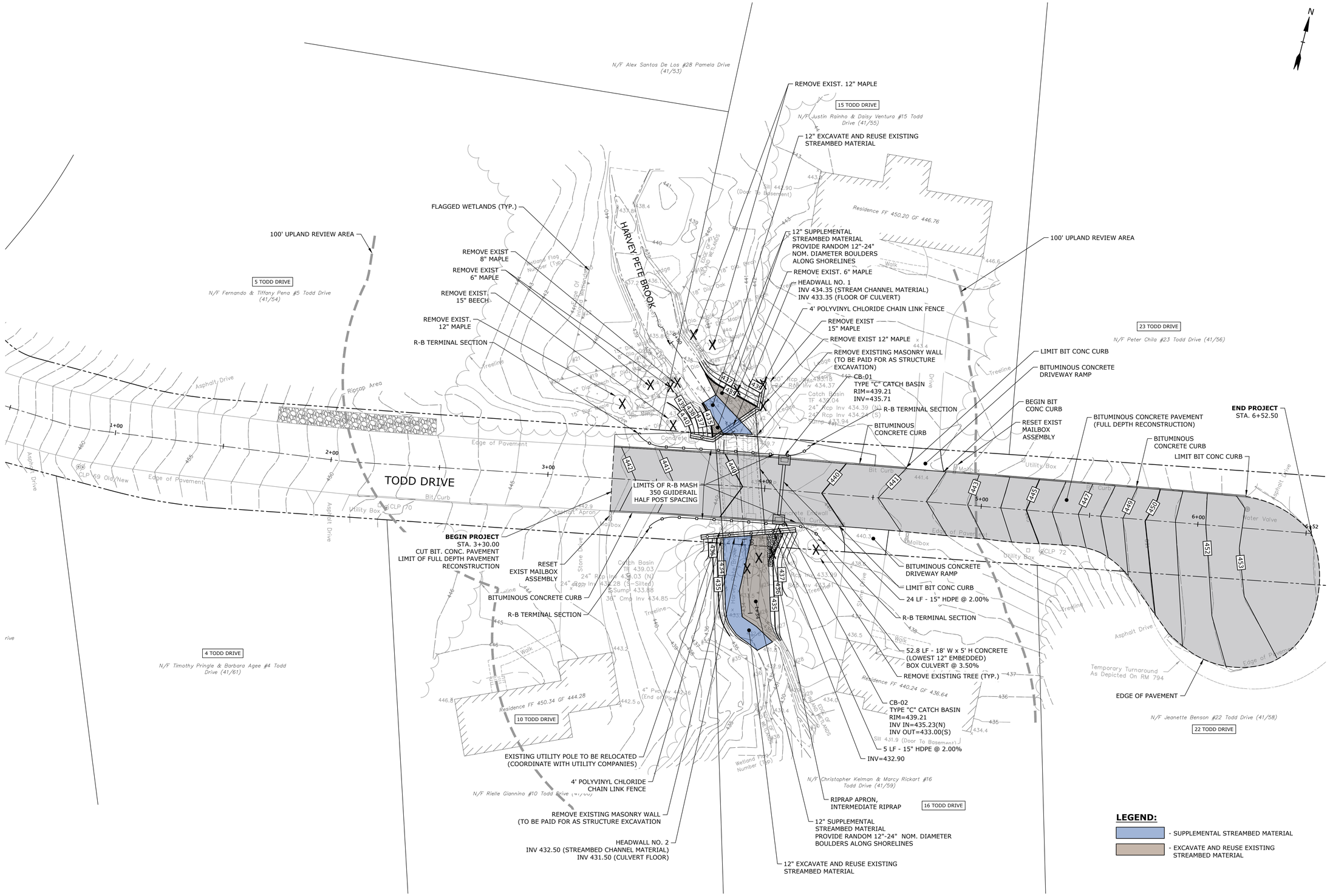
PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-100-ALGN.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

ALIGNMENT AND RIGHT OF WAY PLAN

SCALE: 1" = 20'

C-101

Last Saved: 3/29/2024
Plotted On:Jun 02, 2024-11:27am By: Canas3
Tighe & Bond:J:\M\M1836 Monroe CT HSA\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-100-ALGN.dwg



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SEMI-FINAL DESIGN

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Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

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DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

ROADWAY CONSTRUCTION PLAN

SCALE: 1" = 30'

C-201

Last Saved: 5/31/2024
Plotted On:Jun 02, 2024-11:27am By: Canas3
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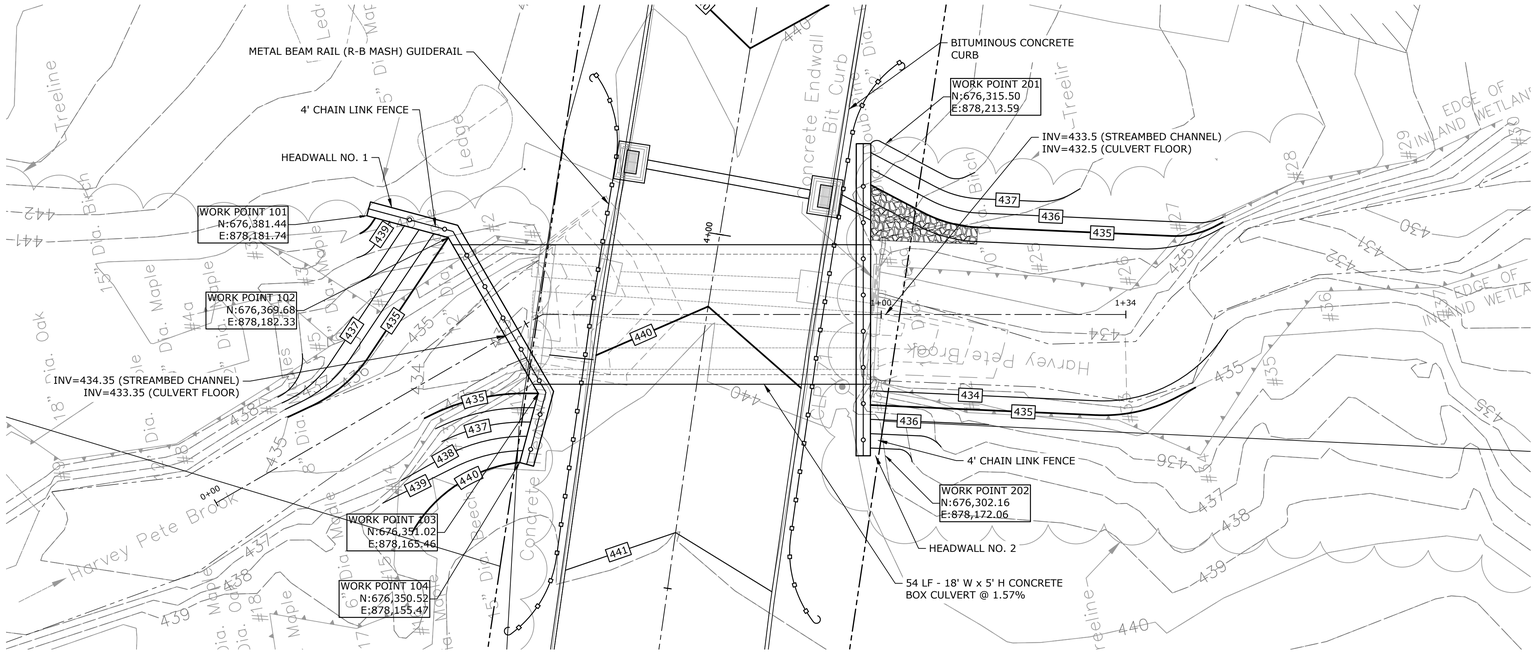
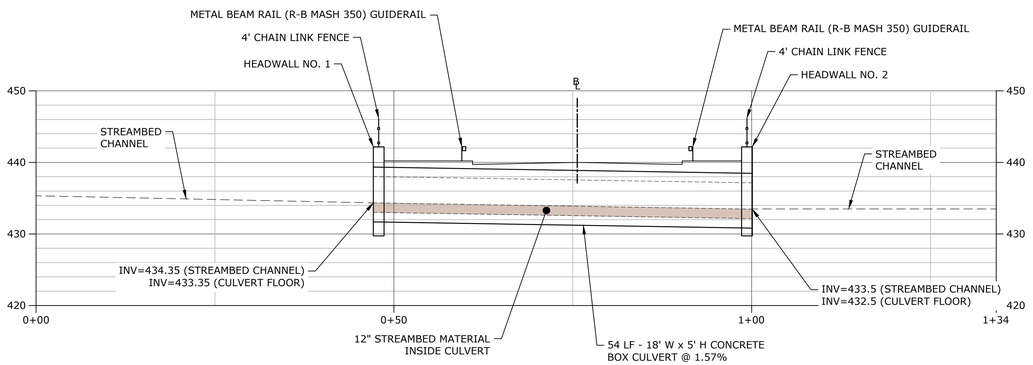


BOX CULVERT - PLAN
SCALE: 1' = 10'



BOX CULVERT - PROFILE
SCALE: 1' = 10'

SCALE: 1" = 10'

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SEMI-FINAL DESIGN

Todd Drive Culvert Replacement

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CULVERT PLAN AND PROFILE

SCALE: 1" = 10'

C-210

Last Saved: 5/31/2024
Plotted On:Jun 02, 2024 11:27am By: Canas3
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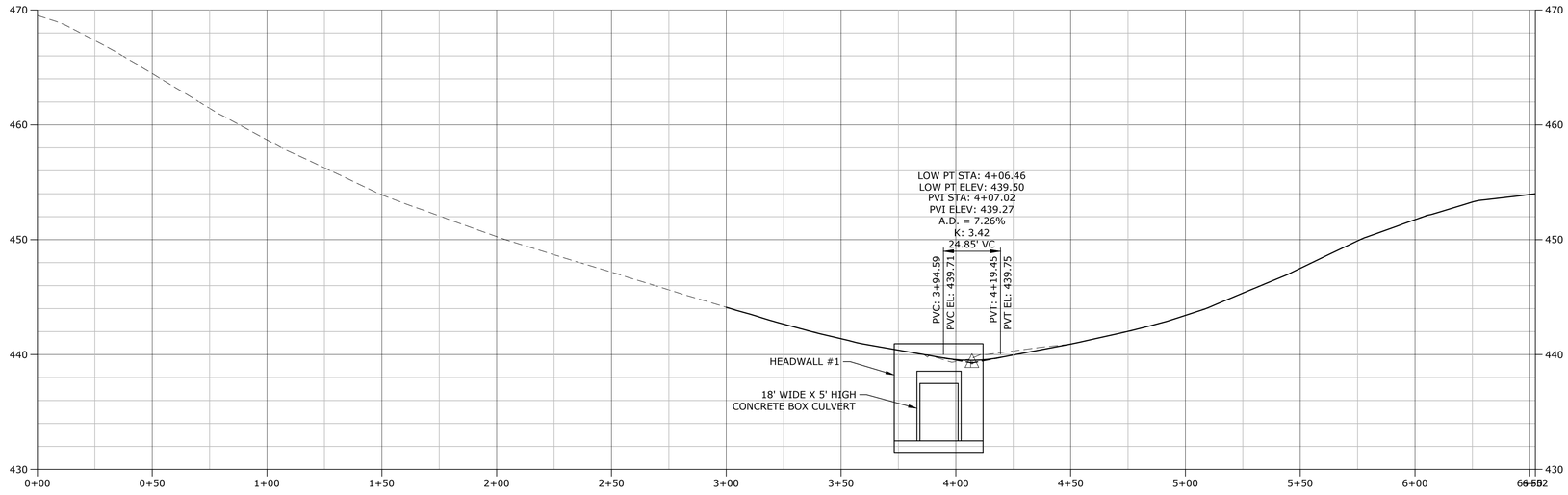

EXISTING ROADWAY - STA: 0+00 TO 6+52

HORIZONTAL SCALE 1" = 30'
0 30' 60'
0 6' 12'
VERTICAL SCALE 1" = 6'

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INLAND WETLANDS SUBMISSION

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DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

ROADWAY PROFILE

SCALE: AS SHOWN

C-301

Last Saved: 3/29/2024
Plotted On:Jun 02, 2024-11:28am By: Canas3
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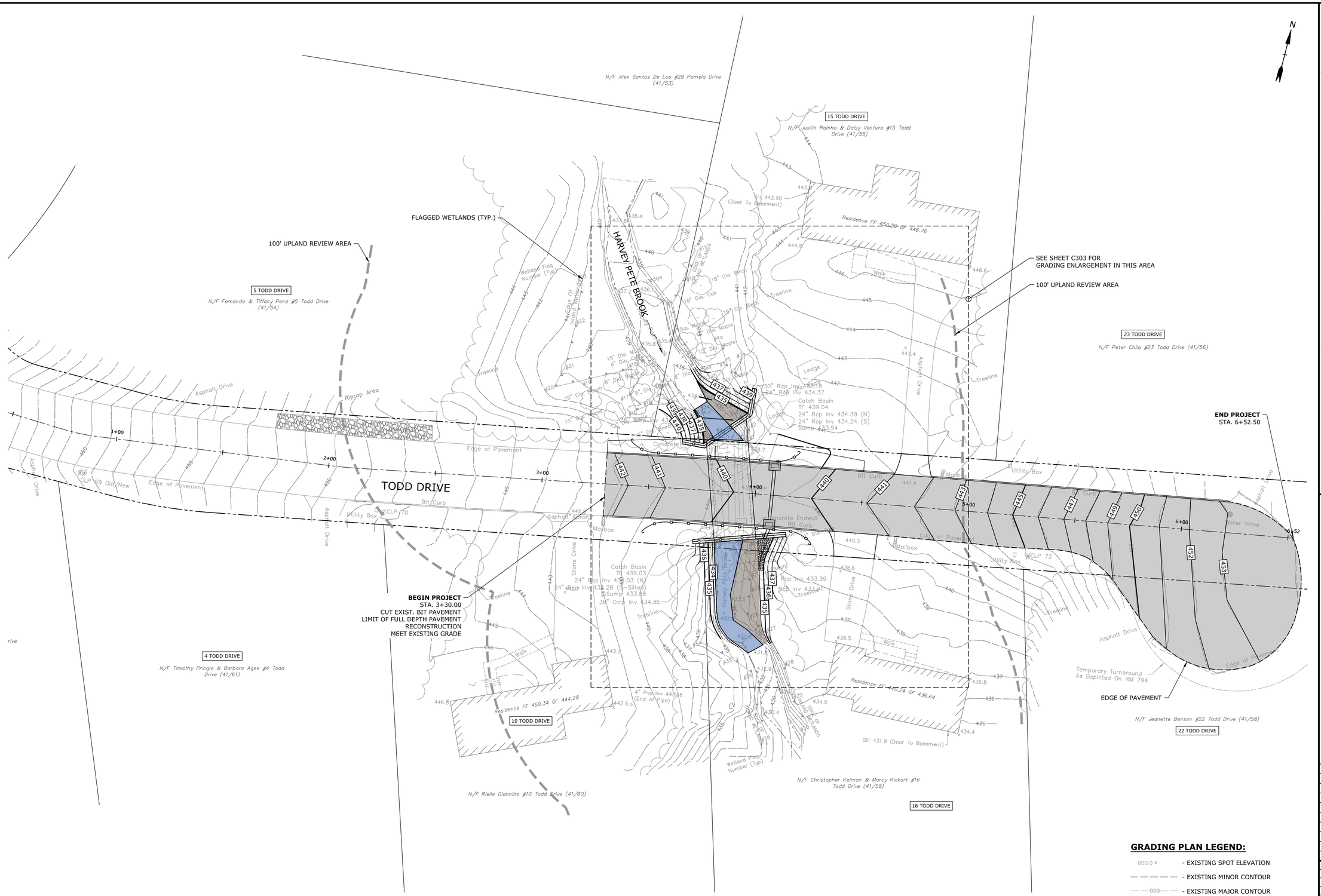

GRADING PLAN LEGEND:

- 000.0 x — EXISTING SPOT ELEVATION
- EXISTING MINOR CONTOUR
- 000 — EXISTING MAJOR CONTOUR
- 000 — PROPOSED MINOR CONTOUR
- 000 — PROPOSED MAJOR CONTOUR

0 20' 40'

SCALE: 1" = 20'

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MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-302-GRAD.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

GRADING PLAN

SCALE: 1" = 20'

C-302

Last Saved: 5/29/2024
Plotted On:Jun 02, 2024-11:29am By: Canas3
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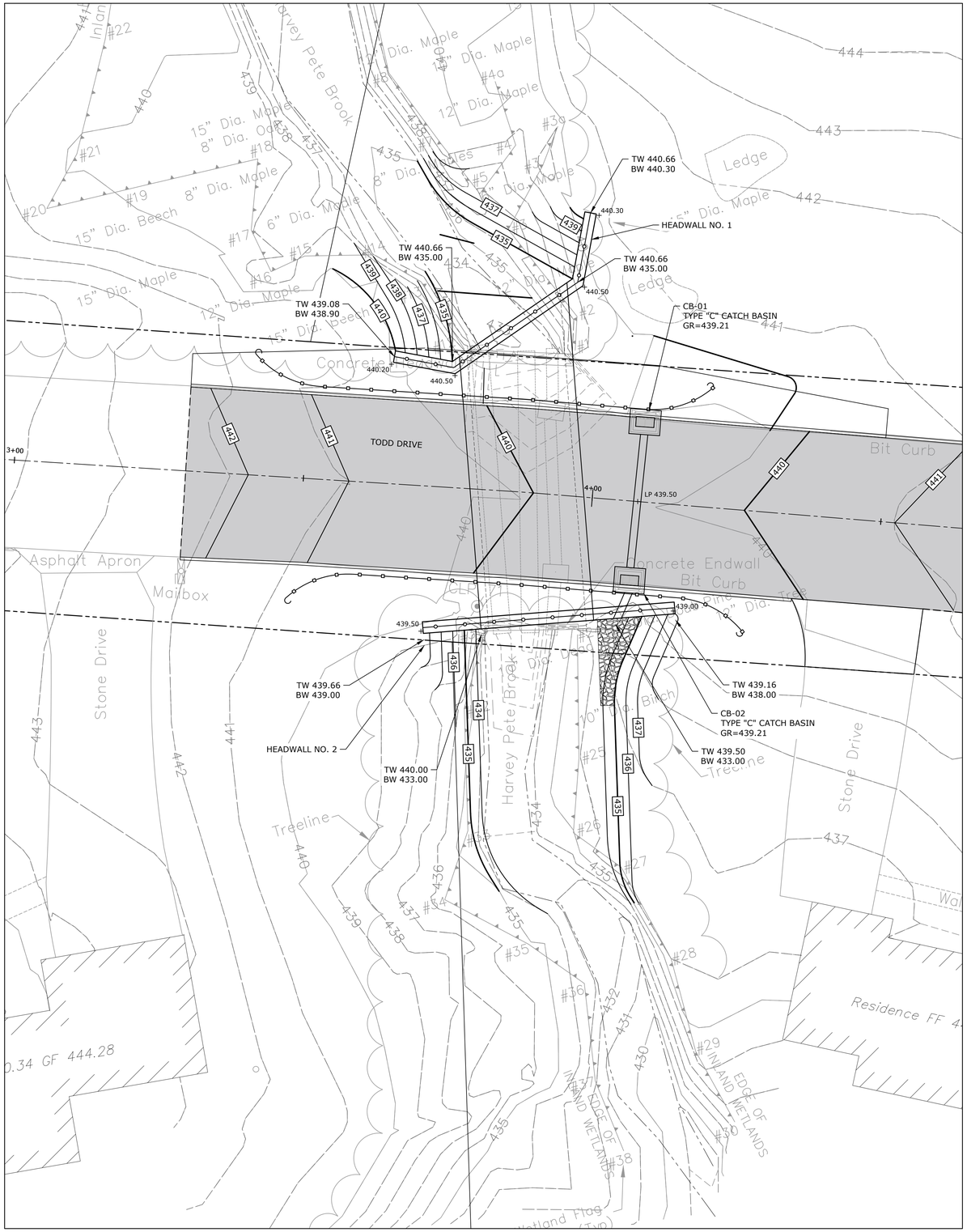

GRADING ENLARGEMENT PLAN
SCALE: 1" = 10'

GRADING PLAN LEGEND:

- 000.0 × - EXISTING SPOT ELEVATION
- +000.00 - PROPOSED SPOT ELEVATIOn
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- 000 - PROPOSED MINOR CONTOUR
- 000 - PROPOSED MAJOR CONTOUR

0 10' 20'
SCALE: 1" = 10'

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INLAND WETLANDS SUBMISSION

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Monroe, Connecticut

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DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

GRADING ENLARGEMENT PLAN

SCALE: 1" = 10'

C-303

Last Saved: 5/29/2024
Plotted On:Jun 02, 2024-11:29am By: Canas3
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SOIL EROSION AND SEDIMENT CONTROL PLAN LEGEND

- GSF GEOTEXTILE SILT FENCE
- S.S. SS SILT SACK
- DEWATERING FILTER BAG WITH STONE APRON
- SANDBAG COFFERDAM
- ECB EROSION CONTROL BLANKET
- RR RIPRAP (INTERMEDIATE)
- TS TOPSOIL AND SEEDING
- TP TREE PROTECTION

CULVERT REPLACEMENT CONSTRUCTION SEQUENCE- PHASE 1

1. POST ADVISORY SIGNAGE IN ADVANCE OF PROJECT START.
2. NOTIFY TOWN AND ENGINEER IN ADVANCE OF CONSTRUCTION START.
3. INSTALL PERIMETER EROSION CONTROLS: SILT FENCE, HAYBALE BARRIER, ETC.
4. CUT AND STUMP TREES TO BE REMOVED.
5. SAWCUT EXISTING PAVEMENT.
6. CONSTRUCT TEMPORARY CULVERT EAST OF THE CROSSING
7. SANDBAG UPSTREAM END OF TEMPORARY CULVERT. ENSURE WEST END OF CULVERT TEE IS CAPPED.
8. INSTALL TEMPORARY PAVEMENT ON TODD DRIVE.
9. CONSTRUCT COFFERDAM ACROSS HARVEY PETE, AND REMOVE SANDBAGS FROM UPSTREAM END OF TEMPORARY CULVERT.

0 30' 60'
SCALE: 1" = 30'

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INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-400-SESC.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

SOIL EROSION AND SEDIMENT CONTROL PLAN PHASE 1

SCALE: 1" = 30'

C-401

Last Saved: 5/30/2024
Plotted On:Jun 02, 2024-11:29am By: Canas3
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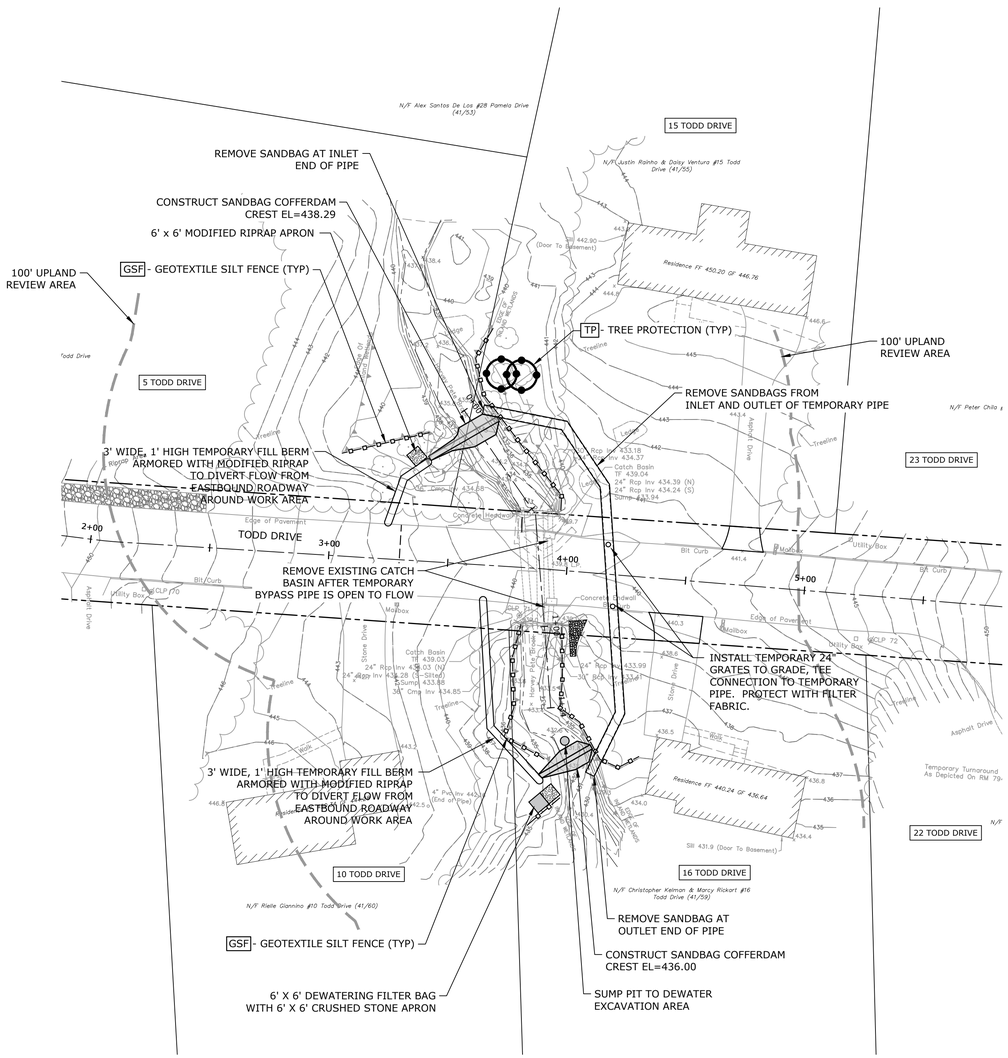
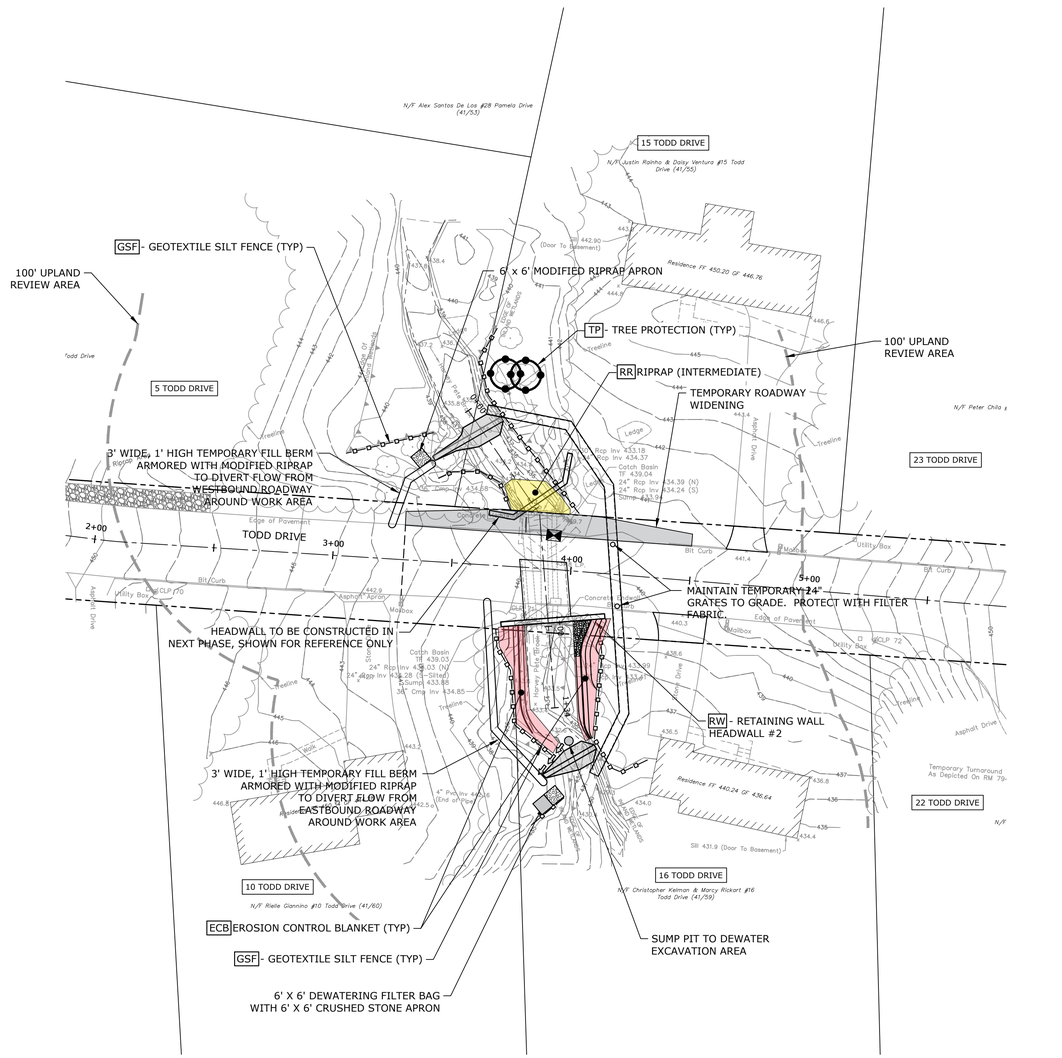


SEDIMENT AND EROSION CONTROL - PHASE 2

SCALE: 1" = 30'



SEDIMENT AND EROSION CONTROL - PHASE 3

SCALE: 1" = 30'

SOIL EROSION AND SEDIMENT CONTROL PLAN LEGEND

- GSF GEOTEXTILE SILT FENCE
- SS SILT SACK
- DEWATERING FILTER BAG WITH STONE APRON
- SANDBAG COFFERDAM
- ECB EROSION CONTROL BLANKET
- RR RIPRAP (INTERMEDIATE)
- TS TOPSOIL AND SEEDING
- TP TREE PROTECTION

CULVERT REPLACEMENT CONSTRUCTION SEQUENCE- PHASE 2

1. INSTALL NEW SEDIMENT AND EROSION CONTROLS, REFRESH EXISTING CONTROLS.
2. INSTALL SANDBAGS DOWNSTREAM OF CULVERT CROSSING TO KEEP WORK AREA DRY FROM POTENTIAL TAILWATER EFFECT.
3. PLACE FILL FOR TEMPORARY ROAD WIDENING, COMPACT AND GRADE.
4. PLACE RIPRAP ON FILL SLOPE.
5. PAVE TEMPORARY ROADWAY.
6. INSTALL PRECAST BARRIER CURB.

0 30' 60'

SCALE: 1" = 30'

SOIL EROSION AND SEDIMENT CONTROL PLAN LEGEND

- GSF GEOTEXTILE SILT FENCE
- SS SILT SACK
- DEWATERING FILTER BAG WITH STONE APRON
- SANDBAG COFFERDAM
- ECB EROSION CONTROL BLANKET
- RR RIPRAP (INTERMEDIATE)
- TS TOPSOIL AND SEEDING
- TP TREE PROTECTION

CULVERT REPLACEMENT CONSTRUCTION SEQUENCE- PHASE 3

1. INSTALL NEW SEDIMENT AND EROSION CONTROLS, REFRESH EXISTING CONTROLS.
2. INSTALL DOWNSTREAM HEADWALL AND CULVERT.
3. CONSTRUCT PERMANENT ROADWAY OVER NEWLY INSTALLED CULVERT, INCLUDING RAILS.
4. PAVE BINDER COURSE ON DOWNSTREAM SIDE OF CROSSING OVER NEW CULVERT.

0 30' 60'

SCALE: 1" = 30'

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INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

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DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

SOIL EROSION AND SEDIMENT CONTROL PLAN PHASE 2 AND 3

SCALE: 1" = 30'

C-401

Last Saved: 5/30/2024
Plotted On:Jun 02, 2024-11:29am By: Canas3
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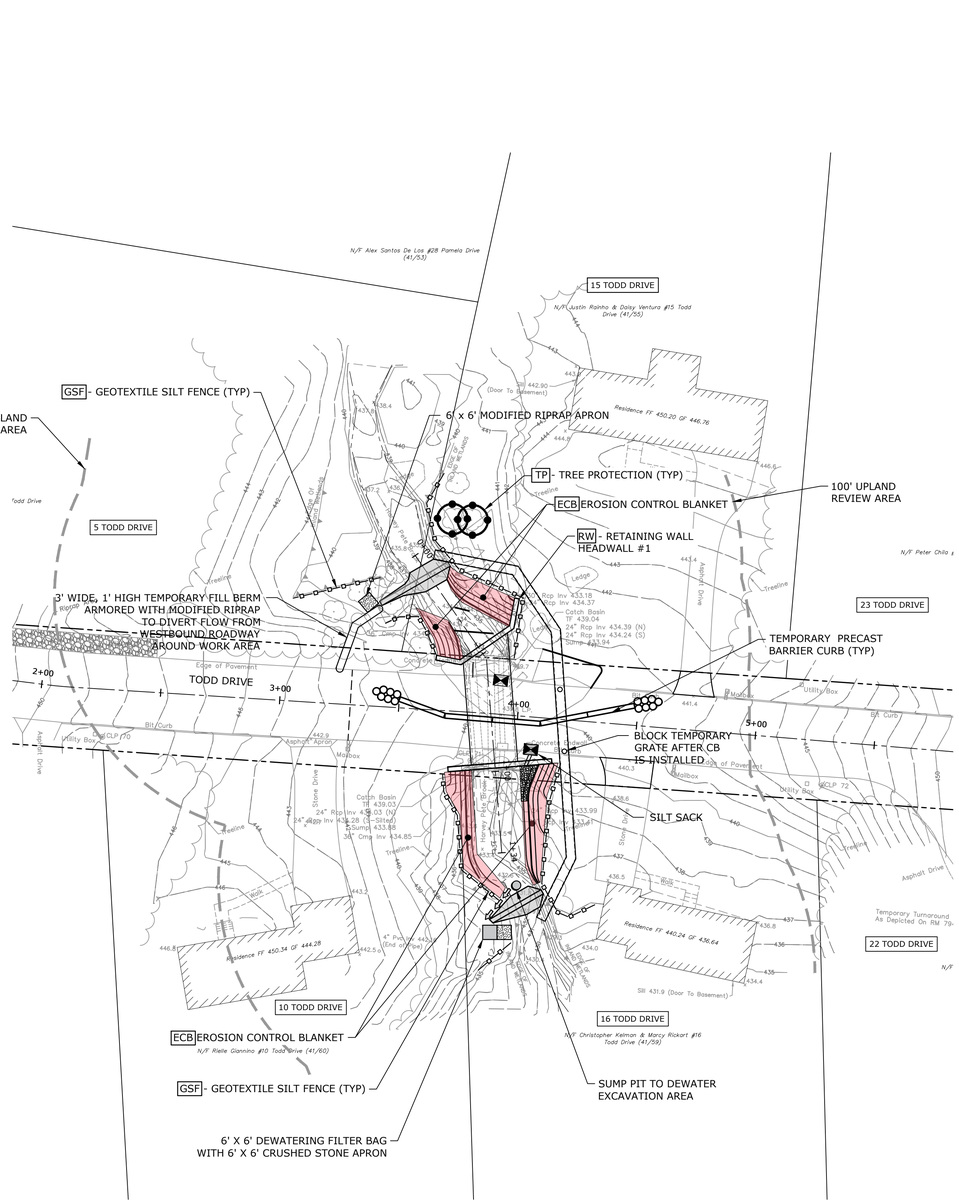

SEDIMENT AND EROSION CONTROL - PHASE 4

SCALE: 1" = 30'

SOIL EROSION AND SEDIMENT CONTROL PLAN LEGEND

- GSF GEOTEXTILE SILT FENCE
- S.S. SS SILT SACK
- DEWATERING FILTER BAG WITH STONE APRON
- SANDBAG COFFERDAM
- ECB EROSION CONTROL BLANKET
- RR RIPRAP (INTERMEDIATE)
- TS TOPSOIL AND SEEDING
- TP TREE PROTECTION

CULVERT REPLACEMENT CONSTRUCTION SEQUENCE - PHASE 4

1. INSTALL NEW SEDIMENT AND EROSION CONTROLS, REFRESH EXISTING CONTROLS.
2. RELOCATE PRECAST BARRIER CURB.
3. REMOVE TEMPORARY FILL SUPPORTING ROADWAY.
4. INSTALL UPSTREAM PORTION OF BOX CULVERT AND HEADWALL.
5. REGRADE TRIBUTARY CHANNEL.
6. STABILIZE FILL SLOPE TO REMAIN.

0 30' 60'

SCALE: 1" = 30'

SEDIMENT AND EROSION CONTROL - PHASE 5

SCALE: 1" = 30'

SOIL EROSION AND SEDIMENT CONTROL PLAN LEGEND

- GSF GEOTEXTILE SILT FENCE
- S.S. SS SILT SACK
- DEWATERING FILTER BAG WITH STONE APRON
- SANDBAG COFFERDAM
- ECB EROSION CONTROL BLANKET
- RR RIPRAP (INTERMEDIATE)
- TS TOPSOIL AND SEEDING
- TP TREE PROTECTION

CULVERT REPLACEMENT CONSTRUCTION SEQUENCE - PHASE 5

1. MAINTAIN EROSION CONTROLS
2. REMOVE PRECAST CONCRETE BARRIERS.
3. REMOVE DOWNSTREAM COFFERDAM.
4. REMOVE SANDBAG COFFERDAMS ACROSS CHANNELS AND PLACE SANDBAGS IN FRONT OF TEMPORARY CULVERTS TO SHIFT FLOW INTO NEW BOX CULVERT.
5. REMOVE TEMPORARY CULVERTS
6. INSTALL PERMANENT DRAINAGE
7. FINAL PAVE ROADWAY
8. ESTABLISH TOPSOIL AND SEED
9. ONCE STABILIZED, REMOVE EROSION CONTROLS.

0 30' 60'

SCALE: 1" = 30'

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INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-400-SESC.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

SOIL EROSION AND SEDIMENT CONTROL PLAN PHASE 4 AND 5

SCALE: 1" = 30'

C-403

Last Saved: 5/30/2024
Plotted On:Jun 02, 2024-11:29am By: Canas3
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SEDIMENT AND EROSION CONTROL NOTES

1. ALL SEDIMENTATION AND EROSION CONTROL MEASURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE "2023 CONNECTICUT GUIDELINES FOR SOIL EROSION AND SEDIMENT CONTROL", AND ALL AMENDMENTS AND ADDENDA THERETO AS PUBLISHED BY THE CONNECTICUT DEPARTMENT OF ENERGY AND ENVIRONMENTAL PROTECTION.
2. LAND DISTURBANCE SHALL BE KEPT TO THE MINIMUM NECESSARY FOR CONSTRUCTION OPERATIONS.
3. INSTALL ALL EROSION CONTROL MEASURES AS SHOWN ON THE PLAN AND ELSEWHERE AS ORDERED BY THE ENGINEER OR THE TOWN.
4. PROTECT ALL CATCH BASINS WITH A SILT SACKS, HAYBALE RING, SILT FENCE OR BLOCK AND STONE INLET PROTECTION THROUGHOUT THE CONSTRUCTION PERIOD AND UNTIL ALL DISTURBED AREAS ARE THOROUGHLY STABILIZED AS NOTED ON PLANS.
5. WHENEVER POSSIBLE, INSTALL EROSION AND SEDIMENT CONTROL MEASURES PRIOR TO CONSTRUCTION. SEE "EROSION CONTROL NARRATIVE".
6. INSTALL ADDITIONAL CONTROL MEASURES DURING THE CONSTRUCTION PERIOD AS ORDERED BY THE ENGINEER.
7. MAINTAIN ALL SEDIMENTATION AND EROSION CONTROL MEASURES IN EFFECTIVE CONDITION THROUGHOUT THE CONSTRUCTION PERIOD.
8. SEDIMENT REMOVED SHALL BE DISPOSED OF OFF-SITE IN A MANNER AS REQUIRED BY THE ENGINEER.
9. THE CONSTRUCTION CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION AND MAINTENANCE OF ALL CONTROL MEASURES THROUGHOUT THE CONSTRUCTION PERIOD.
10. PROTECT ALL DISTURBED AREAS EXPOSED FOR MORE THAN 7 DAYS WITH A TEMPORARY VEGETATIVE COVER. SEED THESE AREAS WITH PERENNIAL RYEGRASS AT THE RATE OF 40 LBS. PER ACRE (1 LB. PER 1,000 SQ. FT). APPLY SOIL AMENDMENTS AND MULCH AS REQUIRED TO ESTABLISH A UNIFORM STAND OF VEGETATION OVER ALL DISTURBED AREAS.
11. THE CONSTRUCTION CONTRACTOR SHALL UTILIZE APPROVED METHODS/MATERIALS FOR PREVENTING THE BLOWING AND MOVEMENT OF DUST FROM EXPOSED SOIL SURFACES ONTO ADJACENT PROPERTIES AND SITE AREAS.
12. THE CONSTRUCTION CONTRACTOR SHALL MAINTAIN A SUPPLY OF SILT FENCE/HAYBALES AND ANTI-TRACKING CRUSHED STONE ON SITE FOR EMERGENCY REPAIRS.
13. THE CONTRACTOR SHALL INSPECT WEEKLY AT A MINIMUM, ALL DRAINAGE STRUCTURES AND CLEAN THEM AS NEEDED TO PREVENT THE BUILD-UP OF SILT.
14. THE CONSTRUCTION CONTRACTOR SHALL CAREFULLY COORDINATE THE PLACEMENT OF EROSION CONTROL MEASURES WITH THE PHASING OF CONSTRUCTION.
15. KEEP ALL PAVED ROADWAYS CLEAN. SWEEP BEFORE FORECASTED STORMS.
16. TREAT ALL UNPAVED SURFACE WITH 4" MINIMUM OF TOPSOIL PRIOR TO FINAL STABILIZATION.
17. INSTALL HAYBALE BARRIERS AND SILT FENCING ALONG THE TOE OF CRITICAL CUT AND FILL SLOPES.
18. THE CONTRACTOR SHALL NOTIFY THE TOWN OF TRUMBULL'S ENVIRONMENTAL OFFICIAL PRIOR TO THE INSTALLATION OF EROSION CONTROLS, CUTTING OF TREES, OR ANY EXCAVATION.
19. COVER ALL TRUCKS CONTAINING MATERIALS BEFORE LEAVING THE SITE.
20. SOIL TYPE BOUNDARIES SHOWN ON THESE MAPS WERE OBTAINED FROM DIGITAL FILES FROM THE UNIVERSITY OF CONNECTICUT'S MAP AND GEOGRAPHIC INFORMATION CENTER. SOIL TYPE DESIGNATIONS WERE TAKEN FROM THE UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE "SOIL SURVEY OF FAIRFIELD COUNTY.
21. CHECK ALL SEDIMENTATION AND EROSION CONTROLS WEEKLY AND/OR AFTER EACH RAINFALL EVENT. MAKE NECESSARY REPAIRS IMMEDIATELY.
22. INSPECT AND REPAIR EROSION AND SEDIMENT CONTROLS PRIOR TO FORECASTED RAIN EVENTS.
23. REMOVE EROSION CONTROLS WHEN ALL DISTURBED AREAS HAVE BEEN STABILIZED AND THE TOWN HAS PROVIDED AUTHORIZATION. DISTURBED AREAS SHALL BE SEEDED AND MULCHED.

