Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Notice of Intent

JANUARY 2021

EAST BELCHER ROAD RECONSTRUCTION

WSE PROJECT NO. ENG20-0719

PREPARED FOR:
TOWN OF FOXBOROUGH

SUBMITTED TO:
FOXBOROUGH CONSERVATION COMMISSION

55 Walkers Brook Drive, Suite 100, Reading, MA 01867
Tel: 978.532.1900

Foxborough – East Belcher Road Reconstruction
WSE Project No. ENG20-0719

January 22, 2021

Foxborough Conservation Commission
40 South Street
Foxborough, MA 02035

Re: NOI Filing
East Belcher Road

Dear Members of the Commission:

On behalf of the Town of Foxborough Highway Department, Weston & Sampson Engineers, Inc. is hereby enclosing eight (8) copies of the Notice of Intent submittal (including (1) large plan set and (7) half size plans) to fulfill the requirements of the Massachusetts Wetlands Protection Act, M.G.L. Chapter 131, Section 40 submittal requirements and the Town of Foxborough submittal requirements. This submittal is a formal Notice of Intent for the reconstruction and widening of a section of East Belcher road in Foxborough.

As part of the filing, we have attached the following:

Appendix A: Project Description
Appendix B: Alternatives Analysis
Appendix C: Stormwater Report
Appendix D: Project Maps
Appendix E: Applicable Technical Specifications
Appendix F: Abutters Information
Appendix G: Wetlands Memorandum
Appendix H: Photos

If you have any questions regarding this submittal, please contact me at 978-532-1900 ext. 2117.

Very truly yours,

WESTON & SAMPSON

Devin Batchelder
Environmental Scientist

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 3 – Notice of Intent

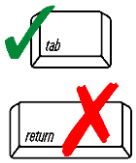
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
Foxborough Wetlands Protection Bylaw, Ch. 267

(To be provided by MassDEP)

MassDEP File Number

Foxborough
Town

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note:
Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

A. General Information

1. **Project Location:**

East Belcher Road
a. Street Address

Foxborough
b. Town

02035
c. Zip Code

Latitude and Longitude:

42° 3'5.16"N
d. Latitude

71°13'21.52"W
e. Longitude

f. Assessors Map/Plat Number

g. Parcel /Lot Number

2. **Applicant:**

Christopher
a. First Name

Gallagher
b. Last Name

Town of Foxborough – Highway Department
c. Organization

70 Elm Street
d. Street Address

Foxborough
e. City/Town

MA
f. State

02035
g. Zip Code

h. Phone Number

i. Fax Number

j. Email Address

3. **Property owner** (required if different from applicant): ☐ Check if more than one owner

a. First Name

b. Last Name

c. Organization

d. Street Address

e. City/Town

f. State

g. Zip Code

h. Phone Number

i. Fax Number

j. Email address

4. **Representative** (if any):

Devin
a. First Name

Batchelder
b. Last Name

Weston & Sampson Engineers
c. Company

55 Walkers Brook Drive, Suite 100
d. Street Address

Reading
e. City/Town

MA
f. State

01867
g. Zip Code

(978)-532-1900
h. Phone Number

i. Fax Number

batchelder.devin@wseinc.com
j. Email address

5. **Wetland Filing Fees Paid** *(to calculate fees, refer to attached NOI Wetland Fee Transmittal Form):*

Exempt	Exempt	Exempt	Exempt
a. State WPA Fee/***Total***	b. WPA Fee/***State's Share***	c. WPA Fee/***Town's Share***	d. Town Bylaw (Ch. 267) Fee

A. General Information *(continued)*

6. General Project Description:

Proposed roadway reconstruction.

7a. Project Type Checklist: (Limited Project Types see Section A. 7b.)

1. ☐ Single Family Home
2. ☐ Residential Subdivision
3. ☐ Commercial/Industrial
4. ☐ Dock/Pier
5. ☐ Utilities
6. ☐ N/A - Coastal engineering Structure
7. ☐ Agriculture (e.g., cranberries, forestry)
8. ☒ Transportation
9. ☐ Other

7b. Is any portion of the proposed activity eligible to be treated as a limited project (including Ecological Restoration Limited Project) subject to 310 CMR 10.53 (inland)?

1. ☒ Yes ☐ No

If yes, describe which limited project applies to this project. (See 310 CMR 10.53 for a complete list and description of limited project types)

(f)Maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections, and improving inadequate drainage systems

If the proposed activity is eligible to be treated as an Ecological Restoration Limited Project (310 CMR 10.53(4)), complete and attach Appendix A: Ecological Restoration Limited Project Checklist and Signed Certification.

8. Property recorded at the Registry of Deeds for:

a. County	b. Certificate # (if registered land)	c. Book	d. Page Number
Norfolk		1304	504

B. Buffer Zone & Resource Area Impacts **(temporary & permanent)**

1. ☐ Buffer Zone Only – Check if the project is located only in the Buffer Zone of a Bordering Vegetated Wetland, or Inland Bank.
2. ☒ Inland Resource Areas (see 310 CMR 10.54-10.58).

Check all that apply below. Attach narrative and any supporting documentation describing how the project will meet all performance standards for each of the resource areas altered, including standards requiring consideration of alternative project design or location.

B. Buffer Zone & Resource Area Impacts **(temporary & permanent)** *(continued)*

For all projects affecting other Resource Areas, please attach a narrative explaining how the resource area was delineated.

Resource Area	Size of Proposed Alteration	*(if any)* Proposed Replacement
a. ☐ Bank	1. linear feet	2. linear feet
b. ☐ Bordering Vegetated Wetland	1. square feet	2. square feet
c. ☐ Land Under Waterbodies and Waterways	1. square feet 3. cubic yards dredged	2. square feet
d. ☐ Bordering Land Subject to Flooding	1. square feet 3. cubic feet of flood storage lost	2. square feet 4. cubic feet replaced
e. ☐ Isolated Land Subject to Flooding	1. square feet 2. cubic feet of flood storage lost	3. cubic feet replaced

f. ☒ Riverfront Area *(if checked, complete #1-6)*

Unnamed Perennial Stream - Inland
1. Name of Waterway (if available)

2. Width of Riverfront Area (check one):

☐ 25 ft. - Designated Densely Developed Areas only
☐ 100 ft. - New agricultural projects only
☒ 200 ft. - All other projects

3. Total area of Riverfront Area on the site of the proposed project: 209,400 square feet

4. Proposed alteration of the Riverfront Area:

17,490	0	17,490
a. total square feet	b. square feet within 100 feet	c. square feet between 100 feet and 200 feet

5. Has an alternatives analysis been done and is it attached to this NOI? ☒ Yes ☐ No

6. Was the lot where the activity is proposed created prior to August 1, 1996? ☒ Yes ☐ No

3. ☒ Bylaw Resource Areas *(Foxborough Wetlands Protection Bylaw, Ch. 267; No Activity Zones)*

a. ☐ 100 Foot Vernal Pool Adjacent Upland Resource Area

b. ☒ 25 Foot No Activity Zone

4. ☐ Restoration/Enhancement - If the project is for the purpose of restoring or enhancing a wetland resource area in addition to the square footage that has been entered in Section B.2.b above, please enter the additional amount here.

a. square feet of BVW

5. ☐ Project Involves Stream Crossings

a. number of new stream crossings	b. number of replacement stream crossings

C. Other Applicable Standards and Requirements

☐ **This is a proposal for an Ecological Restoration Limited Project.** *If checked, skip Section C and complete Appendix A: Ecological Restoration Notice of Intent – Required Actions (310 CMR 10.11).*

Streamlined Massachusetts Endangered Species Act/Wetlands Protection Act Review

1. Is any portion of the proposed project located in **Estimated Habitat of Rare Wildlife** as indicated on the most recent Estimated Habitat Map of State-Listed Rare Wetland Wildlife published by the Natural Heritage and Endangered Species Program (NHESP)? *To view habitat maps, see the Massachusetts Natural Heritage Atlas or go to http://maps.massgis.state.ma.us/PRI_EST_HAB/viewer.htm*.

   a. ☒ Yes ☐ No

   Dec 2020
   b. Date of map

   If yes, include proof of mailing or hand delivery of NOI to:
   Natural Heritage and Endangered Species Program
   Division of Fisheries and Wildlife, 1 Rabbit Hill Road
   Westborough, MA 01581 - Phone: (508) 389-6360

   If *yes*, the project is also subject to Massachusetts Endangered Species Act (MESA) review (321 CMR 10.18). To qualify for a streamlined, 30-day, MESA/Wetlands Protection Act review, please complete Section C.1.c, and include requested materials with this Notice of Intent (NOI); ***OR*** complete Section C.1.f, if applicable. *If MESA supplemental information is not included with the NOI, by completing Section 1 of this form, the NHESP will require a separate MESA filing which may take up to 90 days to review (unless noted exceptions in Section 2 apply, see below).*

   c. Submit Supplemental Information for Endangered Species Review*

      1. ☒ Percentage/acreage of property to be altered:

         (a) within wetland Resource Area _____ percentage/acreage

         (b) outside Resource Area _____ percentage/acreage

      2. ☒ Assessor's Map or right-of-way plan of site

2. ☒ Project plans for entire project site, including wetland resource areas and areas outside of wetlands jurisdiction, showing existing and proposed conditions, existing and proposed tree/vegetation clearing line, and clearly demarcated limits of work **

   (a) ☒ Project description *(include description of impacts outside of wetland resource area & buffer zone)*

   (b) ☒ Photographs representative of the site

   (c) ☒ MESA filing fee - Make check payable to "Commonwealth of Massachusetts - NHESP" and ***mail to NHESP*** at above address (fee information available at https://www.mass.gov/regulatory-review)

   *Projects altering **10 or more acres** of land, also submit:*

   (d) ☐ Vegetation cover type map of site

   (e) ☐ Project plans showing Priority & Estimated Habitat boundaries

   (f) OR - see next page

* Some projects **not** in Estimated Habitat may be located in Priority Habitat (see http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/) and require NHESP review. Priority Habitat includes habitat for state-listed plants and strictly upland species not protected by the Wetlands Protection Act.

** MESA projects may not be segmented (321 CMR 10.16). The applicant must disclose full development plans even if such plans are not required as part of the Notice of Intent process.

C. Other Applicable Standards and Requirements (continued)

(f) OR Check One of the Following

1. ☐ *Project is exempt from MESA review.*
   Attach applicant letter indicating which MESA exemption applies. (See 321 CMR 10.14, https://www.mass.gov/service-details/exemptions-from-review-for-projectsactivities-in-priority-habitat; the NOI must still be sent to NHESP if the project is within estimated habitat pursuant to 310 CMR 10.59.)
2. ☒ *Separate MESA review ongoing*. Concurrent With NOI Submission — 1/22/2021 b. Date submitted to NHESP
3. ☐ *Separate MESA review completed.*
   Include copy of NHESP "no Take" determination or valid Conservation and Management Permit with approved plan.

3. For coastal projects only: ☒ Not applicable in Foxborough

4. Is any portion of the proposed project within an Area of Critical Environmental Concern (ACEC)?

   a. ☐ Yes ☒ No If yes, provide name of ACEC.

   Canoe River Aquifer
   b. ACEC

5. Is any portion of the proposed project within an area designated as an Outstanding Resource Water (ORW) as designated in the Massachusetts Surface Water Quality Standards, 314 CMR 4.00?

   a. ☐ Yes ☒ No

6. Is any portion of the site subject to a Wetlands Restriction Order under the Inland Wetlands Restriction Act (M.G.L. c. 131, § 40A)?

   a. ☐ Yes ☒ No

7. Is this project subject to provisions of the MassDEP Stormwater Management Standards?

   a. ☒ **Yes.** Attach a copy of the Stormwater Report as required by the Stormwater Management Standards per 310 CMR 10.05(6)(k)-(q) and check if:

      1. ☐ Applying for Low Impact Development (LID) site design credits (as described in Stormwater Management Handbook Vol. 2, Chapter 3)
      2. ☐ A portion of the site constitutes redevelopment
      3. ☐ Proprietary BMPs are included in the Stormwater Management System.

   b. ☐ **No.** Check why the project is exempt:

      1. ☐ Single-family house
      2. ☐ Emergency road repair
      3. ☐ Small Residential Subdivision (less than or equal to 4 single-family houses or less than or equal to 4 units in multi-family housing project) with no discharge to Critical Areas.

8. ☐ **This is a proposed Ecological Restoration Limited Project**. *[If checked, skip Section D and complete Appendix A: Ecological Restoration NOI; Minimum Required Documents (310 CMR 10.12).]*

D. Additional Information

Applicants must include the following with this Notice of Intent (NOI). *See instructions for details.*

1. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site.
2. ☒ Plans identifying the location of proposed activities (including activities proposed to serve as a Bordering Vegetated Wetland [BVW] replication area or other mitigating measure) relative to the boundaries of each affected resource area.
3. ☐ Identify the method for BVW and other resource area boundary delineations (MassDEP BVW Field Data Form(s), Determination of Applicability, Order of Resource Area Delineation, etc.), and attach documentation of the methodology.
4. ☒ List the titles and dates for all plans and other materials submitted with this NOI.

East Belcher Road Roadway Reconstruction Project
a. Plan Title

Weston & Sampson
b. Prepared By

Laurence F. Keegan, Jr, #33708
c. Signed and Stamped by

January 2021
d. Final Revision Date

1:20
e. Scale

Notice of Intent Final Design
f. Additional Plan or Document Title

g. Date

h. Additional Plan or Document Title

i. Date

5. ☐ If more than one property owner, attach a list of property owners not listed on this form.
6. ☒ Attach proof of mailing for Natural Heritage and Endangered Species Program, if needed.
7. ☒ Notice of Intent Application checklist
8. ☒ Abutter Notification Form
9. ☒ Affidavit of Service Form
10. ☒ Attach Stormwater Report with *signed, stamped Stormwater Checklist (unless exempt).*

E. Fees

1. ☒ a. Fee Exempt: *No filing fee shall be assessed for projects of any town, county, or district of the Commonwealth, municipal housing authority, or the Massachusetts Bay Transportation Authority.*

   ☐ b. Applicants must submit the following information to confirm fee payment *(in addition to pages 1 and 2 of the attached NOI Wetland Fee Transmittal Form)*:

2. Check Number (town share of state fee [see A.5.c., page 1])

3. Check date (town share of state fee)

4. Check Number (Bylaw filing fee [see A.5.d, page 1])

5. Check date (Bylaw filing fee)

6. State Check Number (state share of state fee [see A.5.b.])

7. Check date (state share of state filing fee)

8. First Name of Payor on checks

9. Last Name of Payor on checks

F. Signatures and Submittal Requirements

I hereby certify under the penalties of perjury that the foregoing Notice of Intent and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge.

I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I hereby grant permission, to the Agent or member of the Conservation Commission and the Department of Environmental Protection, to enter and inspect the area subject to this Notice at reasonable hours to evaluate the wetland resource boundaries, if included with this application, subject to this Notice, and to require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made by Certificate of Mailing or in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

Chris Kelly DPW Director — 1. Signature of Applicant
1/20/2021 — 2. Date

3. Signature of Property Owner (if different)
4. Date

Dew Bow — 5. Signature of Representative (if any)
1/20/2021 — 6. Date

Tax Collector's Release

The above referenced applicant is applying for a permit from the Conservation Commission and is in good standing with respect to any taxes, fees, assessments, betterments or other municipal charges as recorded with the Foxborough Treasurer's Office.

N/A Town Project — 1. Signature of Tax Collector or Agent
2. Date

F. Signatures and Submittal Requirements

Submittal Requirements *(please refer to NOI Filing Instructions, downloadable at http://www.foxboroughma.gov/Pages/FoxboroughMA_Conservation/Forms)*

For Foxborough Conservation Commission:

One original and seven (7) copies of this completed Notice of Intent (form 3), including supporting plans and documents *(listed at section D. "Additional Information"),* NOI Filing Check List, Abutter Notification, one copy of the NOI Wetland Fee Transmittal Form *(see following page; attached),* and the two town fee payments (Bylaw filing fee and town share of State filing fee), by certified mail or hand delivery to:

Foxborough Conservation Commission
Town Hall, 40 South Street, Foxborough, MA 02035

For MassDEP:

One copy of this completed Notice of Intent (form 3), including supporting plans and documents *(listed at Section D),* one copy of the NOI Wetland Fee Transmittal Form *(attached),* and a ***copy*** of the state fee payment (for State share, see below) by certified mail or hand delivery to:

MassDEP Southeast Regional Office
20 Riverside Drive, Lakeville, MA 02347

State share of the filing fee (check or money order, payable to the *Commonwealth of Massachusetts)* and the NOI Wetland Fee Transmittal Form by certified mail or hand delivery to:

Department of Environmental Protection
Box 4062, Boston, MA 02211

Other:

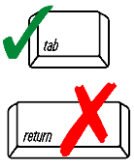
If the applicant has checked the "yes" box in any part of Section C, Item 3, above, refer to that section and the Instructions for additional submittal requirements. The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
Foxborough Wetlands Protection Bylaw, Chapter 267

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A. Applicant Information

1. Location of Project:

East Belcher Road — a. Street Address
Foxborough — b. City/Town

2. Applicant Mailing Address:

Christopher — a. First Name
Gallagher — b. Last Name
Town of Foxborough – Highway Department — c. Organization
70 Elm Street — d. Mailing Address
Foxborough — e. City/Town
MA — f. State
02035 — g. Zip Code
h. Phone Number
i. Fax Number
j. Email Address

3. Property Owner *(if different from Applicant)*:

a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email Address

To calculate filing fees, refer to the category fee list and examples in the instructions for filling out WPA Form 3 (Notice of Intent).

B. Fees - *Please see NOI Instructions before filling out worksheet.*

Fees should be calculated using the following process and the worksheet on the next page.

Refer to Conservation Commission's website to download the Town and State Filing Fee Schedules: http://www.foxboroughma.gov/Pages/FoxboroughMA_Conservation/Forms

State Wetlands Protection Act (WPA) Filing Fee Instructions

Step 1/ Type of Activity: Describe each type of activity that will occur in a wetland resource area and/or buffer zone *(the area within 100 feet of a wetland, or 200 feet of a river).*

Step 2/ Number of Activities: Identify the number of each type of activity.

Step 3/ Individual Activity Fee:
Identify each activity fee from the six project categories listed in the instructions.

Step 4/ Subtotal Activity Fee: Multiply the number of activities (identified in Step 2) times the fee per category (identified in Step 3) to reach a subtotal fee amount.

Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5/ Total State Project Fee:
Determine the total project fee by adding the subtotal amounts from Step 4.

Step 6a-c/ Fee Payments (State):
To calculate the state share of the fee, divide the total fee in half and subtract $12.50.
To calculate the town share of the fee, divide the total fee in half and add $12.50.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
Foxborough Wetlands Protection Bylaw, Chapter 267

B. Fees (continued)

Town Bylaw Filing Fee Instructions

Step 1a/ Type of Activity:
Describe each type of activity that will occur in wetland resource area and buffer zone.

Step 2a/ Number of Activities: Identify the number of each type of activity.

Step 3a/ Individual Activity Fee: Identify each activity fee from the six project categories listed in the instructions.

Step 4a/ Subtotal Activity Fee: Multiply the number of activities (identified in Step 2a) times the fee per category (identified in Step 3a) to reach a subtotal fee amount. Note: If any of these activities are in a Riverfront Area in addition to another Resource Area or the Buffer Zone, the fee per activity should be multiplied by 1.5 and then added to the subtotal amount.

Step 5a/ Total Bylaw Project Fees:
Determine the total project fee by adding the subtotal amounts from Step 4a.

Step 6d/ Fee Payment (Bylaw): ***Insert Step 5a fee payment amount.***

Type of Activity	**Number of Activities**	**Individual Activity Fee**	**Subtotal Activity Fee**
State Filing Fees: *(Step 1)*	*(Step 2)*	*(Step 3)*	*(Step 4)*
Total State Filing Fee: *(Step 5)*			
Bylaw Filing Fees: *(Step 1a)*	*(Step 2a)*	*(Step 3a)*	*(Step 4a)*
Total Bylaw Filing Fee: *(Step 5a)*			
Filing Fee Payments: *(Step 6)*			
Total State Filing Fee:	*(insert the following amount on this NOI form page 1, Section A.5.a)*		Exempt a. Total **State** Fee from Step 5
State's share of filing fee: *(Paid to State [Boston address])*	*(insert following amount on this NOI form page 1, Section A.5.b.)*		Exempt b. 1/2 of (a), above, **less $**12.50
Town's share of filing fee: *(Paid to Town of Foxborough)*	*(insert following amount on this NOI form page 1, Section A.5.c.)*		Exempt c. 1/2 of (a) above, **plus** $12.50
Bylaw Filing Fee*:* *(Paid to Town of Foxborough)*	*(insert following amount on this NOI form page 1, Section A.5.d.)*		Exempt d. Total **Bylaw** Fee from Step 5a

See Submittal Requirements and Instructions on the next page.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

NOI Wetland Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40
Foxborough Wetlands Protection Bylaw, Chapter 267

C. Submittal Requirements

For additional instructions, please refer to the Submittal Instructions on the last page (page 7) of the attached NOI Form (above).

a. ***To Department of Environmental Protection:***

Complete pages 1 and 2 of this NOI Wetland Fee Transmittal Form and send with a check or money order for the **State share of the filing fee**, payable to the *Commonwealth of Massachusetts.*

Department of Environmental Protection
Box 4062
Boston, MA 02211

b. ***To the Foxborough Conservation Commission:***

Send the Notice of Intent or Abbreviated Notice of Intent; one **copy** of this form and the Town fee payments (**Bylaw fee and town share of State fee**), payable to the *Town of Foxborough*.

Foxborough Conservation Commission
40 South Street
Foxborough, MA 02035

c. ***To MassDEP Regional Office:***

Send a copy of the Notice of Intent or Abbreviated Notice of Intent; a **copy** of this form; and a **copy** of the state fee payment.

MassDEP, Southeast Regional Office
20 Riverside Drive
Lakeville, MA 02347

Enter your transmittal number → X287051 (Transmittal Number)

Your unique Transmittal Number can be accessed online:
http://www.mass.gov/eea/agencies/massdep/service/approvals/transmittal-form-for-payment.html

Massachusetts Department of Environmental Protection

Transmittal Form for Permit Application and Payment

1. Please type or print. A separate Transmittal Form must be completed for each permit application.

2. Make your check payable to the Commonwealth of Massachusetts and mail it with a copy of this form to: MassDEP, P.O. Box 4062, Boston, MA 02211.

3. Three copies of this form will be needed.

Copy 1 - the original must accompany your permit application. **Copy 2** must accompany your fee payment. **Copy 3** should be retained for your records

4. Both fee-paying and exempt applicants must mail a copy of this transmittal form to:

MassDEP
P.O. Box 4062
Boston, MA 02211

*** Note:**
For BWSC Permits, enter the LSP.

A. Permit Information

1. Permit Code: 4 to 7 character code from permit instructions	2. Name of Permit Category
WPA Form 3	Notice of Intent

3. Type of Project or Activity: Roadway reconstruction

B. Applicant Information – Firm or Individual

1. Name of Firm - Or, if party needing this approval is an individual enter name below: Town of Foxborough – Highway Department

2. **Last Name** of Individual	3. **First Name** of Individual	4. MI
Gallagher	Christopher	

5. Street Address: 70 Elm Street

6. City/Town	7. State	8. Zip Code	9. Telephone #	10. Ext. #
Foxborough	MA	02035		

11. Contact Person	12. e-mail address

C. Facility, Site or Individual Requiring Approval

1. Name of Facility, Site Or Individual: East Belcher Road

2. Street Address: East Belcher Road

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Foxborough	MA	02035		

8. DEP Facility Number (if Known)	9. Federal I.D. Number (if Known)	10. BWSC Tracking # (if Known)

D. Application Prepared by (if different from Section B)*

1. Name of Firm Or Individual: Weston & Sampson Engineers

2. Address: 55 Walkers Brook Dr, Suite 100

3. City/Town	4. State	5. Zip Code	6. Telephone #	7. Ext. #
Reading	MA	01867	978-532-1900	

8. Contact Person	9. LSP Number (BWSC Permits only)
Devin Batchelder	

E. Permit - Project Coordination

1. Is this project subject to MEPA review? ☒ yes ☐ no
   If yes, enter the project's EOEA file number - assigned when an Environmental Notification Form is submitted to the MEPA unit:

EOEA File Number

F. Amount Due

DEP Use Only

Permit No:

Rec'd Date:

Reviewer:

Special Provisions:

1. ☒ **Fee** Exempt (city, town or municipal housing authority)(state agency if fee is $100 or less).
   There are no fee exemptions for BWSC permits, regardless of applicant status.
2. ☐ Hardship Request - payment extensions according to 310 CMR 4.04(3)(c).
3. ☐ Alternative Schedule Project (according to 310 CMR 4.05 and 4.10).
4. ☐ Homeowner (according to 310 CMR 4.02).