CONSTRUCTION SEQUENCE

GENERAL

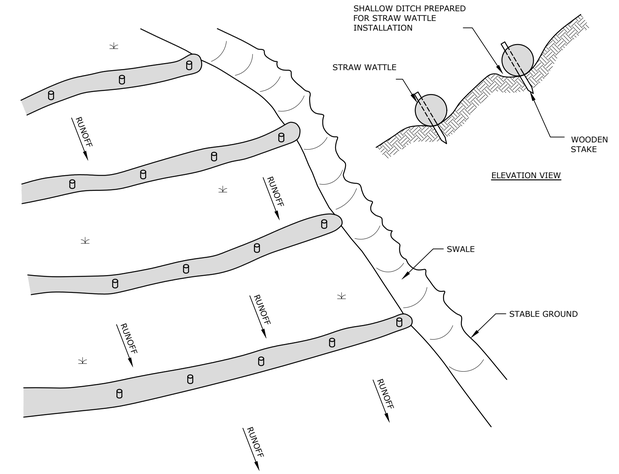
1. PROJECT IS TITLED "TODD DRIVE CULVERT REPLACEMENT", AND IS LOCATED ON TODD DRIVE IN MONROE CT.

   ESTIMATED PROJECT START: SUMMER 2024
   ESTIMATED PROJECT COMPLETION: WINTER 2024/2025
2. EROSION CONTROL NARRATIVE REFERS TO C-400 SERIES DRAWINGS.
3. THE CONTROLS SHOWN ON THESE PLANS ARE CONSIDERED TO BE THE MINIMUM NECESSARY. THE CONTRACT WILL BE REQUIRED TO SUPPLEMENTED WITH ADDITIONAL CONTROLS AS NEEDED TO ENSURE THAT NO SILTY RUNOFF LEAVES THE SITE.
4. A SUPPLY OF SUPPLEMENTAL EROSION CONTROL MATERIALS MUST BE STORED ON SITE AT ALL TIMES FOR REPAIRS OR EXTENSIONS OF CONTROLS.
5. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL PROVIDE A SCHEDULE AND UPDATE WEEKLY AS NEEDED.

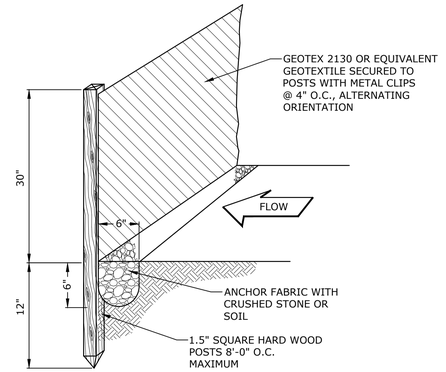
TEMPORARY HYDRAULIC DATA	
AREA =	0.71 SQ. MI.
1 YEAR FLOW =	104.20 CFS
AVERAGE DAILY FLOW =	1.34 CFS (602 GPM)
AVERAGE SPRING FLOW =	2.58 CFS (1,158 GPM)

CONSTRUCTION SEQUENCE GENERAL NOTES

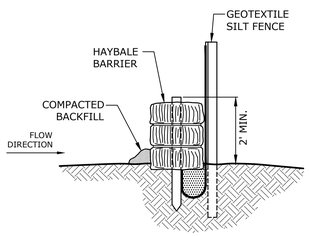
1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH BEST MANAGEMENT PRACTICES.
2. SEQUENCE OF CONSTRUCTION NOTES SHALL BE USED IN CONJUNCTION WITH THE ROADWAY MAINTENANCE AND PROTECTION OF TRAFFIC PLANS.
3. THE SUGGESTED STEPS ILLUSTRATE A SEQUENCE OF CONSTRUCTION THAT CONFORMS TO STAGING REQUIREMENTS. THE SEQUENCE MAY BE ALTERED, SUBJECT TO THE APPROVAL OF THE ENGINEER AND TOWN SO LONG AS THE OPERATION OF VEHICULAR TRAFFIC IS MAINTAINED.
4. NEITHER THE WORK NOR STEPS LISTED IN THE CONSTRUCTION SEQUENCE ARE INTENDED TO COVER ALL DETAILS OF THE WORK. THE CONTRACTOR SHALL PREPARE A DETAILED CONSTRUCTION SEQUENCE AND SCHEDULE FOR REVIEW AND APPROVAL Y THE ENGINEER.
5. EQUIPMENT SHALL NOT BE PERMITTED IN THE STREAM OUTSIDE OF THE ENCLOSED COFFERDAM WITHOUT APPROVAL FROM ENGINEER.
6. ANY UNCONFINED IN-STREAM WORK IS LIMITED TO THE PERIOD FROM JUNE 1 THROUGH SEPTEMBER 30, INCLUSIVE.
7. NO ADDITIONAL REGULATORY IMPACTS WILL BE ALLOWED BEYOND THE AREAS SHOWN ON THE PERMIT PLANS. ALL DISTURBED AREAS SHALL BE RESTORED.
8. THE CONTRACTOR IS ADVISED TO MONITOR NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA) WEATHER FORECASTS AND TO SCHEDULE WORK AROUND MAJOR RAIN EVENTS AND PROVIDE AMPLE TIME IN FOLLOWING THESE EVENTS.
9. THE CONTRACTOR IS HEREIN NOTIFIED THAT THE OVERHEAD ELECTRICAL FACILITIES WILL REMAIN LIVE THROUGHOUT THE DURATION OF CONSTRUCTION.



STRAW WATTLE
NO SCALE

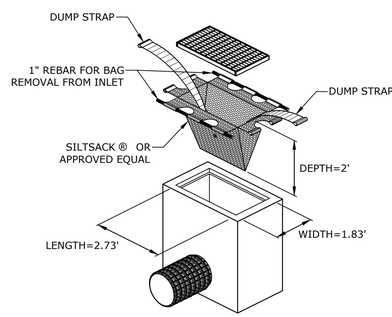


SILT FENCE
NO SCALE



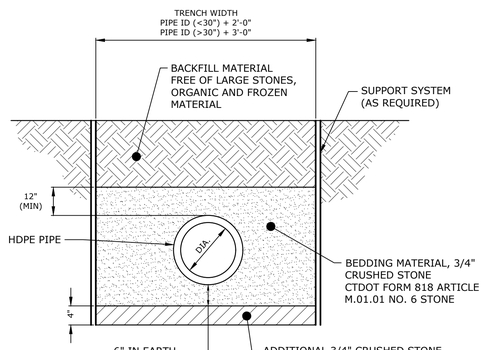
BACKFILL AND COMPACT THE EXCAVATED SOIL AS SHOWN ON THE UPHILL SIDE OF THE BARRIER TO PREVENT PIPING.

SILT FENCE AND HAYBALE COMBINED BARRIER
NO SCALE



SILTSACK MANUFACTURED BY:
ACF ENFIRONMENTAL
2831 CARDWELL ROAD
RICHMOND, VIRGINIA 23237

SILTSACK ®
NO SCALE



TEMPORARY HDPE CULVERT
NO SCALE

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

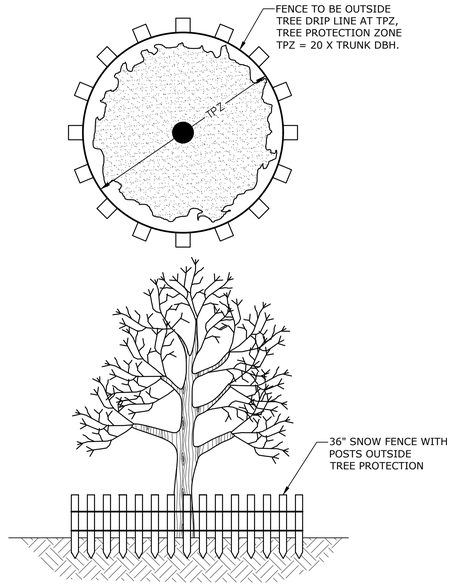
PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-400-SESC.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

SOIL EROSION AND SEDIMENT CONTROL NOTES NARRATIVE AND DETAILS

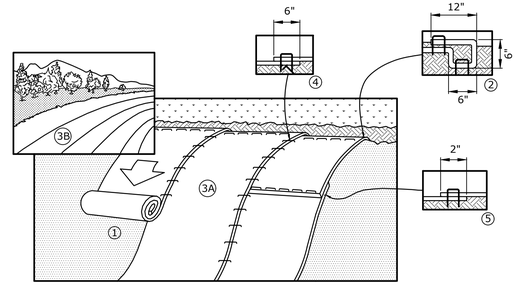
SCALE: AS SHOWN

C-410

Last Saved: 5/30/2024
Plotted On:Jun 02, 2024 11:29am By: Canas3
Tighe & Bond:J:\WM\1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Sheet\M1836-012-C-400-SESC.dwg



TREE PROTECTION
NO SCALE



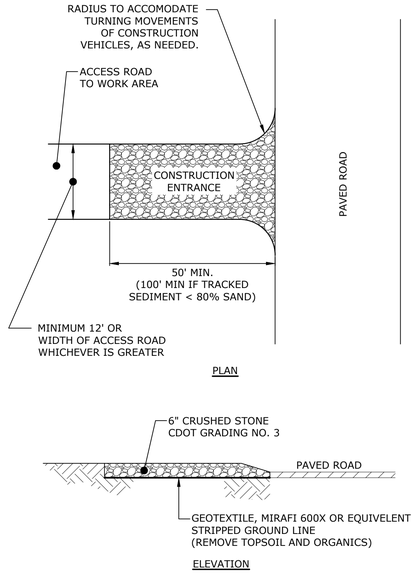
1. PREPARE SOIL BEFORE INSTALLING BLANKETS, INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER AND SEED.

2. BEGIN AT THE TOP OF THE SLOPE, 36" OVER THE GRADE BREAK, BY ANCHORING THE BLANKET IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF BLANKET EXTENDED BEYOND THE UPSLOPE PORTION OF THE TRENCH. ANCHOR THE BLANKET WITH A ROW OF TAPLES/STAKES 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF BLANKET BACK OVER SEED AND COMPACTED SOIL. SECURE BLANKET OVER COMPACTED SOIL WITH A ROW OF STAPLES SPACED 12" APART ACROSS THE WIDTH OF THE BLANKET.

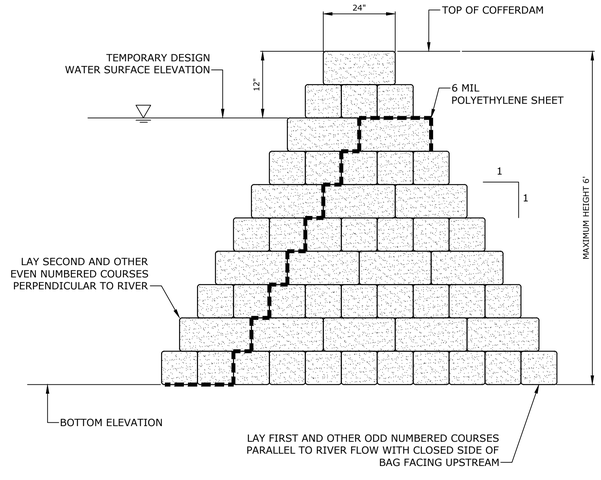
3. ROLL THE BLANKETS DOWN THE SLOPE. ALL BLANKETS MUST BE SECURELY FASTENED TO THE SOIL SURFACE BY PLACING STAPLES IN APPROPRIATE LOCATIONS AS SHOWN ON THE STAPLE PATTERN GUIDE.

4. STAPLE LENGTHS SHALL BE A MINIMUM OF 8 INCHES.

EROSION CONTROL BLANKET
FOR SLOPE PROTECTION
NO SCALE



CONSTRUCTION ENTRANCE
NO SCALE



NOTES:
1. OVERLAP BAGS SUCH THAT FILLED PORTION OF SECOND BAG SITS OVER THE EMPTY PORTION OF THE FIRST.

2. OVERLAP POLYETHYLENE SHEETS MINIMUM 2 FEET

SANDBAG COFFERDAM
NO SCALE

Tighe&Bond
1000 Bridgeport Avenue
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Shelton, CT 06484
(203) 712-1100

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SOIL EROSION AND SEDIMENT CONTROL DETAILS

SCALE: AS SHOWN

C-411

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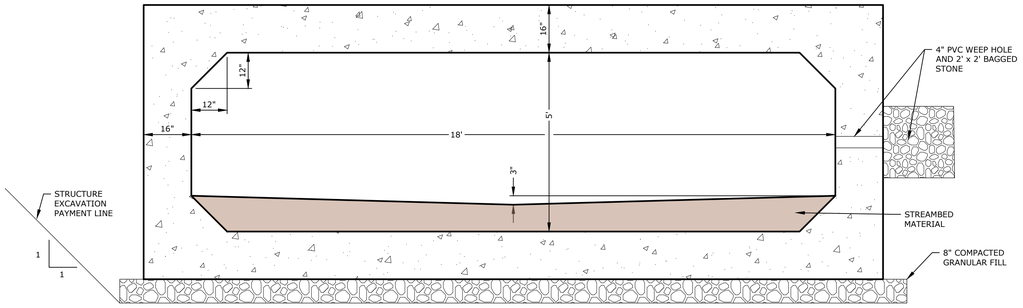
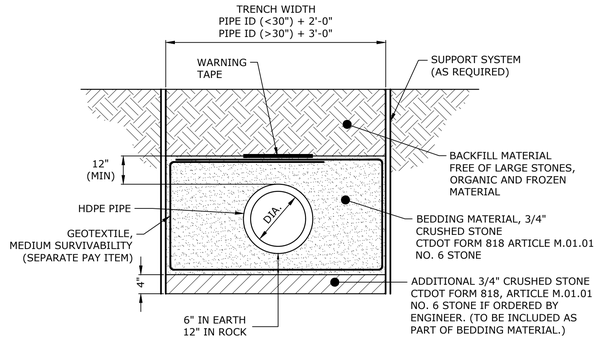


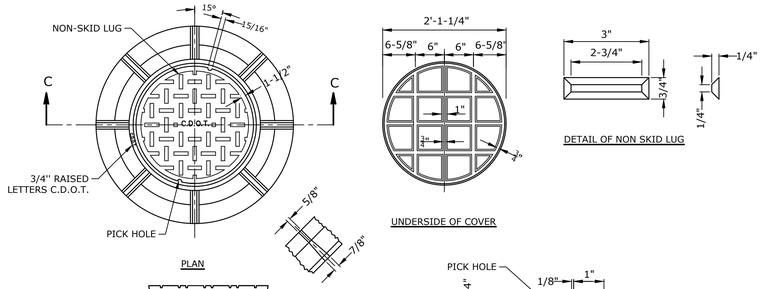
NOTES

1. UNITS SHALL BE 8' LONG
2. WEIGHT PER FOOT = 4,125 LBS
3. MEET REQUIREMENTS OF ASTM C1433.
4. WEEP HOLES SHALL CONSIST OF 4" PVC TUBING, LOCATION AND NUMBER TO BE DETERMINED BY MANUFACTURER. BAGGED STONE SHALL CONSIST OF CRUSHED STONE OR GRAVEL IN BURLAP BAGS AT THE INLET END OF WEEP HOLES. CRUSHED STONE OR GRAVEL SHALL CONFORM TO CTDOT FORM 818, ARTICLE M1.01.1 FOR NO. 3 OR NO.4 STONE. ALL WORK ASSOCIATED WITH WEEP HOLES AND BAGGED STONE SHALL BE PAID FOR AS PART OF THE BOX CULVERT ITEM.
5. MATERIALS TO BE USED SHALL BE AS INDICATED ON THE PLANS.
6. MINIMUM CONCRETE STRENGTH SHALL BE 4,500 PSI.
7. REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
8. BALANCE OF CONSTRUCTION MATERIALS SHALL CONFORM TO CTDOT FORM 818.

18'W x 5'H CONCRETE BOX CULVERT
SCALE: 1" = 2'



HDPE TRENCH BEDDING
NO SCALE

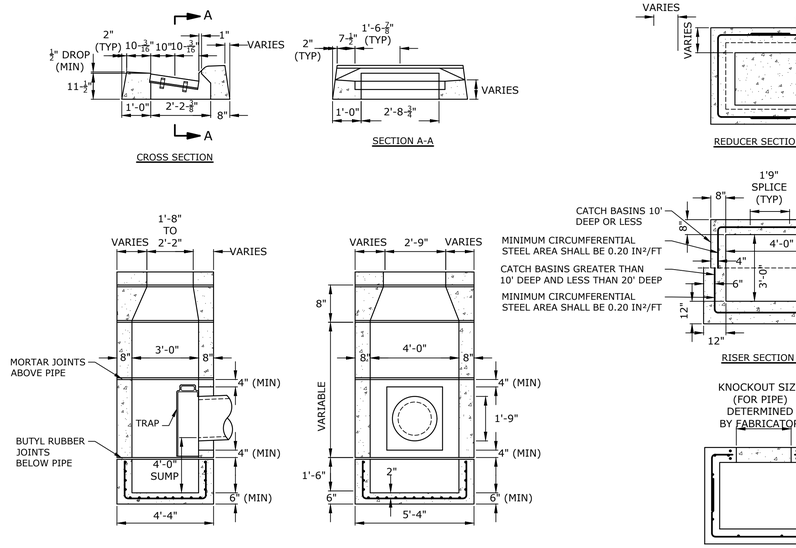


MATERIAL	CAST IRON	CAST STEEL
APPROXIMATE WEIGHT OF COVER	184 LB	134 LB
APPROXIMATE WEIGHT OF FRAME	312 LB	227 LB

ALL DIMENSIONS SUBJECT TO MANUFACTURING TOLERANCES

A FRAME DIAMETER OF 3'-3" WITH 4" FLANGE MUST BE USED WHEN THE TOP DIAMETER OF THE PRECAST CONE IS LESS THAN 3'-6". ALL OTHER FRAME DIMENSIONS ARE TO REMAIN THE SAME.

CONNECTICUT DEPARTMENT OF TRANSPORTATION
MANHOLE FRAME & COVER
NO SCALE



TYPE "C" CATCH BASIN
NO SCALE

CATCH BASIN NOTES:

1. REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
2. DETAILS ON THIS SHEET SHOW STANDARD REINFORCEMENT. WELDED WIRE FABRIC WITH AN AREA EQUAL TO OR GREATER THAN THE REINFORCING SHOWN MAY BE SUBSTITUTED.
3. ALL LAP SPLICES, DEVELOPMENT LENGTHS, BENDS FOR REINFORCEMENT, AND WELDED WIRE FABRIC SHALL CONFORM TO AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES.
4. ALL REINFORCEMENT SHALL HAVE A MINIMUM CLEAR COVER OF 2", EXCEPT FOR BENEATH BOTTOM REINFORCEMENT IN TOP SLABS, WHERE THE MINIMUM MAY BE 1½"
5. MINIMUM CONCRETE COMPRESSIVE STRENGTH FC'=4,000PSI SHALL BE OBTAINED BEFORE SHIPPING.
6. BASES AND RISERS AT A DEPTH OF 20' AND GREATER SHALL BE DESIGNED BY THE CONTRACTOR AND WORKING DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW.
7. RISERS SHALL NEVER HAVE CORNER PIPE ENTRIES. WHERE THE ALIGNMENT OF THE PIPE WITH RESPECT TO THE CORNER OF THE CATCH BASIN CANNOT BE CHANGED, A ROUND STRUCTURE CONFORMING TO ASTM C478 SHALL BE USED. REINFORCING FOR THE ROUND TOP SLAB WITH A RECTANGULAR OPENING SHALL CONFORM TO DETAILS SHOWN HERE.
8. ALL PIPE OPENINGS SHALL BE CLOSED USING MATERIALS WHICH CONFORM TO STATE OF CONNECTICUT STANDARD SPECIFICATIONS SECTION M.08.02. IF THE ENGINEER DETERMINES THAT THE CLOSURE OF ANY PIPE OPENING IS UNSATISFACTORY, THE CONTRACTOR SHALL RE-CLOSE SAID OPENING AT NO ADDITIONAL COST TO THE STATE. KNOCKOUTS FOR PIPE OPENINGS SHALL NOT RESULT IN A REDUCED WALL THICKNESS.
9. THE LATEST STATE OF CONNECTICUT STANDARD SPECIFICATIONS AND SUPPLEMENTALS SHALL GOVERN.
10. FOR ADDITIONAL DETAILS, SEE OTHER CATCH BASIN SHEETS.
11. WALL THICKNESS OF ALL CB'S OVER 10' DEEP SHALL BE INCREASED TO 12" THICK. INSIDE DIMENSION SHALL REMAIN THE SAME. (THE 12" THICKNESS SHALL START AFTER THE FIRST 10")
12. BUTYL RUBBER JOINT SEAL SHALL CONFORM TO AASHTO M-198 AND MORTAR SHALL CONFORM TO THE LATEST STATE OF CONNECTICUT STANDARD SPECIFICATIONS MATERIAL SECTION M11.04.
13. SHRINKAGE AND TEMPERATURE REINFORCEMENT SHALL BE PROVIDED IN THE TOPS OF SLABS. THE TOTAL AREA OF REINFORCEMENT PROVIDED SHALL BE AT LEAST 0.125 IN²/FT IN EACH DIRECTION. THE MAXIMUM SPACING OF THIS REINFORCEMENT SHALL NOT EXCEED 18 INCHES.
14. THE DETAILS SHOWN IN THE PLAN VIEW FOR THE PRECAST CONCRETE ROUND STRUCTURES SHALL ALSO BE USED FOR CONVERTING MANHOLES TO CATCH BASINS.

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Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

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DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

DETAILS - 1

SCALE: AS SHOWN

C-501

Last Saved: 4/30/2024
Plotted On:Jun 02, 2024-11:30am By: Canas3
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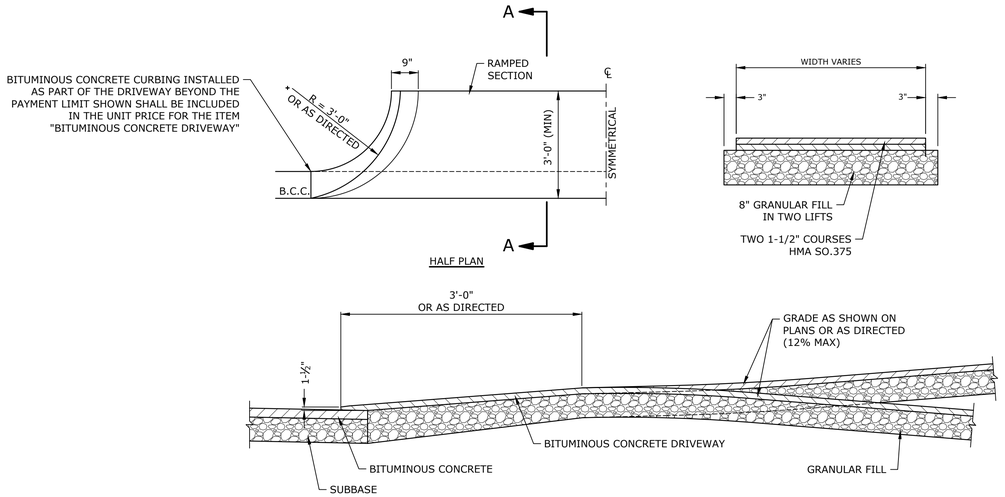
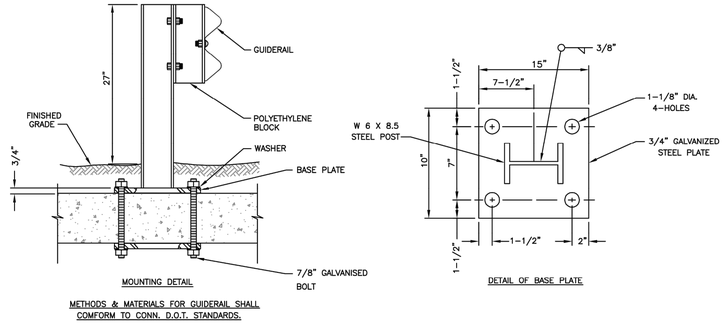
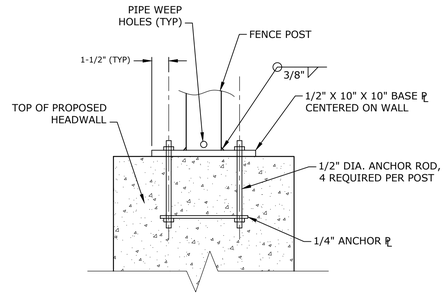


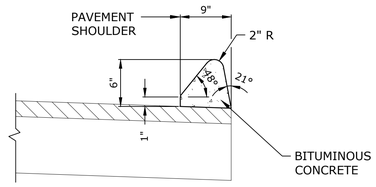
BITUMINOUS CONCRETE DRIVEWAY RAMP
NO SCALE



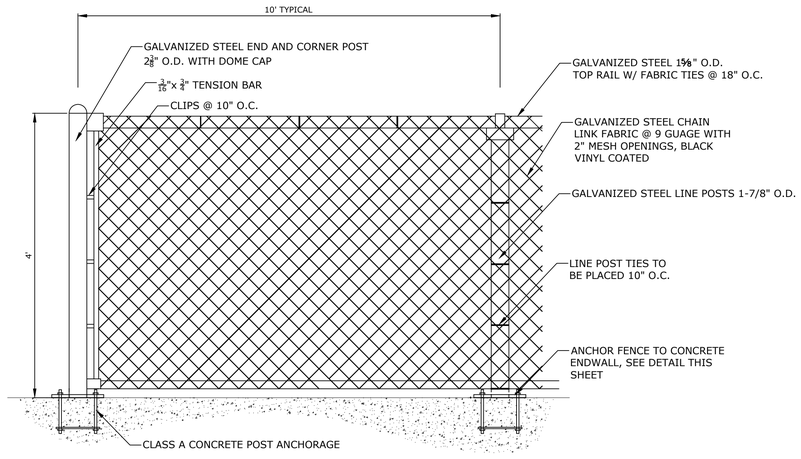
METAL BEAM RAIL CONNECTION DETAIL
GUIDE RAIL POST TO CONCRETE BOX CULVERT
NO SCALE



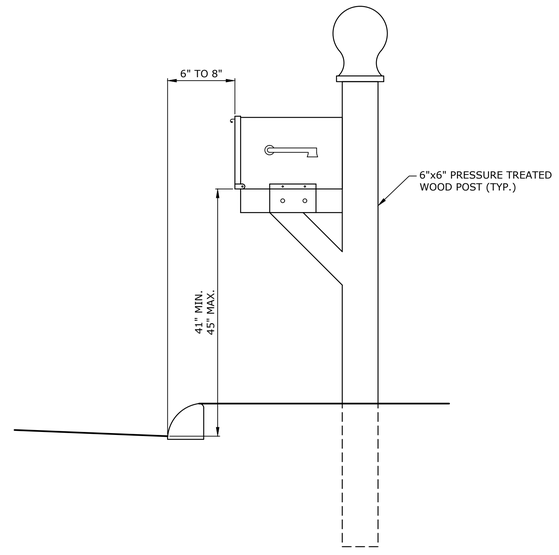
FENCE ANCHOR DETAIL
NO SCALE



BITUMINOUS CONCRETE LIP CURBING
NO SCALE



4' POLYVINYL CHLORIDE
CHAIN LINK FENCE
NO SCALE



MAILBOX PLACEMENT DETAIL
NO SCALE

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1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

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APPROVED BY:	JWB

DETAILS - 2

SCALE: AS SHOWN

C-502

Last Saved: 4/30/2024
Plotted On:Jun 02, 2024-11:39am By: Canas3
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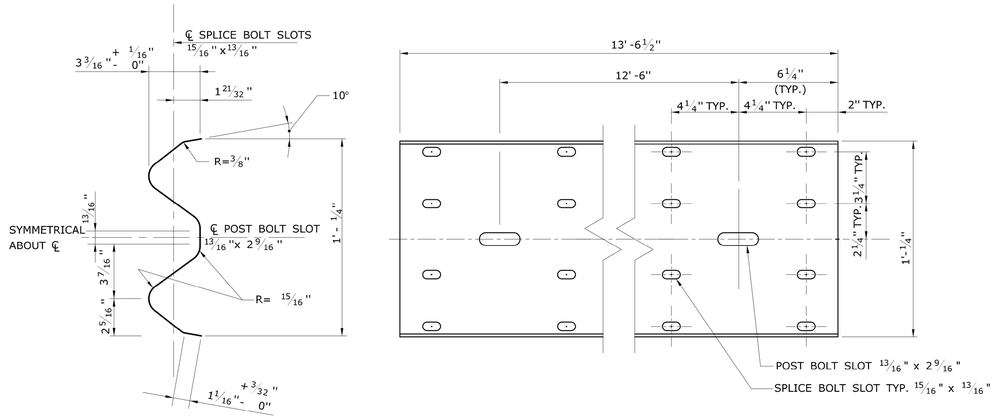
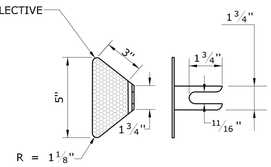


SECTION VIEW

ELEVATION VIEW

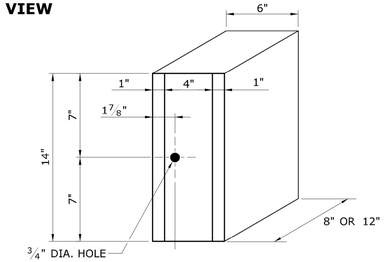
TYPICAL W-BEAM RAIL ELEMENT



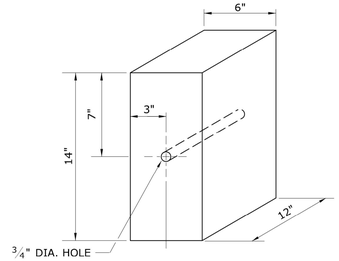
W-BEAM DELINEATOR

GENERAL NOTES:

1. W6 x 9 POSTS MAY BE USED IN PLACE OF W6 x 8.5 POSTS.
2. W-BEAM GUIDERAIL SHALL USE CLASS A (12 GAUGE), TYPE II W-BEAM RAIL ELEMENTS.
3. SEVEN FOOT LONG STEEL POSTS (W6 X 8.5) ARE TO BE INSTALLED WHERE INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.
4. ALL DIMENSIONS SUBJECT TO MANUFACTURING TOLERANCES



8" or 12" PLASTIC BLOCKOUT
NOMINAL DIMENSIONS

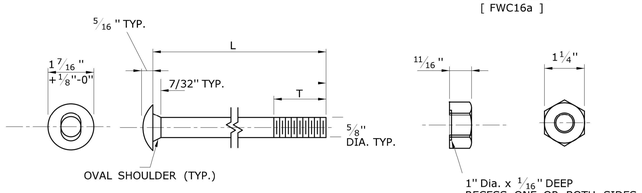


12" WOOD BLOCKOUT

W-BEAM DELINEATOR INSTALLATION NOTES:

1. INSTALL W-BEAM DELINEATORS ON RAIL THAT IS PARALLEL TO AND NOT GREATER THAN 8' FROM THE EDGE OF THE ROADWAY. A MINIMUM OF THREE W-BEAM DELINEATORS SHALL BE INSTALLED ON ANY LENGTH OF GUIDERAIL.
2. THE SPACING OF W-BEAM DELINEATORS IS 50 FEET, INSTALLED AT RAIL SPLICE LOCATIONS. SPACING IS 25 FEET ON RADII LESS THAN 300 FEET.
3. NO W-BEAM DELINEATORS ARE PERMITTED WITHIN 75 FEET OF THE IMPACT HEAD OF ANY TANGENTIAL OR FLARED IMPACT ATTENUATION SYSTEM.
4. RETROREFLECTIVE SHEETING SHALL BE WHITE EXCEPT ON THE LEFT SIDE OF DIVIDED STREETS, HIGHWAYS, RAMPS, AND ONE WAY ROADS IN THE DIRECTION OF TRAVEL WHERE IT SHALL BE YELLOW.

WASHER
[FWC16a]



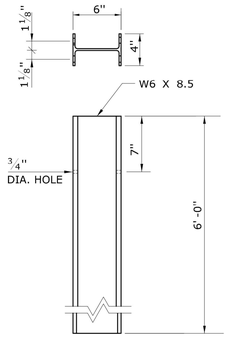
BUTTONHEAD BOLT

HEX NUT

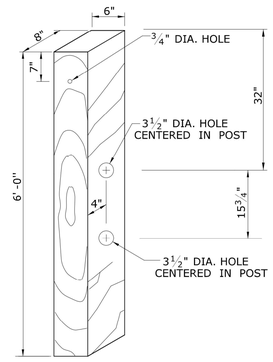
DESIGNATOR	L	T	INTENDED USE
FBB01	1-1/4"	1-1/8"	RAIL SPLICE BOLTS
FBB02	2"	1-3/4"	RUB RAIL BOLTS
FBB03	10"	4"	POST BOLTS (8" BLOCK OUTS)
	14"	4"	POST BOLT (12" BLOCK OUTS)
FBB04	18"	4"	POST BOLTS (2- 8"BLOCK OUTS)
	22"	4"	POST BOLT (CRT WOOD POST SYSTEM)

5/8" BUTTON HEAD BOLT(S) AND RECESSED NUT(S)

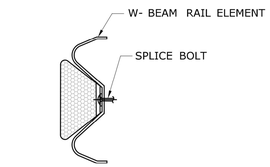
NOTE: AFTER GALVANIZING, THE NUT SHALL BE FREE RUNNING ON THE BOLT. DIAMETER SHOWN IS TYPICAL FOR ALL GUIDERAIL BOLTS. SEE DETAILS ABOVE FOR SPECIFIC LENGTHS.



STEEL POST
6'-0" LONG



CONTROL RELEASE TIMBER (CRT) POST
6' - 0" LONG



W-BEAM DELINEATOR INSTALLATION

NOT TO SCALE	SIGNATURE BLOCK: OFFICE OF ENGINEERING 2800 BERLIN TURNPIKE NEWINGTON, CT 06111	SUBMITTED BY: Leo Fontaine, P.E. 2020.07.08 10:22:13-04'00'	APPROVED BY: James Fallon, P.E. 2020.07.15 10:16:08-04'00'

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

CTDOT STANDARD SHEET

STANDARD SHEET TITLE: MASH W-BEAM HARDWARE

STANDARD SHEET NO.: HW-910_20

PLOTTED DATE: 7/1/2020

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

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DETAILS - 3

SCALE: AS SHOWN

C-503

Last Saved: 4/30/2024
Plotted On:Jun 02, 2024-11:31am By: Canas3
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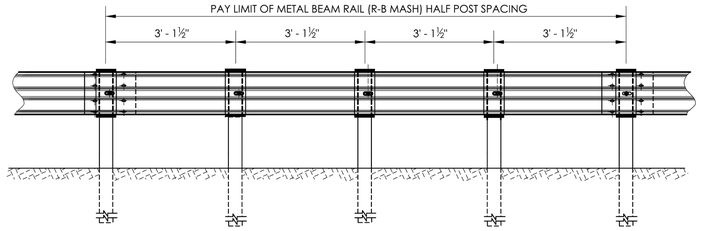
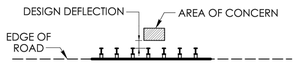


METAL BEAM RAIL (R-B MASH) HALF POST SPACING

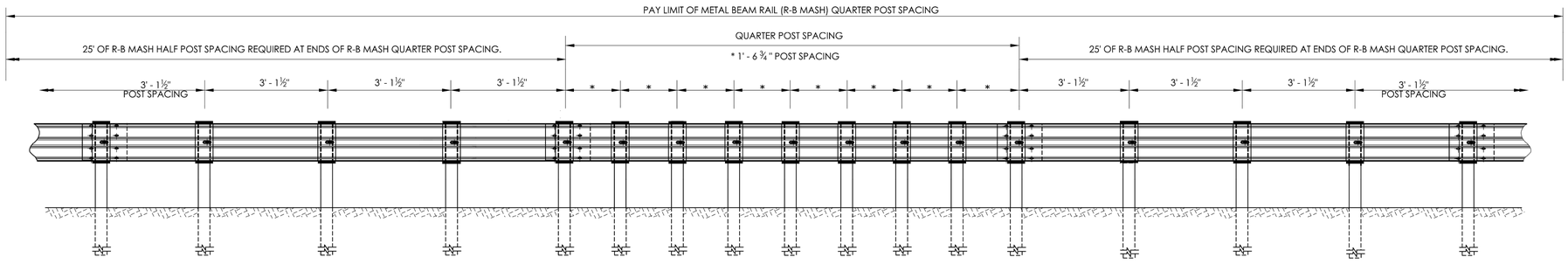
GENERAL NOTES:

1. SEE SHEET HW-910_20 FOR HARDWARE AND W-BEAM DELINEATOR DETAILS.
2. W-BEAM DELINEATOR MAY BE INSTALLED AT POST BOLT CONNECTION TO MAINTAIN APPROPRIATE DELINEATOR SPACING.



POST SPACING		DESIGN DEFLECTION
STANDARD	(6' - 3")	4' - 3"
HALF POST	(3' - 1½")	2' - 8"
QUARTER POST	(1' - 6¾")	1' - 10"

TABLE 1



METAL BEAM RAIL (R-B MASH) QUARTER POST SPACING

	NOT TO SCALE	SIGNATURE BLOCK: OFFICE OF ENGINEERING 2800 BERLIN TURNPIKE NEWINGTON, CT 06111	SUBMITTED BY: Digitally signed by Leo Fontaine, P.E. Date: 2022.09.27 15:10:48-04'00'	APPROVED BY: Digitally signed by Calabrese, Michael Date: 2022.11.08 09:52:25-05'00'	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	CTDOT STANDARD SHEET	STANDARD SHEET TITLE: METAL BEAM RAIL (R-B MASH) HALF AND QUARTER POST SPACING GUIDERAIL	STANDARD SHEET NO.: HW- 910_23

PLOTTED DATE: 9/21/2022

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1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-500-DETL.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

DETAILS - 4

SCALE: AS SHOWN

C-504

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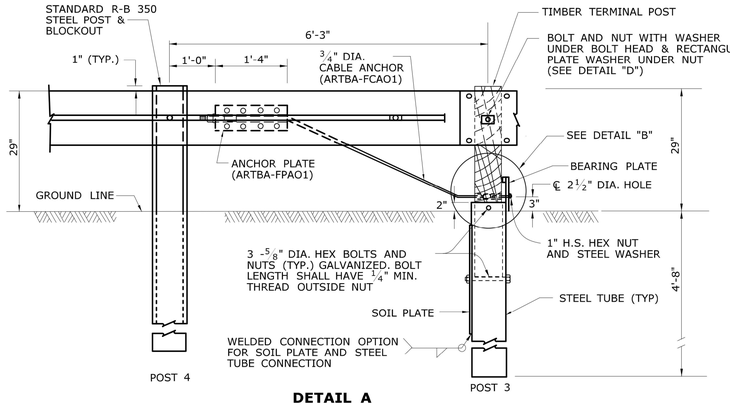
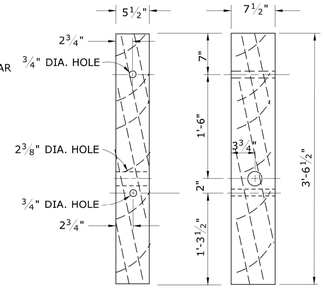
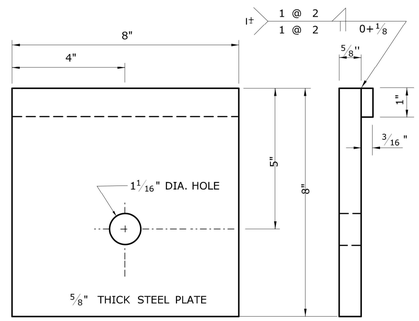


DETAIL A
CABLE ANCHORAGE ASSEMBLY



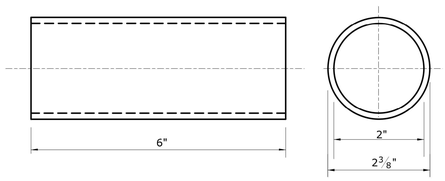
DETAIL C
TIMBER TERMINAL POST
(ARTBA-PDFO1)
(SEE NOTE 2)



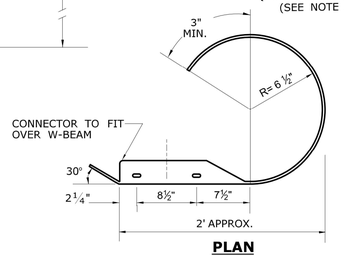
BEARING PLATE
(ARTBA-FPBO1)

GENERAL NOTES:

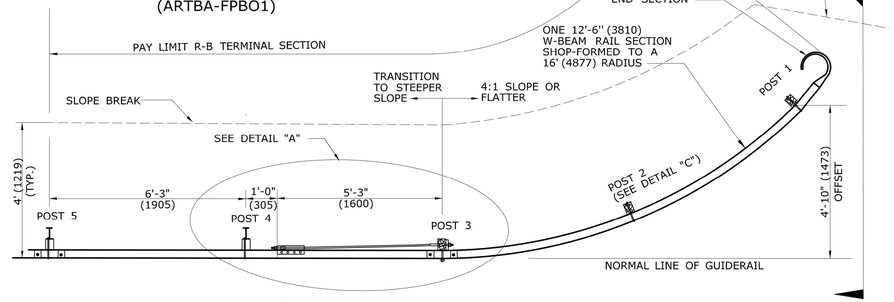
1. APPROACH END R-B TERMINAL SECTION SHALL ONLY BE USED ON LOW SPEED (<45 MPH) ROADWAYS.
2. POSTS 1, 2 AND 3 ARE TIMBER TERMINAL POSTS (DETAIL "C") WITH STEEL TUBES. POSTS 4 AND 5 ARE STANDARD R-B 350 STEEL POSTS WITH BLOCKOUTS.
3. REFER TO CTDOT STANDARD SPECIFICATIONS FOR MATERIAL AND GENERAL CONSTRUCTION METHODS.
4. MINIMUM RAIL HEIGHT FOR NEW CONSTRUCTION SHALL BE 29" +/- 1".