Check Number	Dollar Amount	Date

East Belcher Road Reconstruction Project

Massachusetts Endangered Species Act Filing Check

Provided Here

Copy of NOI to MESA - East Belcher Rd

7016 1370 0001 7155 7542

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

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

OFFICIAL USE

Certified Mail Fee
$

Extra Services & Fees *(check box, add fee as appropriate)*
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Natural Heritage and Endangered Species
Division of Fisheries and Wildlife
1 Rabbit Hill Road
Westborough, MA 01581

or Instructions

APPENDIX A

PROJECT DESCRIPTION

PROJECT DESCRIPTION

Background

East Belcher Road is a frequently utilized local road that is currently in very poor condition. The road requires reconstruction of the existing pavement which is characterized by major cracking and some sections that are completely comprised of asphalt patching. E. Belcher Road needs to be reconstructed so that the pavement does not fall apart and become subject to major freeze thaw impacts. Additionally, the existing street needs to be widened to provide the absolute narrowest width to support the vehicle traffic consisting of cars, school buses and very large both single unit and tractor trailer trucks as well as various construction vehicles. In the current configuration E. Belcher road is very narrow and does not allow for safe passage of two large vehicles.

Site Description

East Belcher Road is located in the northern section of Foxborough. E. Belcher Road serves as a Local Road extending from Concasset Street at its northerly end to Spring Street at its southerly end. The proposed street reconstruction project begins approximately 300 feet south of the Comcast Building located on the west side of E. Belcher Road and extends approximately 2,000 ft. (0.38 miles) to the Spring Street intersection. The proposed project area begins as a very flat roadway before climbing approximately 50 feet to a high point located approximately 100 feet north of the Spring Street intersection with steep grades of 3% to 8%.

Due to nearby land uses, E. Belcher Road is used primarily as a Local and Collector roadway. The Foxborough transfer station and former landfill is located north of the Comcast Building on E. Belcher Road. Also, along the northerly end of E. Belcher Road there are a number of construction company yards, a “portapotty” yard and light industrial uses towards the Concasset end of E. Belcher Road. The adjacent land use is composed of residential and undeveloped uplands and wetlands. The adjacent residential properties include a new 19 lot Residential Subdivision called Pine Ridge that is under construction. The new subdivision is located along the east side of the E. Belcher Road and was a former gravel pit.

The existing street is very narrow. Along the northerly extent of the project area where E. Belcher Road abuts the wetlands, the roadway is an average of approximately 19.2 feet wide and varies in width from 17.7 ft. to 21.4 ft. wide. The existing street through the upland portion of the project area is an average of approximately 16.3 ft. wide and varies in width from 13.6 ft. to 21.0 ft. wide. In order to minimize the impact of the road reconstruction, the proposed reconstructed road will be 22 ft. wide with two 10 ft. wide lanes and 1 ft. shoulders.

The northerly extent of the proposed project area, where E. Belcher Road abuts the wetlands, the roadway is in close proximity to the vegetation and wetlands on both sides of the road and is characterized by shallow depth to groundwater (2-3 feet as indicated by the wetlands). In this area, the existing street is being widened an average of approximately 2.8 feet total. The reconstructed road will all be sloped to the west allowing overland flow to be directed towards a proposed 2-foot wide broken stone filter strip underlain by a 3-foot deep infiltration trench. This filter strip will be composed of 3-inch diameter stone and will address the runoff from the reconstructed street to the maximum extent practicable.

Because of the flat street slope, close proximity of wetlands on both sides and shallow depth to groundwater it is not possible or practicable to construct any other drainage improvements.

Along the southern portion of East Belcher Road (STA 42+50 to STA 34) a drainage ditch with infiltration trench is proposed which will run downhill into a level spreader at STA 32+80. This level spreader is provided to act as an appropriate outfall through energy dissipation and infiltration for any runoff from the upslope drainage ditch. Due to site topography the only available location for this level spreader is on Town owned land designated as conservation land. Utilization of this property was discussed on a site walk with Town representatives and Conservation Commission representatives. This location is also within the Riverfront Area, 100-foot Wetland Buffer and NHESP Estimated Habitat of Rare Wildlife and Priority Habitat of Rare Species. The level spreader has been minimized to the smallest footprint possible and is located immediately adjacent to the road in order to minimize potential impacts.

Scope of Work

The purpose of this project is to reconstruct, widen and improve E. Belcher Road. The project will greatly improve the safety (of what is now essentially a one-way road) so that it can provide minimum local and through access for the vehicles that have to use this road.

Before work begins, sedimentation and erosion control devices will be placed at the site to minimize sediment migration off-site into any neighboring wetland resource areas. This will include compost filter tubes located downgradient of the work area, between the work area and wetland resource areas. Work will begin with reconstruction of the road surface which will include excavation of the existing roadway, laying down a layer of crushed stone, then installing a new layer of pavement. The filter strip/infiltration trench and level spreader will then be added adjacent to the roadway. Upon completion any exposed areas will be loamed and seeded with a native seed mix.

Environmental Considerations - NOI

As part of this proposed project, one resource area identified by the Massachusetts Wetlands Protection Act (WPA) will be impacted: the Riverfront Area. The proposed project area is located outside the designated “Coastal Zone” and as such all impacts are to inland resource areas.

Riverfront Area

Due to the presence of an unnamed perennial river running west of E. Belcher Road, portions of the proposed project area fall within the “riverfront area” that is regulated by the WPA per 310 CMR 10.58. The riverfront area applies to the portion of land located between the unnamed perennial stream’s mean annual highwater line and a parallel line measured horizontally 200 feet out from the mean annual highwater line. This area is considered to be significant because it provides important functions and values such as flood control, nutrient filtration, groundwater recharge, and wildlife habitat. This project proposes a total 17,490 SF of impact within the riverfront area.

Impacts within the riverfront area include roadway widening and reconstruction, the installation of the proposed filter strip/infiltration trench and the level spreader. Due to the existing roadway the location of the proposed work within the Riverfront Area is considered

already altered area. As such, work at this site is considered re-development work in riverfront area. Each standard for work in riverfront for redevelopment projects area (per 310 CMR 10.58 (5)) are provided below, followed by an explanation on how the project meets each standard.

(a) At a minimum, proposed work shall result in an improvement over existing conditions of the capacity of the riverfront area to protect the interests identified in M.G.L. c. 131 § 40.

The proposed work in the Riverfront Area will occur within and immediately adjacent to the existing roadway on site. As stated above, impacts within the riverfront area include roadway reconstruction and minor widening, installation of the proposed filter strip/infiltration trench. The proposed project will provide infiltration adjacent to the roadway where none currently exists. This infiltration will improve water quality prior to entering the adjacent wetlands which is an improvement over existing conditions.

(b) Stormwater management is provided according to standards established by the Department.

Per Appendix C of the Notice of Intent, this project will adhere to the stormwater standards established by the Department.

(c) Within 200 foot riverfront areas, proposed work shall not be located closer to the river than existing conditions or 100 feet, whichever is less, or not closer than existing conditions within 25 foot riverfront areas, except in accordance with 310 CMR 10.58(5)(f) or (g).

This proposed work will occur within the limits of the road and immediately adjacent. There will be no proposed work within 100ft of the unnamed perennial stream. The proposed roadway reconstruction and minor widening will occur immediately adjacent to the existing roadway and shoulders utilizing re-grading.

(d) Proposed work, including expansion of existing structures, shall be located outside the riverfront area or toward the riverfront area boundary and away from the river, except in accordance with 310 CMR 10.58(5)(f) or (g).

As stated above, this proposed work will occur within the limits of the road and immediately adjacent. There will be no proposed work within 100ft of the unnamed perennial stream. The proposed roadway reconstruction and minor widening will occur immediately adjacent to the existing roadway and shoulders utilizing re-grading. Due to limitations associated with site topography and the existing roadway it is not possible to move away from the river. This project is being filed as a limited project 310 CMR 10.53 (f) “Maintenance and improvement of existing public roadways, but limited to widening less than a single lane, adding shoulders, correcting substandard intersections, and improving inadequate drainage systems”. Based on this limited project status and the constraints associated with the project we would request leniency from the commission on this standard.

(e) The area of proposed work shall not exceed the amount of degraded area, provided that the proposed work may alter up to 10% if the degraded area is less than 10% of the riverfront area, except in accordance with 310 CMR 10.58(5)(f) or (g).

This project proposes a total of 17,490 SF of impact within the Riverfront Area. Most of this proposed impact is located within the already disturbed roadway. Only 3,945 SF of impact within the Riverfront Area is located outside the previously degraded area.(2614 SF of additional pavement and 1,321 SF of additional grading) The total of 3,935 SF is less than 2% of the overall Riverfront Area in the area which is 209,400 SF. This work area was previously disturbed as part of the original road construction.

(f) When an applicant proposes restoration on-site of degraded riverfront area, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), and (e) at a ratio in square feet of at least 1:1 of restored area to area of alteration not conforming to the criteria. Areas immediately along the river shall be selected for restoration. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Restoration shall include:
1. removal of all debris, but retaining any trees or other mature vegetation;
2. grading to a topography which reduces runoff and increases infiltration;
3. coverage by topsoil at a depth consistent with natural conditions at the site; and
4. seeding and planting with an erosion control seed mixture, followed by plantings of herbaceous and woody species appropriate to the site;

This proposed project will result in an overall improvement of conditions within the Riverfront Area. Currently the existing roadway is fractured and patched which can lead to unwanted erosion into the adjacent resource area. Upon completion the roadway surface will be sound and the seeded areas will prevent erosion.

(g) When an applicant proposes mitigation either on-site or in the riverfront area within the same general area of the river basin, alteration may be allowed notwithstanding the criteria of 310 CMR 10.58(5)(c), (d), or (e) at a ratio in square feet of at least 2:1 of mitigation area to area of alteration not conforming to the criteria or an equivalent level of environmental protection where square footage is not a relevant measure. Alteration not conforming to the criteria shall begin at the riverfront area boundary. Mitigation may include off-site restoration of riverfront areas, conservation restrictions under M.G.L. c. 184, §§ 31 through 33 to preserve undisturbed riverfront areas that could be otherwise altered under 310 CMR 10.00, the purchase of development rights within the riverfront area, the restoration of bordering vegetated wetland, projects to remedy an existing adverse impact on the interests identified in M.G.L. c. 131, § 40 for which the applicant is not legally responsible, or similar activities undertaken voluntarily by the applicant which will support a determination by the issuing authority of no significant adverse impact. Preference shall be given to potential mitigation projects, if any, identified in a River Basin Plan approved by the Secretary of the Executive Office of Energy and Environmental Affairs.

Not applicable. No mitigation is proposed outside the work area.

(h) The issuing authority shall include a continuing condition in the Certificate of Compliance for projects under 310 CMR 10.58(5)(f) or (g) prohibiting further alteration within the restoration or mitigation area, except as may be required to maintain the area in its restored or mitigated condition. Prior to requesting the issuance of the Certificate of

Compliance, the applicant shall demonstrate the restoration or mitigation has been successfully completed for at least two growing seasons.

Agreed.

100ft Wetland Buffer Zone

Portions of the proposed project area occur within 100ft of adjacent delineated wetlands, which is an Area Subject to Protection and recognized by the WPA as the 100ft Wetland Buffer Zone (Buffer Zone) per 310 CMR 10.02(2)(b). The Buffer Zone is defined as any area within 100ft of any of the areas subject to the protection of M.G.L chapter 131, section 40 and identified per 310 CMR 10.02(1)(a), including bordering vegetated wetlands.