BREAKAWAY TERMINAL POST SLEEVE
(ARTBA-FMMO2)

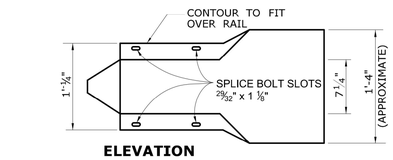


PLAN



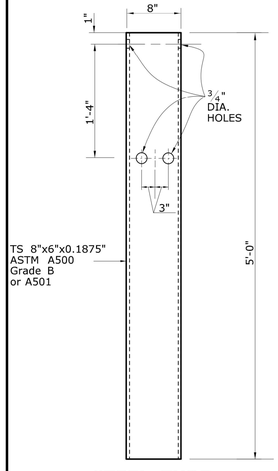
DIRECTION OF TRAFFIC

APPROACH END
(TRAILING END NOT SHOWN)

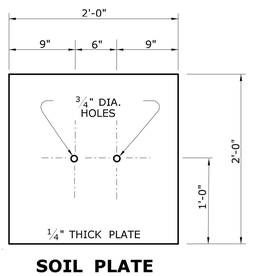


ELEVATION

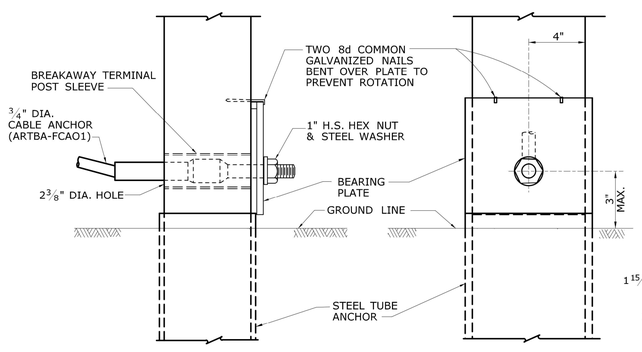
ROUNDED W-BEAM END SECTION



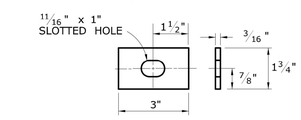
STEEL TUBE



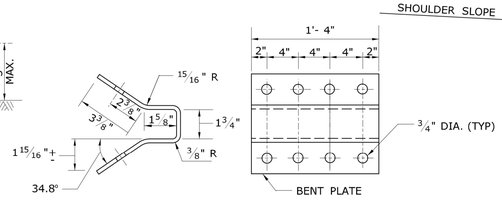
SOIL PLATE



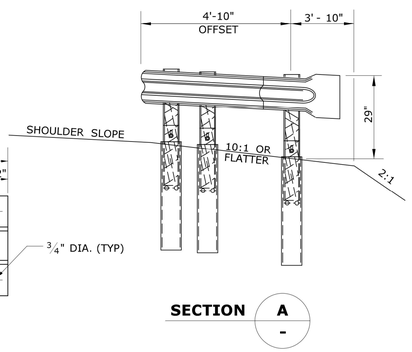
DETAIL B



DETAIL D
RECTANGULAR PLATE WASHER



ANCHOR PLATE
(ARTBA-FPAO1)



SECTION A
-

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APPROVED BY:	Digitally signed by Calabrese, Michael Date: 2021.11.09 07:43:37-05'00'	
NOT TO SCALE	####	
STATE OF CONNECTICUT	DEPARTMENT OF TRANSPORTATION	
CTDOT STANDARD SHEET		
STANDARD SHEET TITLE:	R-B TERMINAL SECTION	
STANDARD SHEET NO.:	HW-910_17	

PLOTTED DATE: 10/29/2021

Tighe&Bond
1000 Bridgeport Avenue
Suite 320
Shelton, CT 06484
(203) 712-1100

INLAND WETLANDS SUBMISSION

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-500-DETL.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

DETAILS - 5

SCALE: AS SHOWN

C-505

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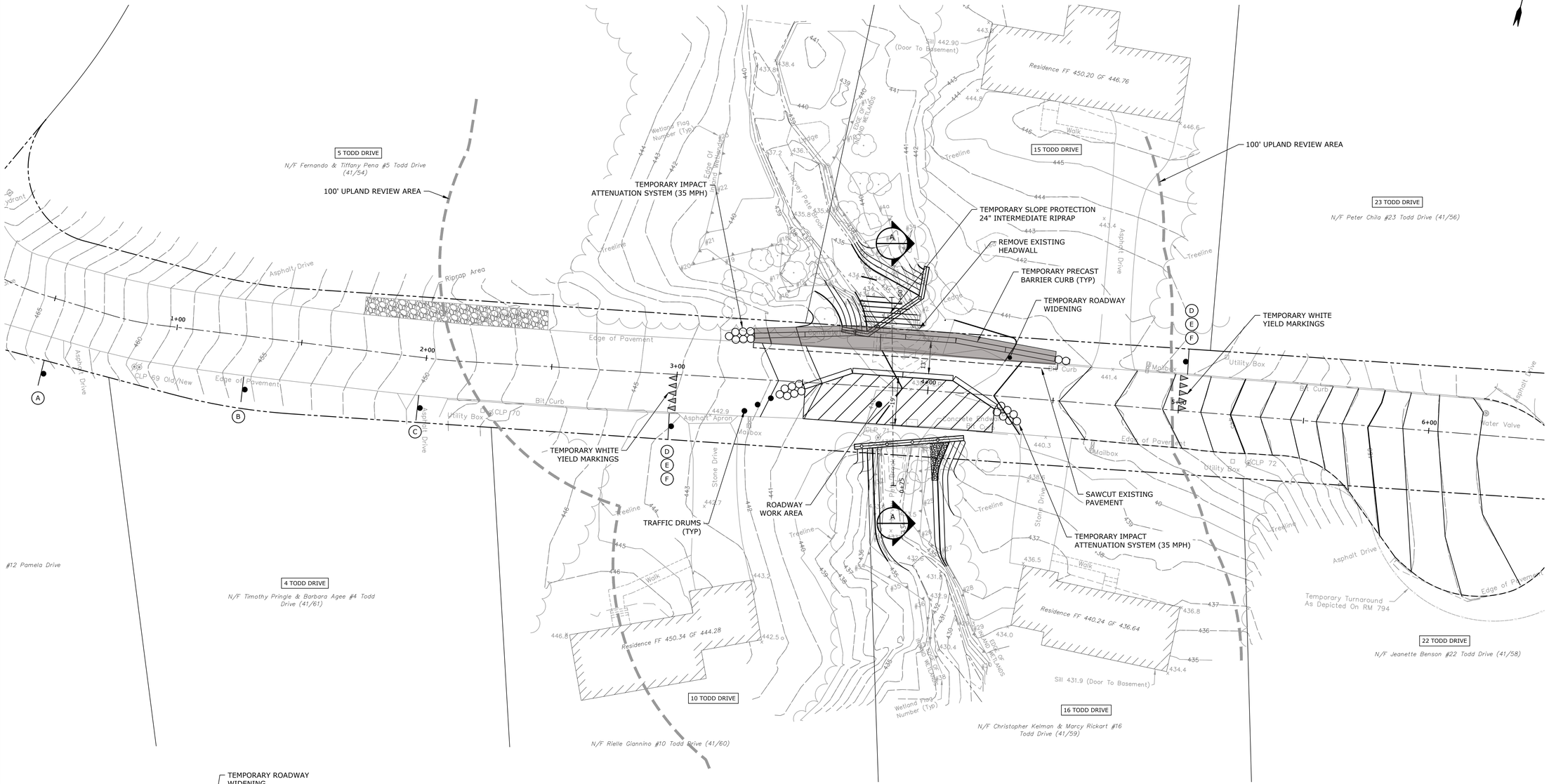

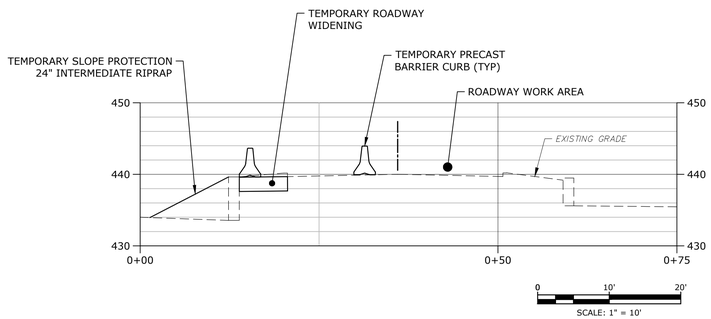

TEMPORARY WIDENING - SECTION A-A
SCALE: 1" = 10'

SIGN LEGEND:

A	B	C	D	E	F
36" ROAD WORK AHEAD	36" ONE LANE ROAD X FT	36"	YIELD 36"	LOCAL TRAFFIC ONLY 18" x 24"	72" x 4"
INSTALL 80-9603	INSTALL 80-9933	INSTALL 80-9054	INSTALL 31-5023	INSTALL 31-0582	INSTALL 31-5104

0 20' 40'
SCALE: 1" = 20'

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Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
DATE:	05/30/2024
FILE:	M1836-012-C-600-WIDE.dwg
DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

TEMPORARY ROADWAY WIDENING PLAN - PHASE 1

SCALE: AS SHOWN

C-601

Last Saved: 2/29/2024
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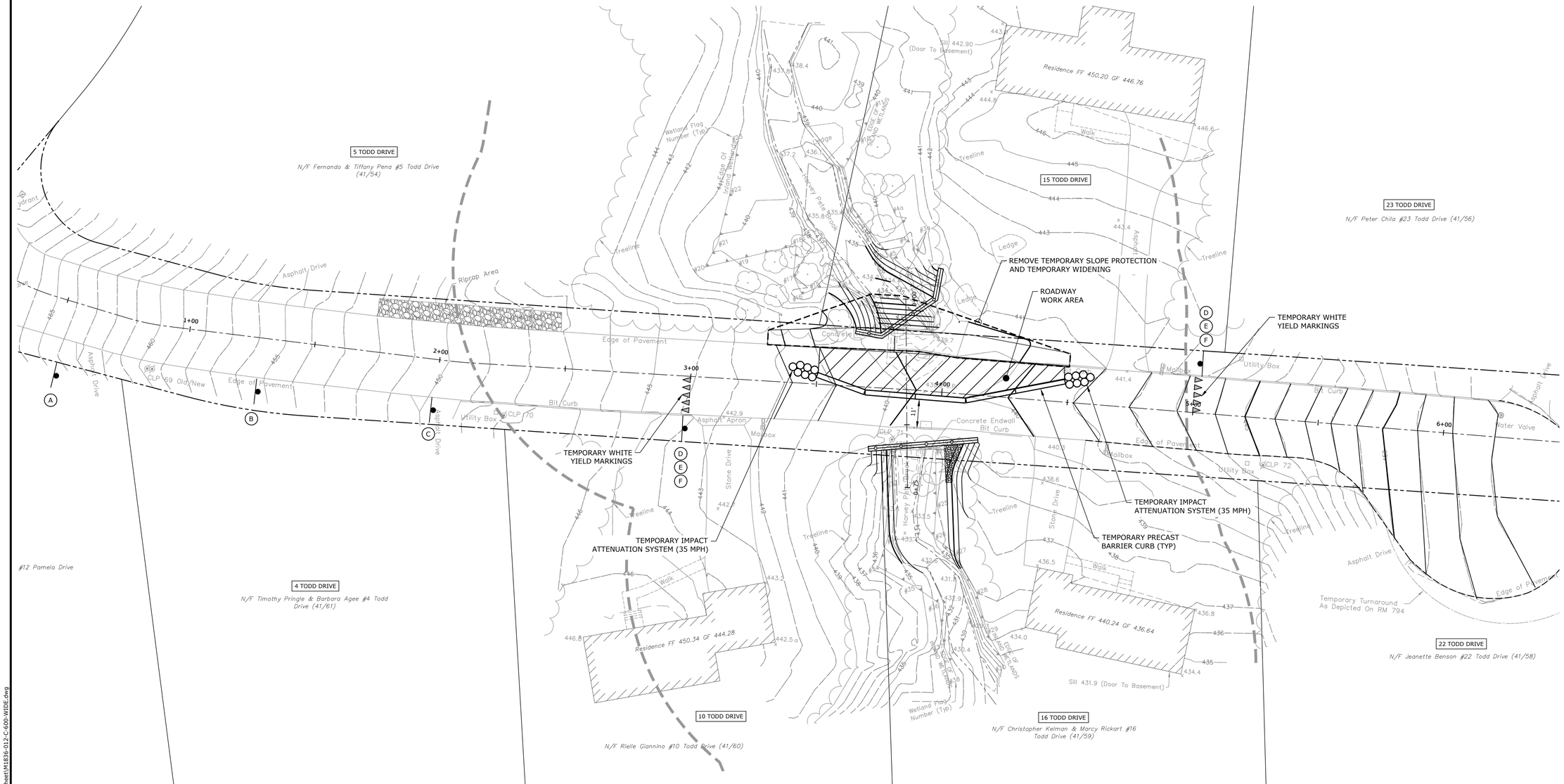

SIGN LEGEND:

A	B	C	D	E	F
36" ROAD WORK AHEAD	36" ONE LANE ROAD X FT	36"	YIELD 36"	LOCAL TRAFFIC ONLY 18" / 24"	72" / 4"
INSTALL 80-9603	INSTALL 80-9933	INSTALL 80-9054	INSTALL 31-5023	INSTALL 31-0582	INSTALL 31-5104

0 20' 40'
SCALE: 1" = 20'

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INLAND WETLANDS SUBMISSION

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DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

TEMPORARY ROADWAY WIDENING PLAN - PHASE 2

SCALE: AS SHOWN

C-602

Last Saved: 2/29/2024
Plotted On:Jun 02, 2024-11:37am By: Canas3
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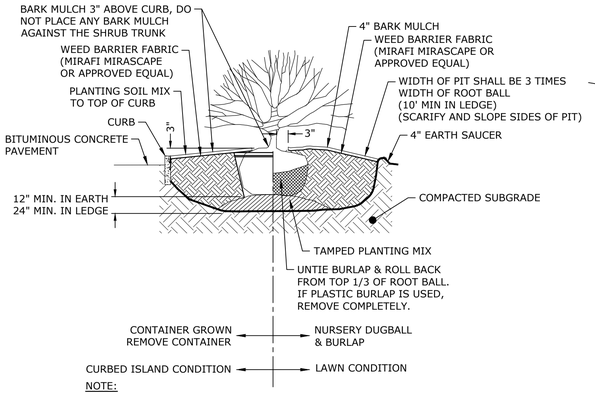
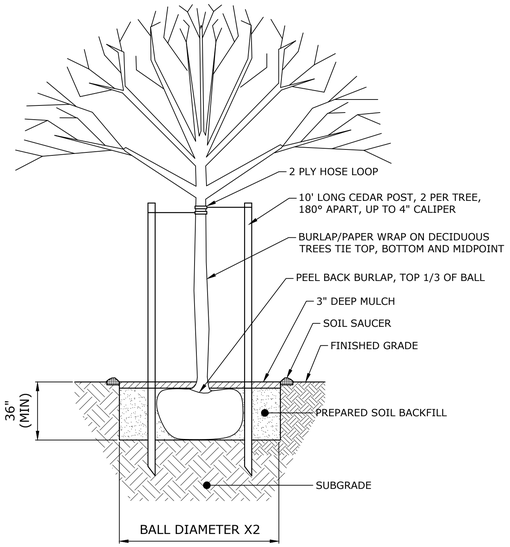


SHRUB PLANTING
NO SCALE



TREE PLANTING DETAIL
NO SCALE

PLANTING NOTES

1. CONTRACTOR SHALL BEGIN MAINTENANCE IMMEDIATELY AFTER PLANTING AND WILL CONTINUE UNTIL FINAL WRITTEN ACCEPTANCE OF PLANT MATERIAL.
2. THE LANDSCAPE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE ALL PLANTINGS SHOWN ON THIS DRAWING.
3. ALL MATERIALS SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION.
4. ALL PLANTS SHALL BEAR THE SAME RELATIONSHIP TO FINISH GRADE AS TO ORIGINAL GRADES BEFORE DIGGING.
5. ALL PLANTS TO BE BALLED IN BURLAP OR CONTAINERIZED.
6. MULCH FOR PLANTED AREAS TO BE AGED PINE BARK: PARTIALLY DECOMPOSED, DARK BROWN IN COLOR AND FREE OF WOOD CHIPS THICKER THAN 1/4 INCH.
7. THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL PLANT MATERIALS FOR ONE (1) FULL YEAR FROM DATE OF ACCEPTANCE.
8. ALL PLANT MATERIALS ARE SUBJECT TO THE APPROVAL OF THE OWNER'S REPRESENTATIVE, AT THE NURSERY, AND AT THE SITE.

PLANTING SCHEDULE

ADDRESS	CANOPY TREE QUANTITY	SHRUB QUANTITY
5 TODD DR	2	6
10 TODD DR	1	3
15 TODD DR	1	7
16 TODD DR	1	3

CANOPY TREES AND SHRUB/UNDERSTORY TREES TO BE SELECTED FROM RECOMMENDED PLANTING LIST ON DRAWING C-702.
ALL FOUR LISTED PROPERTIES SHALL RECEIVE VARIOUS AMOUNTS OF HERBACEOUS PLANTINGS.

FINAL QUANTITIES, LOCATION, AND TYPE TO BE BASED UPON PROPERTY OWNER RECOMMENDATIONS AND APPROVED BY STAFF.

LEGEND:

- TURF ESTABLISHMENT
- NEW ENGLAND WETMIX
- SUPPLEMENTAL STREAMBED MATERIAL
- EXCAVATE AND REUSE EXISTING STREAMBED MATERIAL

SCALE: 1" = 20'

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SEMI-FINAL DESIGN

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Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

MARK	DATE	DESCRIPTION

PROJECT NO:	M1836-012
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DRAWN BY:	MDS
DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

ROADWAY RESTORATION PLAN

SCALE: 1" = 30'

C-701

Last Saved: 5/31/2024
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Nyssa sylvatica Black Gum

Platanus occidentalis Sycamore

Acer rubrum Red Maple

Betula nigra River Birch

CANOPY TREES

Lindera benzoin Spicebush

Viburnum dentatum Arrowwood

Ilex verticillata Winterberry

Myrica pensylvanica Northern Bayberry

Clethra alnfolia Sweet pepperbush

SHRUBS

Amelanchier canadensis Serviceberry

Hamamelis virginiana Witch Hazel

UNDERSTORY TREES

Eutrochium maculatum Joe Pye Weed

Symphyotrichum novae-angliae New England Aster

Carex Vulpinoidea Fox Sedge

HERBACEOUS

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1000 Bridgeport Avenue
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SEMI-FINAL DESIGN

Todd Drive Culvert Replacement

Town of Monroe

Monroe, Connecticut

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DESIGNED/CHECKED BY:	JAC
APPROVED BY:	JWB

RECOMMENDED PLANT LIST

SCALE: 1" = 30'

C-702

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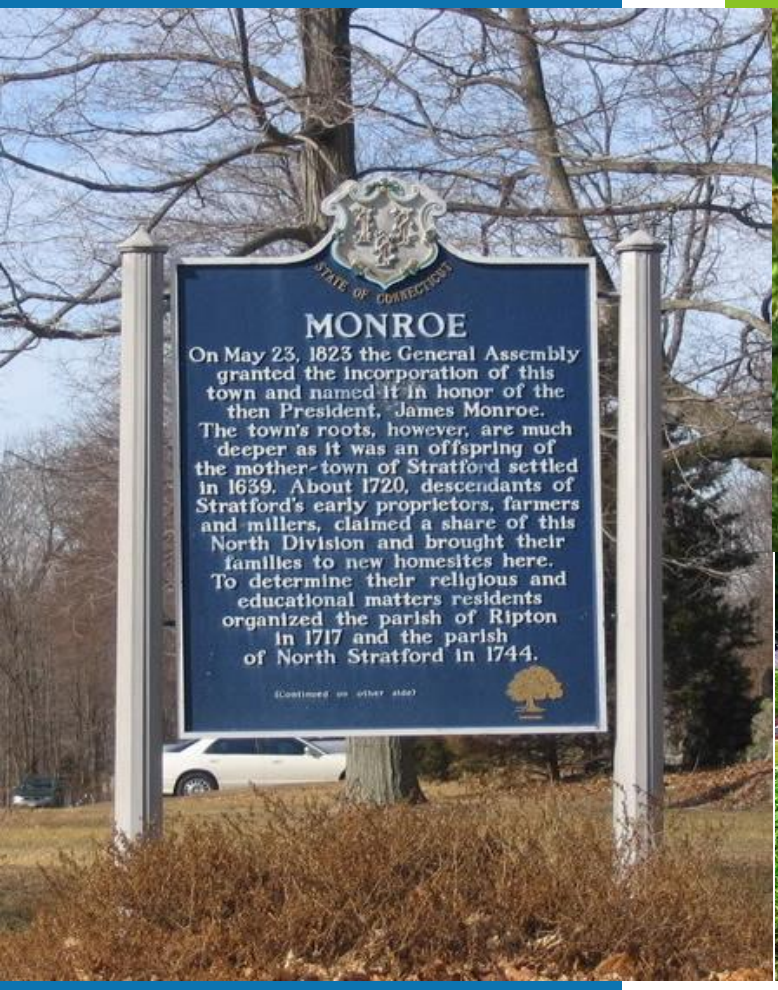

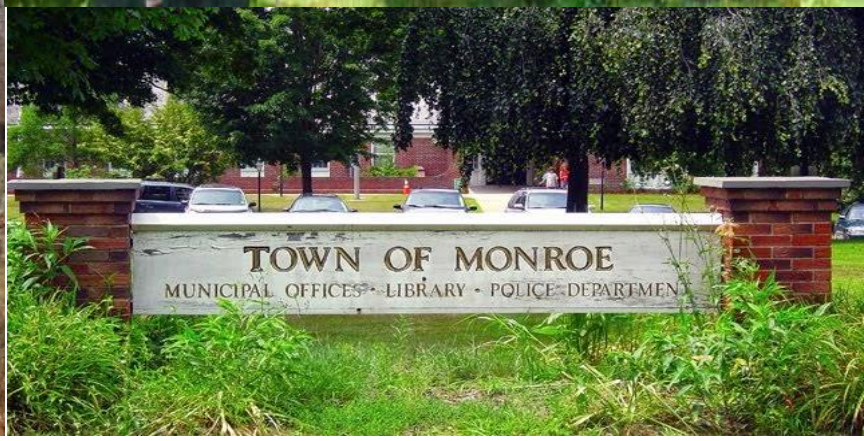

Todd Drive Culvert Replacement

ENGINEERING REPORT

Town of Monroe

May 31, 2024

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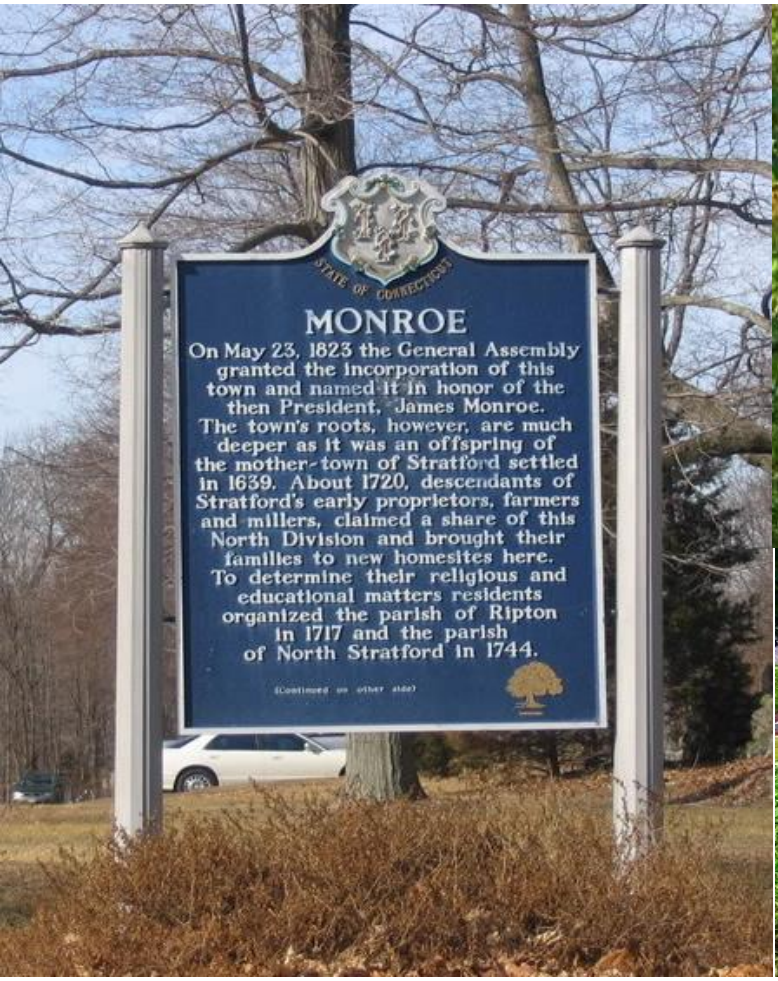

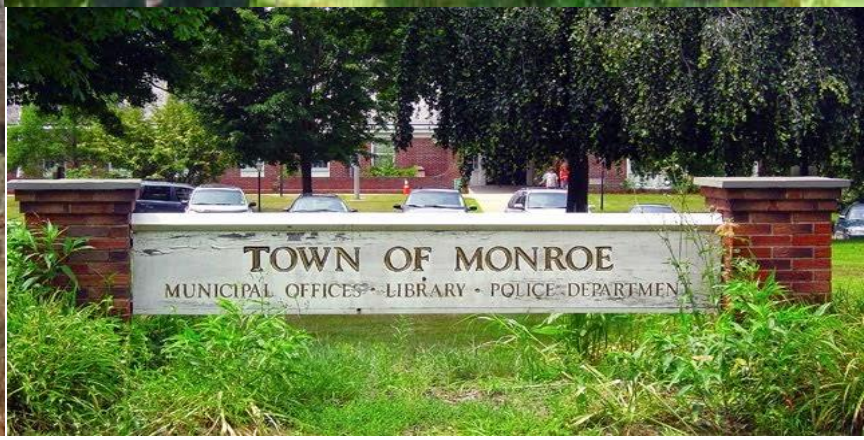

Todd Drive Culvert Replacement

ENGINEERING REPORT

Town of Monroe

May 31, 2024

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Table of Contents

Figures

Appendices

Abbreviations

CFR	Code of Federal Regulations
CMP	Corrugated Metal Pipe
CPP	Corrugated Plastic Pipe
CTDEEP	Connecticut Department of Energy and Environmental Protection
CTDOT	Connecticut Department of Transportation
CY	Cubic yard
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
ft	feet
NAVD88	North American vertical Datum of 1988
RCP	Reinforced Concrete Pipe
SF	square feet
SFHA	Special Hazard Flood Area
USACE	U.S. Army Corps of Engineers
USGS	United State Geologic Survey
WSEL	Water Surface Elevation
WQC	Water Quality Certification
yr	year

Section 1
Introduction

1.1 Overview

The Town of Monroe has engaged Tighe & Bond to design a replacement of the culverts that carry Harvey Pete Brook beneath Todd Drive. The crossing consists of three culverts, a 36 inch CMP, a 30 inch RCP, and a 24 inch RCP, listed from west to east. All three culverts are in poor condition.

1.2 Project Location

Todd Drive is a local minor roadway located near the municipal boundary of Shelton. The roadway is a cul-de-sac and serves a total of six residences, with four residences located beyond the culvert crossing, with no other access to the local roadway network. Todd Drive is located off Pamela Drive, which itself is a local minor roadway off Wheeler Road.

Please refer to **Figure 1** for the location of the site shown on a USGS Quadrangle Map. **Figure 2** shows the location on an aerial photo.

1.3 Existing Conditions

The culvert conveys the flow of Harvey Pete Brook beneath Todd Drive. The upstream stream bed is lined primarily with stones and large boulders, with vegetative cover along the banks. The downstream stream bed is similar to the upstream bed.

The culvert crossing was observed to be in poor condition, with deterioration noted on the downstream end of the culverts, a failing headwall, and loss of section on the corrugated metal pipe. The pavement at the crossing location is in extremely poor condition with a significant amount of alligator cracking indicative of overtopping, and loss of subbase fine material, which indicates a potential for seepage out of the culverts and into the roadway base.

1.4 Environmental Constraints

1.4.1 Floodplain

The detailed study of Harvey Pete Brook ends at the Shelton City line, approximately 630 feet downstream of the project site, based on FEMA FIRM Panel 09001C0279F, effective June 18, 2010. Therefore, there are no Special Flood Hazard Areas in the project area.

1.4.2 Natural Diversity Database

The project area is NOT within any area of concern based upon the CTDEEP Natural Diversity Database Map for the Town of Monroe dated December 2023.

1.4.3 Inland Wetlands and Watercourses

Inland wetlands and watercourses were identified on the site by Davison Environmental in July 2020. Please refer to Section 2 of this report.

1.5 Proposed Activity

The existing culverts, and their headwalls will be replaced with a new 18 foot wide by 5 foot high concrete box culvert and concrete headwalls. The box culvert will be installed such that the floor is depressed one foot below the stream bed elevation, with the lowest foot inside the structure will be filled with natural streambed substrate material. With the simulated natural bottom, width of 1.2 times the bankfull stream width, and the openness ratio of 1.5 square feet per foot, the proposed culvert crossing will meet the U.S. Army Corps of Engineers (USACE) and Connecticut Department of Environmental Protection (CTDEEP) stream crossing criteria.

The culvert will need to be constructed in stages, and includes fill on the upstream side of the crossing to allow for a temporary road widening to allow for one-way alternating traffic during construction of the downstream portion of the culvert. The fill and temporary widening will be removed once the downstream portion of the crossing is completed.

The width of the existing roadway will not change in the final condition, and will remain at 29.5 feet.

The existing catch basins located atop the existing 24” barrel will be removed and new catch basins will be installed approximately 12 feet to the east, requiring a minor re-profiling of the roadway to accommodate the shifted low point. The catch basins will discharge into the channel downstream of the site at their own dedicated outlet instead of directly into the culvert.

Section 2
Environmental Impacts

2.1 Overview

The Project design has been made to avoid impact when possible and to minimize and mitigate the impacts which are unavoidable to accomplish the Project.

Due to the nature of the project, complete avoidance of the Site's regulated wetland areas is not possible. The Applicant proposes to minimize permanent, temporary and secondary wetland impacts to the greatest extent practicable. Impacts will be minimized through implementation of best management practices, including construction phasing.

An analysis of the possible effects of unavoidable permanent and temporary wetland impacts is provided below.

2.2 Natural Diversity Database

The Connecticut Department of Energy and Environmental Protection's Natural Diversity Database (NDDB) Map for the Town of Monroe, dated December 2023, does not show any state and federal listed species and significant natural communities within or immediately adjacent to the park. Refer to **Figure 4**.

2.3 Aquifer Protection Areas

The proposed crossing is not located within any Aquifer Protection Area as identified by CTDEEP, as there are no state aquifer protection areas in the Town of Monroe.

2.4 Floodplain Management

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Panel No. 09001C0279F, effective June 18, 2010, shows no Special Flood Hazard Areas on the project site.

2.5 Wetland Identification

A soils scientist from Davison Environmental identified wetland soils and their boundaries, and prepared wetland determination data forms that describe the hydrology, soil, and vegetation of the subject area. Wetlands are associated with the watercourse corridors through the site. Please refer to **Figure 5** showing the extent of wetlands through the site.

Please refer to the Wetlands Report in **Appendix F**.

2.6 Wetland Impacts

Permanent wetland impacts include the culvert and headwall construction. Temporary impacts will be made to areas that are traversed, but not graded. These are depicted in **Figure 6.** Disturbance along any single streambank does not exceed 50 feet in length.

The project impacts are summarized in **Table 2-1**:

Table 2-1
Wetland Impact Summary

Type	Disturbance sf	Disturbance ac
Permanent	2,150	0.049
Temporary	1,348	0.031
Total	3,498	0.080

Table 2-2
Earthwork Summary within Wetlands

Type	Cut cy	Fill cy	Total cy
General Excavation, Upstream	17	6	- 11
General Excavation, Downstream	10	5	- 5
Excavation for Streambed Material	25	0	- 25
New Streambed Material	0	50	+ 50
Concrete for Headwalls	0	120	+ 120
Crushed Stone beneath Headwalls	0	53	+53
Excavation for Headwalls	107	0	- 107
Excavation for Culvert	275	0	- 275
Riprap Apron	0	3	+ 3
Proposed Culvert	0	97	+ 97
Streambed Material in Culvert	0	34	+34
Total Permanent	**434**	**368**	**- 66 (cut)**
Temporary Fill for Roadway Bypass	0	390	+390
Riprap Armoring for Roadway Fill	0	59	+49
Total Temporary	**0**	**439**	**+439 (fill)**

2.7 Tree Removals

The project will result in tree cutting for the purposes to accommodating construction of the culvert replacement. We anticipate 13 trees of 8-inch diameter and larger will be removed, which will be replaced by new plantings. Please refer to **Figure 7** for the anticipated tree removals**.** Tree removals are prohibited between April 15 and August 31 due to the presence of the Northern Long Eared Bat in Connecticut.

2.8 Mitigation

2.8.1 Improved Crossing

The crossing will meet current USACE stream crossing guidelines, providing a naturalized bottom and sufficient openness to encourage wildlife passage. The current crossing does not meet these guidelines.

2.8.2 Improved Water Quality

Currently, the storm drainage from the roadway discharges into storm drainage grates sitting directly over the 24 inch culvert, directly into the watercourse. The proposed project would capture the runoff in catch basins with sumps before discharging to the watercourse.

2.8.3 Native Plantings

Native plantings have been incorporated into the design to enhance the buffer surrounding the crossing.

2.9 Alternatives Assessment

The proposed 18' wide x 5' high crossing represents the most feasible and prudent alternative considered with the least amount of environmental impact.

2.9.1 No-Build

The Town considered a no-build alternative, but it would do nothing to address the deterioration of the culverts, which would ultimately fail and leave four homes without access to the public road network. Therefore, the no-build alternative was not considered to be prudent due to health, safety, and welfare considerations.

2.9.2 Conducting the Activity in a Different Location

The proposed activity is a culvert replacement, and can therefore only occur at the location of the crossing without relocating the stream, which would result in a significantly larger area of disturbance. Therefore, conducting the activity in a different location was considered to be neither prudent nor feasible.

2.9.3 Narrower Crossing

The proposed crossing is 18' wide. We note that since the existing stream channel bankfull width is 15 feet wide, the USACE stream crossing criteria requires the replacement crossing to span 1.2 times the channel bankfull width, which would be 18 feet. Therefore, the proposed crossing is the minimum width that meets the crossing requirements. If the crossing were to be less than 12 feet wide, there would be less hydraulic opening, meaning that it would not be able to pass the design flow, and would overtop more frequently, which is not desirable when the crossing is the only means of ingress and egress.

Section 3
Hydraulics and Hydrology

3.1 Hydrologic Setting

Todd Drive lies within the middle to upper portions of the Harvey Pete Brook watershed. Belden Brook is part of the Farmill River Subregional Drainage Baisn. The contributing watershed to the site is approximately 0.71 square miles (454.4 acres), predominated by residential land uses. Please refer to **Figure 8** for the watershed extent.

3.2 Precipitation Depth

We utilized NOAA's Atlas 14 online application to develop 24-hour precipitation depths for the project location, as shown in **Table 3-1** below:

Table 3-1
Project Location Precipitation Depths (inches)

Year	2	10	25	50	100	200	500
Probability	50%	10%	4%	2%	1%	0.5%	0.2%
Depth	3.60	5.57	6.80	7.71	8.70	9.90	11.70

The NOAA Atlas 14 output appears in **Appendix A.**

3.3 Hydrology

3.3.1 Stream Gauge Locations

There are no USGS stream gauges on Harvey Pete Brook or the Farmill River.

3.3.2 Flood Insurance Study

The Flood Insurance Study for Fairfield County effective July 8, 2013, utilized the discharges, beginning approximately 630 feet downstream of the site as presented in **Table 3-2.**

Table 3-2
Peak Flow Discharges Harvey Pete Brook at Shelton City Line (cfs)

Watercourse	Frequency			
	10-year (10%)	50-year (2%)	100-year (1%)	500-year (0.2%)
at Shelton City Line (published in FIS)	330	490	560	720
at Todd Drive (Transposed)	292	434	496	638

We note that the FIS lists Park Street as a flow change location. We adopted the higher flow immediately downstream of the culvert to account for the input of the small tributary that joins immediately upstream of the culvert.

3.3.3 USGS Regional Regression Equations

To analyze the discharges developed in the FIS, the USGS StreamStats web application was utilized to delineate the drainage area and compute flows at the crossing. The StreamStats Report is included in **Appendix B** of this report. Since the watershed is more than 30-percent urbanized, the computed discharges were adjusted for urbanization per Section 6.12.2 of the CTDOT Drainage Manual. A summary of the USGS Regression Equations and FIS discharges are shown in **Table 3-3** below.

Table 3-3
USGS Regression Equations
Harvey Pete Brook at Todd Drive

Return Period (years)	Rural Discharge (cfs)	Urbanized Discharge (cfs)	Transposed FIS Discharge (cfs)	Percent Difference Urbanized from FIS
2	69.7	118	150(1)	21%
10	127	256	292	12%
25	168	331	373(1)	11%
50	231	397	434	8%
100	283	468	496	5%
200	N/A	N/A	557(1)	N/A
500	461	603	638	5%

Notes: (1) Based on semilogarithmic plot of 10-, 50-, 100-, and 500-year discharges

Table 3-3 shows that the USGS Regression Equations for Harvey Pete Brook, when adjusted for urbanization, result in smaller discharges than the FIS transposed flow for all storms. Since the FIS did not include flow rates for the 2-year, 25-year and 200-year storm events, a semi-logarithmic plot of the FIS data was used to determine the discharges. Refer to the USGS Regression Equation computations in **Appendix B.**

3.3.4 Comparison of FIS and USGS Discharges

The USGS discharges, after urbanization adjustment, are slightly less than the discharges from the transposed FIS discharges. Section 6.12.2 of the CTDOT Drainage Manual Identifies the following criteria for the USGS equations to be valid:

1. The drainage area must be greater than one (1) square mile and less than one thousand (1,000) square miles.

2. The drainage basin must not be significantly affected by flood control impoundments or by storage facilities having 4.5 million cubic feet (103 acre-feet) or more of storage per square mile.

3. The watershed must not exhibit a significant degree of development. If more than 30 percent of the drainage basin is urbanized, an adjustment to the rural peak discharge will be required.

The watershed is less than one square mile, and therefore does not meet the first criteria for the USGS Regional Regression Equations to be valid. Therefore, we will not be using flow rate based on the USGS methodology.

3.3.5 HEC-HMS Analysis

Recognizing that there are small storage areas upstream of the crossing, we performed a watershed analysis to determine a discharge at the crossing location using Geo HEC-HMS. The Geo HEC-HMS software by CivilGeo provides a GIS interface for the USACE HEC-HMS hydrologic modeling software that allows for automatic importation of land use cover, hydrologic soils groups, and automatically computes lag times for individual watersheds.**Table 3-4** summarizes the results from the HEC-HMS output, which is available in **Appendix C**.

Table 3-4
HEC-HMS Peak Flow Discharges Harvey Pete Brook at Todd Drive (cfs)

	Frequency				
Watercourse	2-year (50%)	10-year (10%)	50-year (2%)	100-year (1%)	500-year (0.2%)
at Todd Drive	155	322	517	610	638

3.3.6 Design Discharge

Since the USGS Regional Regression Equations do not meet the CTDOT criteria for validity, we are left with the FIS flow rates. Harvey Pete Brook was last studied by FEMA on April 1, 1977. There has been significant development in the watershed since then, and the underlying precipitation data for the 1977 study has since been superseded. Therefore, we will rely upon the HEC-HMS model for the design discharges for the project, as shown in **Table 3-5**:

Table 3-5
Design Discharges, Harvey Pete Brook at Todd Drive (cfs)

Return Frequency (years)	Annual Chance Probability	Discharge (cfs)
2	50%	155
10	10%	322
25	4%	440
50	2%	517
100	1%	610
200	0.5%	729
500	0.2%	1,150
Average Daily Flow		1.34
Average Spring Flow		2.58

3.4 Culvert Design

The proposed culvert for Park Street will be a 18' wide by 5' high concrete box culvert, with the lowest foot buried beneath the streambed to simulate an open bottom, providing an effective opening height of 4 feet. The channel on either side of the crossing is 15 feet wide.

3.4.1 Existing Crossing

We analyzed the crossing using the Federal Highway Administration's HY-8 Culvert Analysis program, which accounts for stream channel slope, bed material, tailwater, and roadway elevation. Our analysis indicated that the existing crossing overtopped for a discharge of 157 cfs, which roughly corresponds to just over 3 year event. Please refer to the culvert computations in **Appendix E**.

3.4.2 CTDOT Crossing Hydraulic Criteria

Table 8-4 of the CTDOT Drainage Manual indicates that the crossing is considered a small structure because it crosses a defined watercourse with a drainage area of less than one square mile. Small structures have a 50-year design frequency with a minimum freeboard of 1 foot. The proposed crossing can pass the 50-year storm event with 1 foot of freeboard. The 100-year storm does not overtop the roadway.

3.4.3 Crossing Selection

3.4.3.1 Shape

Tighe & Bond selected a concrete box culvert for the proposed replacement because they have the greatest hydraulic opening for an equivalent span of circular pipe, they are readily available from precast concrete suppliers, and they are easier to construct to meet the open bottom crossing requirements of CTDEEP and USACE.

3.4.3.2 Dimensions

Based upon our analysis, the culvert would need to be 18 feet wide and have a clear opening height of 4 feet to be able to pass the 50-year storm event with one-foot of freeboard.

We note that 18 feet is also the minimum culvert width based upon the USACE's 1.2 x bankfull width requirement. Please refer to the culvert computations in **Appendix E**.

3.4.4 USACE Stream Crossing Criteria

The USACE requires stream crossings to meet certain minimum criteria for permitting purposes. The first is that the culvert allows for the continuous, uninterrupted flow of the 50-year storm event, which this culvert allows. Another criteria is that the culvert span 1.2 times the bank full width. The upstream stream approach is 15 feet wide, therefore, the culvert must be at least 18 feet wide. The proposed culvert is 18 feet wide.

No riprap is proposed across the bed of the brook, complying with the USACE recommendations. Additionally, streambank stabilization does not extend more than 50 feet along any upstream bank.

The minimum USACE openness ratio is 0.82 feet, measured by the ratio of the opening area to the length of culvert. The openness ratio of the proposed culvert is 1.33 feet. Please refer to the culvert computations in **Appendix E**.

3.4.5 Downstream Impact

The proposed culvert will have a larger cross-sectional area than the existing culvert. The approach to the culvert is steep, which minimizes the available storage behind the culvert. The cover over the existing culvert is very shallow, so the overtopping happens rapidly, and there is little to no attenuation of floodwaters. Since no upstream storage area is provided and the culvert overtops rapidly, it does not act as a detention by design or default, and therefore downstream peak flows will not be increased.

3.5 Temporary Hydraulic Facilities

Since the construction of the proposed culvert will require a cofferdam and a temporary culvert to handle the flow, we employed the temporary hydraulic facilities criteria in the CTDOT Drainage Manual to appropriately size the temporary culvert and cofferdam. The temporary facilities were designed for a 1-year storm event. Please refer to the computations in **Appendix D**.

The temporary hydraulic facilities will consist of a cofferdam in Harvey Pete Brook, which would direct flow into a temporary culvert, allowing the replacement culvert to be constructed in dry conditions. In order to size the culverts, we checked the pipe capacity of the proposed temporary culverts, and set the top of the cofferdam to one foot above the 1-year water surface elevation as computed by HY-8.

Section 4
Required Approvals

The proposed work will require environmental permits from local, state and federal authorities as further described below:

4.1 US Army Corps of Engineers

The project qualifies for coverage under the USACE Connecticut General Permits (effective 8/19/2016). Since the project disturbs less than 5,000 square feet of wetlands and no more than 50 feet along any upstream or downstream bank, meets the crossing criteria for spanning the bankfull width and openness, and allows the 50-year storm to pass uninterrupted, the project is Self-Verification eligible.

4.2 Connecticut DEEP

4.2.1 401 Water Quality Certification

Section 401 of the Federal Clean Water Act requires a permit for activities which may result in a discharge of pollutants into waters of the United States. The project will require a 401 Water Quality Certification (WQC, *33 U.S.C. 1341*) from CTDEEP. The application can be made using the Self-Verification Process because the project disturbs less than 5,000 square feet of wetlands and less than 50 feet along any upstream or downstream bank, meets the crossing criteria for spanning the bankfull width and openness, and allows the 50-year storm to pass uninterrupted.

The WQC application will be submitted concurrently with the USACE application.

4.2.2 Floodplain Management Certification

Although the project occurs within a floodplain, a Floodplain Management Certification is not required since the project will not be constructed with state funds.

4.3 Town of Monroe

The Project activities will occur in upland and wetland areas that are regulated by the Town of Monroe Inland Wetlands and Watercourses Agency (Agency) as defined in the Inland Wetlands and Watercourses Regulations of the Town of Monroe (Regulations).

Section 5
Sediment and Erosion Control

5.1 Overview

The project has been designed in accordance with the requirements of the 2002 Connecticut Erosion and Sediment guidelines, and includes detailed phasing plans to demonstrate water handling and construction of a temporary roadway widening to accommodate traffic during construction.

5.2 Construction Sequence

5.2.1 General

1. Project is titled "Todd Drive Culvert Replacement", and is located on Todd Drive in Monroe, Connecticut.

2. Estimated Project Start: Fall 2024
   Estimated Project Completion: Spring 2025

3. Erosion control narrative refers to C-400 series drawings.

4. The controls shown on these plans are considered to be the minimum necessary. The Contract will be required to supplemented with additional controls as needed to ensure that no silty runoff leaves the site.

5. A supply of supplemental erosion control materials must be stored on site at all times for repairs or extensions of controls.

6. Prior to construction, the Contractor shall provide a schedule and update weekly as needed.

5.2.2 Culvert Replacement

5.2.2.1 Culvert Replacement – Phase 1

1. Post advisory signage in advance of project start.

2. Notify Town and Engineer in advance of construction start.

3. Install perimeter erosion controls: silt fence, haybale barrier, etc.

4. Cut and stump trees to be removed.

5. Sawcut existing pavement.

6. Construct temporary culvert east of the crossing

7. Sandbag upstream end of temporary culvert. Ensure west end of culvert tee is capped.

8. Install temporary pavement on Todd Drive.

9. Construct cofferdam across Harvey Pete, and remove sandbags from upstream end of temporary culvert.

5.2.2.2 Culvert Replacement – Phase 2

1. Install new sediment and erosion controls, refresh existing controls.

2. Install sandbags downstream of culvert crossing to keep work area dry from potential tailwater effect.

3. Place fill for temporary road widening, compact and grade.

4. Place riprap on fill slope.

5. Pave temporary roadway.

6. Install precast barrier curb.

5.2.2.3 Culvert Replacement – Phase 3

1. Install new sediment and erosion controls, refresh existing controls.

2. Install downstream headwall and culvert.

3. Construct permanent roadway over newly installed culvert, including rails.

4. Pave binder course on downstream side of crossing over new culvert.

5.2.2.5 Culvert Replacement – Phase 4

1. Install new sediment and erosion controls, refresh existing controls.

2. Relocate precast barrier curb.

3. Remove temporary fill supporting roadway.

4. Install upstream portion of box culvert and headwall.

5. Regrade tributary channel.

6. Stabilize fill slope to remain.

5.2.2.6 Culvert Replacement – Phase 5

1. Maintain erosion controls

2. Remove precast concrete barriers.

3. Remove downstream cofferdam.

4. Remove sandbag cofferdams across channels and place sandbags in front of temporary culverts to shift flow into new box culvert.

5. Remove temporary culverts

6. Install permanent drainage

7. Final pave roadway

8. Establish topsoil and seed

9. Once stabilized, remove erosion controls.

5.2 Sediment and Erosion Control Notes

1. All sedimentation and erosion control measures shall be constructed in accordance with the standards and specifications of the "2023 Connecticut Guidelines for Soil Erosion and Sediment Control", and all amendments and addenda thereto as published by the Connecticut Department of Energy and Environmental Protection.

2. Land disturbance shall be kept to the minimum necessary for construction operations.

3. Install all erosion control measures as shown on the plan and elsewhere as ordered by the engineer or the town.

4. Protect all catch basins with a silt sacks, haybale ring, silt fence or block and stone inlet protection throughout the construction period and until all disturbed areas are thoroughly stabilized as noted on plans.

5. Whenever possible, install erosion and sediment control measures prior to construction. See "Erosion Control Narrative".

6. Install additional control measures during the construction period as ordered by the engineer.

7. Maintain all sedimentation and erosion control measures in effective condition throughout the construction period.

8. Sediment removed shall be disposed of off-site in a manner as required by the engineer.

9. The construction contractor shall be responsible for construction and maintenance of all control measures throughout the construction period.

10. Protect all disturbed areas exposed for more than 7 days with a temporary vegetative cover. Seed these areas with perennial ryegrass at the rate of 40 lbs. per acre (1 lb. per 1,000 sq. Ft). Apply soil amendments and mulch as required to establish a uniform stand of vegetation over all disturbed areas.

11. The construction contractor shall utilize approved methods/materials for preventing the blowing and movement of dust from exposed soil surfaces onto adjacent properties and site areas.

12. The construction contractor shall maintain a supply of silt fence/haybales and anti-tracking crushed stone on site for emergency repairs.

13. The contractor shall inspect weekly at a minimum, all drainage structures and clean them as needed to prevent the build-up of silt.

14. The construction contractor shall carefully coordinate the placement of erosion control measures with the phasing of construction.

15. Keep all paved roadways clean. Sweep before forecasted storms.

16. Treat all unpaved surface with 4" minimum of topsoil prior to final stabilization.

17. Install haybale barriers and silt fencing along the toe of critical cut and fill slopes.

18. The contractor shall notify the Town of Trumbull's environmental official prior to the installation of erosion controls, cutting of trees, or any excavation.

19. Cover all trucks leaving the site.

20. Soil type boundaries shown on these maps were obtained from digital files from the University of Connecticut's Map and Geographic Information Center. Soil type designations were taken from the United States Department of Agriculture, Soil Conservation Service "Soil Survey of Fairfield County.

21. Check all sedimentation and erosion controls weekly and/or after each rainfall event. Make necessary repairs immediately.

22. Inspect and repair erosion and sediment controls prior to forecasted rain events.

23. Remove erosion controls when all disturbed areas have been stabilized and the town has provided authorization. Disturbed areas shall be seeded and mulched.

APPENDIX A

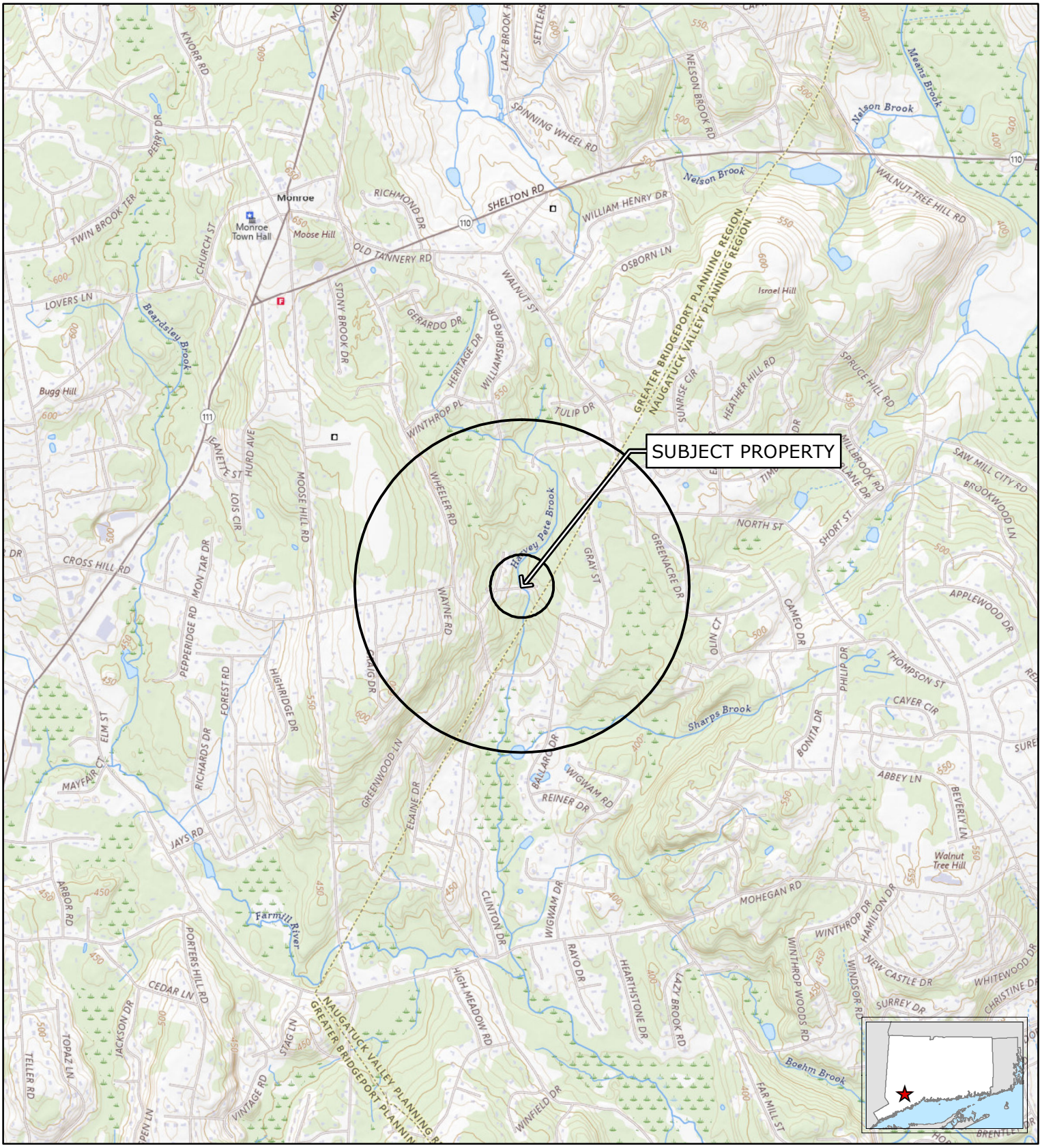

FIGURE 1
SITE LOCATION MAP

Todd Drive
Culvert Replacement
Monroe, Connecticut

June 2024

Tighe&Bond

Based on USGS National Map
Topo Basemap for Long Hill, CT.
Contour Interval Equals 10 Feet
Circles indicate 500-foot and half-mile radii.

1:24,000
0 1,000 2,000
Feet

N

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M-1836

LEGEND

CT Municipal Boundary

Tighe&Bond

Based on 2019 Statewide Leaf-Off Orthophotography, Courtesy of CTECO.

1:2,400

0 100 200

Feet

N

FIGURE 2
ORTHOPHOTOGRAPH

Todd Drive
Culvert Replacement
Monroe, Connecticut

June 2024

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M-1836

LEGEND

- 100-Year Flood Zone
- 500-Year Flood Zone
- CT Municipal Boundary

Tighe&Bond

Based on 2019 Statewide Orthophotography, Courtesy of CTECO.
FEMA data from CTDEEP.

1:2,400

0 100 200

Feet

N

FIGURE 3
FEMA FLOOD ZONES

Todd Drive
Culvert Replacement
Monroe, Connecticut

June 2024

G:\GIS\CT\SiteLocus\MonroeCT\ToddDr_CulvertCrossing_MonroeCT\ToddDr_CulvertReplacement_MonroeCT_FEMA.mxd [Exported By: AFreudenberg, 6/3/2024, 7:06:07 AM]

M-1836

LEGEND

Natural Diversity Database Area

CT Municipal Boundary

Tighe&Bond

Based on 2019 Statewide Leaf-Off Orthophotography, Courtesy of CTECO.

1:2,400

0 100 200

Feet

N

FIGURE 4
NDDB
Todd Drive
Culvert Replacement
Monroe, Connecticut

June 2024

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M-1836

N

N/F Alex Santos De Los #28 Pamela Drive (41/53)

15 TODD DRIVE

N/F Justin Rainho & Daisy Ventura #15 Todd Drive (41/55)

LIMIT OF WETLAND FLAGGING (TYP)

100' UPLAND REVIEW AREA

Residence
FF 450.20 GF 446.76

100' UPLAND REVIEW AREA

N/F Fernando & Tiffany Pena #5 Todd Drive (41/54)

5 TODD DRIVE

N/F Peter Chila #23 Todd Drive (41/56)

23 TODD DRIVE

Asphalt Drive

Riprap Area

1+00

2+00

TODD DRIVE

3+00

4+00

5+00

6+00

6+52

Edge of Pavement

Bit Curb

Asphalt Apron

Utility Box

CLP 69 Old/New

CLP 70

CLP 71

CLP 72

Treeline

Ledge

Walk

Mailbox

Asphalt Drive

Water Valve

Edge of Pavement

Harvey Pete Brook

Stone Drive

Catch Basin
TF 439.03
24" Rcp Inv 434.03 (N)
24" Rcp Inv 434.28 (S-Silted)
Sump 433.88
36" Cmp Inv 434.85

4" Pvc Inv 442.16
(End of Pipe)

Residence
FF 450.34 GF 444.28

4 TODD DRIVE

N/F Timothy Pringle & Barbara Agee #4 Todd Drive (41/61)

10 TODD DRIVE

N/F Rielle Giannino #10 Todd Drive (41/60)

Residence
FF 440.24 GF 436.64

Sill 431.9 (Door To Basement)

22 TODD DRIVE

N/F Jeanette Benson #22 Todd Drive (41/58)

LIMIT OF WETLAND FLAGGING (TYP)

N/F Christopher Kelman & Marcy Rickart #16 Todd Drive (41/59)

16 TODD DRIVE

Wetland Flag Number

Concrete Endwall

30" Rcp Inv 433.18
24" Rcp Inv 433.37
15" Dia.
Catch Basin
TF 439.04
24" Rcp Inv 434.39 (N)
24" Rcp Inv 434.24 (S)
Sump 433.94

LEGEND:

- LIMIT OF WETLAND FLAGGING

0 40' 80'

SCALE: 1" = 40'

TODD LANE CULVERT REPLACEMENT
MONROE, CONNECTICUT

WETLAND AREAS

DATE:	02/14/2024
SCALE:	1" = 40'
FIGURE:	5

Tighe&Bond

Plotted On: Feb 14, 2024-8:56am By: SansoneM
Tighe & Bond: J:\M\M1836 Monroe CT MS4\012 Todd Drive Culvert\Drawings\AutoCAD\Figures\FIGURE 5.dwg

PERMANENT DISTURBANCE DUE TO REGRADING AND ENCROACHMENT = 1,490 SF

1. PERMANENT DISTURBANCE DUE TO REGRADING AND ENCROACHMENT (UPSTREAM) = 523 SF
2. PERMANENT DISTURBANCE DUE TO REGRADING AND ENCROACHMENT (DOWNSTREAM) = 967 SF

PERMANENT DISTURBANCE DUE TO WETLAND EXPANSION BY REGRADING AND ENLARGEMENT OF CULVERT = 660 SF

3. UPSTREAM, RIVER RIGHT = 7 SF
4. UPSTREAM, RIVER LEFT = 14 SF
5. BETWEEN PROP BOX CULVERT WALL AND EXIST 36" CMP = 67 SF
6. BETWEEN EXIST 36" CMP AND 30" RCP = 166 SF
7. BETWEEN EXIST 30" RCP AND EXIST 24" RCP = 67 SF
8. BETWEEN EXIST 24" RCP AND BOX CULVERT WALL = 167 SF
9. DOWNSTREAM, RIVER LEFT = 172 SF

PERMANENT DISTURBANCE DUE TO WETLAND EXPANSION BY REGRADING AND ENLARGEMENT OF CULVERT = 1,348 SF

10. TEMPORARY DISTURBANCE FOR COFFERDAM = 896 SF
11. TEMPORARY DISTURBANCE FOR TEMPORARY BYPASS (UPSTREAM) = 128 SF
12. TEMPORARY DISTURBANCE FOR TEMPORARY BYPASS (DOWNSTREAM) = 324 SF

N

N/F Alex Santos De Los #28 Pamela Drive (41/53)

15 TODD DRIVE

N/F Justin Rainho & Daisy Ventura #15 Todd Drive (41/55)

Residence FF 450.20 GF 446.76

5 TODD DRIVE

N/F Peter Chila #23 Todd Drive (41/56)

23 TODD DRIVE

100' UPLAND REVIEW AREA

TODD DRIVE

3+00 4+00 5+00 6+00 6+52

Edge of Pavement

Asphalt Drive

Utility Box CLP 69 Old/New

Utility Box CLP 70

Utility Box CLP 72

Bit Curb

Asphalt Apron

Concrete Endwall

Mailbox

Water Valve

Stone Drive

Treeline

Walk

Ledge

Sill 431.9 (Door To Basement)

Residence FF 440.24 GF 436.64

Residence FF 450.34 GF 444.28

4" Pvc Inv (End of Pipe)

Wetland Flag Number (Typ)

'12 Pamela Drive

4 TODD DRIVE

N/F Timothy Pringle & Barbara Agee #4 Todd Drive (41/61)

10 TODD DRIVE

N/F Rielle Giannino #10 Todd Drive (41/60)

22 TODD DRIVE

N/F Jeanette Benson #22 Todd Drive (41/58)

16 TODD DRIVE

N/F Christopher Kelman & Marcy Rickart #16 Todd Drive (41/59)

LEGEND:

- PERMANENT DISTURBANCE = 2,150 S.F.
- TEMPORARY DISTURBANCE = 1,348 S.F.

0 40' 80'

SCALE: 1" = 40'

TODD LANE CULVERT REPLACEMENT
MONROE, CONNECTICUT

WETLAND DISTURBANCE AREAS

DATE:	02/14/2024
SCALE:	1" = 40'
FIGURE:	6

Tighe&Bond

N

N/F Alex Santos De Los #28 Pamela Drive (41/53)

15 TODD DRIVE

N/F Justin Rainho & Daisy Ventura #15 Todd Drive (41/55)

Residence
FF 450.20 GF 446.76

Walk

N/F Fernando & Tiffany Pena #5 Todd Drive (41/54)

5 TODD DRIVE

N/F Peter Chila #23 Todd Drive (41/56)

23 TODD DRIVE

Asphalt Drive

Riprap Area

1+00

2+00

TODD DRIVE

3+00

4+00

5+00

6+00

6+52

Edge of Pavement

Bit Curb

Asphalt Drive

Utility Box

CLP 69 Old/New

CLP 70

Asphalt Apron

CLP 71

CLP 72

CLP 73

Mailbox

Water Valve

Concrete Endwall

Concrete Headwall

Harvey Pete Brook

EDGE OF INLAND WETLANDS

Treeline

Ledge

Stone Drive

Walk

18" Dia. Birch

18" Dia. Oak

15" Dia. Birch

10" Dia. Maple

12" Dia. Maple

8" Dia. Oak

15" Dia. Beech

15" Dia. Maple

12" Dia. Maple

8" Dia. Maple

Dia. Maple Ledge

#1 #2 #3 #3a #4 #4a #9 #11 #15 #17 #18 #19 #20 #21 #22 #23 #24 #25 #26 #27 #28 #29 #34 #35 #36

4 TODD DRIVE

N/F Timothy Pringle & Barbara Agee #4 Todd Drive (41/61)

Residence
FF 450.94 GF 444.28

10 TODD DRIVE

N/F Rielle Giannino #10 Todd Drive (41/60)

4" Pvc Inv 442.16
(End of Pipe)

Wetland Flag Number (Typ.)

Residence
FF 440.24 GF 436.64

N/F Christopher Kelman & Marcy Rickart #16 Todd Drive (41/59)

16 TODD DRIVE

22 TODD DRIVE

N/F Jeanette Benson #22 Todd Drive (41/58)

LEGEND:

X - TREE TO BE REMOVED

0 40' 80'

SCALE: 1" = 40'

TODD LANE CULVERT REPLACEMENT
MONROE, CONNECTICUT

TREE REMOVALS

DATE:	02/14/2024
SCALE:	1" = 40'
FIGURE:	7

Tighe&Bond

Plotted On:Feb 14, 2024-8:54am By: SansoneM
Tighe & Bond:J:\MM\M1836 Monroe CT MSA\012 Todd Drive Culvert\Drawings\AutoCAD\Figures\FIGURE 7.dwg

NOAA Atlas 14, Volume 10, Version 3
Location name: Monroe, Connecticut, USA*
Latitude: 41.3163°, Longitude: -73.1946°
Elevation: 462 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.363** (0.278-0.464)	**0.427** (0.327-0.545)	**0.531** (0.405-0.680)	**0.617** (0.468-0.794)	**0.736** (0.543-0.981)	**0.825** (0.598-1.12)	**0.919** (0.648-1.29)	**1.02** (0.687-1.46)	**1.18** (0.760-1.72)	**1.30** (0.822-1.94)
10-min	**0.515** (0.394-0.657)	**0.605** (0.463-0.772)	**0.752** (0.574-0.963)	**0.875** (0.664-1.12)	**1.04** (0.769-1.39)	**1.17** (0.846-1.59)	**1.30** (0.918-1.82)	**1.45** (0.972-2.07)	**1.66** (1.08-2.44)	**1.84** (1.16-2.74)
15-min	**0.606** (0.464-0.773)	**0.712** (0.545-0.909)	**0.885** (0.675-1.13)	**1.03** (0.781-1.32)	**1.23** (0.904-1.64)	**1.38** (0.996-1.87)	**1.53** (1.08-2.14)	**1.71** (1.14-2.43)	**1.96** (1.27-2.87)	**2.16** (1.37-3.23)
30-min	**0.839** (0.643-1.07)	**0.987** (0.755-1.26)	**1.23** (0.937-1.57)	**1.43** (1.08-1.84)	**1.70** (1.25-2.27)	**1.91** (1.38-2.59)	**2.13** (1.49-2.96)	**2.36** (1.58-3.36)	**2.68** (1.74-3.93)	**2.94** (1.86-4.38)
60-min	**1.07** (0.821-1.37)	**1.26** (0.965-1.61)	**1.57** (1.20-2.01)	**1.83** (1.39-2.35)	**2.18** (1.60-2.90)	**2.45** (1.77-3.31)	**2.72** (1.91-3.78)	**3.01** (2.02-4.29)	**3.41** (2.21-4.99)	**3.72** (2.35-5.54)
2-hr	**1.39** (1.07-1.76)	**1.64** (1.26-2.08)	**2.05** (1.57-2.60)	**2.39** (1.82-3.05)	**2.85** (2.11-3.78)	**3.20** (2.33-4.32)	**3.57** (2.53-4.96)	**3.98** (2.68-5.63)	**4.58** (2.97-6.66)	**5.06** (3.21-7.49)
3-hr	**1.60** (1.24-2.02)	**1.90** (1.47-2.40)	**2.38** (1.83-3.02)	**2.78** (2.13-3.54)	**3.33** (2.48-4.40)	**3.74** (2.73-5.03)	**4.18** (2.97-5.81)	**4.68** (3.16-6.59)	**5.41** (3.52-7.85)	**6.02** (3.83-8.88)
6-hr	**2.02** (1.57-2.54)	**2.41** (1.88-3.03)	**3.05** (2.36-3.84)	**3.58** (2.76-4.53)	**4.31** (3.23-5.67)	**4.86** (3.57-6.50)	**5.44** (3.90-7.53)	**6.12** (4.14-8.57)	**7.14** (4.66-10.3)	**8.00** (5.10-11.7)
12-hr	**2.50** (1.95-3.11)	**3.01** (2.35-3.75)	**3.85** (3.00-4.82)	**4.55** (3.53-5.71)	**5.51** (4.15-7.20)	**6.23** (4.60-8.29)	**6.99** (5.04-9.64)	**7.90** (5.36-11.0)	**9.25** (6.06-13.2)	**10.4** (6.65-15.1)
24-hr	**2.94** (2.31-3.63)	**3.60** (2.83-4.45)	**4.68** (3.66-5.80)	**5.57** (4.34-6.95)	**6.80** (5.16-8.85)	**7.71** (5.74-10.2)	**8.70** (6.32-12.0)	**9.90** (6.74-13.7)	**11.7** (7.69-16.7)	**13.3** (8.52-19.2)
2-day	**3.32** (2.63-4.08)	**4.13** (3.27-5.08)	**5.46** (4.31-6.73)	**6.56** (5.14-8.12)	**8.07** (6.16-10.5)	**9.18** (6.89-12.2)	**10.4** (7.65-14.3)	**11.9** (8.16-16.4)	**14.4** (9.46-20.3)	**16.5** (10.6-23.7)
3-day	**3.62** (2.88-4.43)	**4.51** (3.58-5.52)	**5.96** (4.72-7.32)	**7.17** (5.64-8.84)	**8.83** (6.77-11.4)	**10.0** (7.57-13.3)	**11.4** (8.40-15.6)	**13.1** (8.97-17.9)	**15.8** (10.4-22.2)	**18.2** (11.7-26.0)
4-day	**3.89** (3.10-4.75)	**4.83** (3.85-5.90)	**6.37** (5.06-7.80)	**7.64** (6.03-9.40)	**9.40** (7.22-12.1)	**10.7** (8.07-14.1)	**12.1** (8.94-16.6)	**13.9** (9.54-19.0)	**16.7** (11.1-23.5)	**19.2** (12.4-27.4)
7-day	**4.67** (3.74-5.67)	**5.70** (4.56-6.92)	**7.38** (5.89-8.99)	**8.77** (6.96-10.7)	**10.7** (8.24-13.7)	**12.1** (9.16-15.8)	**13.7** (10.1-18.5)	**15.6** (10.7-21.1)	**18.5** (12.3-25.8)	**21.0** (13.6-29.8)
10-day	**5.43** (4.37-6.57)	**6.51** (5.23-7.88)	**8.28** (6.62-10.0)	**9.74** (7.75-11.9)	**11.8** (9.07-14.9)	**13.3** (10.0-17.2)	**14.9** (11.0-19.9)	**16.8** (11.6-22.7)	**19.7** (13.1-27.4)	**22.2** (14.4-31.3)
20-day	**7.73** (6.26-9.29)	**8.92** (7.21-10.7)	**10.9** (8.74-13.1)	**12.5** (9.98-15.1)	**14.7** (11.4-18.4)	**16.3** (12.4-20.8)	**18.1** (13.2-23.7)	**20.0** (13.9-26.8)	**22.7** (15.2-31.3)	**24.9** (16.2-34.9)
30-day	**9.63** (7.82-11.5)	**10.9** (8.82-13.0)	**12.9** (10.4-15.5)	**14.6** (11.7-17.6)	**16.9** (13.1-21.1)	**18.7** (14.2-23.7)	**20.5** (15.0-26.7)	**22.4** (15.6-29.9)	**25.0** (16.7-34.3)	**27.0** (17.6-37.7)
45-day	**12.0** (9.75-14.2)	**13.3** (10.8-15.8)	**15.4** (12.5-18.5)	**17.2** (13.9-20.7)	**19.7** (15.3-24.3)	**21.6** (16.4-27.1)	**23.5** (17.2-30.2)	**25.4** (17.7-33.6)	**27.8** (18.6-37.9)	**29.6** (19.3-41.1)
60-day	**13.9** (11.4-16.5)	**15.3** (12.5-18.1)	**17.5** (14.2-20.9)	**19.4** (15.7-23.2)	**21.9** (17.1-27.0)	**23.9** (18.2-29.9)	**25.9** (18.9-33.1)	**27.7** (19.5-36.6)	**30.1** (20.2-40.9)	**31.7** (20.7-44.0)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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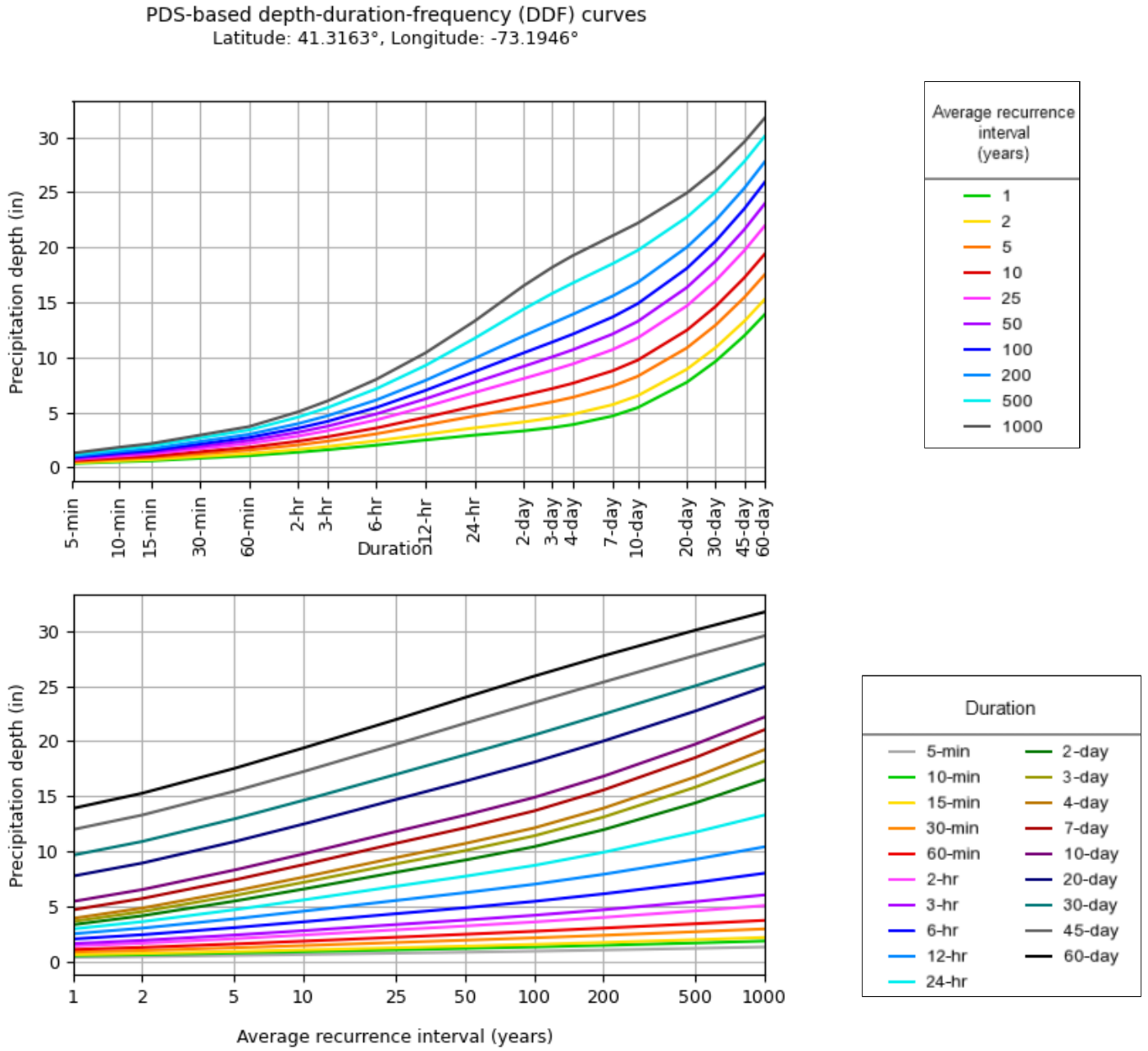
PF graphical



NOAA Atlas 14, Volume 10, Version 3

Created (GMT): Tue Feb 13 17:46:16 2024

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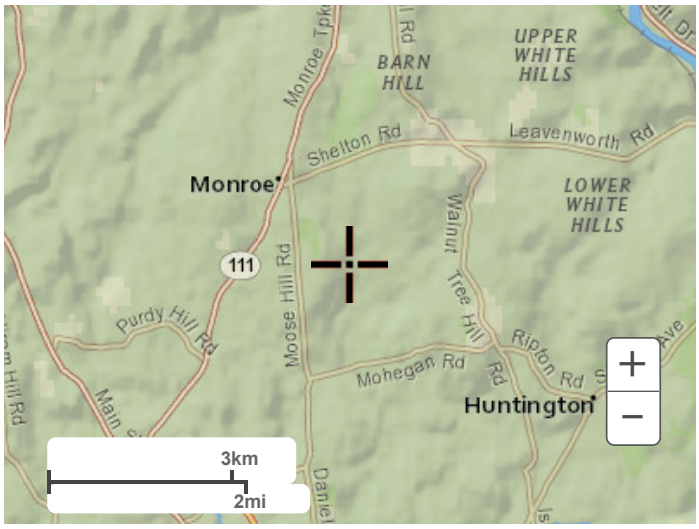
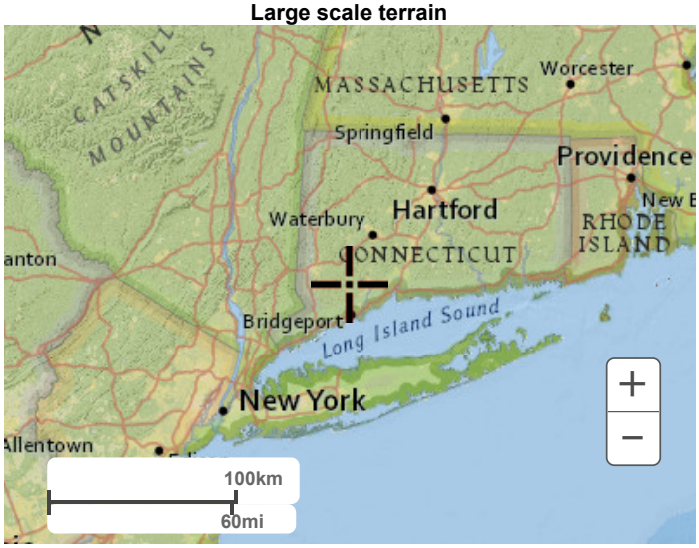
Maps & aerials

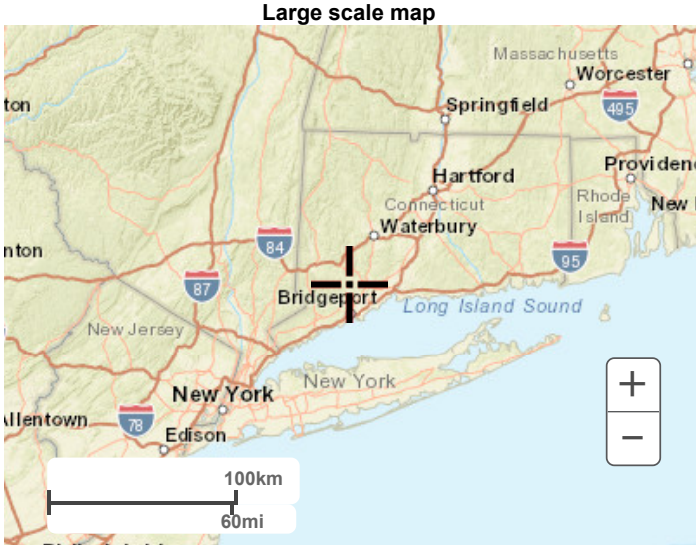
Small scale terrain



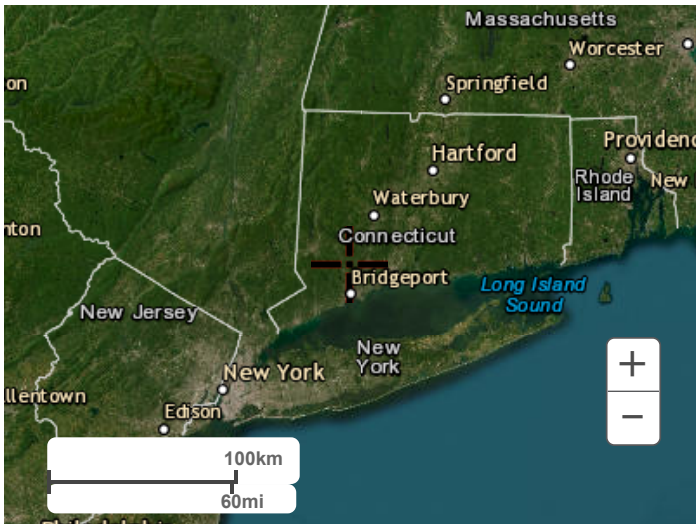
Large scale terrain



Large scale map



Large scale aerial



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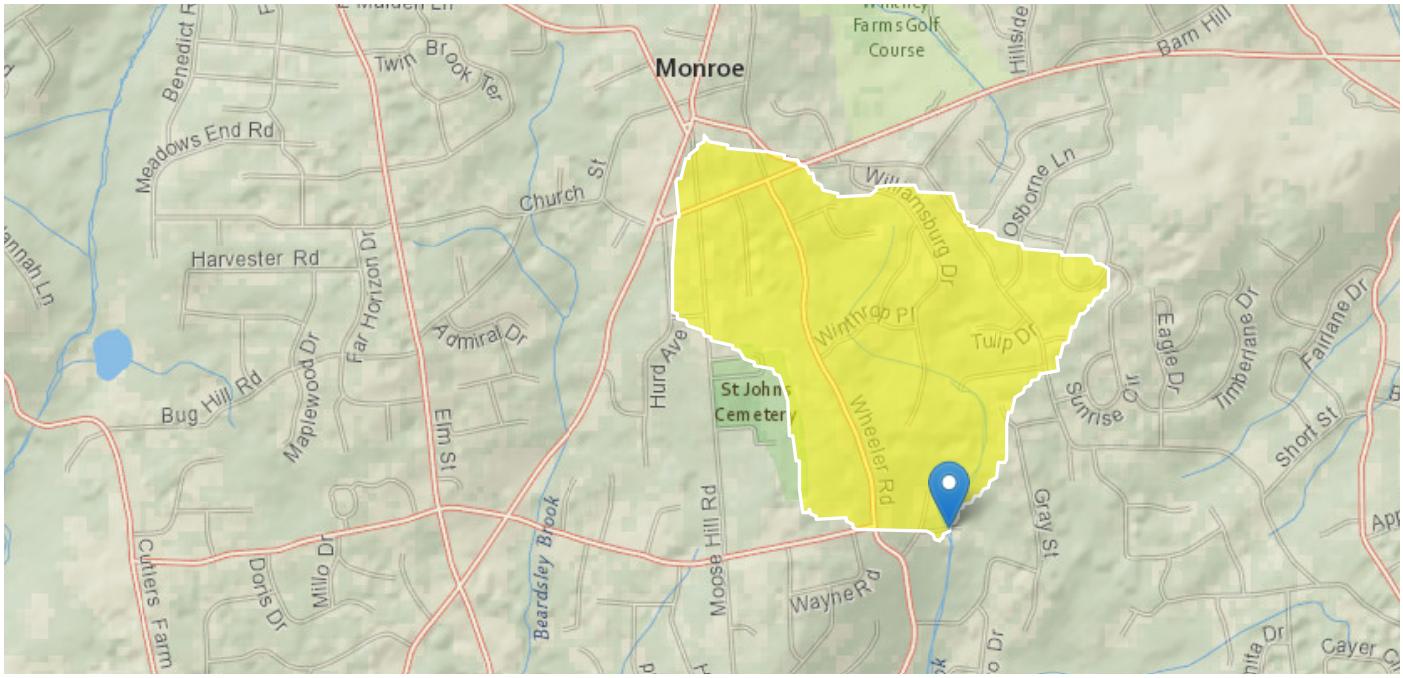
US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

APPENDIX B

StreamStats Report

Region ID: CT
Workspace ID: CT20240213180429379000
Clicked Point (Latitude, Longitude): 41.31637, -73.19343
Time: 2024-02-13 13:04:52 -0500



Todd Drive at Harvey Pete Brook

Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	0.72	square miles
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	8.71	inches
I24H10Y	Maximum 24-hour precipitation that occurs on average once in 10 years	5.5	inches
I24H200Y	Maximum 24-hour precipitation that occurs on average once in 200 years	10.09	inches
I24H25Y	Maximum 24-hour precipitation that occurs on average once in 25 years	6.78	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	3.26	inches

Parameter Code	Parameter Description	Value	Unit
I24H500Y	Maximum 24-hour precipitation that occurs on average once in 500 years	11.91	inches
I24H50Y	Maximum 24-hour precipitation that occurs on average once in 50 years	7.74	inches
I24H5Y	Maximum 24-hour precipitation that occurs on average once in 5 years	4.54	inches
SSURGOCCDD	Percentage of area with hydrologic soil types C, D, or C/D from SSURGO	0.6388	percent

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	0.72	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	0.72	square miles	0.69	325
I24H2Y	24 Hour 2 Year Precipitation	3.26	inches	2.77	3.32
SSURGOCCDD	Percent soil type C or D from SSURGO	0.6388	percent	0.118	0.945
I24H5Y	24 Hour 5 Year Precipitation	4.54	inches	4	4.7
I24H10Y	24 Hour 10 Year Precipitation	5.5	inches	4.86	5.79
I24H25Y	24 Hour 25 Year Precipitation	6.78	inches	5.99	7.22
I24H50Y	24 Hour 50 Year Precipitation	7.74	inches	6.81	8.3
I24H100Y	24 Hour 100 Year Precipitation	8.71	inches	7.62	9.38
I24H200Y	24 Hour 200 YearPrecipitation	10.09	inches	8.7	11.22
I24H500Y	24 Hour 500 Year Precipitation	11.91	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	49.7	ft^3/s	35
Drainage Area Only 20-percent AEP flood	87.8	ft^3/s	35
Drainage Area Only 10-percent AEP flood	120	ft^3/s	36.3
Drainage Area Only 4-percent AEP flood	167	ft^3/s	37.8
Drainage Area Only 2-percent AEP flood	207	ft^3/s	39.8