As indicated above portions of E. Belcher Road are located immediately adjacent to wetlands. All available engineering has been utilized to ensure no direct wetland impacts will occur as part of this proposed project. However, impacts within the wetland buffer zone cannot be avoided due to wetland proximity. This proposed project will include a filter strip/infiltration trench which will provide infiltration adjacent to the roadway where none currently exists. This infiltration will improve water quality prior to entering the adjacent wetlands which is an improvement over existing conditions.

Work within this buffer zone will include roadway reconstruction, widening, installation of the proposed filter strip infiltration trench and the level spreader. Prior to construction erosion control measures including compost filter tubes will be installed to prevent any unwanted sediment migration into the adjacent wetlands.

The 100ft Wetland Buffer Zone is shown on the attached plan set where the scale allows.

Environmental Considerations – Town of Foxborough

The Town of Foxborough through its Chapter 267 Wetland Protection Bylaw has placed additional restrictions on land within 25 feet of vegetated wetlands and inland banks as follows:

> *Chapter 267-8. Setback from vegetated wetlands and inland banks.*
> *No activity other than the maintenance of an already existing structure which will result in the building within or upon, removing, filling, or altering of land within 25 feet of a bordering vegetated wetland or an inland bank will be permitted by the Conservation Commission. The only exceptions to the above twenty five-foot buffer zone will be for:*
>
> *A. A wetland crossing permitted under MGL c. 131, § 40, and this Chapter 267, the Town of Foxborough Conservation Bylaws; and/or*
>
> *B. When the Commission determines that there are no reasonable conditions or alternatives that would allow the project to proceed in compliance with the bylaws; and that the mitigating measures are proposed that will allow the project to be conditioned by the Commission so as to contribute to the protection of the interests identified in MGL c. 131, § 40, and this Chapter 267, the Town of Foxborough Conservation Bylaws*.

This proposed project is seeking relief from the Town Wetland Protection Bylaw per Chapter 267-8(B). Due to the proximity of the existing road there is no practicable way to avoid impacts within 25 feet of the adjacent vegetated wetlands. The primary purpose of this project is the maintenance and necessary minimal improvement to E. Belcher Road.

As discussed above, all available engineering has been utilized to ensure no direct wetland impacts will occur as part of this proposed project. This proposed project will include a filter strip and infiltration trench which will provide infiltration adjacent to the road where none currently exists. This infiltration will improve water quality prior to entering the adjacent wetlands which is an improvement over existing conditions.

Request for Conditional Approval - Property Owners

Portions of the proposed work area extend slightly outside the very narrow existing 33 ft wide road Right of Way to allow for regrading and the installation of a stormwater management feature. The Department of Public Works is in the process of working with the property owners that require Right of Entry signoffs and Drainage Easements located on their property The Department of Public Works is seeking conditional approval of this project from the Conservation Commission with the understanding that prior to any construction work beginning, the Commission will receive copies of the required property owner permissions for the work on their property.

Environmental Considerations – MESA

The Massachusetts Endangered Species Act (MESA) protects rare species and their habitats as part of the Massachusetts Division of Fisheries and Wildlife. The Natural Heritage & Endangered Species Program produces regulatory maps for both Priority and Estimated Habitat of rare wildlife. These habitat maps are available on MassGIS and are used for determining whether or not a proposed project must be reviewed for MESA and WPA compliance. Per the regulations (321 CMR 10.00), MESA Project Review is required when the proposed project area is located within Priority Habitat because there is the potential that a Take of any Endangered, Threatened, or Special Concern species may occur as a result of the proposed project or activity.

The northern portion of E. Belcher Road runs parallel to the boundary of both NHESP Priority and Estimated Habitat of rare wildlife. Additionally, as discussed above, the southern portion of East Belcher Road (STA 42+50 to STA 34) has a drainage ditch with infiltration trench is proposed which will run downhill into a level spreader at STA 32+80. This level spreader is provided to act as an appropriate outfall through energy dissipation and infiltration for any runoff from the upslope drainage ditch. Due to site topography the only available location for this level spreader is on Town owned land designated as conservation land. This location is within the NHESP Estimated Habitat of Rare Wildlife and Priority Habitat of Rare Species. The level spreader has been minimized to the smallest footprint possible and is located immediately adjacent to the road in order to minimize potential impacts.

A copy of this Notice of Intent submission has been sent to MESA concurrently.

APPENDIX B

ALTERNATIVES ANALYSIS

Alternatives Analysis

Basis for Alternatives Analysis

The following is a presentation of alternatives for addressing the existing pavement and safety deficiencies along East Belcher Road as part of the reconstruction and widening project. The primary objective is to allow for the safe flow of traffic and a maintainable road.

Alternative 1 - No Improvements

East Belcher Road is currently not wide enough to properly and efficiently handle the existing and new traffic flow. The roadway surface has been patched many times over the years and is in very poor condition.

Advantages:
There would be no temporary disruption to local traffic patterns due roadway improvements. No wetland resource area buffer or Riverfront Area impacts would be necessary.

Disadvantages:
As stated above East Belcher Road is not wide enough to handle the existing traffic usage and poses an existing hazard to motorists.

Alternative 2 – Widen to Standard Width

The standard configuration for a two lane roadway would be 34 feet wide with two 12 foot wide lanes, 5 foot bike lane/shoulders. A 5 ft wide sidewalk along one side of the road is standard.as well

Advantages:
This configuration would provide the safest option for both motorists and pedestrians.

Disadvantages:
This alternative would require BVW impacts in order to widen the roadway to this standard. Additionally this option would have major impacts to the existing residential properties and be cost prohibitive for the Town of Foxborough.

Alternative 3 – Widen to Greatest Extent Practicable

The existing road through the upland portion of the project area is an average of approximately 16.3 ft. wide. This proposed project seeks to widen East Belcher Road to 22 feet wide with two 10 foot wide lanes and 1 foot shoulders.

Advantages:
This road configuration would provide a much safer alternative than the current deteriorated and narrow road with no impact to adjacent BVW resource areas.

Disadvantages:
There will be a temporary inconvenience to those that utilize the roadway regularly.

Conclusion

Based on the alternatives analysis provided, Weston and Sampson Engineers are recommending that Alternative 3 be the alternative that the Town of Foxborough moves forward with in order to provide a much safer and maintainable road.

APPENDIX C

STORMWATER REPORT

Weston & Sampson

westonandsampson.com

100 Foxborough Boulevard, Suite 250
Foxborough, MA 02035
tel: 508.698.3034

STORMWATER REPORT

January 2021

TOWN OF
Foxborough,
MASSACHUSETTS

East Belcher Road Reconstruction

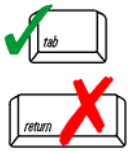
TABLE OF CONTENTS

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

A. Introduction

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



A Stormwater Report must be submitted with the Notice of Intent permit application to document compliance with the Stormwater Management Standards. The following checklist is NOT a substitute for the Stormwater Report (which should provide more substantive and detailed information) but is offered here as a tool to help the applicant organize their Stormwater Management documentation for their Report and for the reviewer to assess this information in a consistent format. As noted in the Checklist, the Stormwater Report must contain the engineering computations and supporting information set forth in Volume 3 of the Massachusetts Stormwater Handbook. The Stormwater Report must be prepared and certified by a Registered Professional Engineer (RPE) licensed in the Commonwealth.

The Stormwater Report must include:

- The Stormwater Checklist completed and stamped by a Registered Professional Engineer (see page 2) that certifies that the Stormwater Report contains all required submittals.[1] This Checklist is to be used as the cover for the completed Stormwater Report.
- Applicant/Project Name
- Project Address
- Name of Firm and Registered Professional Engineer that prepared the Report
- Long-Term Pollution Prevention Plan required by Standards 4-6
- Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan required by Standard 8[2]
- Operation and Maintenance Plan required by Standard 9

In addition to all plans and supporting information, the Stormwater Report must include a brief narrative describing stormwater management practices, including environmentally sensitive site design and LID techniques, along with a diagram depicting runoff through the proposed BMP treatment train. Plans are required to show existing and proposed conditions, identify all wetland resource areas, NRCS soil types, critical areas, Land Uses with Higher Potential Pollutant Loads (LUHPPL), and any areas on the site where infiltration rate is greater than 2.4 inches per hour. The Plans shall identify the drainage areas for both existing and proposed conditions at a scale that enables verification of supporting calculations.

As noted in the Checklist, the Stormwater Management Report shall document compliance with each of the Stormwater Management Standards as provided in the Massachusetts Stormwater Handbook. The soils evaluation and calculations shall be done using the methodologies set forth in Volume 3 of the Massachusetts Stormwater Handbook.

To ensure that the Stormwater Report is complete, applicants are required to fill in the Stormwater Report Checklist by checking the box to indicate that the specified information has been included in the Stormwater Report. If any of the information specified in the checklist has not been submitted, the applicant must provide an explanation. The completed Stormwater Report Checklist and Certification must be submitted with the Stormwater Report.

---

[1] The Stormwater Report may also include the Illicit Discharge Compliance Statement required by Standard 10. If not included in the Stormwater Report, the Illicit Discharge Compliance Statement must be submitted prior to the discharge of stormwater runoff to the post-construction best management practices.

[2] For some complex projects, it may not be possible to include the Construction Period Erosion and Sedimentation Control Plan in the Stormwater Report. In that event, the issuing authority has the discretion to issue an Order of Conditions that approves the project and includes a condition requiring the proponent to submit the Construction Period Erosion and Sedimentation Control Plan before commencing any land disturbance activity on the site.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands Program

Checklist for Stormwater Report

B. Stormwater Checklist and Certification

The following checklist is intended to serve as a guide for applicants as to the elements that ordinarily need to be addressed in a complete Stormwater Report. The checklist is also intended to provide conservation commissions and other reviewing authorities with a summary of the components necessary for a comprehensive Stormwater Report that addresses the ten Stormwater Standards.

Note: Because stormwater requirements vary from project to project, it is possible that a complete Stormwater Report may not include information on some of the subjects specified in the Checklist. If it is determined that a specific item does not apply to the project under review, please note that the item is not applicable (N.A.) and provide the reasons for that determination.

A complete checklist must include the Certification set forth below signed by the Registered Professional Engineer who prepared the Stormwater Report.

Registered Professional Engineer's Certification

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-term Pollution Prevention Plan, the Construction Period Erosion and Sedimentation Control Plan (if included), the Long-term Post-Construction Operation and Maintenance Plan, the Illicit Discharge Compliance Statement (if included) and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Laurence F Keegan Jr 1.20.21
Signature and Date

Checklist

Project Type: Is the application for new development, redevelopment, or a mix of new and redevelopment?

☐ New development

☒ Redevelopment

☐ Mix of New Development and Redevelopment

Checklist for Stormwater Report

Checklist (continued)

LID Measures: Stormwater Standards require LID measures to be considered. Document what environmentally sensitive design and LID Techniques were considered during the planning and design of the project:

☒ No disturbance to any Wetland Resource Areas

☐ Site Design Practices (e.g. clustered development, reduced frontage setbacks)

☐ Reduced Impervious Area (Redevelopment Only)

☐ Minimizing disturbance to existing trees and shrubs

☐ LID Site Design Credit Requested:

- ☐ Credit 1
- ☐ Credit 2
- ☐ Credit 3

☒ Use of "country drainage" versus curb and gutter conveyance and pipe

☐ Bioretention Cells (includes Rain Gardens)

☐ Constructed Stormwater Wetlands (includes Gravel Wetlands designs)

☐ Treebox Filter

☐ Water Quality Swale

☐ Grass Channel

☐ Green Roof

☐ Other (describe): _____

Standard 1: No New Untreated Discharges

☐ No new untreated discharges

☒ Outlets have been designed so there is no erosion or scour to wetlands and waters of the Commonwealth

☐ Supporting calculations specified in Volume 3 of the Massachusetts Stormwater Handbook included.

Checklist for Stormwater Report

Checklist (continued)

Standard 2: Peak Rate Attenuation

☐ Standard 2 waiver requested because the project is located in land subject to coastal storm flowage and stormwater discharge is to a wetland subject to coastal flooding.