Statistic	Value	Unit	ASEp
Drainage Area Only 1-percent AEP flood	251	ft^3/s	42.4
Drainage Area Only 0.5-percent AEP flood	300	ft^3/s	44.4
Drainage Area Only 0.2-percent AEP flood	373	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	69.7	ft^3/s	17.3	281	26.5
20-percent AEP flood	127	ft^3/s	28.7	562	26.3
10-percent AEP flood	168	ft^3/s	34.9	809	28.4
4-percent AEP flood	231	ft^3/s	43.3	1230	31.5
2-percent AEP flood	283	ft^3/s	48.1	1660	34.3
1-percent AEP flood	341	ft^3/s	52.6	2210	37.1
0.5-percent AEP flood	384	ft^3/s	66.9	2200	40.6
0.2-percent AEP flood	461	ft^3/s	85.3	2490	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	49.7	ft^3/s	35		
Drainage Area Only 20-percent AEP flood	87.8	ft^3/s	35		
Drainage Area Only 10-percent AEP flood	120	ft^3/s	36.3		
Drainage Area Only 4-percent AEP flood	167	ft^3/s	37.8		
Drainage Area Only 2-percent AEP flood	207	ft^3/s	39.8		
Drainage Area Only 1-percent AEP flood	251	ft^3/s	42.4		
Drainage Area Only 0.5-percent AEP flood	300	ft^3/s	44.4		
Drainage Area Only 0.2-percent AEP flood	373	ft^3/s	48		
50-percent AEP flood	69.7	ft^3/s	17.3	281	26.5
20-percent AEP flood	127	ft^3/s	28.7	562	26.3
10-percent AEP flood	168	ft^3/s	34.9	809	28.4
4-percent AEP flood	231	ft^3/s	43.3	1230	31.5
2-percent AEP flood	283	ft^3/s	48.1	1660	34.3
1-percent AEP flood	341	ft^3/s	52.6	2210	37.1
0.5-percent AEP flood	384	ft^3/s	66.9	2200	40.6
0.2-percent AEP flood	461	ft^3/s	85.3	2490	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)

Application Version: 4.19.4
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

Tighe&Bond
Engineers | Environmental Specialists

Urbanization Adjustment - Harvey Pete Brook at Todd Drive, Monroe, CT
USGS Regional Regression Equations

31-Jan-24
Prepared by: J. Canas

Basin Parameters	
DA, Drainage Area	0.71 mi2

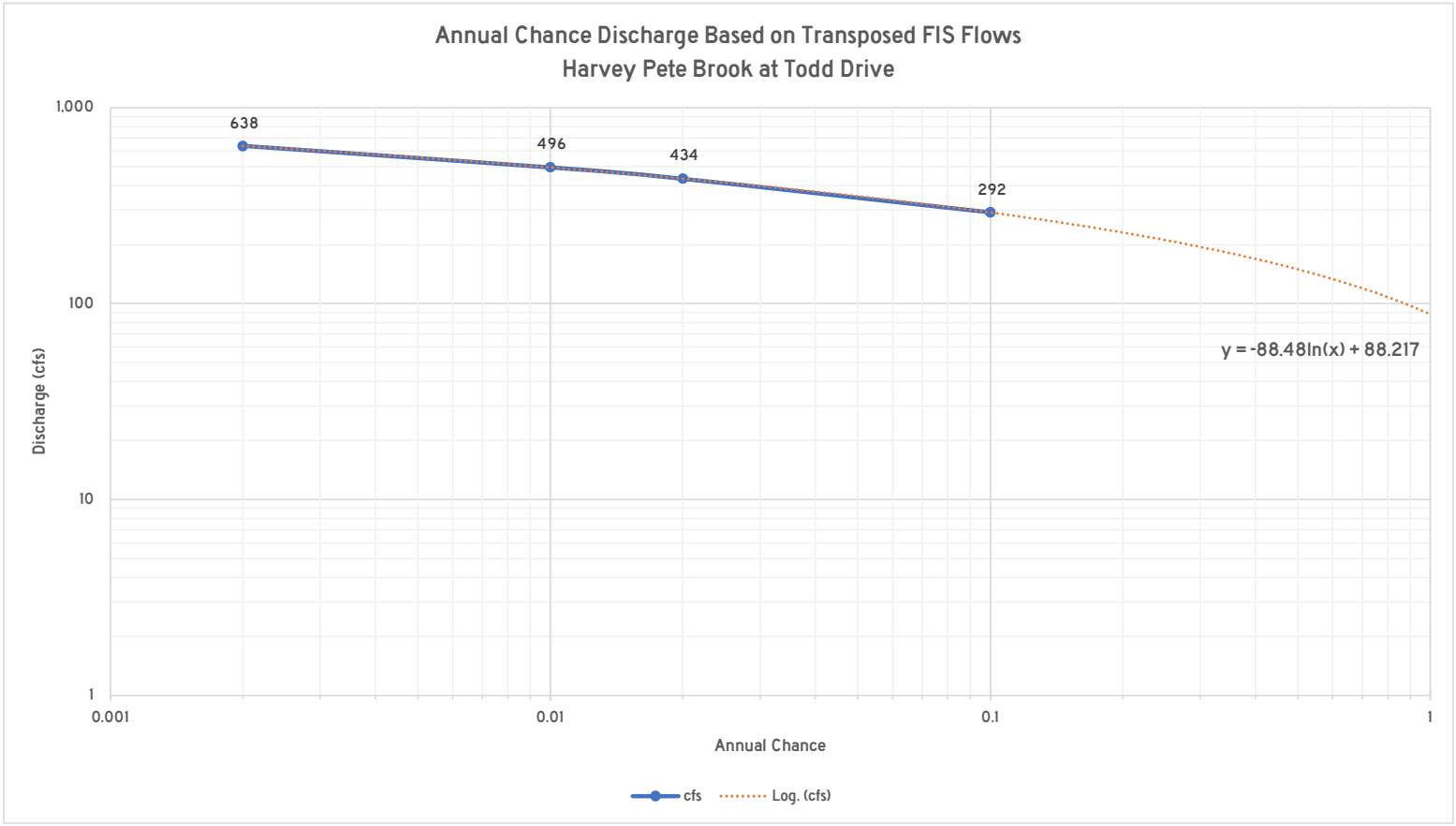
Basin Development Factor			
Parameter	**Upper**	**Middle**	**Lower**
Channel Improvements	0	0	0
Channel Linings	0	0	0
Storm Drains	1	1	1
Curb and Gutter Streets	1	1	1
Subtotal	**2**	**2**	**2**
Total			**6**

Regression Equations (Non-Urbanized)	
RQ2	69.7 cfs
RQ10	168 cfs
RQ25	231 cfs
RQ50	283 cfs
RQ100	341 cfs
RQ500	461 cfs

Urbanized Regression Equations	
UQ2	118 cfs
UQ10	256 cfs
UQ25	331 cfs
UQ50	397 cfs
UQ100	468 cfs
UQ500	603 cfs

FIS Flow Rates Transposed	
% Chance	cfs
0.002	638
0.01	496
0.02	434
0.1	292

Interpolated Flows	
% Chance	cfs
0.005	557
0.04	373
0.2	231
0.5	150
1	88



Tighe&Bond
Engineers | Environmental Specialists

Transposition of FIS Flows
Harvey Pete Brook at Todd Drive, Monroe, CT
USGS Regional Regression Equations
1/31/2024
Prepared by: J. Canas

Location	Area, sq mi	Flow, cfs			
		2 year	10 year	50 year	100 year
1. City Line	0.81	330	490	560	720
2. Site	0.71	292	434	496	638

$$\frac{Q_1 / A_1}{Q_2 / A_2} = \frac{A_1^{[(0.894 / A_1^{0.048})-1]}}{A_2^{[(0.894 / A_2^{0.048})-1]}}$$

Equation Part	2 year	10 year	50 year	100 year
1. Q_1/A_1	407.41	604.94	691.36	888.89
2. $A_1^{[(0.894/A_1^{0.048})-1]}$	1.02063127	1.02063127	1.0206313	1.0206313
3. $A_2^{[(0.894/A_2^{0.048})-1]}$	1.03172154	1.03172154	1.0317215	1.0317215
4. Item 2/Item 3	0.98925071	0.98925071	0.9892507	0.9892507
5. Q_2	292	434	496	638

APPENDIX C

Tighe&Bond

Engineers | Environmental Specialists

Todd Drive Culvert Replacement

Monroe, CT

Prepared for:

Town of Monroe

Prepared by:

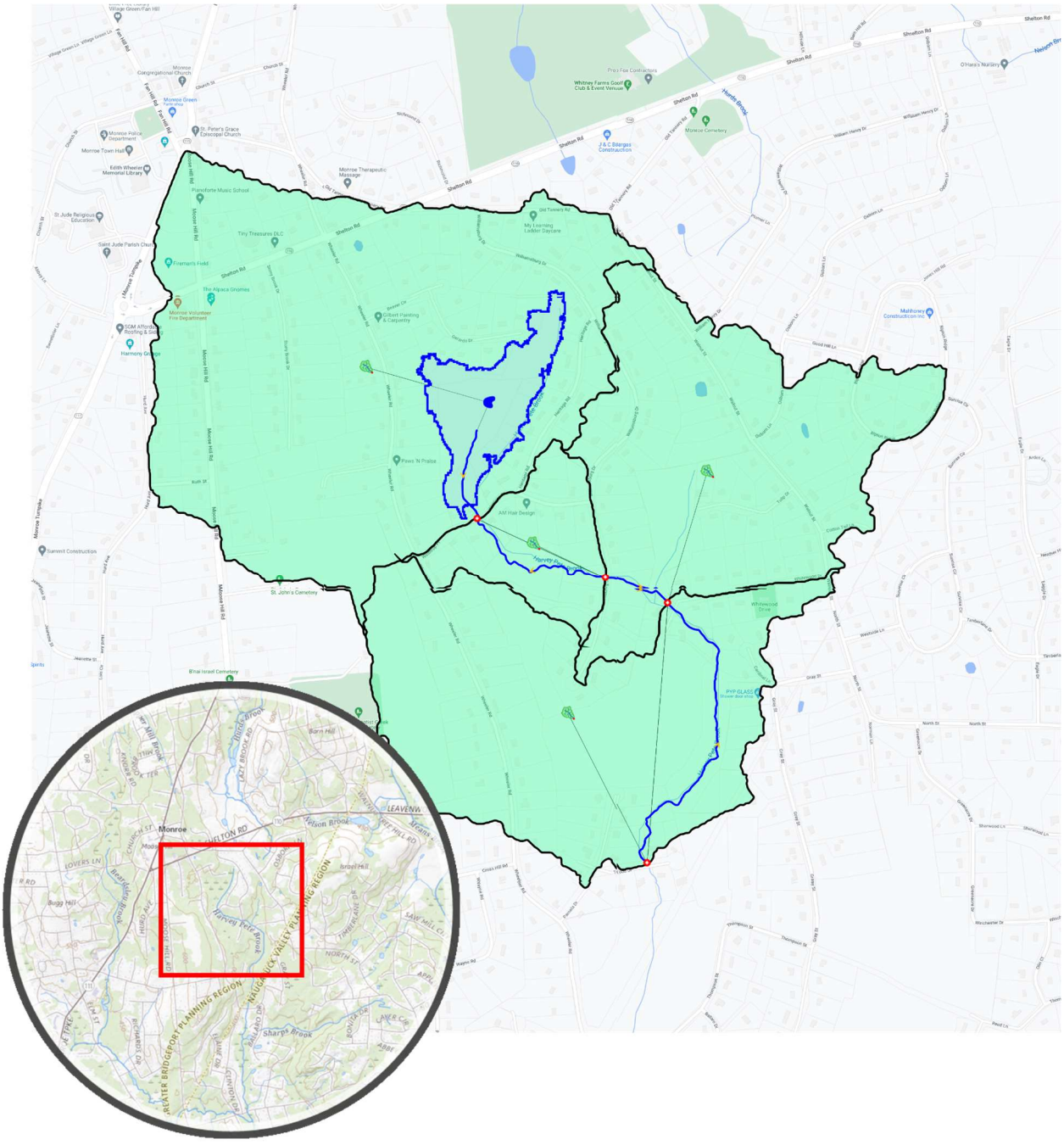
Joseph Canas, PE, LEED AP, CFM

October 25, 2023

Contents

Project Description

The project is located at **16 Winthrop Pl, Monroe, CT 06468.** The site is 475.204 acres in size.



Purpose

The purpose of this hydrology study is to determine the peak runoff rates for pre-development and post-development conditions.

Methodology Used

The HEC-HMS version 4.5 computer software was used in this hydrology study. The **SCS Curve Number** infiltration (loss) method and **SCS Unit Hydrograph** runoff (transform) method was used for determining the stormwater runoff**.** The **Kinematic Wave** routing method was used for routing the stormwater**.**

The following scenarios were analyzed in this hydrology study:

Existing Conditions

This scenario contains:

- 4 delineated subbasin areas and corresponding lag time flow paths.
- 4 routing reaches.
- 4 connecting junctions.
- 1 storage area

050-Existing Conditions

This scenario contains:

- 4 delineated subbasin areas and corresponding lag time flow paths.
- 4 routing reaches.
- 4 connecting junctions.
- 1 storage area

002-Existing Conditions

This scenario contains:

- 4 delineated subbasin areas and corresponding lag time flow paths.
- 4 routing reaches.
- 4 connecting junctions.
- 1 storage area

010-Existing Conditions

This scenario contains:

- 4 delineated subbasin areas and corresponding lag time flow paths.
- 4 routing reaches.
- 4 connecting junctions.
- 1 storage area

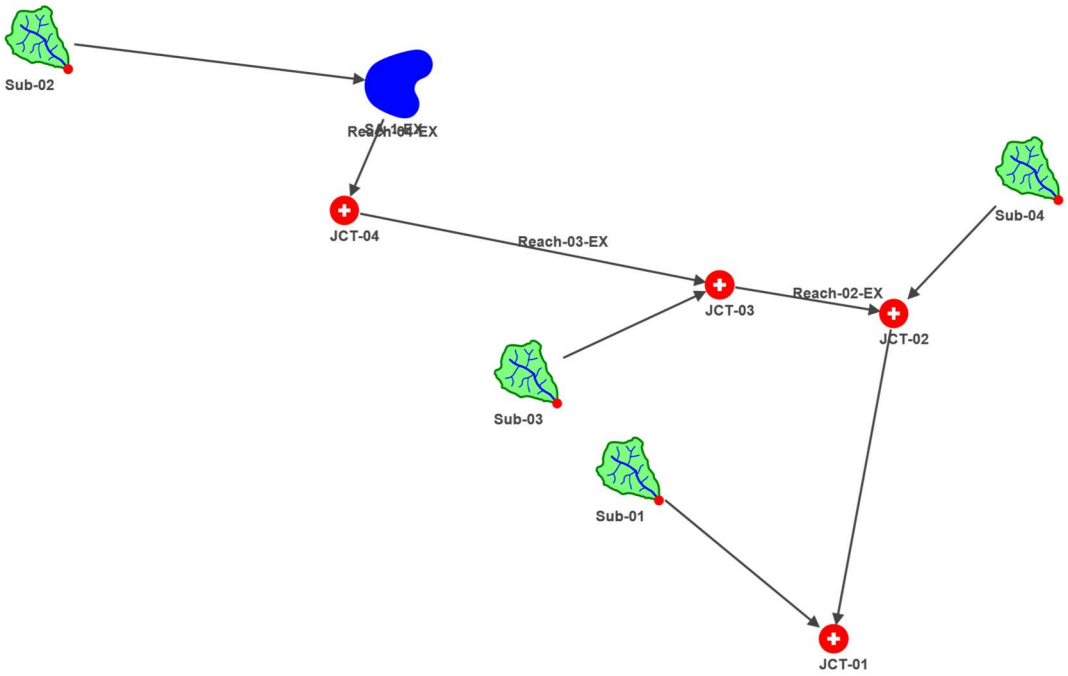
100-Existing Conditions

This scenario contains:

- 4 delineated subbasin areas and corresponding lag time flow paths.
- 4 routing reaches.
- 4 connecting junctions.
- 1 storage area

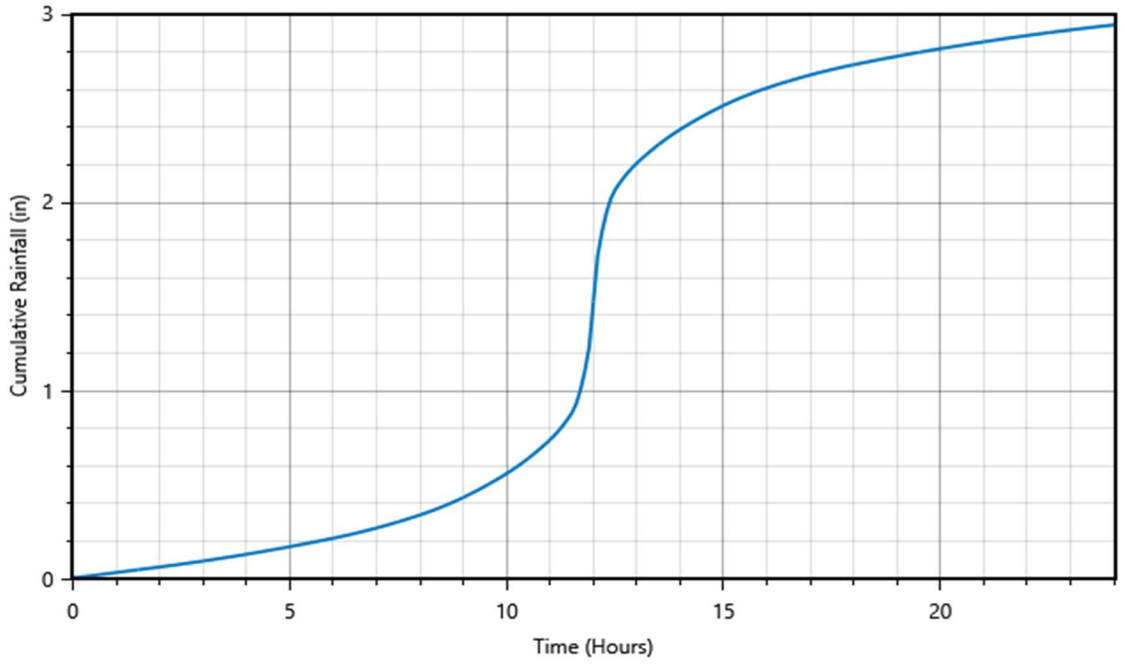
001-Existing Conditions

Watershed Routing Diagram



Design Storm

Precipitation type: SCS Storm
SCS storm distribution: Type III
Rainfall depth: 2.94 in



Watershed Summary

Subbasin ID	Drainage Area (acres)	Initial Abstraction (in)	Curve Number	Impervious Surface (%)	Lag Time (minutes)	Peak Discharge (cfs)
Sub-01	125.988	0.67	74.89	5.03	27.38	66.40
Sub-02	212.546	0.58	77.66	16.12	78.23	79.25
Sub-03	26.056	0.47	80.81	13.01	12.68	28.48
Sub-04	110.614	0.80	71.46	15.80	71.46	32.98

Subbasins

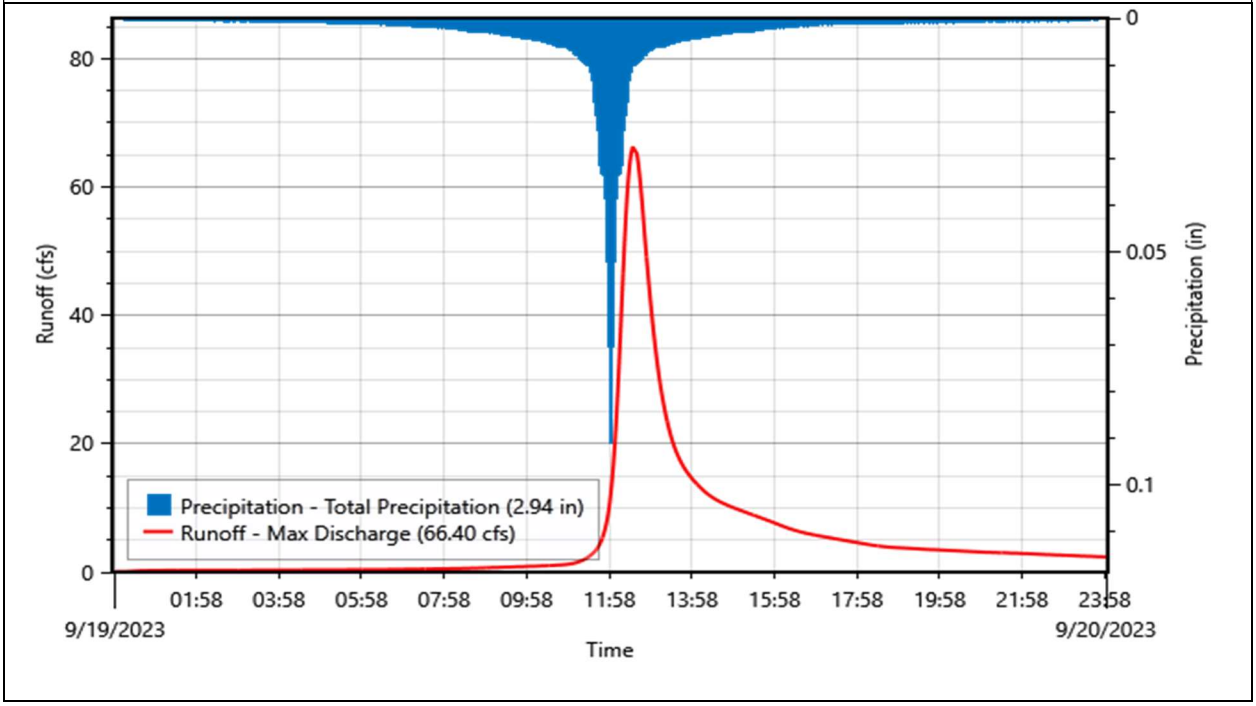
Subbasin ID:	**Sub-01**			
Scenario:	**001-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	66.40 cfs	**Time of peak:**	19 Sep 2023, 12:34	
Drainage area:	125.988 acres	**Total rainfall:**	2.94 in	30.87392 ac-ft
Initial abstraction:	0.67 in	**Losses:**	1.92 in	20.18149 ac-ft
Curve Number:	74.89	**Precip excess:**	1.02 in	10.69242 ac-ft
Impervious surface:	5.03%	**Direct runoff:**	1.01 in	10.58 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	27.38 minutes	**Total runoff:**	1.01 in	10.58 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
10.505	8.34	100.00	Wetlands, Forested
1.413	1.12	91.25	Developed, Medium Density
0.626	0.50	55.04	Undeveloped, Evergreen Forest
0.657	0.52	74.00	Agricultural, Pasture/Hay
9.746	7.74	83.03	Developed, Low Density
15.711	12.47	79.17	Developed, Open Space
6.880	5.46	69.46	Undeveloped, Mixed Forest
80.448	63.85	70.12	Undeveloped, Deciduous Forest
125.988	**100.00**	**74.89**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
23.91	100.00	0.01320	0.4268	Sheet Flow
20.37	4,049.32	0.04218	6.7821	Shallow Concentrated Flow
1.34	495.78	0.03463	6.1450	Channel Flow
45.62	**4,645.10**	**Total**	**Lag Time = 27.38 minutes**	



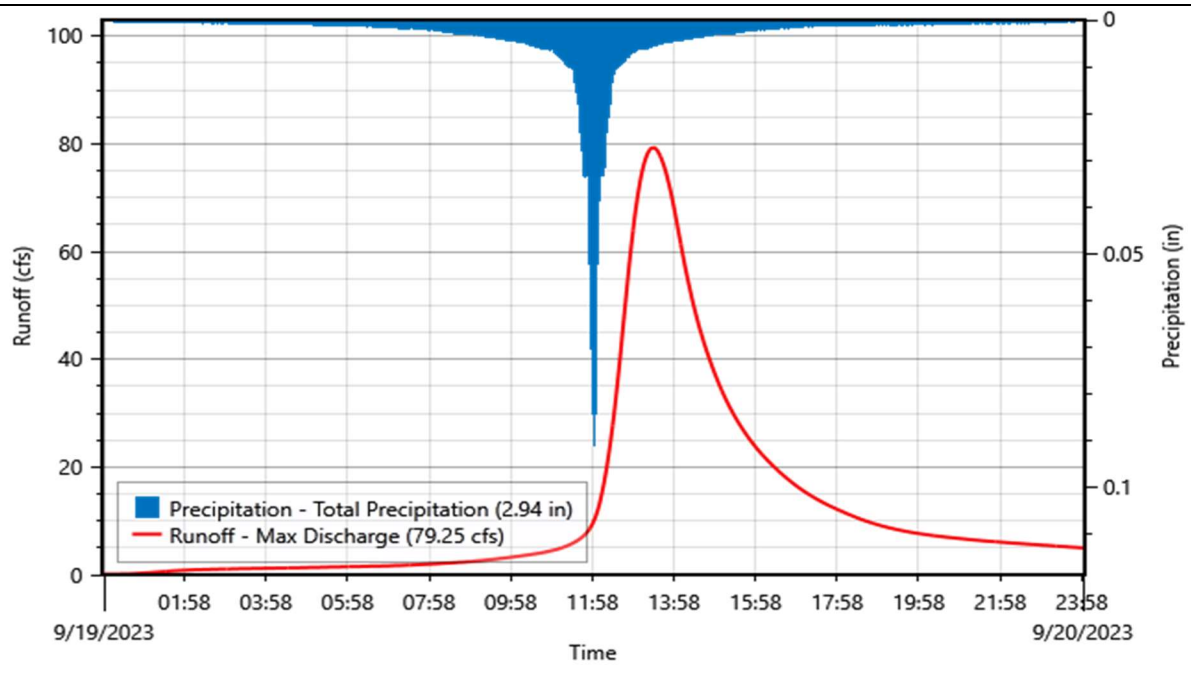
Subbasin ID:	Sub-02			
Scenario:	001-Existing Conditions		Depth	Volume
Peak discharge:	79.25 cfs	**Time of peak:**	19 Sep 2023, 01:28	
Drainage area:	212.546 acres	**Total rainfall:**	2.94 in	52.07328 ac-ft
Initial abstraction:	0.58 in	**Losses:**	1.57 in	27.87761 ac-ft
Curve Number:	77.66	**Precip excess:**	1.37 in	24.19567 ac-ft
Impervious surface:	16.12%	**Direct runoff:**	1.33 in	23.56 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	78.23 minutes	**Total runoff:**	1.33 in	23.56 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
20.795	9.78	100.00	Wetlands, Forested
18.136	8.53	88.01	Developed, Medium Density
5.060	2.38	72.76	Agricultural, Pasture/Hay
45.421	21.37	80.36	Developed, Low Density
1.389	0.65	94.00	Developed, High Density
39.329	18.50	76.01	Developed, Open Space
20.573	9.68	71.08	Undeveloped, Mixed Forest
61.842	29.10	68.41	Undeveloped, Deciduous Forest
212.546	**100.00**	**77.66**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
19.14	100.00	0.02303	0.5638	Sheet Flow
31.65	4,916.01	0.02575	5.2990	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
130.38	**5,516.01**	**Total**	**Lag Time = 78.23 minutes**	



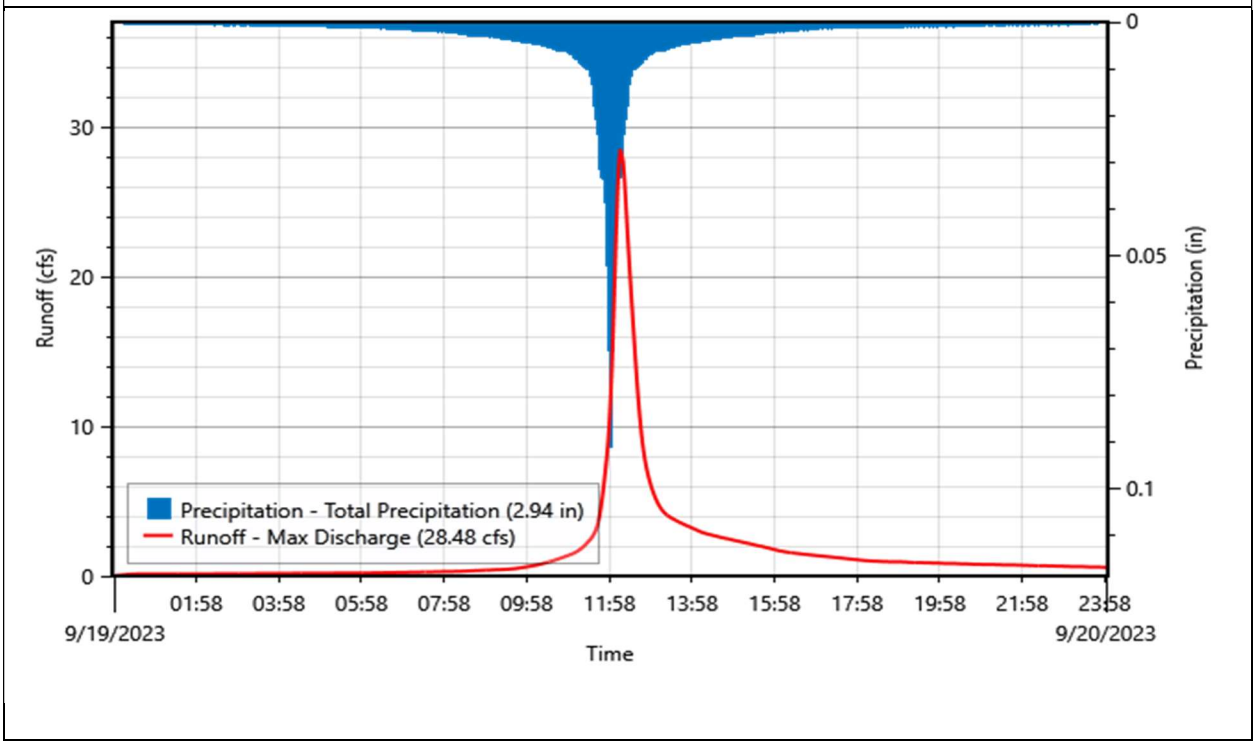
Subbasin ID:	Sub-03			
Scenario:	**001-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	28.48 cfs	**Time of peak:**	19 Sep 2023, 12:14	
Drainage area:	26.056 acres	**Total rainfall:**	2.94 in	6.38176 ac-ft
Initial abstraction:	0.47 in	**Losses:**	1.46 in	3.17362 ac-ft
Curve Number:	80.81	**Precip excess:**	1.48 in	3.20814 ac-ft
Impervious surface:	13.01%	**Direct runoff:**	1.47 in	3.20 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	12.68 minutes	**Total runoff:**	1.47 in	3.20 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
4.379	16.80	100.00	Wetlands, Forested
1.701	6.53	91.82	Developed, Medium Density
4.200	16.12	86.03	Developed, Low Density
3.541	13.59	79.39	Developed, Open Space
12.234	46.95	71.02	Undeveloped, Deciduous Forest
26.056	**100.00**	**80.81**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
10.87	100.00	0.09466	1.1430	Sheet Flow
6.90	1,352.35	0.04107	6.6922	Shallow Concentrated Flow
3.36	500.00	0.00560	2.4705	Channel Flow
21.13	**1,952.35**	**Total**	**Lag Time = 12.68 minutes**	



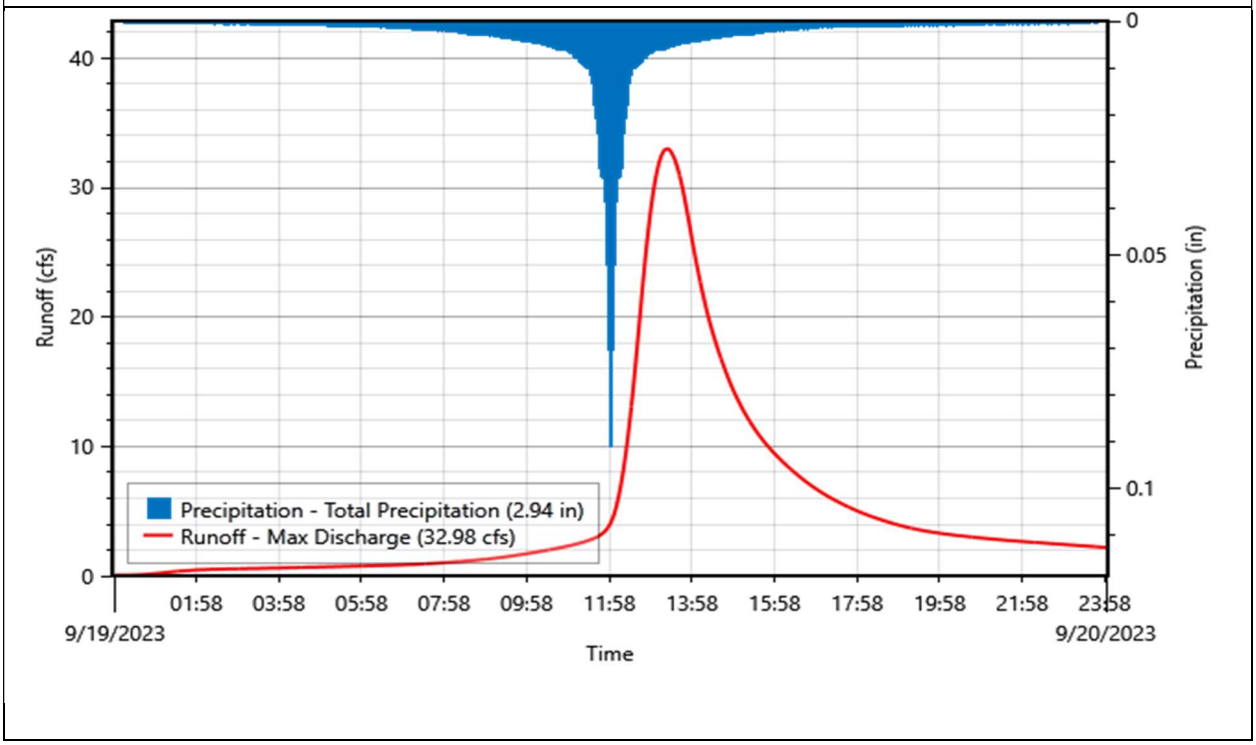
Subbasin ID:	Sub-04			
Scenario:	**001-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	32.98 cfs	**Time of peak:**	19 Sep 2023, 01:22	
Drainage area:	110.614 acres	**Total rainfall:**	2.94 in	27.09504 ac-ft
Initial abstraction:	0.80 in	**Losses:**	1.85 in	17.02041 ac-ft
Curve Number:	71.46	**Precip excess:**	1.09 in	10.07463 ac-ft
Impervious surface:	15.80%	**Direct runoff:**	1.07 in	9.82 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	71.46 minutes	**Total runoff:**	1.07 in	9.82 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
5.810	5.25	100.00	Wetlands, Forested
6.653	6.01	87.49	Developed, Medium Density
25.120	22.71	78.68	Developed, Low Density
22.168	20.04	73.33	Developed, Open Space
13.755	12.43	58.39	Undeveloped, Mixed Forest
37.109	33.55	62.96	Undeveloped, Deciduous Forest
110.614	**100.00**	**71.46**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
18.59	100.00	0.02475	0.5845	Sheet Flow
20.91	3,337.20	0.02720	5.4459	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
119.09	**3,937.20**	**Total**	**Lag Time = 71.46 minutes**	



Nodes

Element ID	Element Type	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Diverted Flow (cfs)
JCT-01	Junction	104.33	104.33	
JCT-02	Junction	54.45	54.45	
JCT-03	Junction	33.31	33.31	
JCT-04	Junction	27.98	27.98	

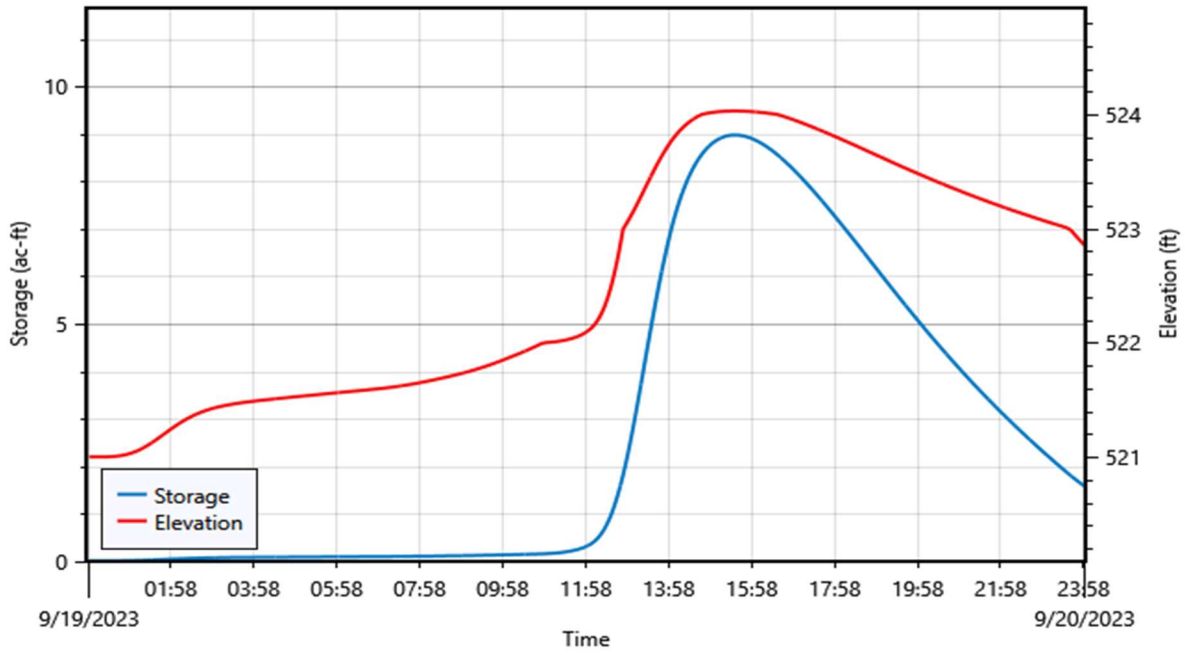
Routing Reaches

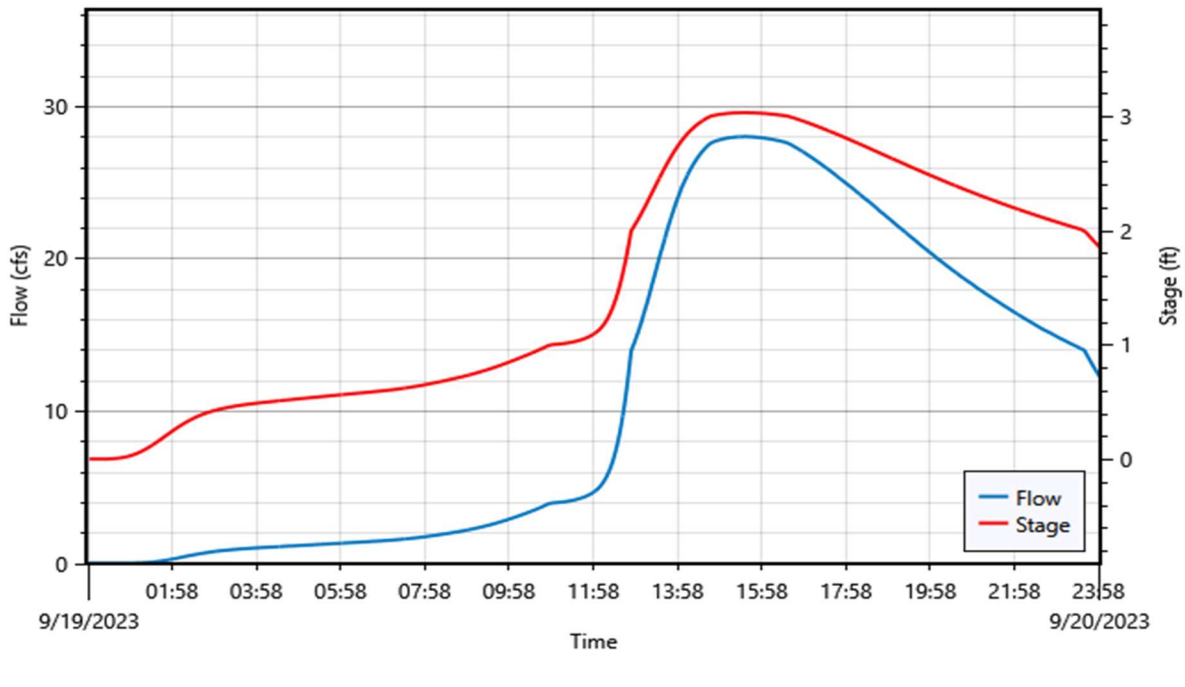
Reach ID	Peak Inflow (cfs)	Peak Outflow (cfs)	Attenuated Flow (cfs)
Reach-01-EX	0.00	0.00	0.00
Reach-02-EX	33.31	33.28	0.03
Reach-03-EX	27.98	27.98	0.00
Reach-04-EX	27.98	27.98	0.00

Storage Areas

These are the storage areas that are defined:

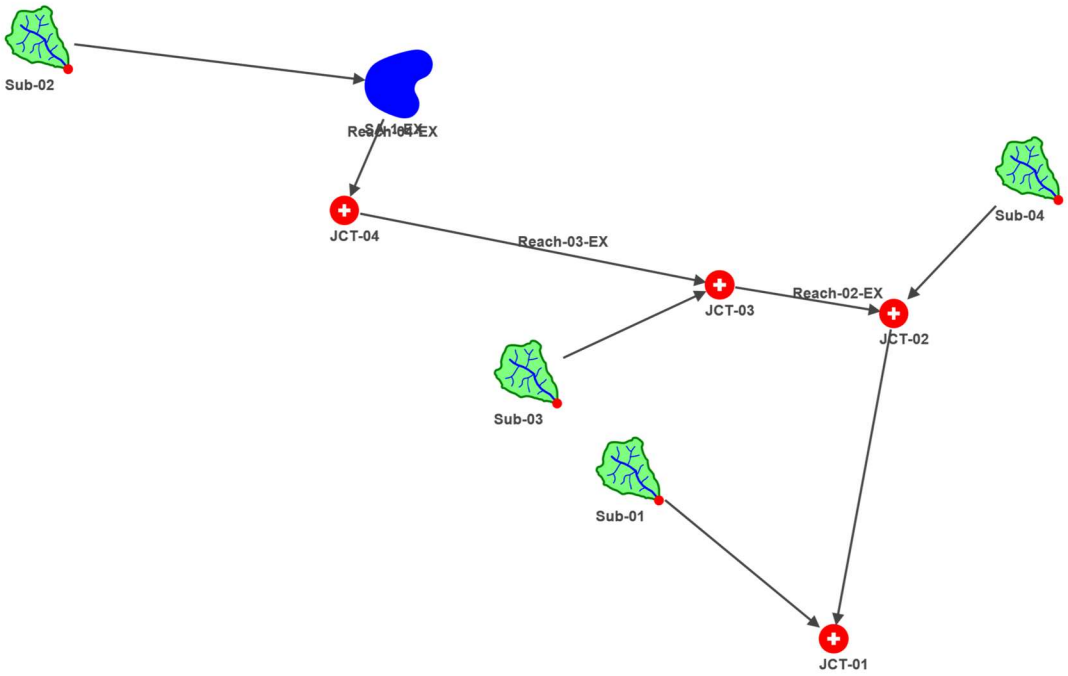
Storage Area ID:	**SA-1-EX**		
Scenario:	**001-Existing Conditions**		
Peak storage:	8.98 ac-ft		
Peak elevation:	524.03 ft	**Peak Volume**	**Time of Peak**
Peak inflow:	79.25 cfs	23.56 ac-ft	19Sep2023, 13:28
Peak outflow:	27.98 cfs	21.99 ac-ft	19Sep2023, 15:34





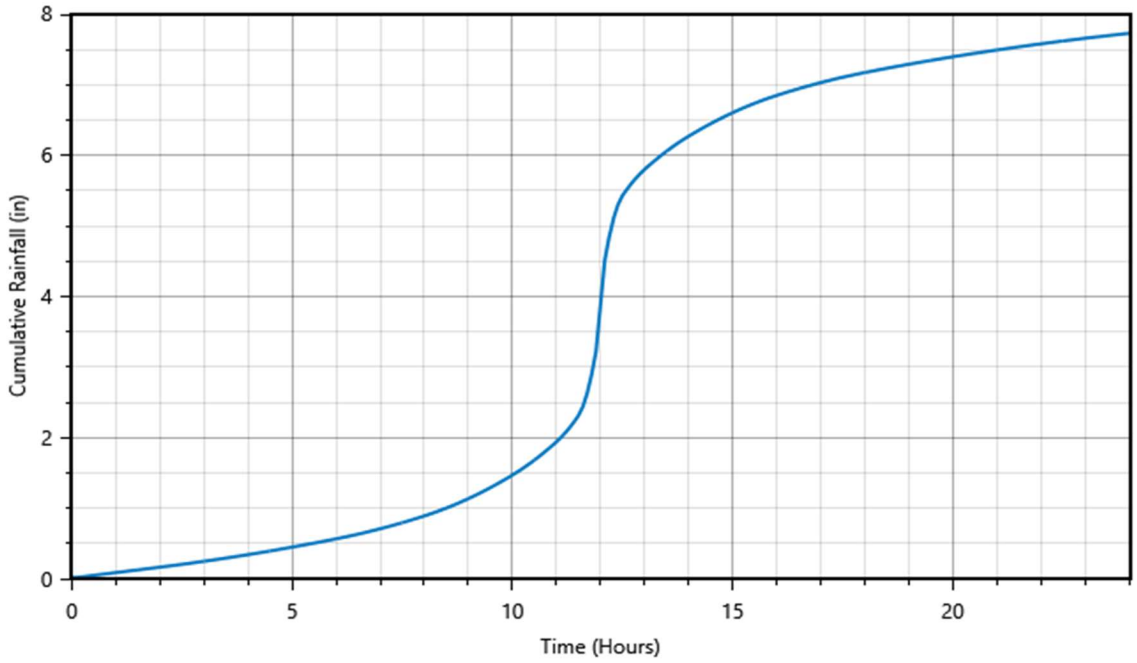
050-Existing Conditions

Watershed Routing Diagram



Design Storm

Precipitation type: SCS Storm
SCS storm distribution: Type III
Rainfall depth: 7.72 in



Watershed Summary

Subbasin ID	Drainage Area (acres)	Initial Abstraction (in)	Curve Number	Impervious Surface (%)	Lag Time (minutes)	Peak Discharge (cfs)
Sub-01	125.988	0.67	74.89	5.03	27.38	343.74
Sub-02	212.546	0.58	77.66	16.12	78.23	338.16
Sub-03	26.056	0.47	80.81	13.01	12.68	113.11
Sub-04	110.614	0.80	71.46	15.80	71.46	166.01

Subbasins

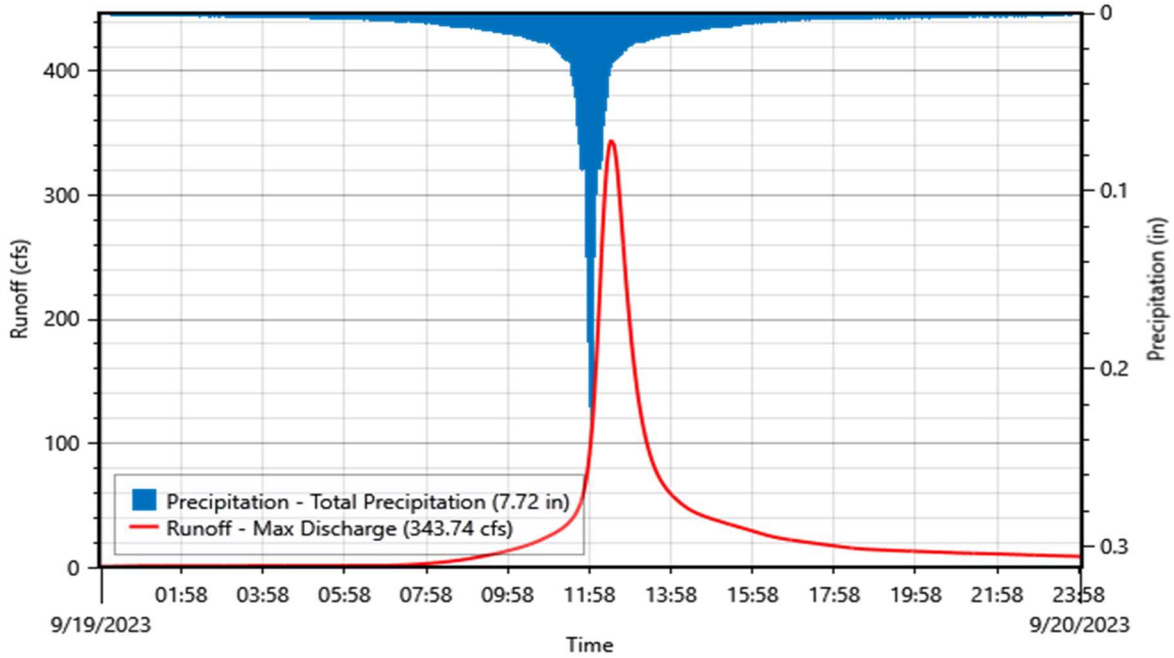
Subbasin ID:	**Sub-01**			
Scenario:	**050-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	343.74 cfs	**Time of peak:**	19 Sep 2023, 12:30	
Drainage area:	125.988 acres	**Total rainfall:**	7.72 in	81.07029 ac-ft
Initial abstraction:	0.67 in	**Losses:**	2.79 in	29.34344 ac-ft
Curve Number:	74.89	**Precip excess:**	4.93 in	51.72685 ac-ft
Impervious surface:	5.03%	**Direct runoff:**	4.89 in	51.34 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	27.38 minutes	**Total runoff:**	4.89 in	51.34 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
10.505	8.34	100.00	Wetlands, Forested
1.413	1.12	91.25	Developed, Medium Density
0.626	0.50	55.04	Undeveloped, Evergreen Forest
0.657	0.52	74.00	Agricultural, Pasture/Hay
9.746	7.74	83.03	Developed, Low Density
15.711	12.47	79.17	Developed, Open Space
6.880	5.46	69.46	Undeveloped, Mixed Forest
80.448	63.85	70.12	Undeveloped, Deciduous Forest
125.988	**100.00**	**74.89**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
23.91	100.00	0.01320	0.4268	Sheet Flow
20.37	4,049.32	0.04218	6.7821	Shallow Concentrated Flow
1.34	495.78	0.03463	6.1450	Channel Flow
45.62	**4,645.10**	**Total**	**Lag Time = 27.38 minutes**	



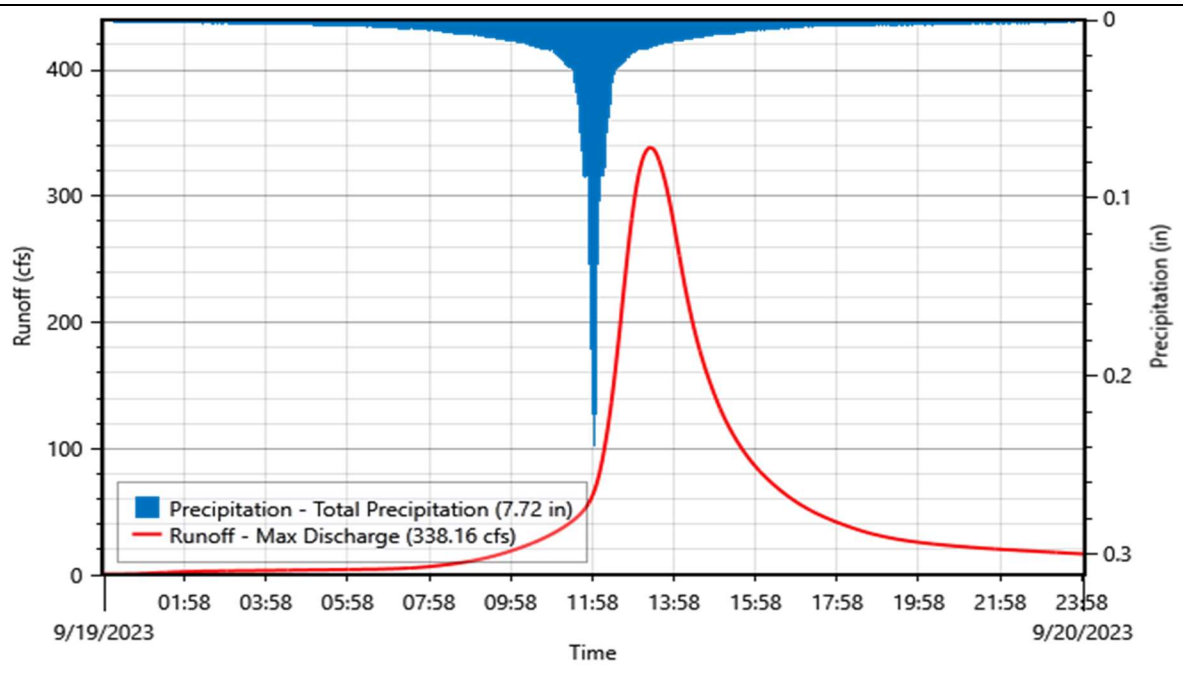
Subbasin ID:	Sub-02			
Scenario:	**050-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	338.16 cfs	**Time of peak:**	19 Sep 2023, 01:24	
Drainage area:	212.546 acres	**Total rainfall:**	7.72 in	136.73663 ac-ft
Initial abstraction:	0.58 in	**Losses:**	2.21 in	39.08102 ac-ft
Curve Number:	77.66	**Precip excess:**	5.51 in	97.65561 ac-ft
Impervious surface:	16.12%	**Direct runoff:**	5.40 in	95.57 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	78.23 minutes	**Total runoff:**	5.40 in	95.57 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
20.795	9.78	100.00	Wetlands, Forested
18.136	8.53	88.01	Developed, Medium Density
5.060	2.38	72.76	Agricultural, Pasture/Hay
45.421	21.37	80.36	Developed, Low Density
1.389	0.65	94.00	Developed, High Density
39.329	18.50	76.01	Developed, Open Space
20.573	9.68	71.08	Undeveloped, Mixed Forest
61.842	29.10	68.41	Undeveloped, Deciduous Forest
212.546	**100.00**	**77.66**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
19.14	100.00	0.02303	0.5638	Sheet Flow
31.65	4,916.01	0.02575	5.2990	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
130.38	**5,516.01**	**Total**	**Lag Time = 78.23 minutes**	



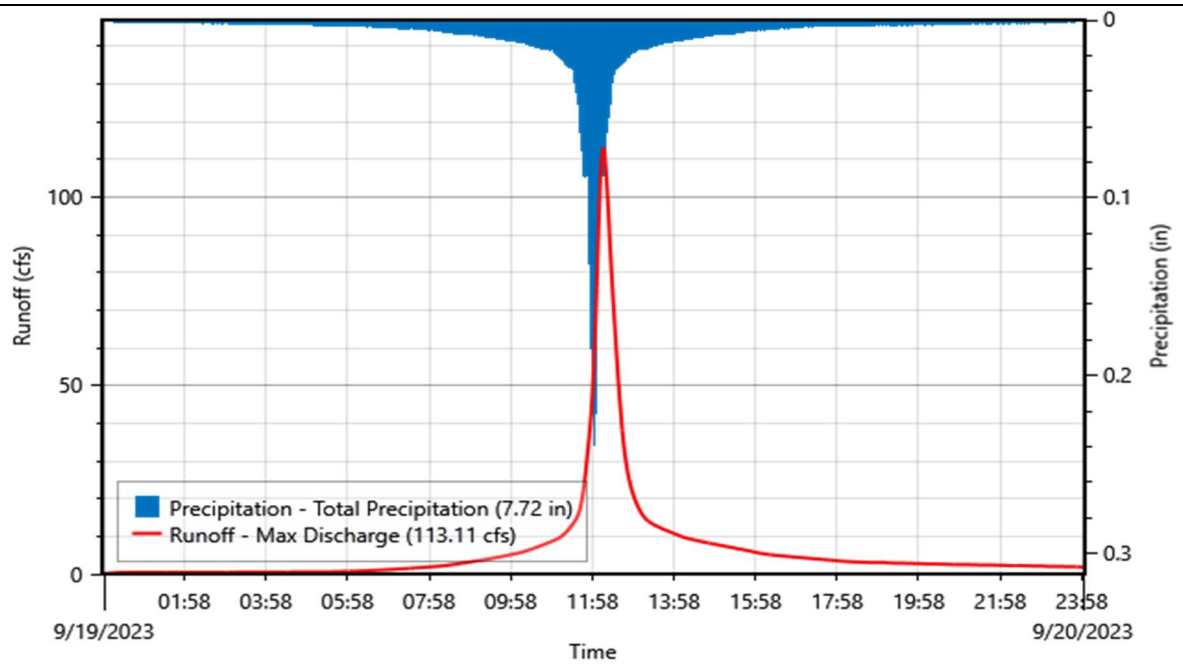
Subbasin ID:	Sub-03			
Scenario:	**050-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	113.11 cfs	**Time of peak:**	19 Sep 2023, 12:14	
Drainage area:	26.056 acres	**Total rainfall:**	7.72 in	16.75755 ac-ft
Initial abstraction:	0.47 in	**Losses:**	1.96 in	4.26520 ac-ft
Curve Number:	80.81	**Precip excess:**	5.76 in	12.49235 ac-ft
Impervious surface:	13.01%	**Direct runoff:**	5.74 in	12.45 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	12.68 minutes	**Total runoff:**	5.74 in	12.45 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
4.379	16.80	100.00	Wetlands, Forested
1.701	6.53	91.82	Developed, Medium Density
4.200	16.12	86.03	Developed, Low Density
3.541	13.59	79.39	Developed, Open Space
12.234	46.95	71.02	Undeveloped, Deciduous Forest
26.056	**100.00**	**80.81**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
10.87	100.00	0.09466	1.1430	Sheet Flow
6.90	1,352.35	0.04107	6.6922	Shallow Concentrated Flow
3.36	500.00	0.00560	2.4705	Channel Flow
21.13	**1,952.35**	**Total**	**Lag Time = 12.68 minutes**	



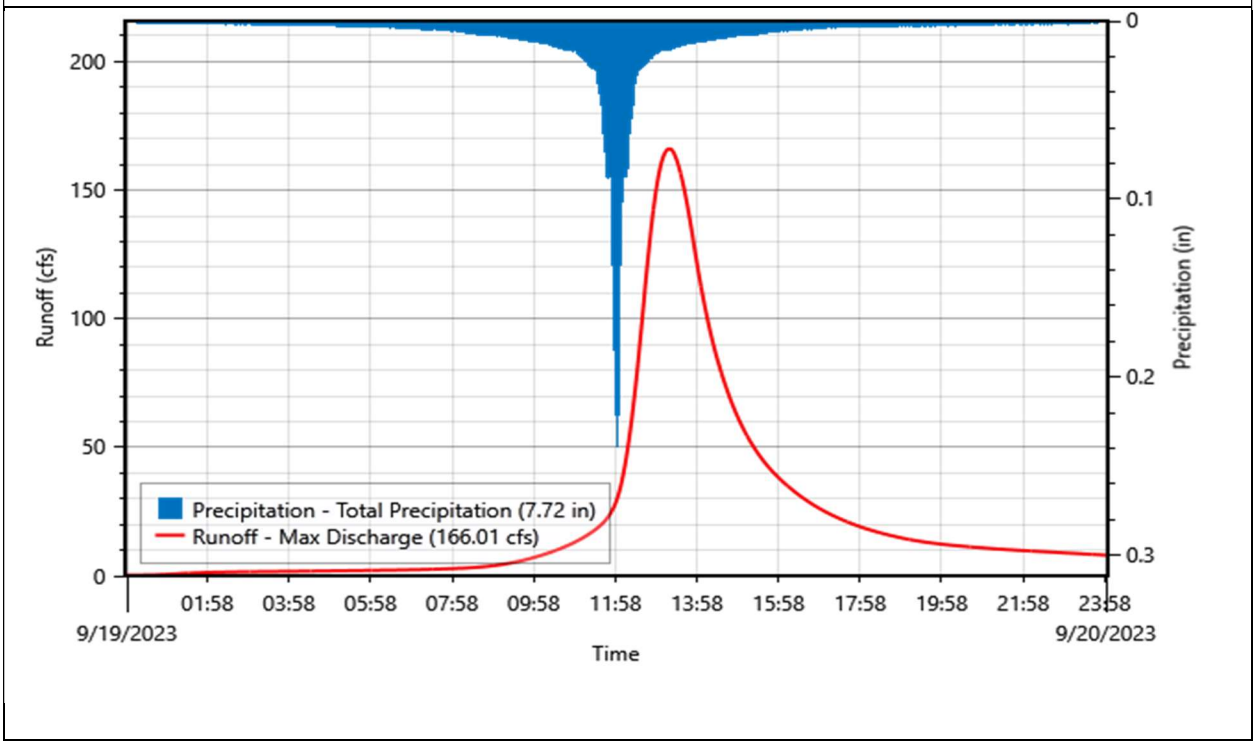
Subbasin ID:	Sub-04			
Scenario:	050-Existing Conditions		Depth	Volume
Peak discharge:	166.01 cfs	**Time of peak:**	19 Sep 2023, 01:18	
Drainage area:	110.614 acres	**Total rainfall:**	7.72 in	71.14752 ac-ft
Initial abstraction:	0.80 in	**Losses:**	2.81 in	25.85841 ac-ft
Curve Number:	71.46	**Precip excess:**	4.91 in	45.28911 ac-ft
Impervious surface:	15.80%	**Direct runoff:**	4.81 in	44.36 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	71.46 minutes	**Total runoff:**	4.81 in	44.36 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
5.810	5.25	100.00	Wetlands, Forested
6.653	6.01	87.49	Developed, Medium Density
25.120	22.71	78.68	Developed, Low Density
22.168	20.04	73.33	Developed, Open Space
13.755	12.43	58.39	Undeveloped, Mixed Forest
37.109	33.55	62.96	Undeveloped, Deciduous Forest
110.614	**100.00**	**71.46**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
18.59	100.00	0.02475	0.5845	Sheet Flow
20.91	3,337.20	0.02720	5.4459	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
119.09	**3,937.20**	**Total**	**Lag Time = 71.46 minutes**	



Nodes

Element ID	Element Type	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Diverted Flow (cfs)
JCT-01	Junction	516.95	516.95	
JCT-02	Junction	216.42	216.42	
JCT-03	Junction	133.01	133.01	
JCT-04	Junction	50.81	50.81	

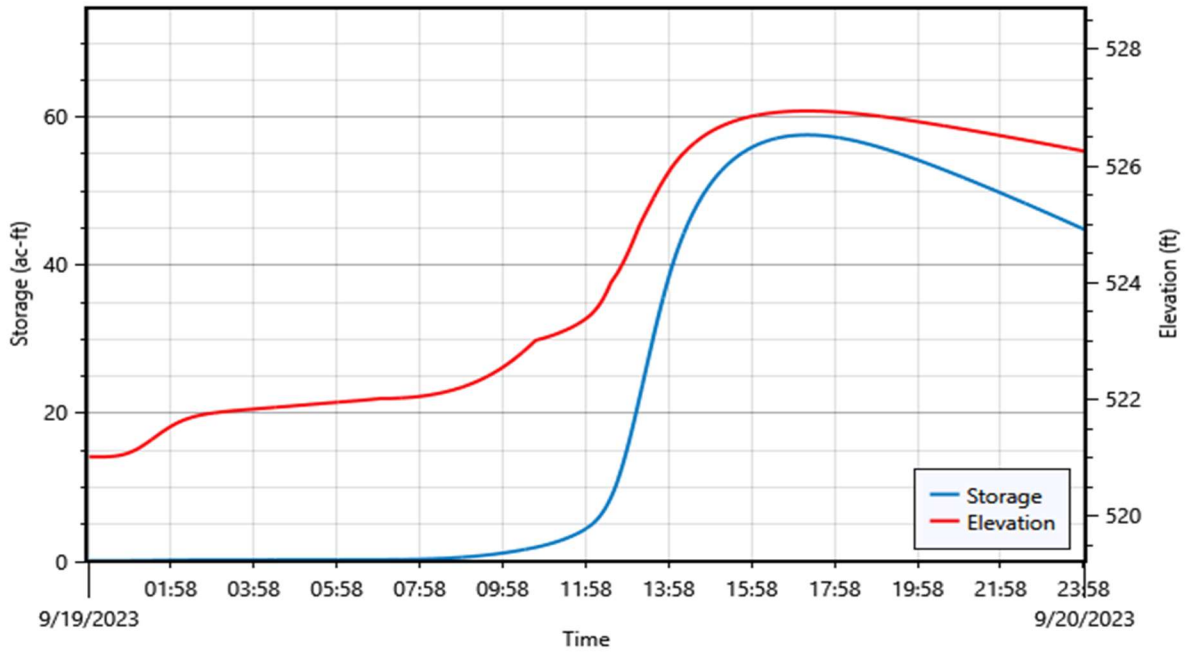
Routing Reaches

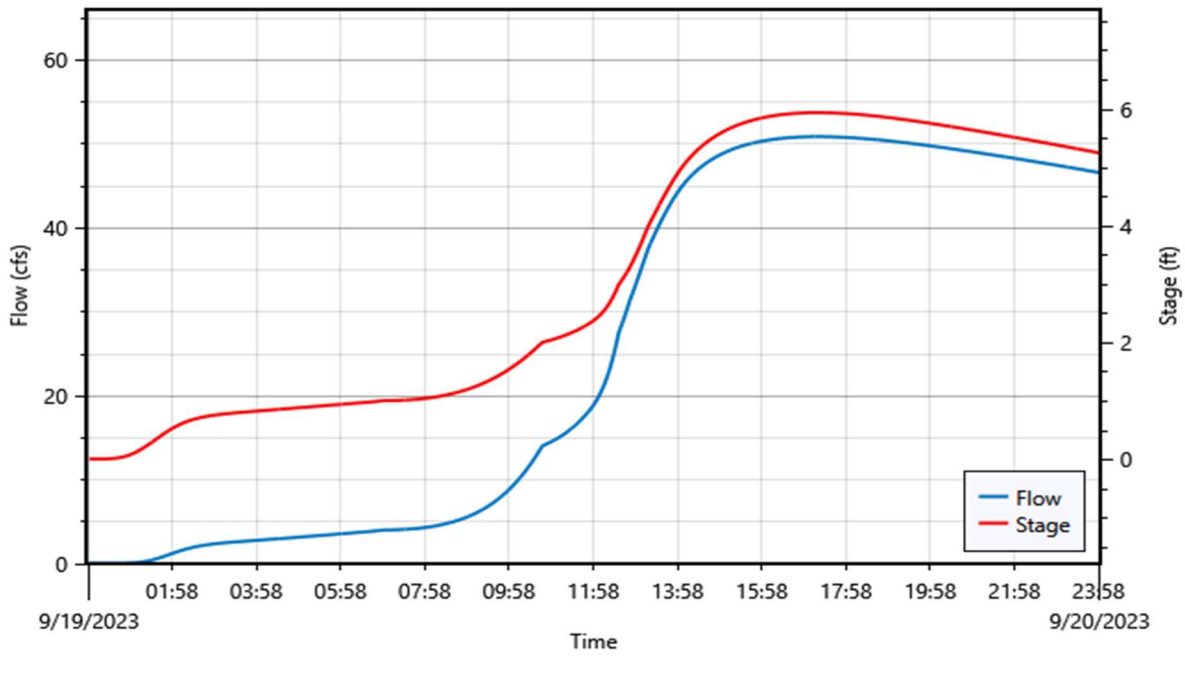
Reach ID	Peak Inflow (cfs)	Peak Outflow (cfs)	Attenuated Flow (cfs)
Reach-01-EX	0.00	0.00	0.00
Reach-02-EX	133.01	132.32	0.69
Reach-03-EX	50.81	50.81	0.00
Reach-04-EX	50.81	50.81	0.00

Storage Areas

These are the storage areas that are defined:

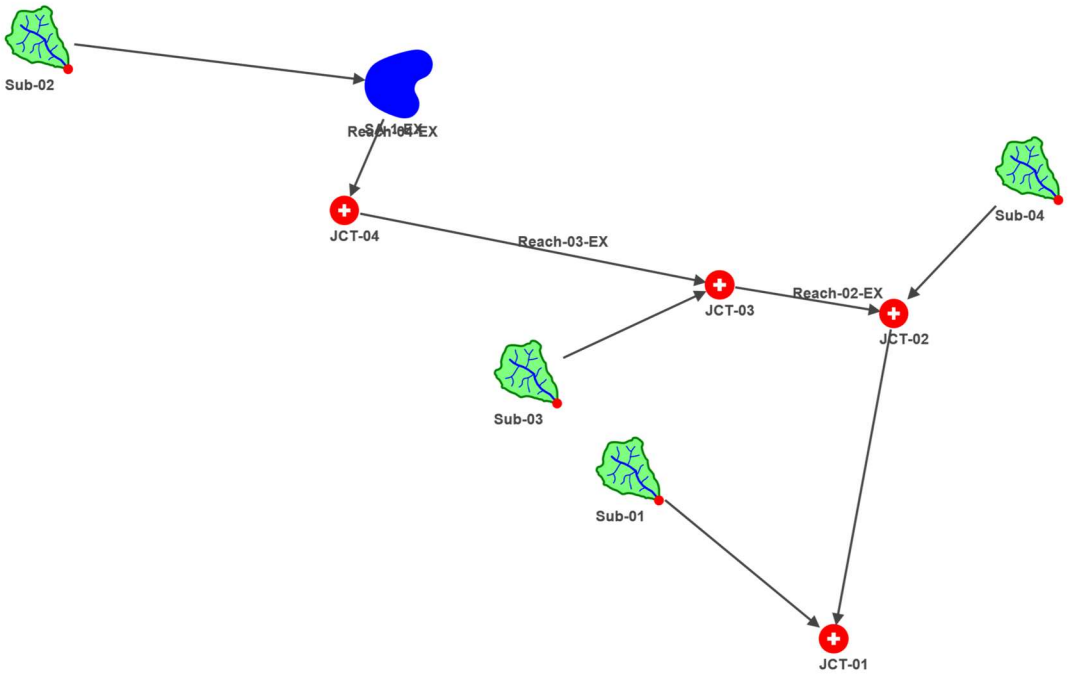
Storage Area ID:	**SA-1-EX**		
Scenario:	**050-Existing Conditions**		
Peak storage:	57.49 ac-ft		
Peak elevation:	526.93 ft	**Peak Volume**	**Time of Peak**
Peak inflow:	338.16 cfs	95.57 ac-ft	19Sep2023, 13:24
Peak outflow:	50.81 cfs	50.88 ac-ft	19Sep2023, 17:18





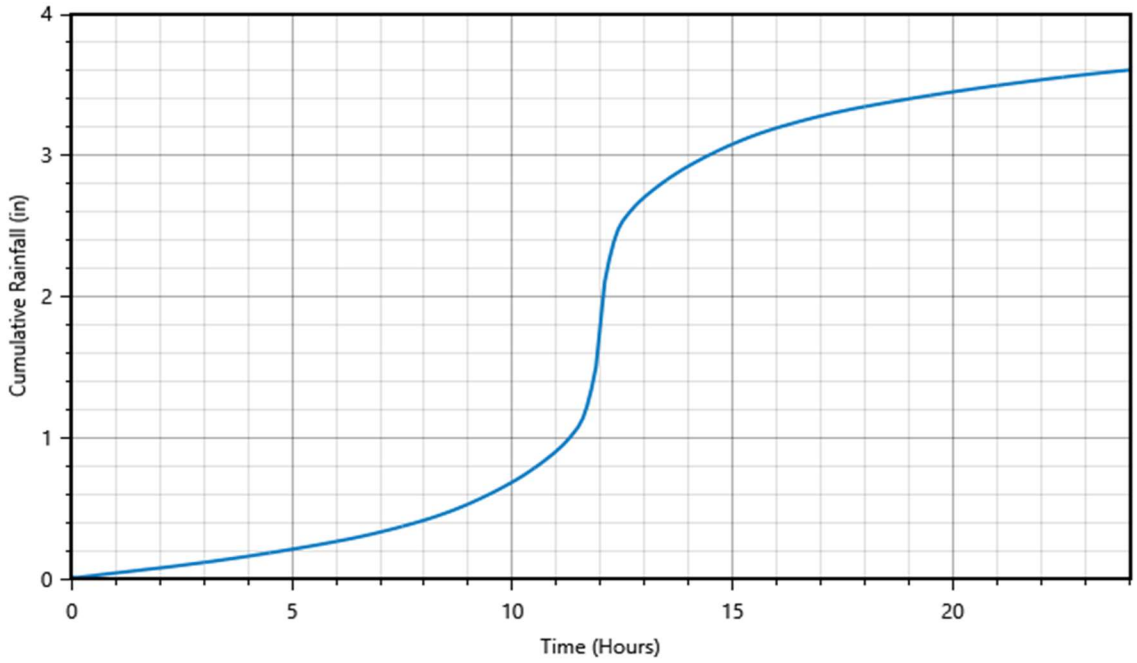
002-Existing Conditions

Watershed Routing Diagram



Design Storm

Precipitation type: SCS Storm
SCS storm distribution: Type III
Rainfall depth: 3.60 in



Watershed Summary

Subbasin ID	Drainage Area (acres)	Initial Abstraction (in)	Curve Number	Impervious Surface (%)	Lag Time (minutes)	Peak Discharge (cfs)
Sub-01	125.988	0.67	74.89	5.03	27.38	99.71
Sub-02	212.546	0.58	77.66	16.12	78.23	111.60
Sub-03	26.056	0.47	80.81	13.01	12.68	39.46
Sub-04	110.614	0.80	71.46	15.80	71.46	48.51

Subbasins

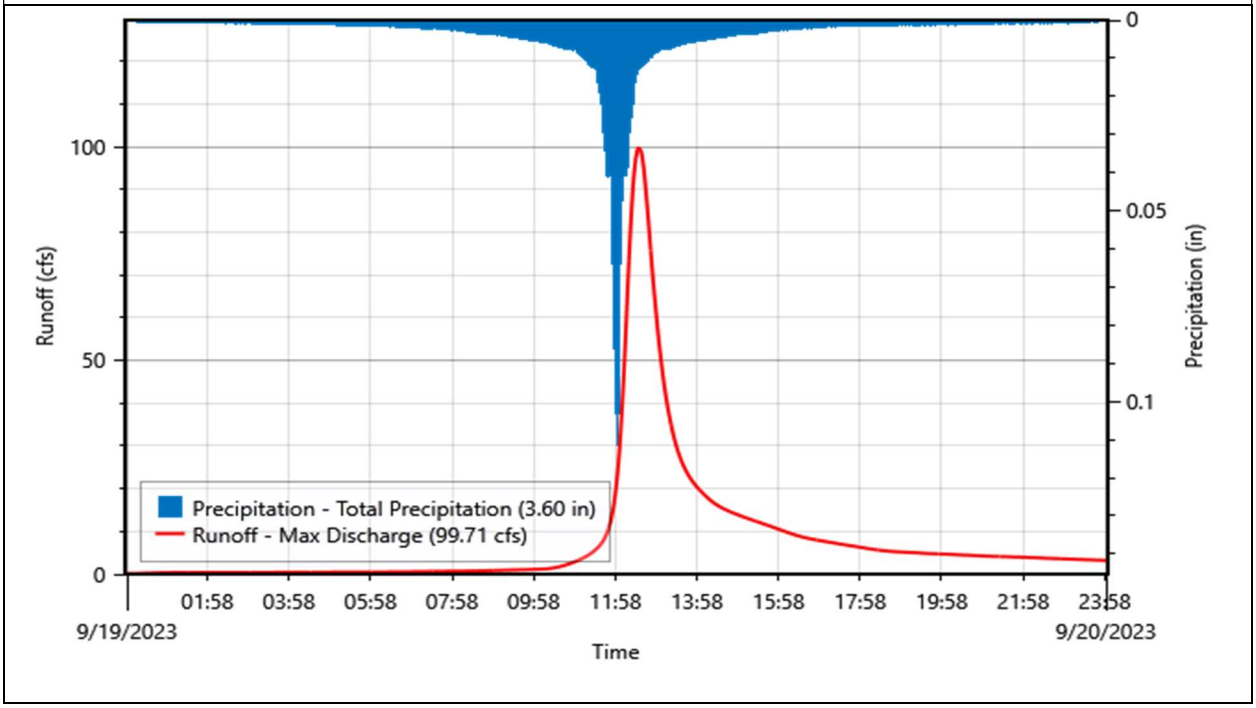
Subbasin ID:	**Sub-01**			
Scenario:	**002-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	99.71 cfs	**Time of peak:**	19 Sep 2023, 12:32	
Drainage area:	125.988 acres	**Total rainfall:**	3.60 in	37.80480 ac-ft
Initial abstraction:	0.67 in	**Losses:**	2.12 in	22.27608 ac-ft
Curve Number:	74.89	**Precip excess:**	1.48 in	15.52872 ac-ft
Impervious surface:	5.03%	**Direct runoff:**	1.46 in	15.38 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	27.38 minutes	**Total runoff:**	1.46 in	15.38 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
10.505	8.34	100.00	Wetlands, Forested
1.413	1.12	91.25	Developed, Medium Density
0.626	0.50	55.04	Undeveloped, Evergreen Forest
0.657	0.52	74.00	Agricultural, Pasture/Hay
9.746	7.74	83.03	Developed, Low Density
15.711	12.47	79.17	Developed, Open Space
6.880	5.46	69.46	Undeveloped, Mixed Forest
80.448	63.85	70.12	Undeveloped, Deciduous Forest
125.988	**100.00**	**74.89**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
23.91	100.00	0.01320	0.4268	Sheet Flow
20.37	4,049.32	0.04218	6.7821	Shallow Concentrated Flow
1.34	495.78	0.03463	6.1450	Channel Flow
45.62	**4,645.10**	**Total**	**Lag Time = 27.38 minutes**	



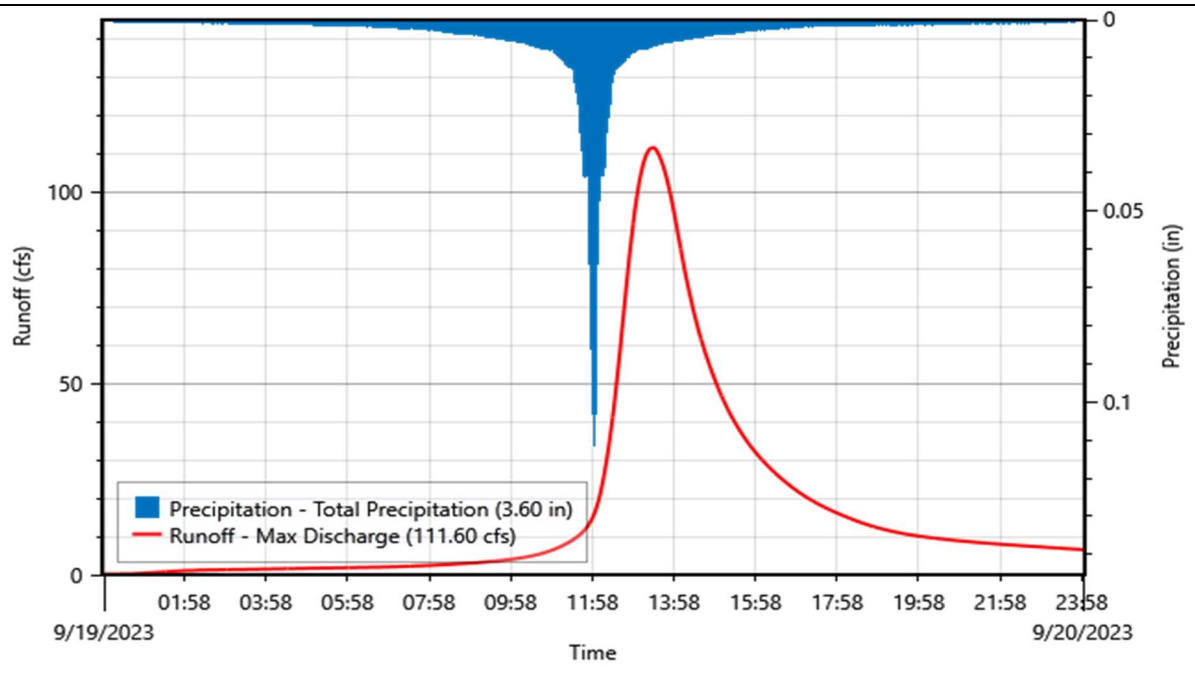
Subbasin ID:	Sub-02			
Scenario:	**002-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	111.60 cfs	**Time of peak:**	19 Sep 2023, 01:26	
Drainage area:	212.546 acres	**Total rainfall:**	3.60 in	63.76320 ac-ft
Initial abstraction:	0.58 in	**Losses:**	1.72 in	30.50536 ac-ft
Curve Number:	77.66	**Precip excess:**	1.88 in	33.25784 ac-ft
Impervious surface:	16.12%	**Direct runoff:**	1.83 in	32.42 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	78.23 minutes	**Total runoff:**	1.83 in	32.42 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
20.795	9.78	100.00	Wetlands, Forested
18.136	8.53	88.01	Developed, Medium Density
5.060	2.38	72.76	Agricultural, Pasture/Hay
45.421	21.37	80.36	Developed, Low Density
1.389	0.65	94.00	Developed, High Density
39.329	18.50	76.01	Developed, Open Space
20.573	9.68	71.08	Undeveloped, Mixed Forest
61.842	29.10	68.41	Undeveloped, Deciduous Forest
212.546	**100.00**	**77.66**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
19.14	100.00	0.02303	0.5638	Sheet Flow
31.65	4,916.01	0.02575	5.2990	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
130.38	**5,516.01**	**Total**	**Lag Time = 78.23 minutes**	



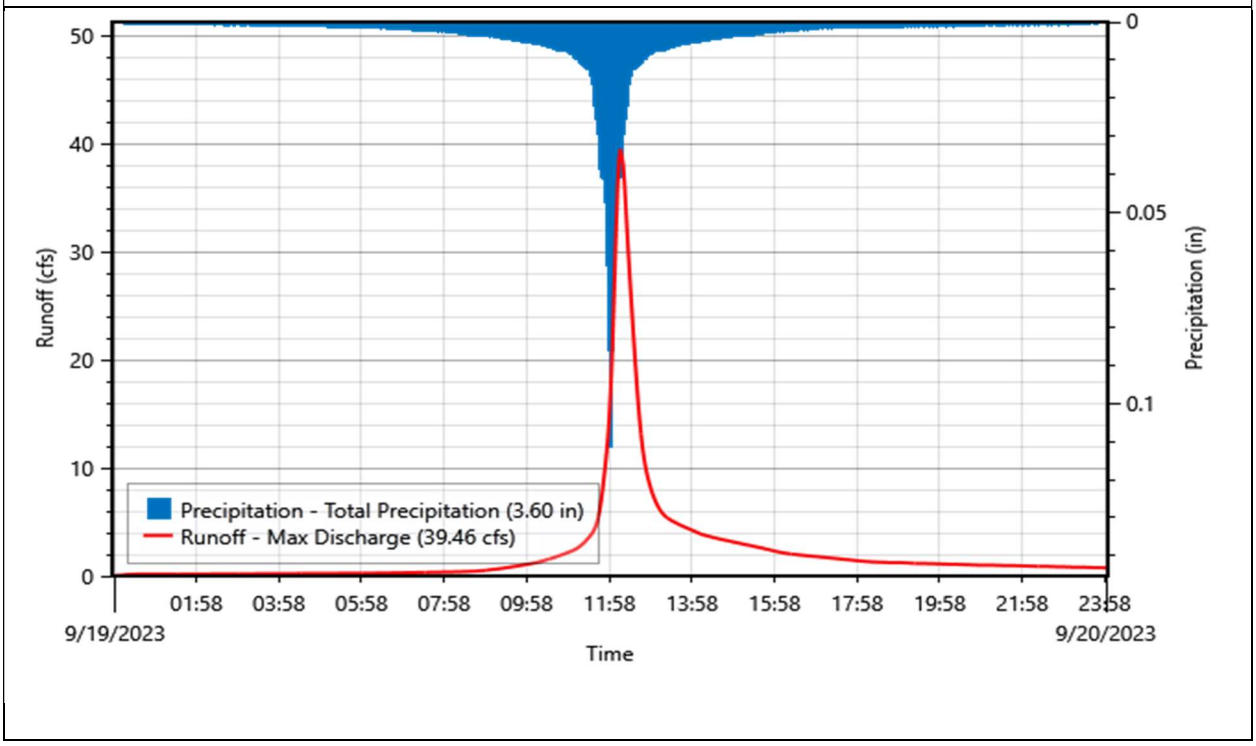
Subbasin ID:	Sub-03			
Scenario:	**002-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	39.46 cfs	**Time of peak:**	19 Sep 2023, 12:14	
Drainage area:	26.056 acres	**Total rainfall:**	3.60 in	7.81440 ac-ft
Initial abstraction:	0.47 in	**Losses:**	1.58 in	3.43714 ac-ft
Curve Number:	80.81	**Precip excess:**	2.02 in	4.37725 ac-ft
Impervious surface:	13.01%	**Direct runoff:**	2.01 in	4.36 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	12.68 minutes	**Total runoff:**	2.01 in	4.36 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
4.379	16.80	100.00	Wetlands, Forested
1.701	6.53	91.82	Developed, Medium Density
4.200	16.12	86.03	Developed, Low Density
3.541	13.59	79.39	Developed, Open Space
12.234	46.95	71.02	Undeveloped, Deciduous Forest
26.056	**100.00**	**80.81**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
10.87	100.00	0.09466	1.1430	Sheet Flow
6.90	1,352.35	0.04107	6.6922	Shallow Concentrated Flow
3.36	500.00	0.00560	2.4705	Channel Flow
21.13	**1,952.35**	**Total**	**Lag Time = 12.68 minutes**	