☐ Evaluation provided to determine whether off-site flooding increases during the 100-year 24-hour storm.

☐ Calculations provided to show that post-development peak discharge rates do not exceed pre-development rates for the 2-year and 10-year 24-hour storms. If evaluation shows that off-site flooding increases during the 100-year 24-hour storm, calculations are also provided to show that post-development peak discharge rates do not exceed pre-development rates for the 100-year 24-hour storm.

Standard 3: Recharge

☒ Soil Analysis provided.

☒ Required Recharge Volume calculation provided.

☐ Required Recharge volume reduced through use of the LID site Design Credits.

☐ Sizing the infiltration, BMPs is based on the following method: Check the method used.

☒ Static ☐ Simple Dynamic ☐ Dynamic Field[1]

☐ Runoff from all impervious areas at the site discharging to the infiltration BMP.

☐ Runoff from all impervious areas at the site is *not* discharging to the infiltration BMP and calculations are provided showing that the drainage area contributing runoff to the infiltration BMPs is sufficient to generate the required recharge volume.

☐ Recharge BMPs have been sized to infiltrate the Required Recharge Volume.

☒ Recharge BMPs have been sized to infiltrate the Required Recharge Volume *only* to the maximum extent practicable for the following reason:

- ☐ Site is comprised solely of C and D soils and/or bedrock at the land surface
- ☐ M.G.L. c. 21E sites pursuant to 310 CMR 40.0000
- ☐ Solid Waste Landfill pursuant to 310 CMR 19.000
- ☒ Project is otherwise subject to Stormwater Management Standards only to the maximum extent practicable.

☐ Calculations showing that the infiltration BMPs will drain in 72 hours are provided.

☐ Property includes a M.G.L. c. 21E site or a solid waste landfill and a mounding analysis is included.

---

[1] 80% TSS removal is required prior to discharge to infiltration BMP if Dynamic Field method is used.

Checklist for Stormwater Report

Checklist (continued)

Standard 3: Recharge (continued)

☐ The infiltration BMP is used to attenuate peak flows during storms greater than or equal to the 10-year 24-hour storm and separation to seasonal high groundwater is less than 4 feet and a mounding analysis is provided.

☐ Documentation is provided showing that infiltration BMPs do not adversely impact nearby wetland resource areas.

Standard 4: Water Quality

The Long-Term Pollution Prevention Plan typically includes the following:

- Good housekeeping practices;
- Provisions for storing materials and waste products inside or under cover;
- Vehicle washing controls;
- Requirements for routine inspections and maintenance of stormwater BMPs;
- Spill prevention and response plans;
- Provisions for maintenance of lawns, gardens, and other landscaped areas;
- Requirements for storage and use of fertilizers, herbicides, and pesticides;
- Pet waste management provisions;
- Provisions for operation and management of septic systems;
- Provisions for solid waste management;
- Snow disposal and plowing plans relative to Wetland Resource Areas;
- Winter Road Salt and/or Sand Use and Storage restrictions;
- Street sweeping schedules;
- Provisions for prevention of illicit discharges to the stormwater management system;
- Documentation that Stormwater BMPs are designed to provide for shutdown and containment in the event of a spill or discharges to or near critical areas or from LUHPPL;
- Training for staff or personnel involved with implementing Long-Term Pollution Prevention Plan;
- List of Emergency contacts for implementing Long-Term Pollution Prevention Plan.

☒ A Long-Term Pollution Prevention Plan is attached to Stormwater Report and is included as an attachment to the Wetlands Notice of Intent.

☐ Treatment BMPs subject to the 44% TSS removal pretreatment requirement and the one inch rule for calculating the water quality volume are included, and discharge:

- ☐ is within the Zone II or Interim Wellhead Protection Area
- ☐ is near or to other critical areas
- ☐ is within soils with a rapid infiltration rate (greater than 2.4 inches per hour)
- ☐ involves runoff from land uses with higher potential pollutant loads.

☐ The Required Water Quality Volume is reduced through use of the LID site Design Credits.

☐ Calculations documenting that the treatment train meets the 80% TSS removal requirement and, if applicable, the 44% TSS removal pretreatment requirement, are provided.

Checklist for Stormwater Report

Checklist (continued)

Standard 4: Water Quality (continued)

☐ The BMP is sized (and calculations provided) based on:

- ☐ The ½" or 1" Water Quality Volume or
- ☐ The equivalent flow rate associated with the Water Quality Volume and documentation is provided showing that the BMP treats the required water quality volume.

☐ The applicant proposes to use proprietary BMPs, and documentation supporting use of proprietary BMP and proposed TSS removal rate is provided. This documentation may be in the form of the propriety BMP checklist found in Volume 2, Chapter 4 of the Massachusetts Stormwater Handbook and submitting copies of the TARP Report, STEP Report, and/or other third party studies verifying performance of the proprietary BMPs.

☐ A TMDL exists that indicates a need to reduce pollutants other than TSS and documentation showing that the BMPs selected are consistent with the TMDL is provided.

Standard 5: Land Uses With Higher Potential Pollutant Loads (LUHPPLs)

☐ The NPDES Multi-Sector General Permit covers the land use and the Stormwater Pollution Prevention Plan (SWPPP) has been included with the Stormwater Report.

☐ The NPDES Multi-Sector General Permit covers the land use and the SWPPP will be submitted ***prior to*** the discharge of stormwater to the post-construction stormwater BMPs.

☒ The NPDES Multi-Sector General Permit does ***not*** cover the land use.

☐ LUHPPLs are located at the site and industry specific source control and pollution prevention measures have been proposed to reduce or eliminate the exposure of LUHPPLs to rain, snow, snow melt and runoff, and been included in the long term Pollution Prevention Plan.

☐ All exposure has been eliminated.

☐ All exposure has ***not*** been eliminated and all BMPs selected are on MassDEP LUHPPL list.

☐ The LUHPPL has the potential to generate runoff with moderate to higher concentrations of oil and grease (e.g. all parking lots with >1000 vehicle trips per day) and the treatment train includes an oil grit separator, a filtering bioretention area, a sand filter or equivalent.

Standard 6: Critical Areas

☐ The discharge is near or to a critical area and the treatment train includes only BMPs that MassDEP has approved for stormwater discharges to or near that particular class of critical area.

☐ Critical areas and BMPs are identified in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 7: Redevelopments and Other Projects Subject to the Standards only to the maximum extent practicable

☒ The project is subject to the Stormwater Management Standards only to the maximum Extent Practicable as a:

- ☐ Limited Project
- ☐ Small Residential Projects: 5-9 single family houses or 5-9 units in a multi-family development provided there is no discharge that may potentially affect a critical area.
- ☐ Small Residential Projects: 2-4 single family houses or 2-4 units in a multi-family development with a discharge to a critical area
- ☐ Marina and/or boatyard provided the hull painting, service and maintenance areas are protected from exposure to rain, snow, snow melt and runoff
- ☐ Bike Path and/or Foot Path
- ☒ Redevelopment Project
- ☐ Redevelopment portion of mix of new and redevelopment.

☒ Certain standards are not fully met (Standard No. 1, 8, 9, and 10 must always be fully met) and an explanation of why these standards are not met is contained in the Stormwater Report.

☒ The project involves redevelopment and a description of all measures that have been taken to improve existing conditions is provided in the Stormwater Report. The redevelopment checklist found in Volume 2 Chapter 3 of the Massachusetts Stormwater Handbook may be used to document that the proposed stormwater management system (a) complies with Standards 2, 3 and the pretreatment and structural BMP requirements of Standards 4-6 to the maximum extent practicable and (b) improves existing conditions.

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control

A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan must include the following information:

- Narrative;
- Construction Period Operation and Maintenance Plan;
- Names of Persons or Entity Responsible for Plan Compliance;
- Construction Period Pollution Prevention Measures;
- Erosion and Sedimentation Control Plan Drawings;
- Detail drawings and specifications for erosion control BMPs, including sizing calculations;
- Vegetation Planning;
- Site Development Plan;
- Construction Sequencing Plan;
- Sequencing of Erosion and Sedimentation Controls;
- Operation and Maintenance of Erosion and Sedimentation Controls;
- Inspection Schedule;
- Maintenance Schedule;
- Inspection and Maintenance Log Form.

☒ A Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan containing the information set forth above has been included in the Stormwater Report.

Checklist for Stormwater Report

Checklist (continued)

Standard 8: Construction Period Pollution Prevention and Erosion and Sedimentation Control (continued)

☐ The project is highly complex and information is included in the Stormwater Report that explains why it is not possible to submit the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan with the application. A Construction Period Pollution Prevention and Erosion and Sedimentation Control has ***not*** been included in the Stormwater Report but will be submitted ***before*** land disturbance begins.

☐ The project is ***not*** covered by a NPDES Construction General Permit.

☐ The project is covered by a NPDES Construction General Permit and a copy of the SWPPP is in the Stormwater Report.

☒ The project is covered by a NPDES Construction General Permit but no SWPPP been submitted. The SWPPP will be submitted BEFORE land disturbance begins.

Standard 9: Operation and Maintenance Plan

☒ The Post Construction Operation and Maintenance Plan is included in the Stormwater Report and includes the following information:

- ☒ Name of the stormwater management system owners;
- ☒ Party responsible for operation and maintenance;
- ☒ Schedule for implementation of routine and non-routine maintenance tasks;
- ☐ Plan showing the location of all stormwater BMPs maintenance access areas;
- ☐ Description and delineation of public safety features;
- ☐ Estimated operation and maintenance budget; and
- ☒ Operation and Maintenance Log Form.

☐ The responsible party is ***not*** the owner of the parcel where the BMP is located and the Stormwater Report includes the following submissions:

- ☐ A copy of the legal instrument (deed, homeowner's association, utility trust or other legal entity) that establishes the terms of and legal responsibility for the operation and maintenance of the project site stormwater BMPs;
- ☐ A plan and easement deed that allows site access for the legal entity to operate and maintain BMP functions.

Standard 10: Prohibition of Illicit Discharges

☐ The Long-Term Pollution Prevention Plan includes measures to prevent illicit discharges;

☒ An Illicit Discharge Compliance Statement is attached;

☐ NO Illicit Discharge Compliance Statement is attached but will be submitted ***prior to*** the discharge of any stormwater to post-construction BMPs.

Applicant/Project Name: Town of Foxborough – East Belcher Road Reconstruction
Project Address: East Belcher Road, Foxborough, MA

Application Prepared by:

Firm:	Weston & Sampson, Inc.
Drainage Engineer	Elena Compter, P.E.
Registered PE:	Larry Keagan, P.E. and Paul Carter, P.E.

GENERAL

The project consists of the reconstruction and widening of approximately 2,000 feet of East Belcher Road in Foxborough, MA. East Belcher Road is a local road connecting Cocasset Street at its northerly end to Spring Street at its southerly end. The project area will be limited to the southern portion of East Belcher Road, beginning approximately 300 feet south of the Comcast Building and extending to the Spring Street intersection. The existing road within the project area varies in width from 16.3 feet to 19.5 feet and shows major pavement deterioration. The proposed project will widen the existing road to achieve the absolute minimum acceptable width for two-way traffic and ensure that the road can provide safe passage for large vehicles, including school buses, tractor trailer trucks, construction vehicles and public safety vehicles.

The beginning portion of the project consists of a relatively flat section of the road that traverses wetland resource areas on both sides for approximately 700 linear feet. A large wetland resource area(30 acres) is located on the right side of the roadway and is further designated as Wetland C in the drainage report, while two small, isolated wetland resource areas are located on the left side of E. Belcher Road and further designated as Wetlands A and Wetland B in the report. Wetlands A and B are hydraulicly connected to the Wetland C via two existing 12-inch culverts. The subsequent 1,000 feet of upland roadway climbs approximately 50 feet in elevation at a variable slope between 3% and 7.5% to a high point near Sta. 42+00. The last section of the roadway, approximately 300 feet, slopes down towards the Spring Street/Mason Place intersection. A locus map of the project area, as well as other site mapping, is included in Appendix A.