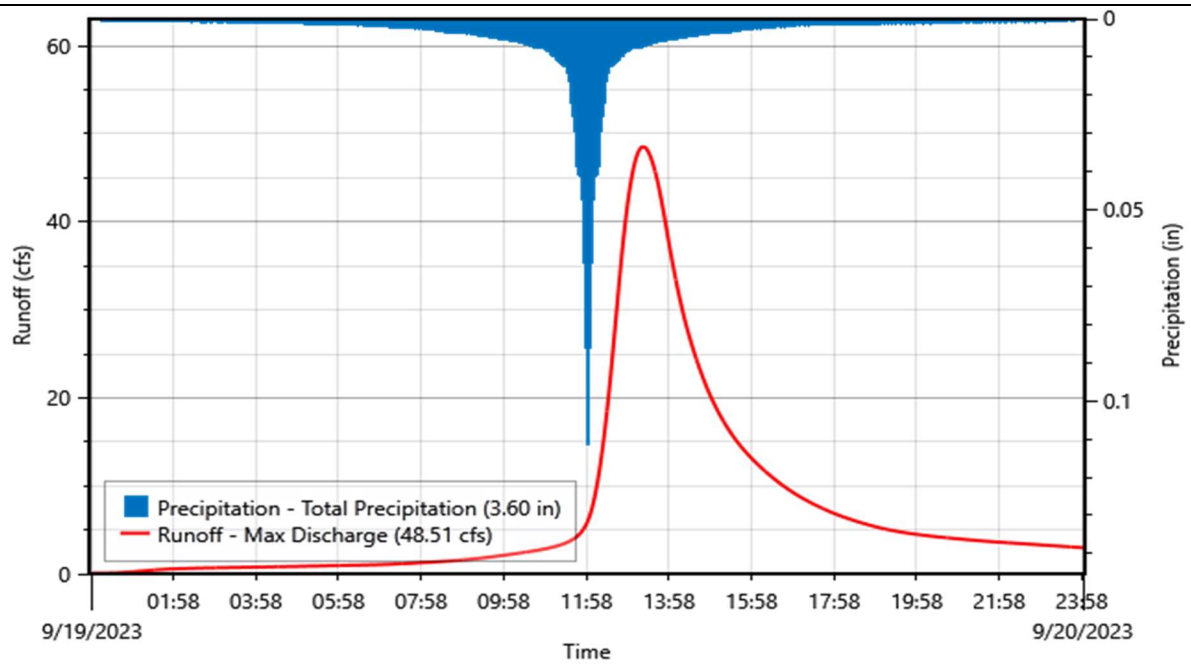
Subbasin ID:	Sub-04			
Scenario:	**002-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	48.51 cfs	**Time of peak:**	19 Sep 2023, 01:20	
Drainage area:	110.614 acres	**Total rainfall:**	3.60 in	33.17760 ac-ft
Initial abstraction:	0.80 in	**Losses:**	2.06 in	18.98075 ac-ft
Curve Number:	71.46	**Precip excess:**	1.54 in	14.19684 ac-ft
Impervious surface:	15.80%	**Direct runoff:**	1.50 in	13.85 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	71.46 minutes	**Total runoff:**	1.50 in	13.85 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
5.810	5.25	100.00	Wetlands, Forested
6.653	6.01	87.49	Developed, Medium Density
25.120	22.71	78.68	Developed, Low Density
22.168	20.04	73.33	Developed, Open Space
13.755	12.43	58.39	Undeveloped, Mixed Forest
37.109	33.55	62.96	Undeveloped, Deciduous Forest
110.614	**100.00**	**71.46**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
18.59	100.00	0.02475	0.5845	Sheet Flow
20.91	3,337.20	0.02720	5.4459	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
119.09	**3,937.20**	**Total**	**Lag Time = 71.46 minutes**	



Nodes

Element ID	Element Type	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Diverted Flow (cfs)
JCT-01	Junction	154.20	154.20	
JCT-02	Junction	75.23	75.23	
JCT-03	Junction	45.83	45.83	
JCT-04	Junction	32.34	32.34	

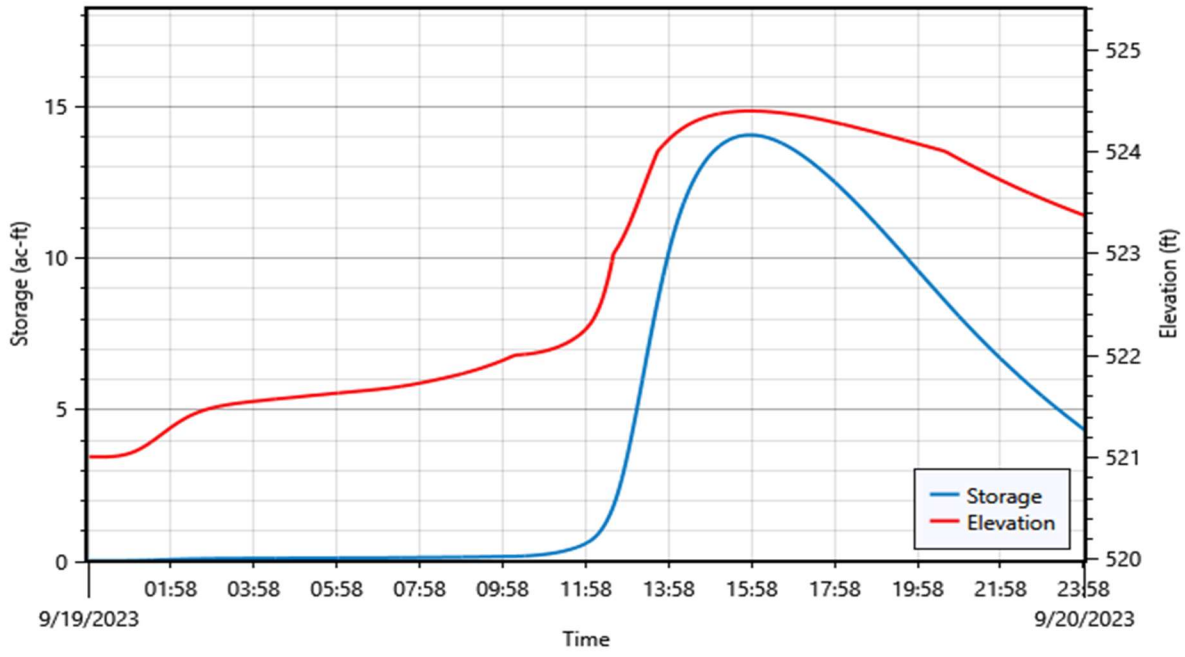
Routing Reaches

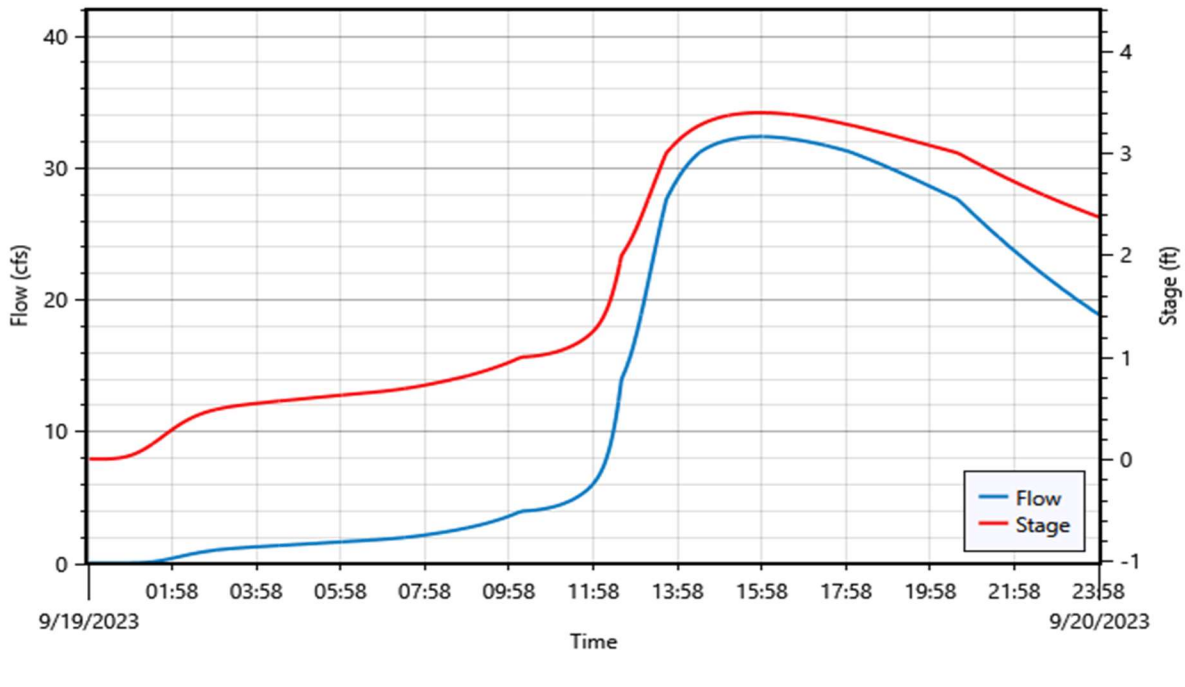
Reach ID	Peak Inflow (cfs)	Peak Outflow (cfs)	Attenuated Flow (cfs)
Reach-01-EX	0.00	0.00	0.00
Reach-02-EX	45.83	45.82	0.01
Reach-03-EX	32.34	32.34	0.00
Reach-04-EX	32.34	32.34	0.00

Storage Areas

These are the storage areas that are defined:

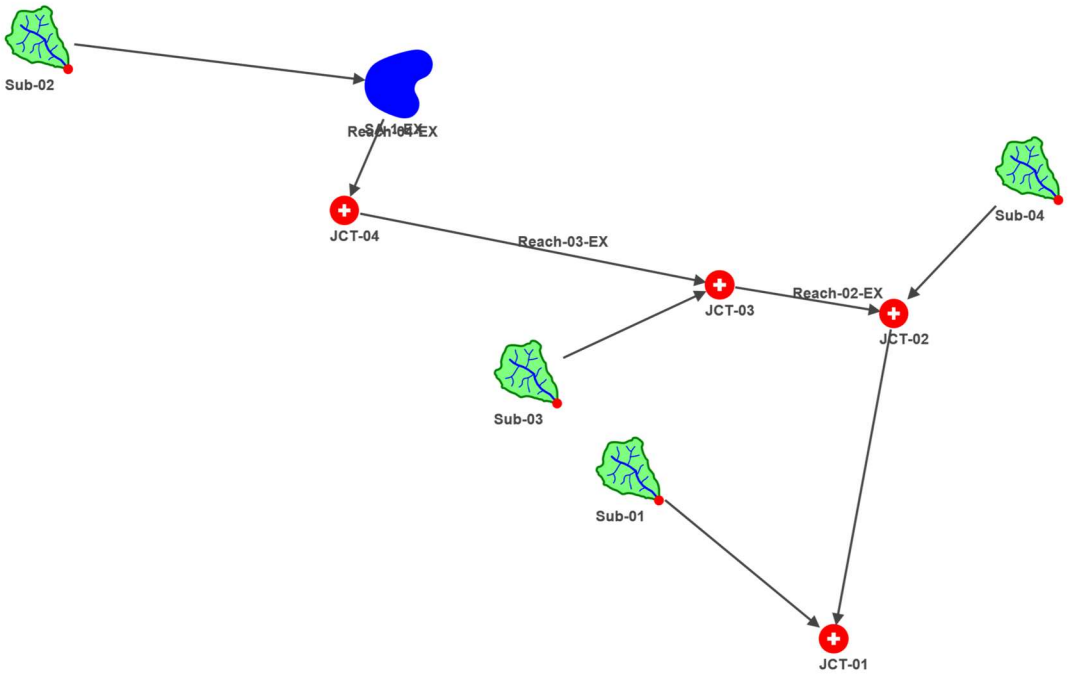
Storage Area ID:	**SA-1-EX**		
Scenario:	**002-Existing Conditions**		
Peak storage:	14.04 ac-ft		
Peak elevation:	524.39 ft	**Peak Volume**	**Time of Peak**
Peak inflow:	111.60 cfs	32.42 ac-ft	19Sep2023, 13:26
Peak outflow:	32.34 cfs	28.12 ac-ft	19Sep2023, 15:56





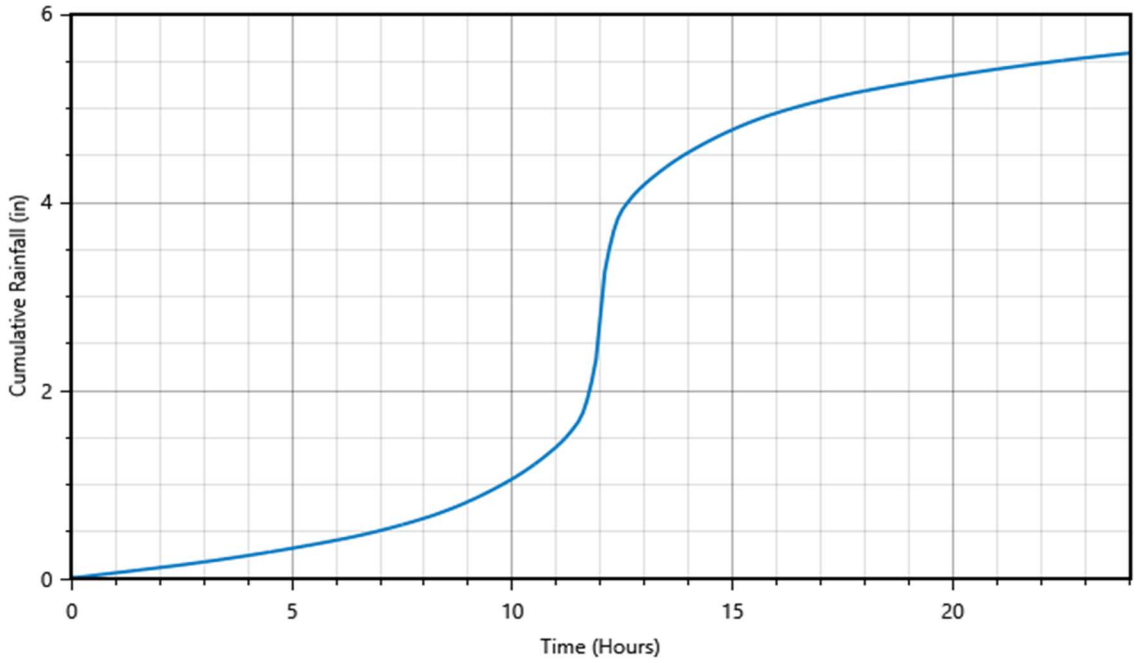
010-Existing Conditions

Watershed Routing Diagram



Design Storm

Precipitation type: SCS Storm
SCS storm distribution: Type III
Rainfall depth: 5.58 in



Watershed Summary

Subbasin ID	Drainage Area (acres)	Initial Abstraction (in)	Curve Number	Impervious Surface (%)	Lag Time (minutes)	Peak Discharge (cfs)
Sub-01	125.988	0.67	74.89	5.03	27.38	212.52
Sub-02	212.546	0.58	77.66	16.12	78.23	217.41
Sub-03	26.056	0.47	80.81	13.01	12.68	74.35
Sub-04	110.614	0.80	71.46	15.80	71.46	102.15

Subbasins

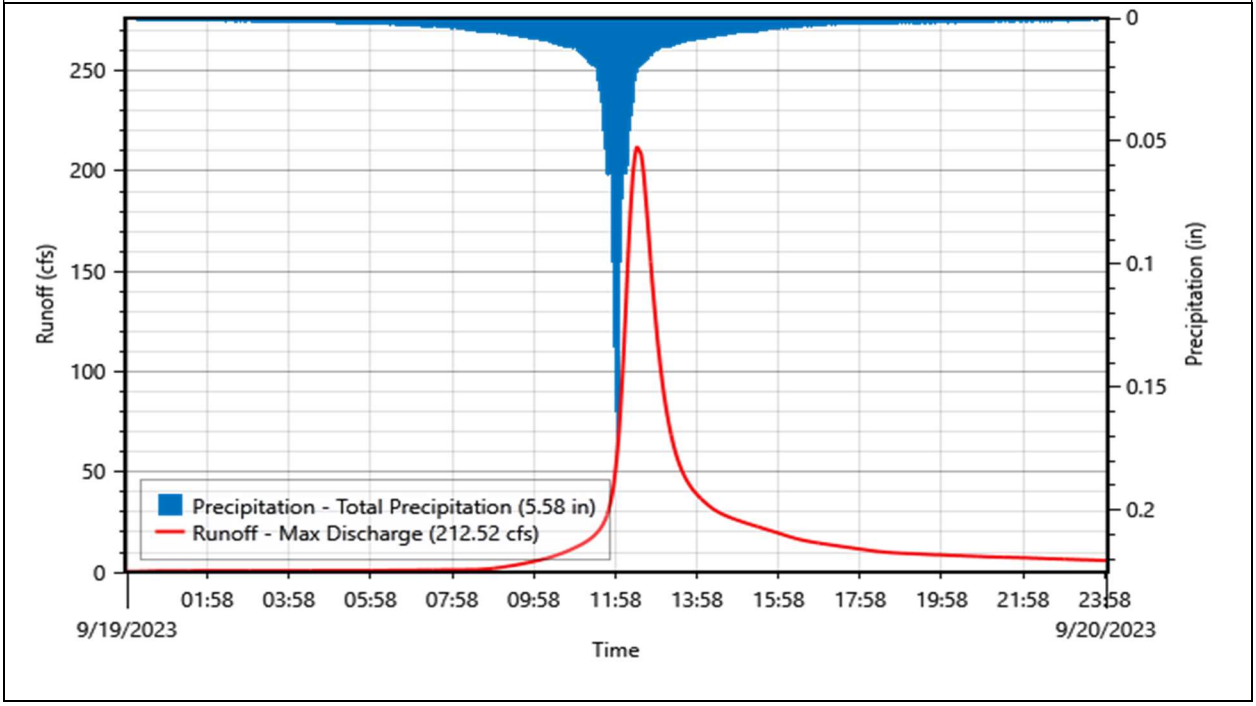
Subbasin ID:	**Sub-01**			
Scenario:	**010-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	212.52 cfs	**Time of peak:**	19 Sep 2023, 12:32	
Drainage area:	125.988 acres	**Total rainfall:**	5.58 in	58.59744 ac-ft
Initial abstraction:	0.67 in	**Losses:**	2.53 in	26.55217 ac-ft
Curve Number:	74.89	**Precip excess:**	3.05 in	32.04527 ac-ft
Impervious surface:	5.03%	**Direct runoff:**	3.03 in	31.78 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	27.38 minutes	**Total runoff:**	3.03 in	31.78 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
10.505	8.34	100.00	Wetlands, Forested
1.413	1.12	91.25	Developed, Medium Density
0.626	0.50	55.04	Undeveloped, Evergreen Forest
0.657	0.52	74.00	Agricultural, Pasture/Hay
9.746	7.74	83.03	Developed, Low Density
15.711	12.47	79.17	Developed, Open Space
6.880	5.46	69.46	Undeveloped, Mixed Forest
80.448	63.85	70.12	Undeveloped, Deciduous Forest
125.988	**100.00**	**74.89**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
23.91	100.00	0.01320	0.4268	Sheet Flow
20.37	4,049.32	0.04218	6.7821	Shallow Concentrated Flow
1.34	495.78	0.03463	6.1450	Channel Flow
45.62	**4,645.10**	**Total**	**Lag Time = 27.38 minutes**	



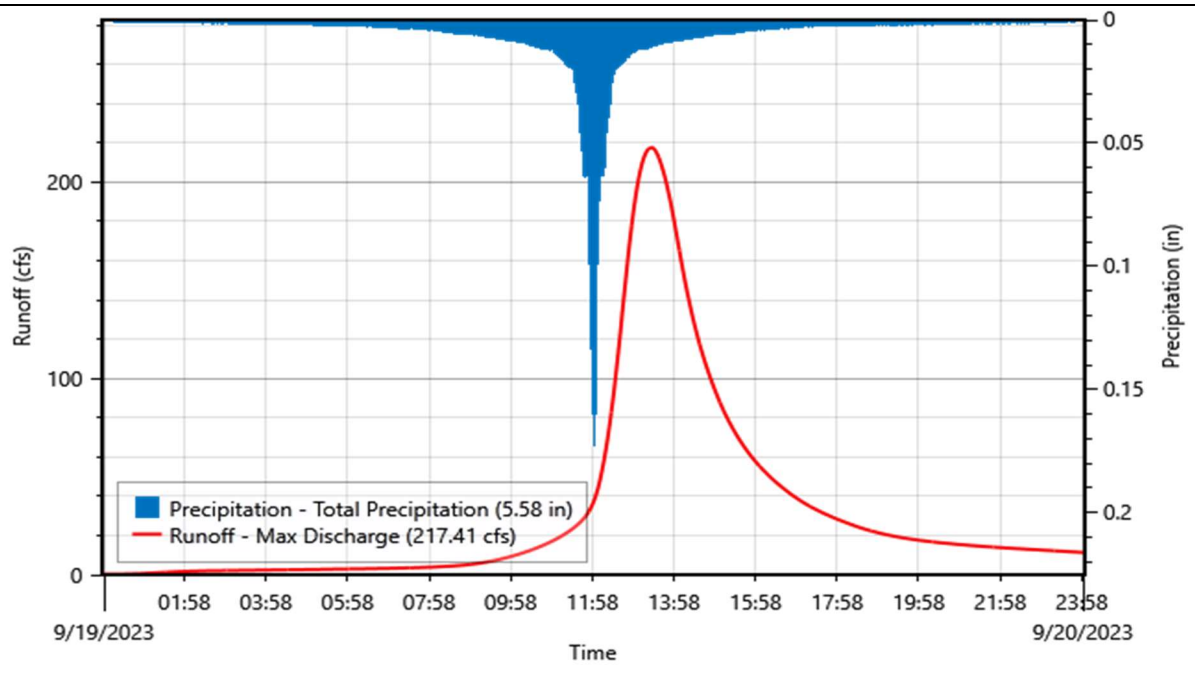
Subbasin ID:	Sub-02			
Scenario:	**010-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	217.41 cfs	**Time of peak:**	19 Sep 2023, 01:24	
Drainage area:	212.546 acres	**Total rainfall:**	5.58 in	98.83296 ac-ft
Initial abstraction:	0.58 in	**Losses:**	2.02 in	35.74639 ac-ft
Curve Number:	77.66	**Precip excess:**	3.56 in	63.08657 ac-ft
Impervious surface:	16.12%	**Direct runoff:**	3.48 in	61.65 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	78.23 minutes	**Total runoff:**	3.48 in	61.65 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
20.795	9.78	100.00	Wetlands, Forested
18.136	8.53	88.01	Developed, Medium Density
5.060	2.38	72.76	Agricultural, Pasture/Hay
45.421	21.37	80.36	Developed, Low Density
1.389	0.65	94.00	Developed, High Density
39.329	18.50	76.01	Developed, Open Space
20.573	9.68	71.08	Undeveloped, Mixed Forest
61.842	29.10	68.41	Undeveloped, Deciduous Forest
212.546	**100.00**	**77.66**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
19.14	100.00	0.02303	0.5638	Sheet Flow
31.65	4,916.01	0.02575	5.2990	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
130.38	**5,516.01**	**Total**	**Lag Time = 78.23 minutes**	



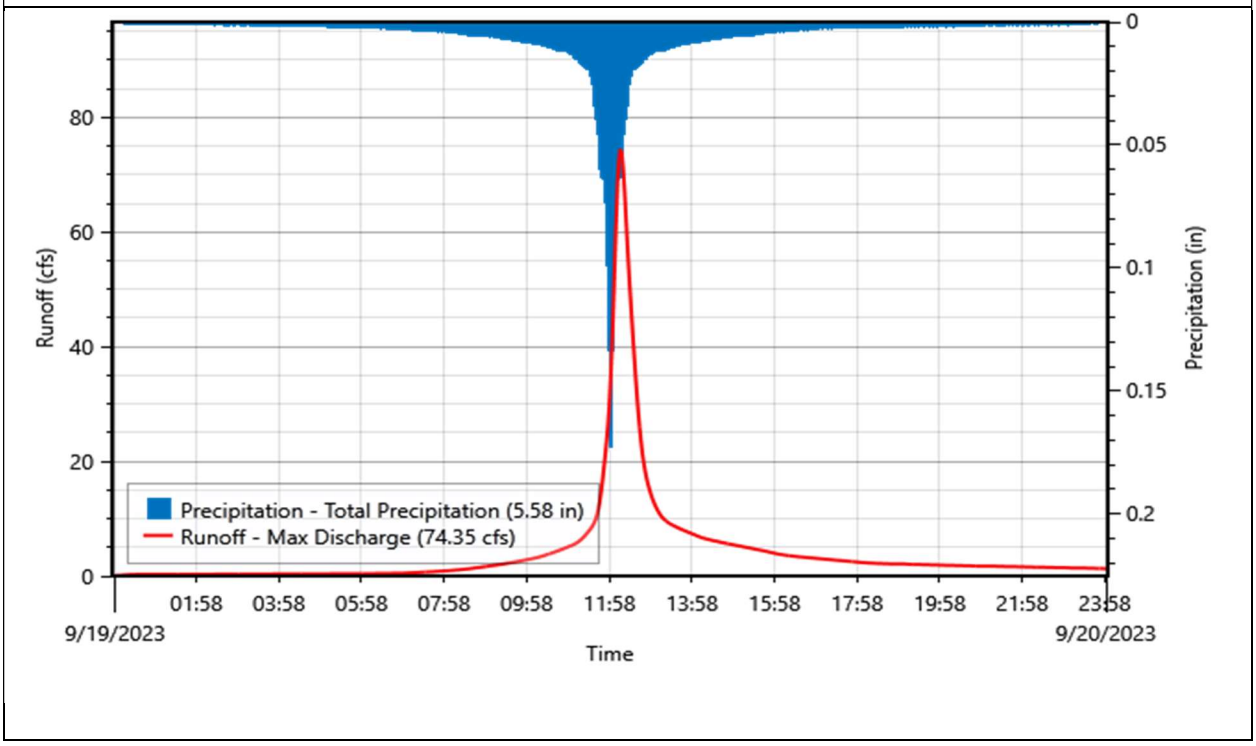
Subbasin ID:	Sub-03			
Scenario:	010-Existing Conditions		Depth	Volume
Peak discharge:	74.35 cfs	**Time of peak:**	19 Sep 2023, 12:14	
Drainage area:	26.056 acres	**Total rainfall:**	5.58 in	12.11232 ac-ft
Initial abstraction:	0.47 in	**Losses:**	1.82 in	3.94887 ac-ft
Curve Number:	80.81	**Precip excess:**	3.76 in	8.16345 ac-ft
Impervious surface:	13.01%	**Direct runoff:**	3.75 in	8.14 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	12.68 minutes	**Total runoff:**	3.75 in	8.14 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
4.379	16.80	100.00	Wetlands, Forested
1.701	6.53	91.82	Developed, Medium Density
4.200	16.12	86.03	Developed, Low Density
3.541	13.59	79.39	Developed, Open Space
12.234	46.95	71.02	Undeveloped, Deciduous Forest
26.056	**100.00**	**80.81**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
10.87	100.00	0.09466	1.1430	Sheet Flow
6.90	1,352.35	0.04107	6.6922	Shallow Concentrated Flow
3.36	500.00	0.00560	2.4705	Channel Flow
21.13	**1,952.35**	**Total**	**Lag Time = 12.68 minutes**	



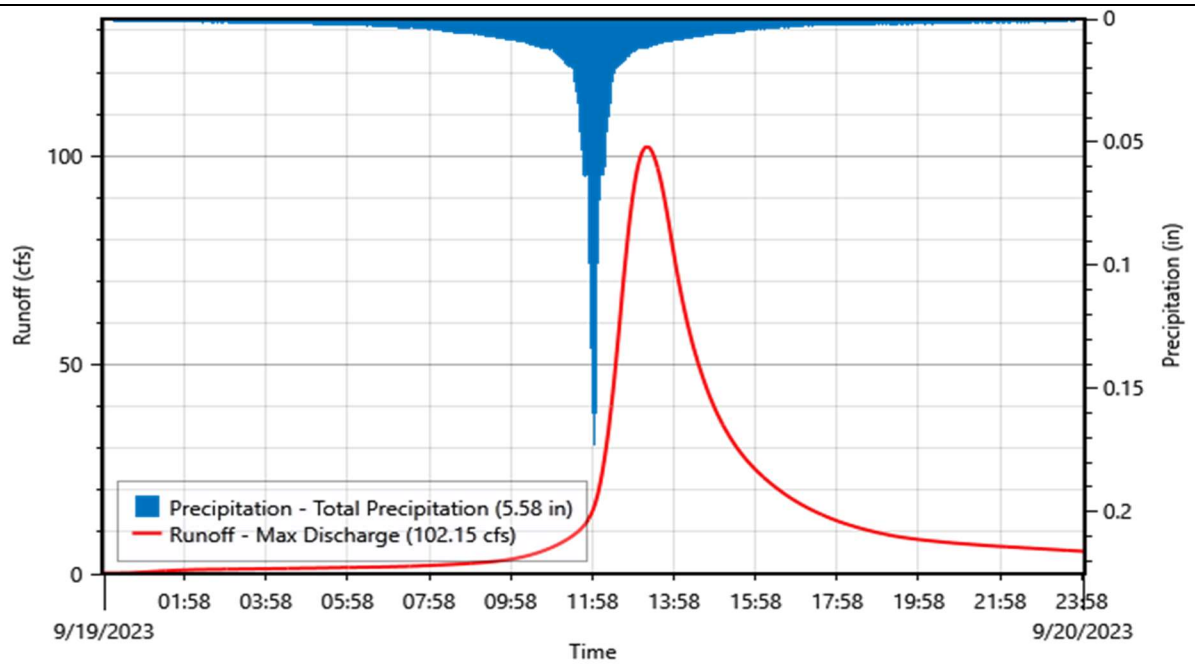
Subbasin ID:	Sub-04			
Scenario:	010-Existing Conditions		Depth	Volume
Peak discharge:	102.15 cfs	**Time of peak:**	19 Sep 2023, 01:18	
Drainage area:	110.614 acres	**Total rainfall:**	5.58 in	51.42528 ac-ft
Initial abstraction:	0.80 in	**Losses:**	2.51 in	23.09222 ac-ft
Curve Number:	71.46	**Precip excess:**	3.07 in	28.33306 ac-ft
Impervious surface:	15.80%	**Direct runoff:**	3.01 in	27.71 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	71.46 minutes	**Total runoff:**	3.01 in	27.71 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
5.810	5.25	100.00	Wetlands, Forested
6.653	6.01	87.49	Developed, Medium Density
25.120	22.71	78.68	Developed, Low Density
22.168	20.04	73.33	Developed, Open Space
13.755	12.43	58.39	Undeveloped, Mixed Forest
37.109	33.55	62.96	Undeveloped, Deciduous Forest
110.614	**100.00**	**71.46**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
18.59	100.00	0.02475	0.5845	Sheet Flow
20.91	3,337.20	0.02720	5.4459	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
119.09	**3,937.20**	**Total**	**Lag Time = 71.46 minutes**	



Nodes

Element ID	Element Type	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Diverted Flow (cfs)
JCT-01	Junction	322.25	322.25	
JCT-02	Junction	142.22	142.22	
JCT-03	Junction	88.99	88.99	
JCT-04	Junction	42.17	42.17	

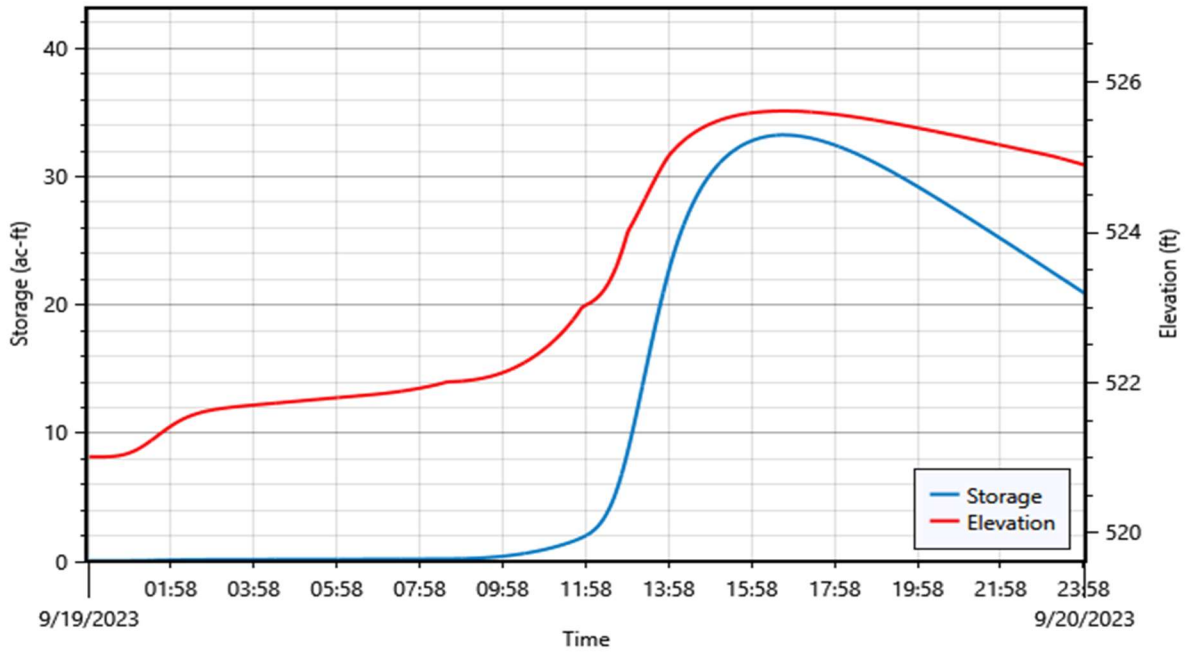
Routing Reaches

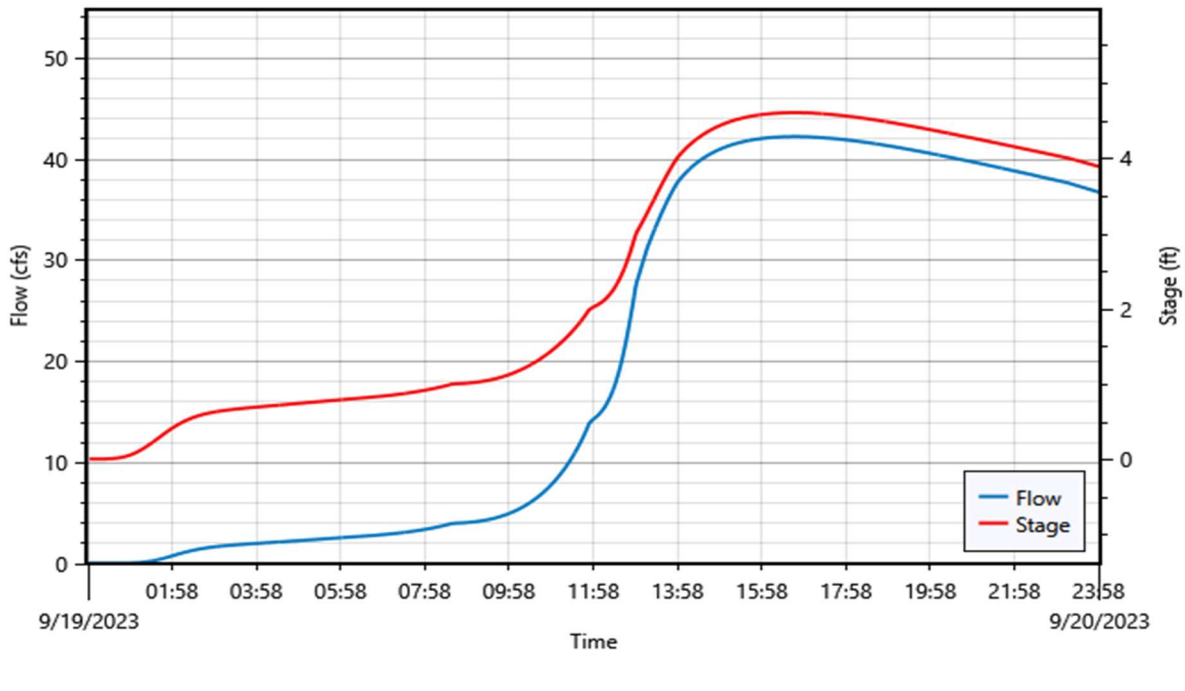
Reach ID	Peak Inflow (cfs)	Peak Outflow (cfs)	Attenuated Flow (cfs)
Reach-01-EX	0.00	0.00	0.00
Reach-02-EX	88.99	88.66	0.33
Reach-03-EX	42.17	42.17	0.00
Reach-04-EX	42.17	42.17	0.00

Storage Areas

These are the storage areas that are defined:

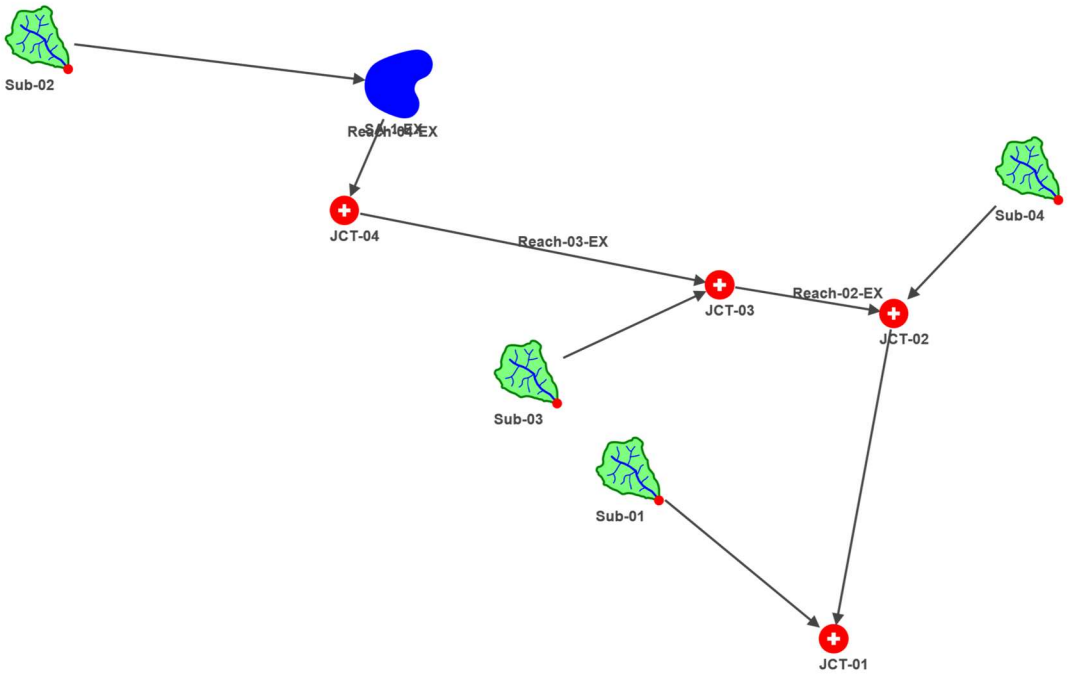
Storage Area ID:	**SA-1-EX**		
Scenario:	**010-Existing Conditions**		
Peak storage:	33.20 ac-ft		
Peak elevation:	525.60 ft	**Peak Volume**	**Time of Peak**
Peak inflow:	217.41 cfs	61.65 ac-ft	19Sep2023, 13:24
Peak outflow:	42.17 cfs	40.82 ac-ft	19Sep2023, 16:44





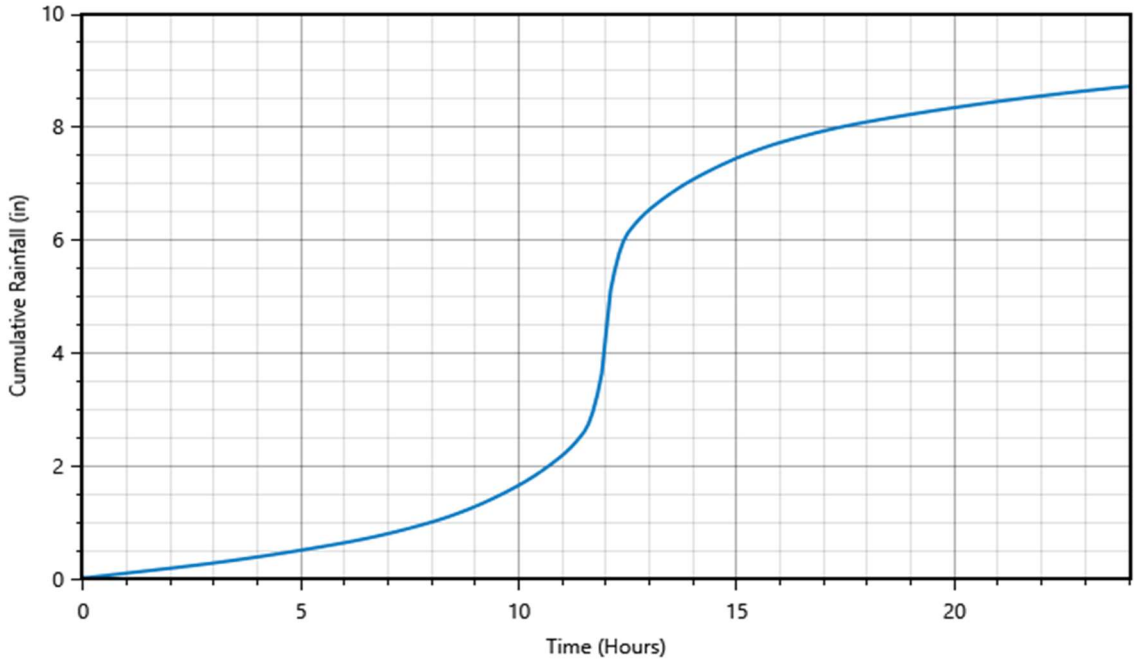
100-Existing Conditions

Watershed Routing Diagram



Design Storm

Precipitation type: SCS Storm
SCS storm distribution: Type III
Rainfall depth: 8.71 in



Watershed Summary

Subbasin ID	Drainage Area (acres)	Initial Abstraction (in)	Curve Number	Impervious Surface (%)	Lag Time (minutes)	Peak Discharge (cfs)
Sub-01	125.988	0.67	74.89	5.03	27.38	406.03
Sub-02	212.546	0.58	77.66	16.12	78.23	394.83
Sub-03	26.056	0.47	80.81	13.01	12.68	131.10
Sub-04	110.614	0.80	71.46	15.80	71.46	196.52

Subbasins

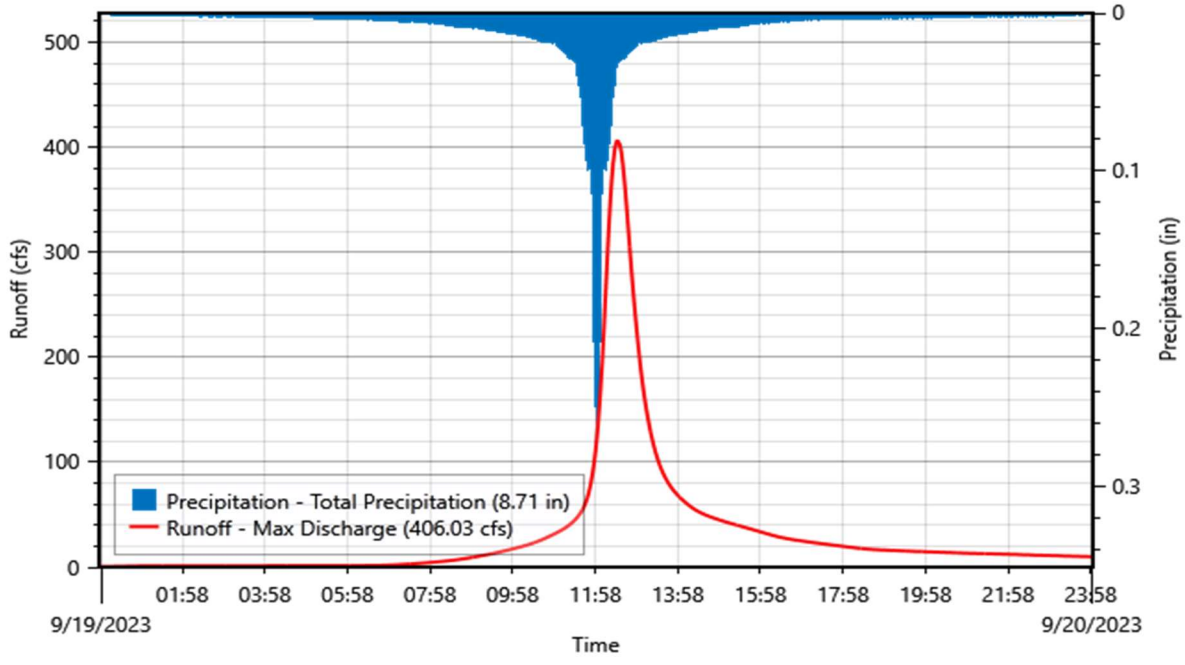
Subbasin ID:	**Sub-01**			
Scenario:	**100-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	406.03 cfs	**Time of peak:**	19 Sep 2023, 12:30	
Drainage area:	125.988 acres	**Total rainfall:**	8.71 in	91.46661 ac-ft
Initial abstraction:	0.67 in	**Losses:**	2.88 in	30.27997 ac-ft
Curve Number:	74.89	**Precip excess:**	5.83 in	61.18664 ac-ft
Impervious surface:	5.03%	**Direct runoff:**	5.78 in	60.74 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	27.38 minutes	**Total runoff:**	5.78 in	60.74 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
10.505	8.34	100.00	Wetlands, Forested
1.413	1.12	91.25	Developed, Medium Density
0.626	0.50	55.04	Undeveloped, Evergreen Forest
0.657	0.52	74.00	Agricultural, Pasture/Hay
9.746	7.74	83.03	Developed, Low Density
15.711	12.47	79.17	Developed, Open Space
6.880	5.46	69.46	Undeveloped, Mixed Forest
80.448	63.85	70.12	Undeveloped, Deciduous Forest
125.988	**100.00**	**74.89**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
23.91	100.00	0.01320	0.4268	Sheet Flow
20.37	4,049.32	0.04218	6.7821	Shallow Concentrated Flow
1.34	495.78	0.03463	6.1450	Channel Flow
45.62	**4,645.10**	**Total**	**Lag Time = 27.38 minutes**	



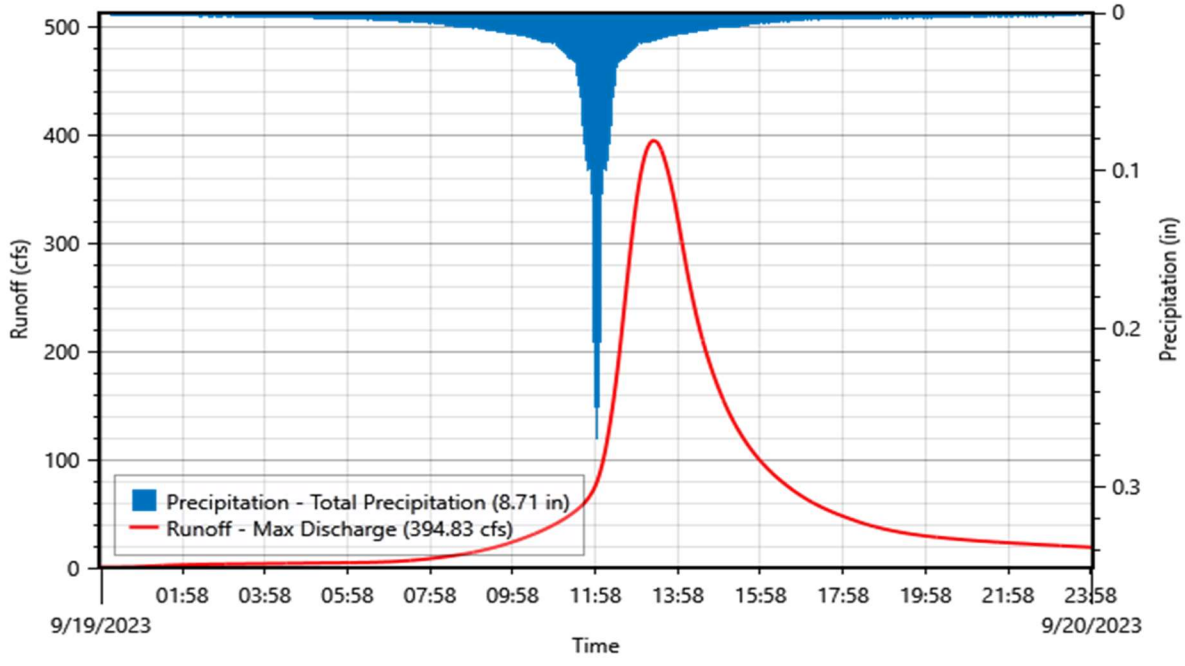
Subbasin ID:	Sub-02			
Scenario:	**100-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	394.83 cfs	**Time of peak:**	19 Sep 2023, 01:24	
Drainage area:	212.546 acres	**Total rainfall:**	8.71 in	154.27151 ac-ft
Initial abstraction:	0.58 in	**Losses:**	2.27 in	40.18499 ac-ft
Curve Number:	77.66	**Precip excess:**	6.44 in	114.08652 ac-ft
Impervious surface:	16.12%	**Direct runoff:**	6.31 in	111.71 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	78.23 minutes	**Total runoff:**	6.31 in	111.71 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
20.795	9.78	100.00	Wetlands, Forested
18.136	8.53	88.01	Developed, Medium Density
5.060	2.38	72.76	Agricultural, Pasture/Hay
45.421	21.37	80.36	Developed, Low Density
1.389	0.65	94.00	Developed, High Density
39.329	18.50	76.01	Developed, Open Space
20.573	9.68	71.08	Undeveloped, Mixed Forest
61.842	29.10	68.41	Undeveloped, Deciduous Forest
212.546	**100.00**	**77.66**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
19.14	100.00	0.02303	0.5638	Sheet Flow
31.65	4,916.01	0.02575	5.2990	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
130.38	**5,516.01**	**Total**	**Lag Time = 78.23 minutes**	



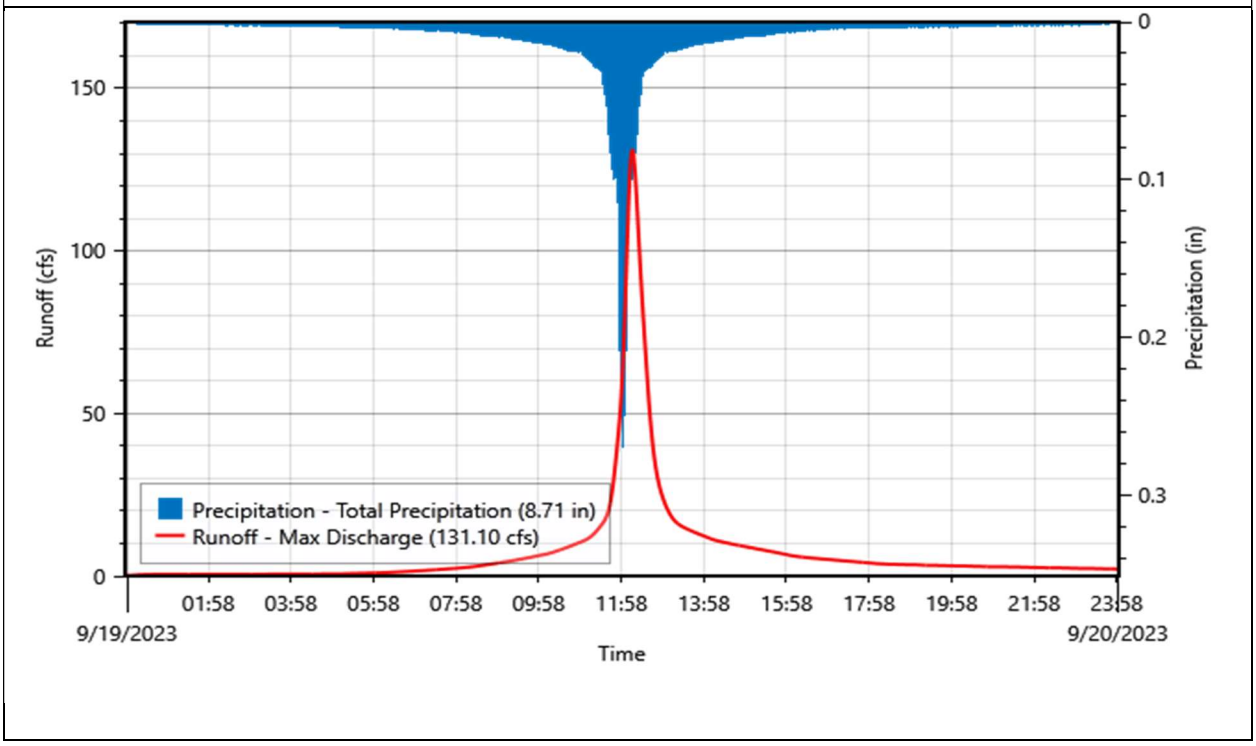
Subbasin ID:	Sub-03			
Scenario:	**100-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	131.10 cfs	**Time of peak:**	19 Sep 2023, 12:14	
Drainage area:	26.056 acres	**Total rainfall:**	8.71 in	18.90651 ac-ft
Initial abstraction:	0.47 in	**Losses:**	2.01 in	4.36838 ac-ft
Curve Number:	80.81	**Precip excess:**	6.70 in	14.53812 ac-ft
Impervious surface:	13.01%	**Direct runoff:**	6.68 in	14.49 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	12.68 minutes	**Total runoff:**	6.68 in	14.49 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
4.379	16.80	100.00	Wetlands, Forested
1.701	6.53	91.82	Developed, Medium Density
4.200	16.12	86.03	Developed, Low Density
3.541	13.59	79.39	Developed, Open Space
12.234	46.95	71.02	Undeveloped, Deciduous Forest
26.056	**100.00**	**80.81**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
10.87	100.00	0.09466	1.1430	Sheet Flow
6.90	1,352.35	0.04107	6.6922	Shallow Concentrated Flow
3.36	500.00	0.00560	2.4705	Channel Flow
21.13	**1,952.35**	**Total**	**Lag Time = 12.68 minutes**	



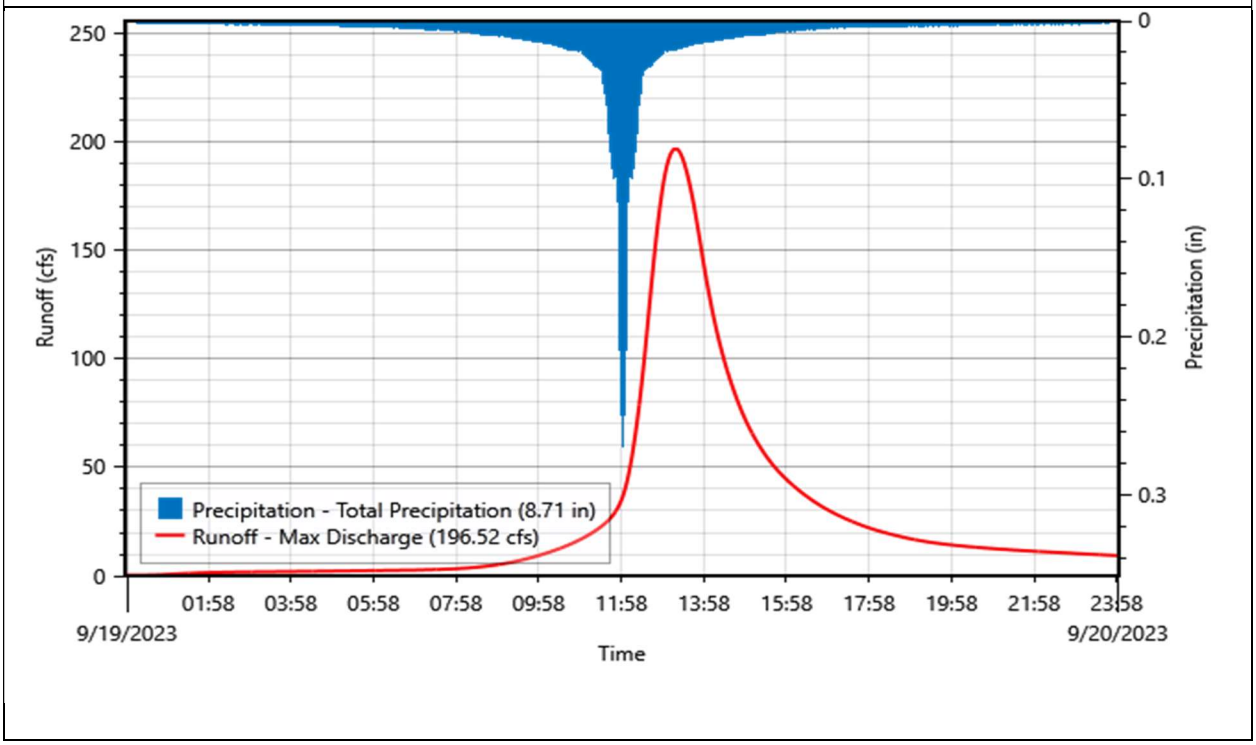
Subbasin ID:	Sub-04			
Scenario:	**100-Existing Conditions**		**Depth**	**Volume**
Peak discharge:	196.52 cfs	**Time of peak:**	19 Sep 2023, 01:18	
Drainage area:	110.614 acres	**Total rainfall:**	8.71 in	80.27136 ac-ft
Initial abstraction:	0.80 in	**Losses:**	2.91 in	26.80162 ac-ft
Curve Number:	71.46	**Precip excess:**	5.80 in	53.46974 ac-ft
Impervious surface:	15.80%	**Direct runoff:**	5.69 in	52.40 ac-ft
Peaking factor:	484	**Baseflow:**	0.00 in	0.00 ac-ft
Lag time:	71.46 minutes	**Total runoff:**	5.69 in	52.40 ac-ft

Weighted Curve Number Calculations

Area (acres)	Area (%)	CN	Description
5.810	5.25	100.00	Wetlands, Forested
6.653	6.01	87.49	Developed, Medium Density
25.120	22.71	78.68	Developed, Low Density
22.168	20.04	73.33	Developed, Open Space
13.755	12.43	58.39	Undeveloped, Mixed Forest
37.109	33.55	62.96	Undeveloped, Deciduous Forest
110.614	**100.00**	**71.46**	**Weighted Average**

Time of Concentration (TOC) / Lag time Calculations

TOC (min)	Length (ft)	Slope (ft/ft)	Velocity (ft/s)	Description
18.59	100.00	0.02475	0.5845	Sheet Flow
20.91	3,337.20	0.02720	5.4459	Shallow Concentrated Flow
79.59	500.00	0.00001	0.1044	Channel Flow
119.09	**3,937.20**	**Total**	**Lag Time = 71.46 minutes**	



Nodes

Element ID	Element Type	Peak Inflow (cfs)	Peak Outflow (cfs)	Peak Diverted Flow (cfs)
JCT-01	Junction	609.95	609.95	
JCT-02	Junction	251.40	251.40	
JCT-03	Junction	154.19	154.19	
JCT-04	Junction	54.49	54.49	

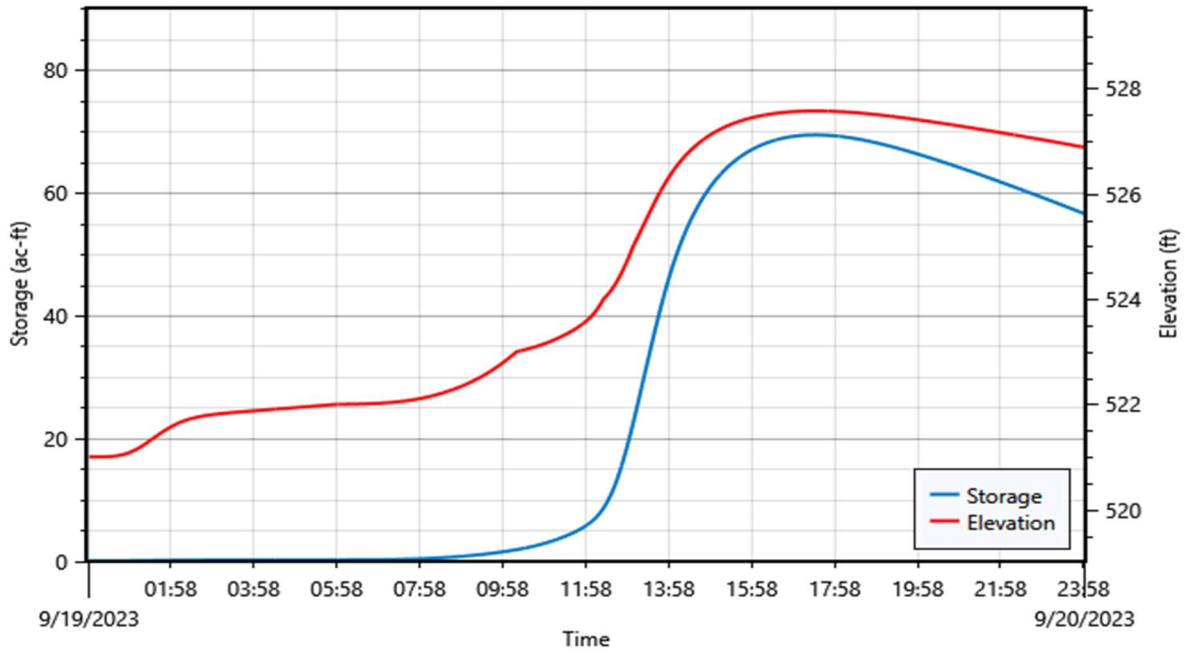
Routing Reaches

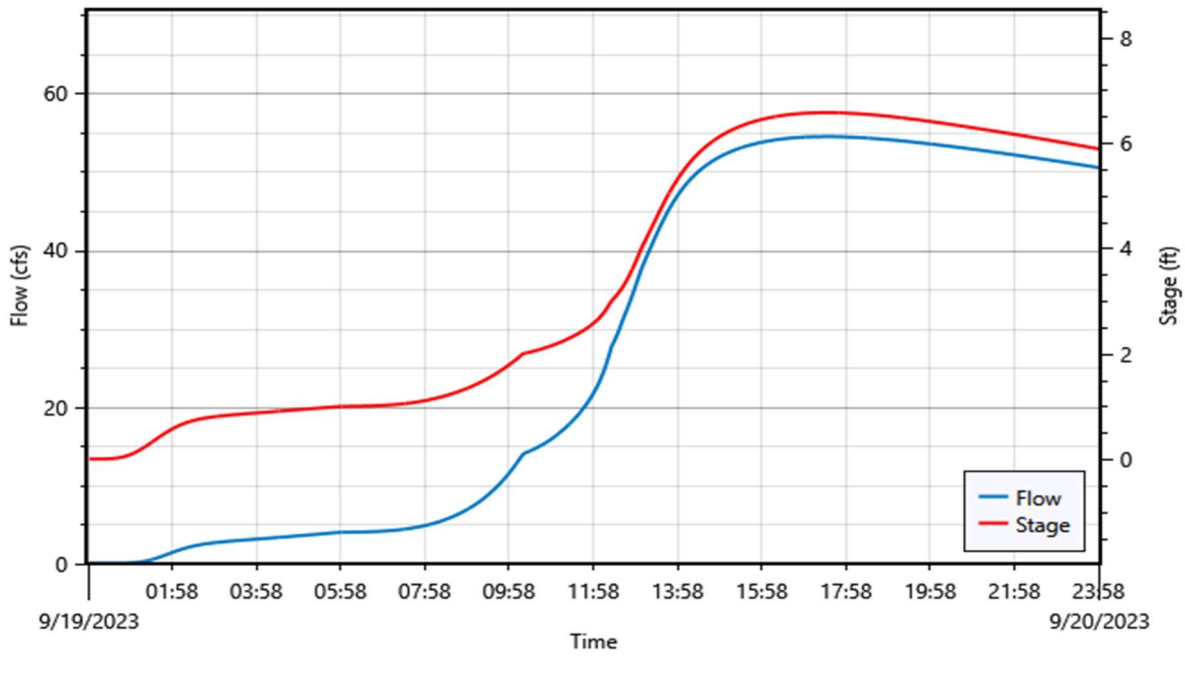
Reach ID	Peak Inflow (cfs)	Peak Outflow (cfs)	Attenuated Flow (cfs)
Reach-01-EX	0.00	0.00	0.00
Reach-02-EX	154.19	153.31	0.88
Reach-03-EX	54.49	54.49	0.00
Reach-04-EX	54.49	54.49	0.00

Storage Areas

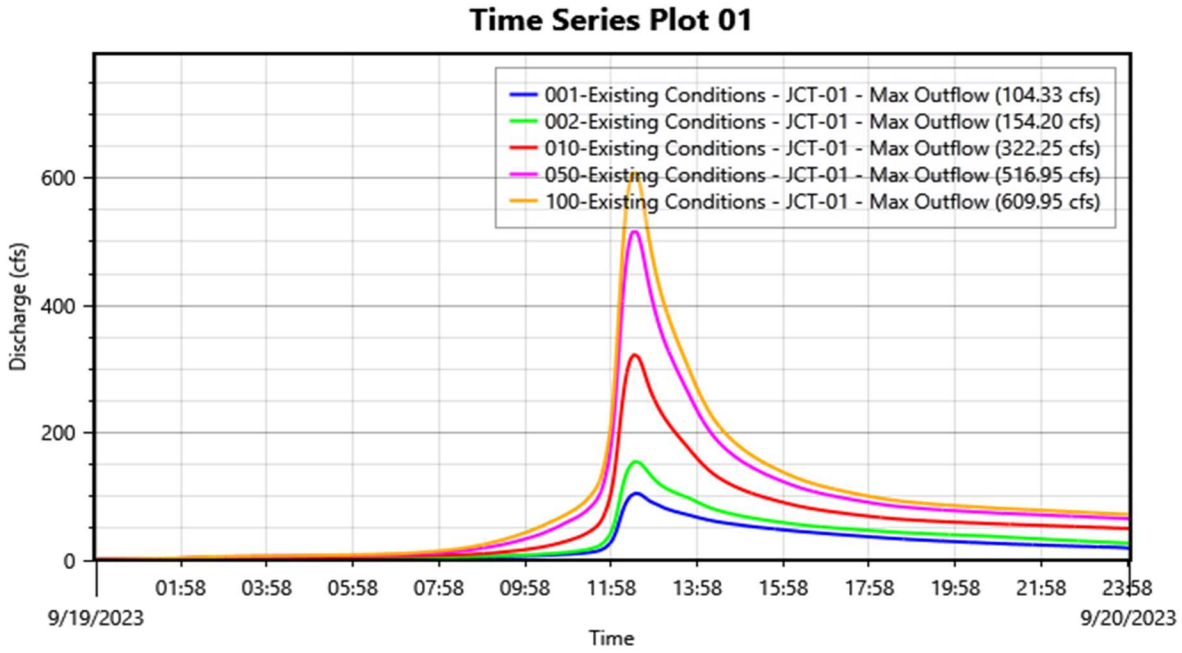
These are the storage areas that are defined:

Storage Area ID:	**SA-1-EX**		
Scenario:	**100-Existing Conditions**		
Peak storage:	69.43 ac-ft		
Peak elevation:	527.57 ft	**Peak Volume**	**Time of Peak**
Peak inflow:	394.83 cfs	111.71 ac-ft	19Sep2023, 13:24
Peak outflow:	54.49 cfs	55.16 ac-ft	19Sep2023, 17:30





Pre vs Post Development



APPENDIX D

AVERAGE DAILY AND SPRING FLOWS
Todd Drive Culvert Replacement
Monroe, Connecticut

October 25, 2023

(per Section 6.16 of CTDOT Drainage Manual, 2000)

Average Daily Flow

CTDOT Drainage Manual, Eqn. 6.24:

$Q_{AD} = A^{0.98} \times 1.87$

Parameter	Value
Area, square miles	0.71
Average daily flow, cfs	1.34
Average daily flow, gpm	602

Average Spring Flow

CTDOT Drainage Manual, Eqn. 6.25:

$Q_{AD} = A^{0.988} \times 3.62$

Parameter	Value
Area, square miles	0.57
Average daily flow, cfs	2.58
Average daily flow, gpm	1,158

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TEMPORARY HYDRAULIC FACILITIES
Todd Drive Culvert Replacement
Monroe, Connecticut

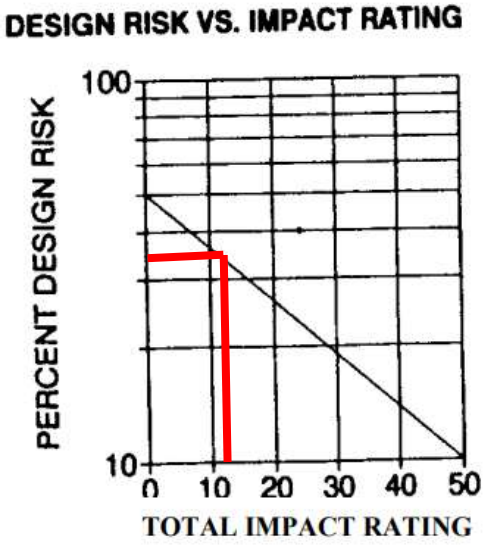
October 25, 2023

(per Appendix 6.F of CTDOT Drainage Manual, 2000)

HYDROLOGY
Step 1: Impact Rating

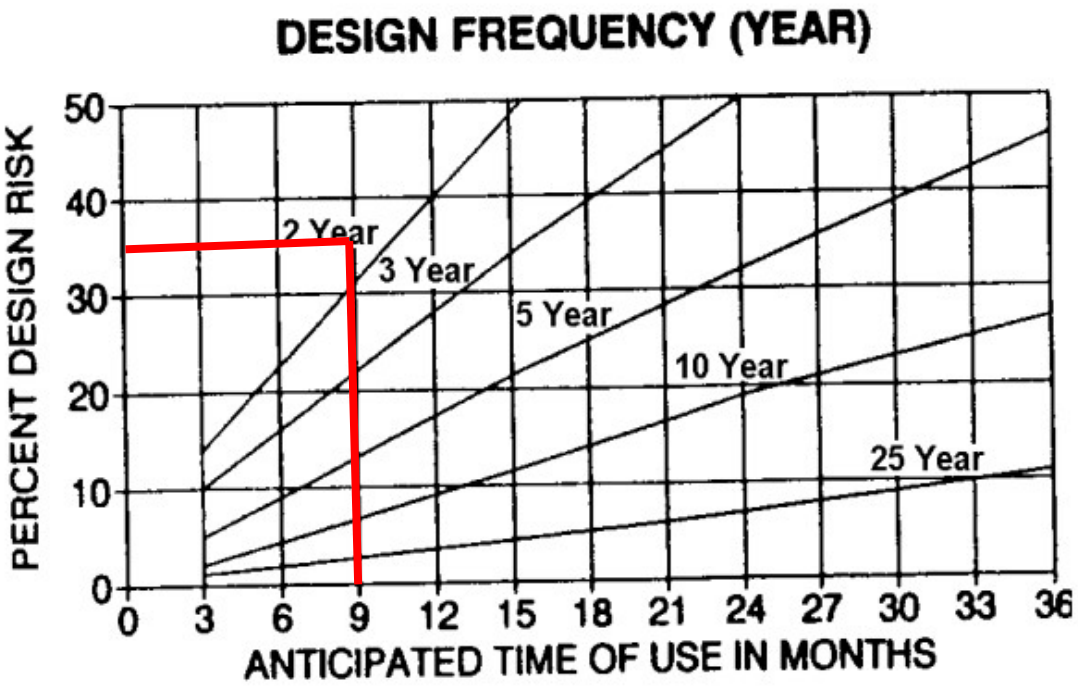
Factor	Rating	Rationale
Loss of Life	1	No structure inundation , use ADT value
Property Damage	2	Medium, property damage but no structure inundation
Traffic Interruption	3	Only way in or out
Detour length	3	No other route available
Height above streambed	1	< 10 feet
Suburban ADT	1	< 750, low traffic
Total	11	

Step 2: Determine risk percentage



Risk percentage ~ 34%

Step 3: Determine Temporary Design Frequency



Assuming 9 month construction period, design frequency, design frequency = ~ 1 year

Step 4: Develop temporary design discharge:

1-year discharge: 104.20 cfs (from HEC-HMS)

HYDRAULICS

Determine size of temporary culvert:

Manning's equation for 36" HDPE @ 1.25%:

$A = 0.25 \times \pi \times (3.0\ ft)^2 = 7.06\ ft^2$

$WP = \pi \times (3.0\ ft) = 9.42\ ft$

$R_h = A / WP = 7.06\ ft^2 / 9.42\ ft = 0.750\ ft$

$n = 0.009$

$Q = 1.49/n \times R_h^{2/3} \times S^{1/2}$

$Q = 107.70\ cfs$

Check height of cofferdam, use 1-year storm, from HY-8

1-year WSEL = 438.29

Tighe&Bond

APPENDIX E

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Todd Drive Culvert

Headwater Elevation (ft)	Total Discharge (cfs)	36 CMP Discharge (cfs)	30 RCP Discharge (cfs)	24 RCP Discharge (cfs)	Roadway Discharge (cfs)	Iterations
441.38	432.00	67.51	61.65	37.32	264.82	10
441.40	449.80	67.72	61.77	37.40	282.54	3
441.43	467.60	67.87	61.88	37.48	300.10	3
441.45	485.40	68.02	61.99	37.55	317.58	3
441.47	503.20	68.24	62.09	37.63	335.05	3
441.49	516.00	68.35	62.17	37.68	347.65	3
441.52	538.80	68.61	62.30	37.77	369.94	3
441.54	556.60	68.86	62.41	37.84	387.51	3
441.56	574.40	68.85	62.51	37.90	404.87	3
441.59	592.20	69.00	62.60	37.97	422.34	3
441.61	610.00	69.39	62.70	38.04	439.82	3
440.80	157.03	62.65	58.90	35.49	0.00	Overtopping

HY-8 Analysis Results

Crossing Summary Table

Culvert Crossing: Todd Drive Culvert

Headwater Elevation (ft)	Total Discharge (cfs)	Culvert 1 Discharge (cfs)	Roadway Discharge (cfs)	Iterations
439.41	432.00	432.00	0.00	1
439.54	449.80	449.80	0.00	1
439.67	467.60	467.60	0.00	1
439.80	485.40	485.40	0.00	1
439.93	503.20	503.20	0.00	1
440.03	516.00	516.00	0.00	1
440.21	538.80	538.80	0.00	1
440.35	556.60	556.60	0.00	1
440.49	574.40	574.40	0.00	1
440.64	592.20	592.20	0.00	1
440.80	610.00	610.00	0.00	1
441.00	633.00	633.00	0.00	Overtopping

USACE CROSSING CRITERIA
Todd Drive Culvert Replacement
Monroe, Connecticut

January 31, 2024

Openness Ratio

Minimum openness ratio = 0.25m = 0.82 ft

Openness ratio = cross sectional area/length

Cross sectional area = 18 ft x 4 ft = 72 ft^2

Openness ratio = 72 ft^2 / 54 ft = 1.33 ft > 0.82 ft OK

Minimum Width

Minimum: 1.2 x bankfull width

Minimum width = 1.2 x 15 ft = 18 ft

Width provided = 18 ft OK

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APPENDIX F

DAVISON ENVIRONMENTAL

10 Maple Street
Chester, CT 06412
860-803-0938
www.davisonenvironmental.com

Biodiversity Studies • Wetland Delineation & Assessment • Habitat Management • GIS Mapping • Permitting • Forestry

WETLANDS / WATERCOURSES DELINEATION REPORT

Date of Work: *7/3/2020*

Project Location: *Todd Drive, Monroe*

Client:
Mike Shevlin, Jr.
Shevlin Land Surveying, LLC

IDENTIFICATION OF WETLANDS AND WATERCOURSES RESOURCES

Wetlands and watercourses present on property? Yes ☒ No ☐

Wetlands:		Watercourses:		Identification Method:	
Inland Wetlands	☒	Perennial Streams	☒	Auger and Spade	☒
Tidal Wetlands	☐	Intermittent Watercourses	☐	Backhoe Pits	☐

Numbering Sequences:

1-3A	
4A-11	
12-23	
24-30	
31-38	

Wetland Plant Communities Present:

Forest ☒
Sapling/Shrub ☐
Wet Meadow ☐
Marsh ☐
Upland/Streamside ☒

Definitions and methodology for identification of state regulated wetlands & watercourses

Wetlands and watercourses are regulated in the State of Connecticut General Statutes, Chapter 440, sections 22a-28 to 22a-45. The Statutes are divided into the Inland Wetlands and Watercourses Act (sections 22a-36 to 22a-45) and the Tidal Wetlands Act (sections 22a-28 to 22a-35). Inland Wetlands "means land, including submerged land, not regulated pursuant to sections 22a-28 to 22a-35, inclusive, which consists of any of the soil types designated as poorly drained, very poorly drained, alluvial, and floodplain by the National Cooperative Soils Survey, as may be amended from time to time, of the National Resources Conservation Service (NRCS) of the United States Department of Agriculture" section 22a-38(15). Watercourses "means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs and all other bodies of water, natural or artificial, vernal or intermittent, public or private which are contained within, flow through or border upon this state or any portion thereof, not regulated pursuant to sections 22a-28 to 22a-35, inclusive. Intermittent watercourses shall be delineated by a defined permanent channel and bank and the occurrence of two or more of the following characteristics: (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 particular storm incident, and (C) the presence of hydrophytic vegetation" section 22a-38(16). Tidal Wetlands are defined as "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 low lands 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 some, but not necessarily all of the following" (includes plant list) section 22a-29(2).

WETLAND SOIL TYPES

Wetland soils consist of the Ridgebury, Leicester and Whitman complex, as well as Aquents. Ridgebury, Leicester and Whitman is an undifferentiated mapping unit consisting of two poorly drained (Ridgebury and Leicester) and one very poorly drained (Whitman) soil developed on glacial till in depressions and drainageways in uplands and valleys. Their use interpretations are very similar, and they typically are so intermingled on the landscape that separation is not practical. The Ridgebury and Leicester series have a seasonal high water table at or near the surface (0-6") from fall through spring. They differ in that the Leicester soil has a more friable compact layer or hardpan, while the Ridgebury soils have a dense to very dense compact layer. The Whitman soil has a high water table for much of the year and may frequently be ponded.

Aquents is a miscellaneous land type used to denote man-made or man-disturbed areas that are wet. These soils have an aquic soil moisture regime and can be expected to support hydrophytic vegetation. Typically, these soils occur in places where less than 2 feet of earthen material have been placed over poorly or very poorly drained soils; areas where the natural soils have been mixed so that the natural soil layers are not identifiable; or where the soil materials have been excavated to the watertable.

NON-WETLAND SOILS

The non-wetland soils consist of Udorthents as well as the Canton and Charlton complex. Udorthents is a miscellaneous land type used to denote moderately well to excessively drained earthen material which has been so disturbed by cutting, filling, or grading that the original soil profile can no longer be discerned.

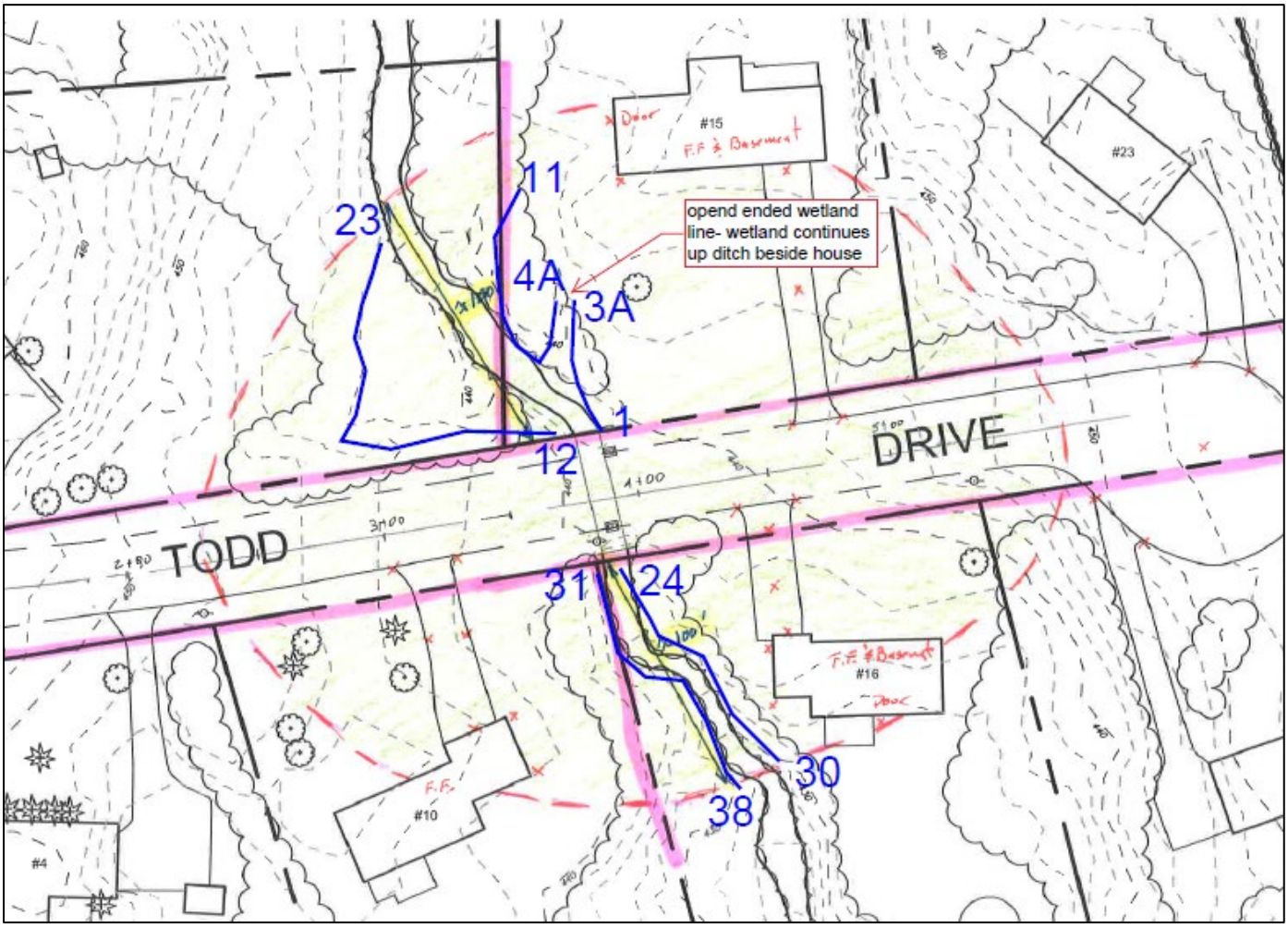
The Canton series consists of very deep, well drained soils formed in a loamy mantle underlain by sandy glacial till. They are on nearly level to very steep glaciated plains, hills, and ridges. Permeability is moderately rapid in the solum and rapid in the substratum. The soils developed in a fine sandy loam mantle over acid sandy glacial till of Wisconsin age derived mainly from granite and gneiss and some fine-grained sandstone.

The Charlton series is a very deep, well drained loamy soil formed in friable till. They are nearly level to very steep soils on till plains and hills. Depth to bedrock and the seasonal high water table is commonly more than 6 feet.

NOTES:

Wetlands were delineated upstream and downstream of the existing culvert crossing. South of Todd Drive the delineated boundary consists of the top of the streambank (i.e., the ordinary high water mark). At several locations along the north side, there are small bordering wetlands. A sketch map illustrating the wetlands delineated is shown below. This map is intended for illustrative purposes only; the location and extent of wetlands is approximate.

WETLAND SKETCH MAP



Eric Davison
Certified Professional Wetland Scientist
Registered Soil Scientist