The site work includes full depth reconstruction of the E. Belcher Road, widening of the roadway to a uniform width of 22 feet (10 ft wide travel Lanes & 1 ft wide shoulders, and construction of stormwater controls along the roadway within project limits. The existing roadway has no existing drainage system, and the stormwater runoff travels down the existing road toward the wetland resource areas or the Spring Street/Mason Place intersection. As part of proposed improvements, a new stormwater conveyance/filtration/infiltration system will be constructed to carry the road stormwater runoff to existing discharge points adjacent to the existing wetlands, while minimizing erosion and enhancing the groundwater recharge and water quality treatment to the maximum extent practicable.

Debris from the site construction preparation operations will be transported in covered container vehicles for off-site disposal or recycling. Erosion control measures, including the use of compost mulch filter tubes, silt fence and temporary seeding will be used to control construction sediment, minimize erosion and prevent any sediment from reaching the wetland resources and properties located outside of the limits of work.

Environmental protection measures will also include dust control to ensure that generation of on-site dust during work activities will be minimized. Dust control activities will not add to any additional stormwater runoff at the site, as dust control will not be used during storm events. Wet suppression shall be used to provide temporary control of dust. At a minimum, wet suppression shall be applied to excavated material, aggregate piles, and exposed soils and dirt. Dust suppression wetting agents shall be water soluble, non-toxic, non-reactive, non-volatile, and non-foaming and will not result in ponding of water.

Stormwater Design:
Weston & Sampson utilized HydroCAD computer software to model the stormwater runoff for 2-year, 10-year, and 100-year 24-hour storm events. Based on NOAA Atlas 14, the rainfall depths are 3.44 inches, 5.24 inches, and 8.10 inches, for 2, 10, and 100-year storms, respectively. To properly simulate the existing and proposed drainage conditions along the existing and reconstructed road, specific data was obtained and/or considered, including topography, roadway layout, soil composition, and groundwater.

Proposed Stormwater Management:
The Stormwater Handbook defines redevelopment projects as "maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving." The proposed design widens the road to 22 feet, an increase of 2.5 to 5.7 feet from the existing condition; therefore, the road reconstruction project is classified as a redevelopment project and only certain standards are required to only be met to the maximum extent practicable (to be discussed in further detail below).

The stormwater management design was driven by the limited right-of-way(approximately 33 ft wide) available for stormwater improvements. Low Impact Development (LID) measures were implemented where feasible, by constructing a roadside stone lined swale/drainage ditch along the east side of the roadway to convey the roadway and off-site stormwater runoff. The stone lined swale/drainage ditch with check dams will reduce the velocity of the flow and allow sediment to settle out while creating the opportunity for stormwater infiltration once the runoff passes through the voids in the rock. Additionally, a broken stone filter strip /infiltration trench will be constructed along the right edge of roadway adjacent to the wetland area allowing pre-treatment of the runoff prior to discharge to wetland resource areas. Where LID measures were not feasible due to right-of-way limits or conflicts with existing utilities, a traditional method of capturing runoff with a Drop Inlet and Catch basin with 4 ft deep sumps was used. Also two(2) deep sump catch basins adjacent to the Spring Street/Mason Place intersection are proposed in order to keep runoff from crossing the intersection from East Belcher Road. Where a traditional conveyance system will be used, appropriate energy dissipating measures will be installed at the point of discharge, including a Level Spreader for the stormwater outletting to the easterly wetland at the bottom the hill.

Existing Soil information was obtained from the Natural Resources Conservation Service (NRCS) Norfolk County Web Soil Survey. The soil survey identifies the combination of soils within the project limits. The beginning portion of the project, along the wetlands, is classified as Freetown muck soil with a Hydrologic Soil Group (HSG) rating of D (high runoff). The central portion of the project is located in Hinkley loamy sand and Merrimac fine sandy loam soils, with Hydraulic Soils Group (HSG) rating of A(very low runoff). finally, the end portion of the project is located in Canton fine sandy loam

soil, with a HSG rating of B (low runoff). At the high point of the road is some Hollis rock outcrop Charlton complex with a HSG D. The soil map and description are included in Appendix A.

In addition to research and review of the soil survey, subsurface conditions in the project area were explored by conducting three test pits performed along the left edge of the roadway to determine the feasibility of infiltration and the use of the stone infiltration swale/drainage ditch. Those test pits were performed at Sta. 36+00,Left, Sta. 39+15 Left and Sta. 45+26 Left. The Test pits showed predominantly loamy sand and sandy loam underlaid by coarse sand and loamy sand with varying amounts of silt and gravel. Ledge was encountered in the TP-1 approximately 5.5 feet below grade. Based on the review of test pit logs a Rawl's rate of 8.27 inches per hour was used in the design of infiltration along the stone swale/drainage ditch. Complete boring logs are included in Appendix A.

Existing Drainage Conditions

The existing conditions in the project area consist of approximately 35,800 sq. feet of impervious area associated with the existing roadway and 105,300 sq. feet of upland areas that consists of wooded areas and approximately 1-acre residential lots that contribute stormwater runoff toward the roadway.

Based on the existing drainage patterns, five(5) existing watershed areas were delineated with four(4) distinct Points Of Analysis (POA), shown graphically on Existing and Proposed Drainage Area maps in Appendix B.

Drainage Area 1 includes left side of the roadway up to the driveway to the new 19 Lot Pine Ridge Subdivision (which is under construction)and roadside vegetated areas along the left edge of road to Wetlands A.

Drainage Area 2 extends from the central crown of the road to left edge of the roadway between the Pine Ridge Subdivision construction access road to the top of the hill and is predominantly impervious with grass/woods combination surfaces along the road edge. Runoff from this aera flows overland following the left edge of E. Belcher Road and discharges into Wetland B.

Drainage Area 3 includes much of the right side of the road and the adjacent vegetated road edge and lawn associated with the 1-acre residential lots before the ground slopes away to the west of the roadway. Drainage Area 3 runs from the beginning of the project to the top of the hill. The runoff from this area flows along the right edge of E. Belcher Road toward Wetland B.

Drainage Area 4 is predominantly wooded with pervious soil that is an upland area that drains toward the road and Drainage Area 3. DA-4 is comprised of a couple residential properties and Town owned wooded conservation land. The runoff from this area flows overland toward the road and follows the edge of roadway toward Wetland B.

Drainage Area 5 includes the left side of the crowned E. Belcher Road from the high point in the road at Sta. 42 +00 to the end of project at the intersection with Spring Street/ Mason Place. The stormwater runoff from this area flows along the edge of the road toward the intersection.

Drainage Area 6 includes the right side of the crowned E. Belcher Road from the high point in the road profile at Sta. 42 +00 to the end of project at the Spring Street/ Mason Place intersection. The stormwater runoff from this area flows along the edge of the road toward the intersection.

Proposed Drainage Conditions

In the proposed conditions the amount of impervious surface along the road will increase by approximately 8,200 square feet to approximately 44,000 sq. feet due to widening of E. Belcher road primarily in the upland area. The minimal road widening through the wetland area is to provide a consistent minimum width for two cares to pass each other without one vehicle having to pull over to let the other vehicle pass by. To mitigate stormwater runoff from the reconstructed road, the road will be superelevated to the right in the beginning section of the project, for approximately 700 linear feet, and superelevated to the left for the major portion of the upland road reconstruction (approximately 1,000 linear feet). The last 300 will have a normal crown with new deep sump catch basins one on each side of the road prior to the Spring St./Mason Place intersection. Superelevation of the roadway to one side will allow for stormwater BMPs constructed on one side of the roadway to treat and convey the runoff from the entire roadway cross section within the very limited right-of-way.

In the first 700 linear feet of the project, where the roadway traverses the wetlands, a stone filter strip and shallow infiltration trench will be constructed along the right edge of the roadway. The filter strip will filter out silt and sediment from the roadway stormwater runoff prior to discharging into the adjacent wetland. Due to the high ground water as evident from the wetland elevations and slow recharge capacity of the soils (HSG D), any other kind of infiltration BMPs were not feasible in this area of the project.

The approximately 1,000 linear foot of the upland section of the road will be superelevated to the left and a stone infiltration swale/drainage ditch will be constructed alone the left edge of the road with check dams with two(2) driveway culverts connecting the swale sections underneath the residential driveways. Due to the right of way limitations and a conflict with a major existing 20 inch water main, the last section of this stormwater conveyance system will be via a drain pipe prior to discharge into Wetland B via a Level Spreader. The proposed Level Spreader will provide for approximately 25 feet of overland sheet flow prior to entering the wetland. The proposed stormwater system design described above will discharge primarily to the wetland resource area on the left side of the road, (Wetlands B) and then into the much larger wetland on the west side of the road (Wetland C) with an area of over 30 acres. Since the Wetlands A and B are hydraulicly connected to Wetland C via existing culverts, this design preserves the overall existing drainage patterns.

The final section of E. Belcher Road from the roadway high point at Sta 42+00 to the Spring Street/ Mason Place intersection will be constructed with a bituminous berm and two(2)proposed catch basins to collect the runoff from this road section prior to intersection.

Similarly, to existing conditions, the proposed watershed was analyzed at the same four POA, with 10 contributing drainage areas, shown graphically in Appendix B on the proposed Drainage Area Map. Below is a description of how the proposed drainage design relates to the MassDEP Stormwater Standards 1-10 as they apply to the Town of Foxborough's East Belcher Road Reconstruction Project:

STANDARD 1 – NO NEW UNTREATED DISCHARGES

The proposed road reconstruction project has been designed to be similar to the existing conditions as much as possible and improve the conditions to the maximum extent practicable. As previously discussed, the proposed project increases the impervious area by approximately 8,200 square feet. The purpose of the road widening is to provide a consistent absolute minimum road width of 22 feet with10 foot wide lanes so that two vehicles will be able to pass each other without one vehicle having to pull over to let the other vehicle to pass by. No new untreated discharges are proposed. The overland flow from the roadway in the wetland area will be filtered by the proposed stone filter strip and shallow infiltration trench, which will treat the runoff by filtering out sediment from the road runoff. The runoff from the upland area of the project will be conveyed via a stone lined infiltration swale/drainage ditch and discharged via a Level Spreader and overland flow.

STANDARD 2 – PEAK RATE ATTENUATION

Post construction peak runoff rates for the 2-, 10-, and 100-year storms will increase slightly for POA-2, POI-3 and POA-4 and decrease for POA-1. Supporting documentation is included in Appendix B. The small increase in post-construction discharge rates are partly due to reconfiguration of the roadway and elimination of the center crown. Since Wetlands A, B, and C are hydrologically connected, the overall increase to the wetland resource area is approximately 0.29 cfs for a 2 year storm, 0.83 cfs for a 10 year storm, and 1.45 cfs for a 100 year storm. As the increase is not concentrated to one point, but rather across the approximately 700 feet of roadway frontage adjacent to wetland resource area and is tributary to an over 30-acre wetland resource area, the increase in runoff is negligible. The attenuation of the peak rate is to the maximum extent practicable which is severely constrained by the extremely narrow 33 ft. wide right of way and the existing topography. The proposed project includes infiltration measures to minimize changes to the stormwater runoff. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures, such as compost mulch filter tubes and silt fence, will be utilized during construction.

STANDARD 3 – RECHARGE

Although there is an increase in the impervious area within the proposed project limits, traditional infiltration devices are not practicable due to the limited right-of-way, steep slope of the existing roadway and soil with poor infiltration rate along the lower portion of the project area. Alternatively, a stone infiltration swale/drainage ditch will be constructed along the roadway in the upland portions of the project with Hydrologic Soils Group Type A and B soils. Due to the steep slope of the roadway the recharge and infiltration trenches within the swale/drainage ditch will be limited to the sections of the stone lined swales/drainage ditches immediately upstream of the driveway culverts and the Drop Inlet that takes the flow at the bottom of the stone lined swale/drainage ditch. Since the stormwater runoff will travel longitudinally significantly faster than water can infiltrate through the sandy soil underneath the swale/drainage ditch. As a result, the recharge will be concentrated in the areas of the swale/ditch directly upstream of the driveway culvert crossings since the culverts such

will act as an outlet control device slowing down the flow and temporary pooling the water behind the culvert.

STANDARD 4 – WATER QUALITY

No specific water quality BMPs are practicable within the project area because of all the site constraints mentioned above; however, the proposed project will improve existing conditions through the construction of a stone filter strip and infiltration trench, stone lined drainage swales ditches with infiltration trenches, deep sump catch basins and a deep sump drop inlet at the end of the stone swale/drainage ditch prior to discharge via a Level Spreader and approximately 30 feet of overland flow.

STANDARD 5 – LAND USES WITH HIGHER POTENTIAL POLLUTANT LOADS (LUHPPLs)

Not applicable

This project area is not considered to have a land use with higher potential pollutant loads.

STANDARD 6 – CRITICAL AREAS

Not applicable

There are no critical areas within the project area.

STANDARD 7 – REDEVELOPMENTS AND OTHER PROJECTS SUBJECT TO THE STANDARDS ONLY TO THE MAXIMUM EXTENT PRACTICABLE

The project area is considered a redevelopment project because the project includes the "maintenance and improvement of existing roadways, including widening less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving." The Standards are met to the Maximum Extent Practicable. Supporting information is contained herein.

STANDARD 8 – CONSTRUCTION PERIOD POLLUTION PREVENTION AND EROSION AND SEDIMENT CONTROL

A detailed Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan is included in Appendix D of this report. To ensure that the work incorporates the performance standards recommended in the DEP's Stormwater Management Policy, necessary erosion and sedimentation control measures will be utilized during construction. These measures include compost filter tubes and silt fence, as depicted on the site plans. This project does not require a SWPPP, as the land disturbance does not exceed one acre.

STANDARD 9 – OPERATION AND MAINTENANCE PLAN

An Operations and Maintenance Plan is provided in Appendix D of this report.

STANDARD 10 – PROHIBITION OF ILLICIT DISCHARGES

Illicit discharges will be prevented on the site through the use of spill/discharge prevention measures, along with good housekeeping and BMPs, and in accordance with the Long-Term Pollution Prevention Plan. An Illicit Discharge Compliance Statement has been developed for this site and is included in Appendix D.

REGISTERED PROFESSIONAL ENGINEER'S CERTIFICATION

I have reviewed the Stormwater Report, including the soil evaluation, computations, Long-Term Pollution Prevention Plan, Construction Period Erosion and Sedimentation Control Plan, Illicit Discharge Compliance Statement, and the plans showing the stormwater management system, and have determined that they have been prepared in accordance with the requirements of the Stormwater Management Standards as further elaborated by the Massachusetts Stormwater Handbook. I have also determined that the information presented in the Stormwater Checklist is accurate and that the information presented in the Stormwater Report accurately reflects conditions at the site as of the date of this permit application.

Registered Professional Engineer Block and Signature

Laurence F Keegan 1.20.21

Signature and Date

APPENDIX A

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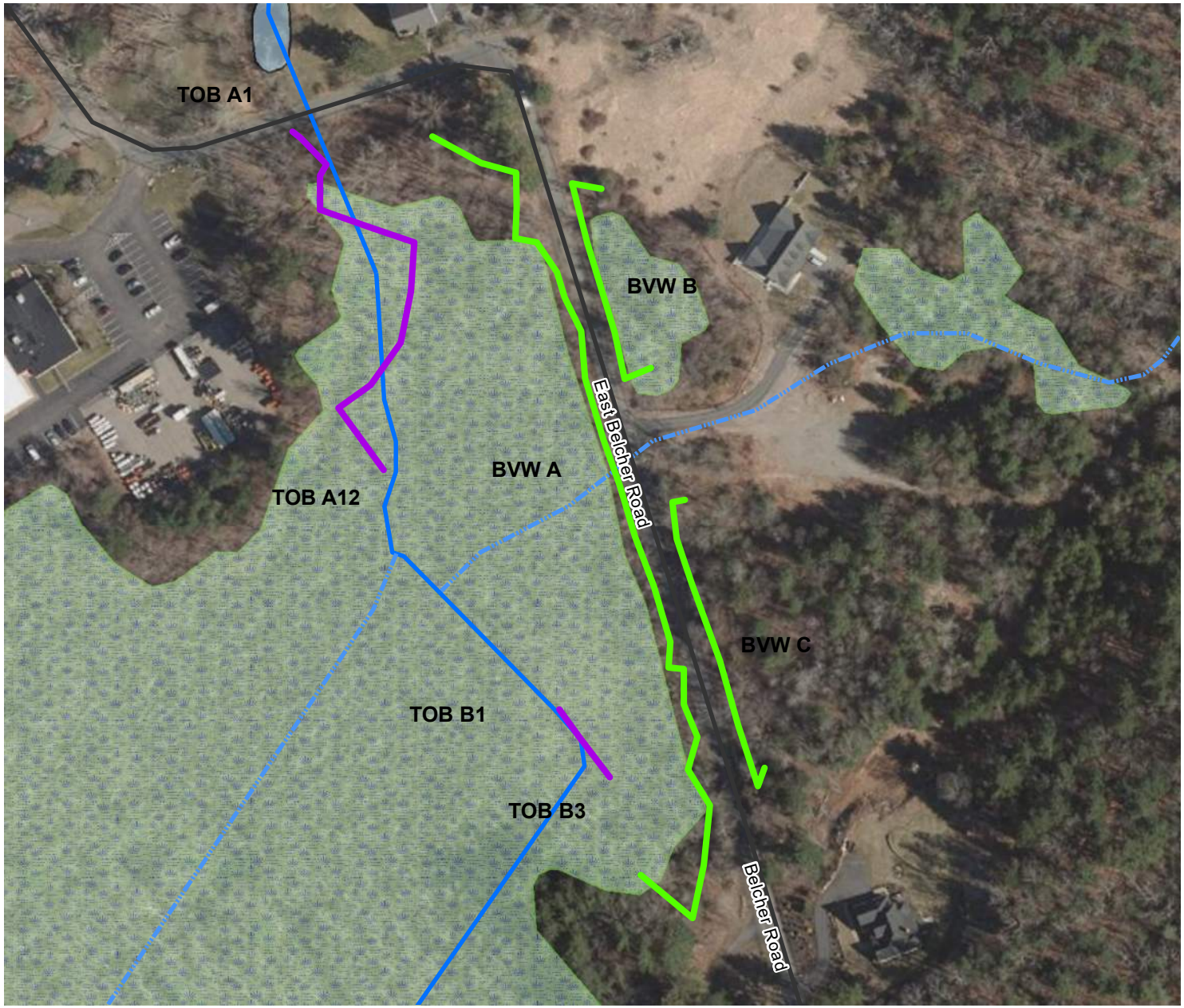

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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Bordering Vegetated Wetlands
- Perennial Stream
- USGS Perennial Stream
- USGS Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune

FIGURE 1

East Belcher Road
Foxborough MA

Wetland Field Map

Weston & Sampson

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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 2

East Belcher Road
Foxborough MA

USGS Topographic Map

Weston & Sampson

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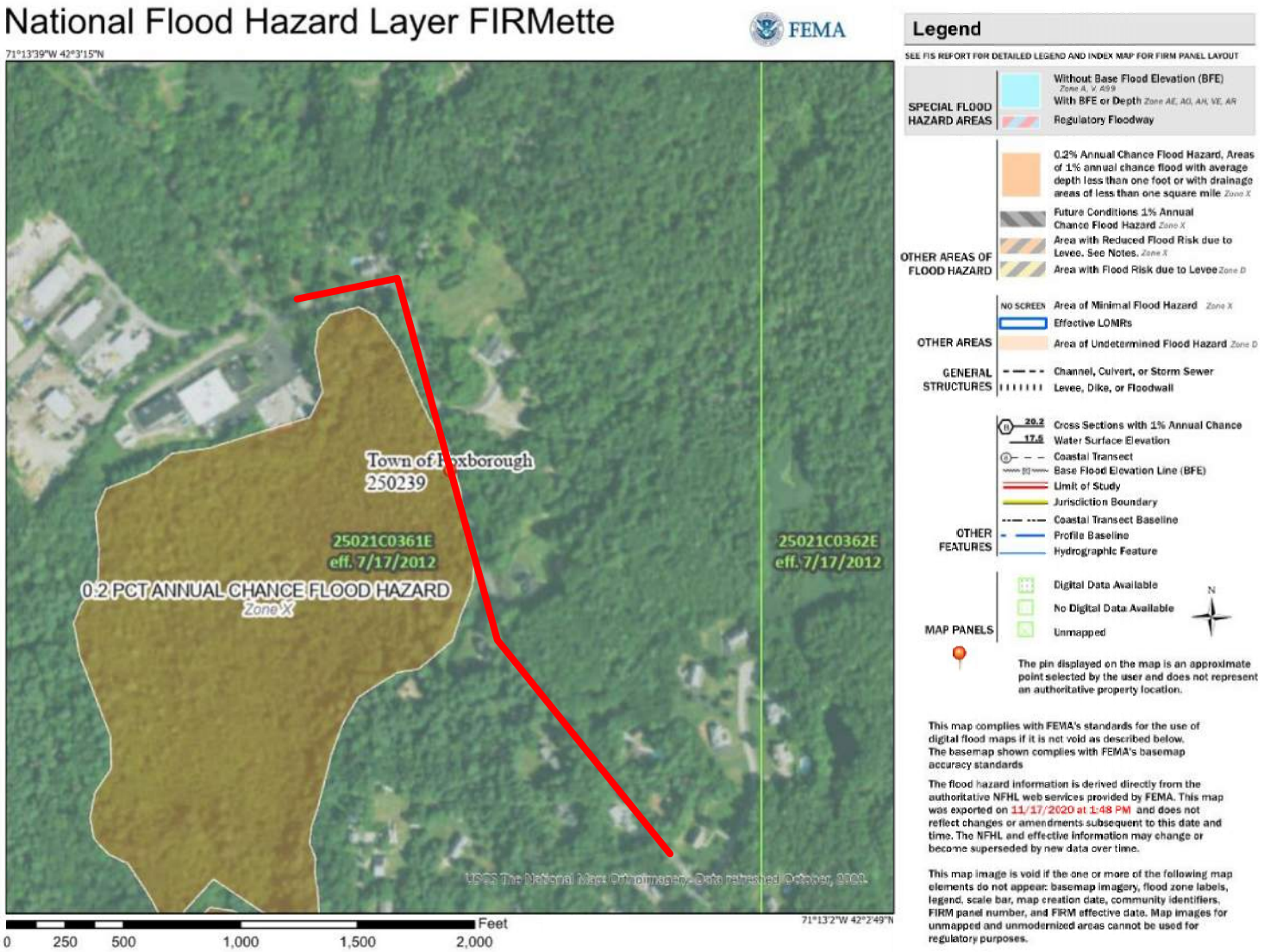

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Investigation Area

FIGURE 3

East Belcher Road
Foxborough MA

FEMA Map

Weston & Sampson

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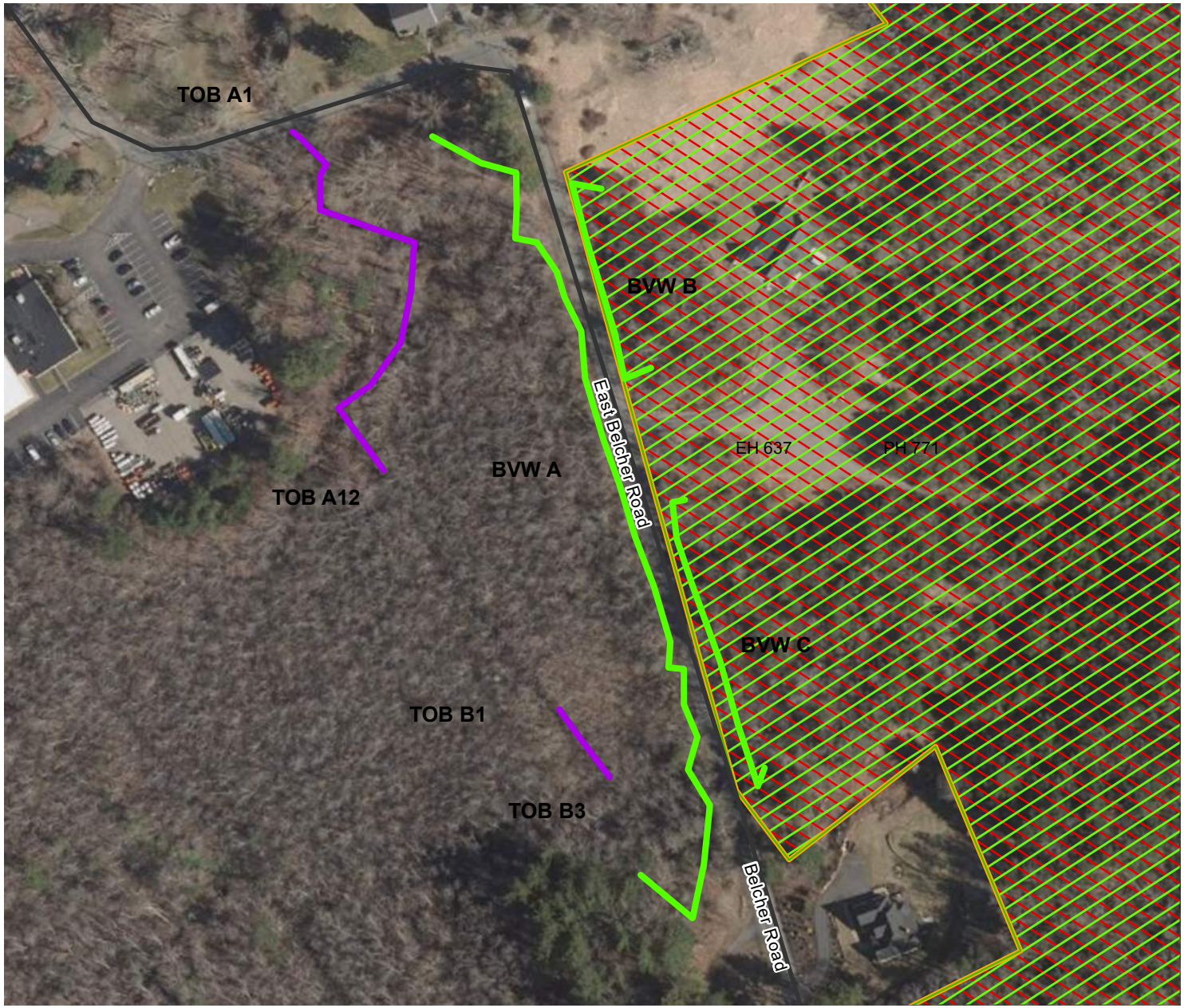

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Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Bordering Vegetated Wetlands
- Perennial Stream

ACECs

- ACECs

NHESP Habitats

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

Outstanding Resource Waters

- Public Water Supply Contributor
- ORW for ACEC
- ORW for both Water Supply and Other

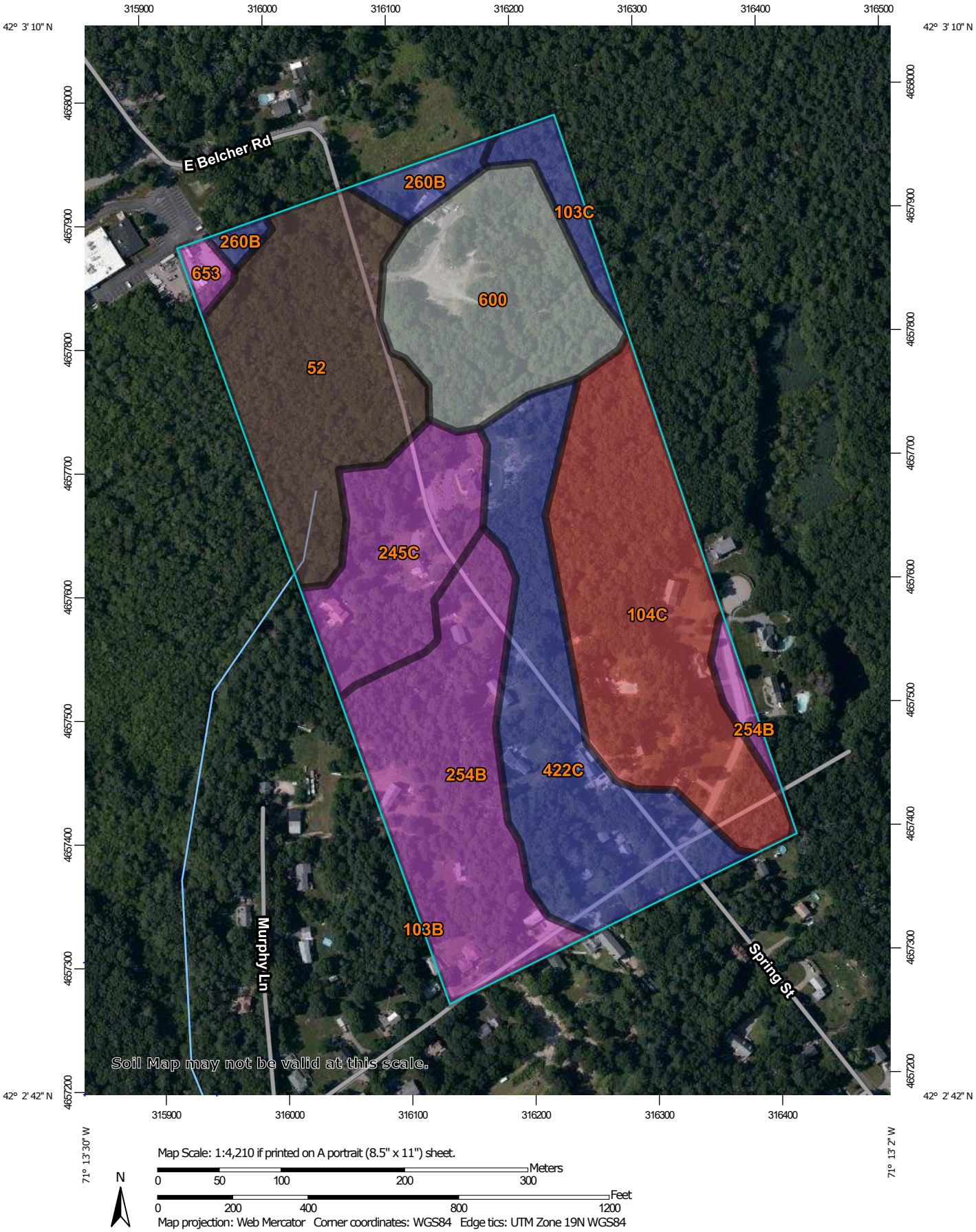
FIGURE 4

East Belcher Road
Foxborough MA

Environmental Resources Map

Weston & Sampson

Hydrologic Soil Group—Norfolk and Suffolk Counties, Massachusetts
(E. Belcher Road Reconstruction)



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points

- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Norfolk and Suffolk Counties, Massachusetts
Survey Area Data: Version 16, Jun 11, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 5, 2019—Jul 8, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
52	Freetown muck, 0 to 1 percent slopes	B/D	8.3	16.8%
103B	Charlton-Hollis-Rock outcrop complex, 3 to 8 percent slopes	A	0.0	0.0%
103C	Charlton-Hollis-Rock outcrop complex, 8 to 15 percent slopes	B	1.1	2.2%
104C	Hollis-Rock outcrop-Charlton complex, 0 to 15 percent slopes	D	10.1	20.2%
245C	Hinckley loamy sand, 8 to 15 percent slopes	A	4.8	9.6%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	8.8	17.7%
260B	Sudbury fine sandy loam, 2 to 8 percent slopes	B	1.1	2.2%
422C	Canton fine sandy loam, 8 to 15 percent slopes, extremely stony	B	8.3	16.8%
600	Pits, sand and gravel		6.8	13.7%
653	Udorthents, sandy	A	0.4	0.8%
Totals for Area of Interest			**49.8**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

TEST PIT LOG

PROJECT NAME/NO.	East Belcher Road Reconstruction			**TEST PIT NUMBER**	
LOCATION	Foxboro, MA Sta. 45+26,14 Left			TP-1	
CLIENT	Town of Foxboro			GROUND SURFACE	
CONTRACTOR	Foxboro DPW	FOREMAN:		ELEVATION	See Site Plan
OBSERVED BY	Alyssa Peck	DATE	11/16/20	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	none observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
3"	Dark brown sandy loam (grass)
50"	Medium brown very gravelly sandy loam w/ some cobbles (firm-in-place)
67"	Gravelly coarse sand w/ several cobbles, ledge at bottom of test pit
	- End of Exploration -

NOTES:

TEST PIT NUMBER
TP-1

WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	East Belcher Road Reconstruction			**TEST PIT NUMBER**	
LOCATION	Foxboro, MA			TP-2	
CLIENT	Town of Foxboro	Sta. 40+25, 17 ft Left		GROUND SURFACE	
CONTRACTOR	Foxboro DPW	FOREMAN:		ELEVATION	See Site Plan
OBSERVED BY	Alyssa Peck	DATE	11/16/20	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	none observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
26"	Medium brown sandy loam w/ several cobbles
100"	Light brown gravelly loamy sand w/ several cobbles
	- End of Exploration -

NOTES:	**TEST PIT NUMBER**
	TP-2
	WESTON & SAMPSON ENGINEERS, INC.

TEST PIT LOG

PROJECT NAME/NO.	East Belcher Road Reconstruction			**TEST PIT NUMBER**	
LOCATION	Foxboro, MA Sta. 36+00, 17 ft Left			TP-3	
CLIENT	Town of Foxboro			GROUND SURFACE	
CONTRACTOR	Foxboro DPW	FOREMAN:		ELEVATION	See Site Plan
OBSERVED BY	Alyssa Peck	DATE	11/16/20	DEPTH TO GROUNDWATER BELOW	
CHECKED BY		DATE		SURFACE	none observed

DEPTH BELOW GROUND SURFACE (in.)	TEST PIT DIAGRAM AND SOIL DESCRIPTION
10"	Organics (leaves, pine needles)
29"	Medium brown sandy loam w/ some cobbles
108"	Gravelly coarse sand w/ several cobbles
	- End of Exploration -

NOTES:	**TEST PIT NUMBER**
	TP-3
	WESTON & SAMPSON ENGINEERS, INC.

APPENDIX B

East Belcher Road Reconstruction
Foxborough, MA

Pre-Development Conditions vs. Post-Development Conditions

Pre-Development Flows				Post-Development Flows			
Storm Fregency Inches of Rainfall in 24 hours Subcatchment/Reach	2 year storm 3.44 Flow (cfs)	10 year storm 5.24 Flow (cfs)	100 year storm 8.1 Flow (cfs)	Subcatchment/Reach	2 year storm 3.44 Flow (cfs)	10 year storm 5.24 Flow (cfs)	100 year storm 8.1 Flow (cfs)
Point of Interest -1 (POI-1) *Wetland A*	0.24	0.43	0.71	Point of Interest -1 (POI-1) *Wetland A*	0.07	0.15	0.29
Point of Interest -2 (POI-2) *Wetland B*	1.01	2.22	5.24	Point of Interest -2 (POI-2) *Wetland B*	1.00	2.70	6.10
Point of Interest -3 (POI-3) *Wetland C*	*1.19*	2.08	3.49	Point of Interest -3 (POI-3) *Wetland C*	*1.66*	2.71	4.50
Point of Interest -4 (POI-4) *Mason Pl/Spring Street*	*0.4*	0.85	1.64	Point of Interest -4 (POI-4) *Mason Pl/Spring Street*	*0.62*	1.17	2.08

N

200' RIVERFRONT AREA LIMIT (TYP)

HSG SOIL LIMIT (TYP)

MATCHLINE A

WETLAND A

WETLAND B

WETLAND C

POA-1

POA-2

POA-3

DA-1

DA-2

DA-3

DA-4

HSG D

HSG B

HSG A

DRAINAGE AREA DELINEATION LIMIT (TYP)

MATCHLINE B

EAST BELCHER ROAD (PUBLIC – VARIABLE WIDTH)

0 30 60 100

SCALE: 1" = 30'

P:\MA\Foxborough, MA\DW220-0719 East Belcher Road Reconstruction\CAD\Current_Stage-East Belcher Road\DWG\Working Drawings\06-14_Drainage Plans EX.dwg

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No.	Date	Description	Dr.By	Ck.By	App.By
A	P	PROVED	P	P	P

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
ROADWAY RECONSTRUCTION PROJECT

EXISTING DRAINAGE AREA PLAN

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	RP	RP	MK	LFK

DA-E1

FILE NO. –

SHEET 1 OF 24

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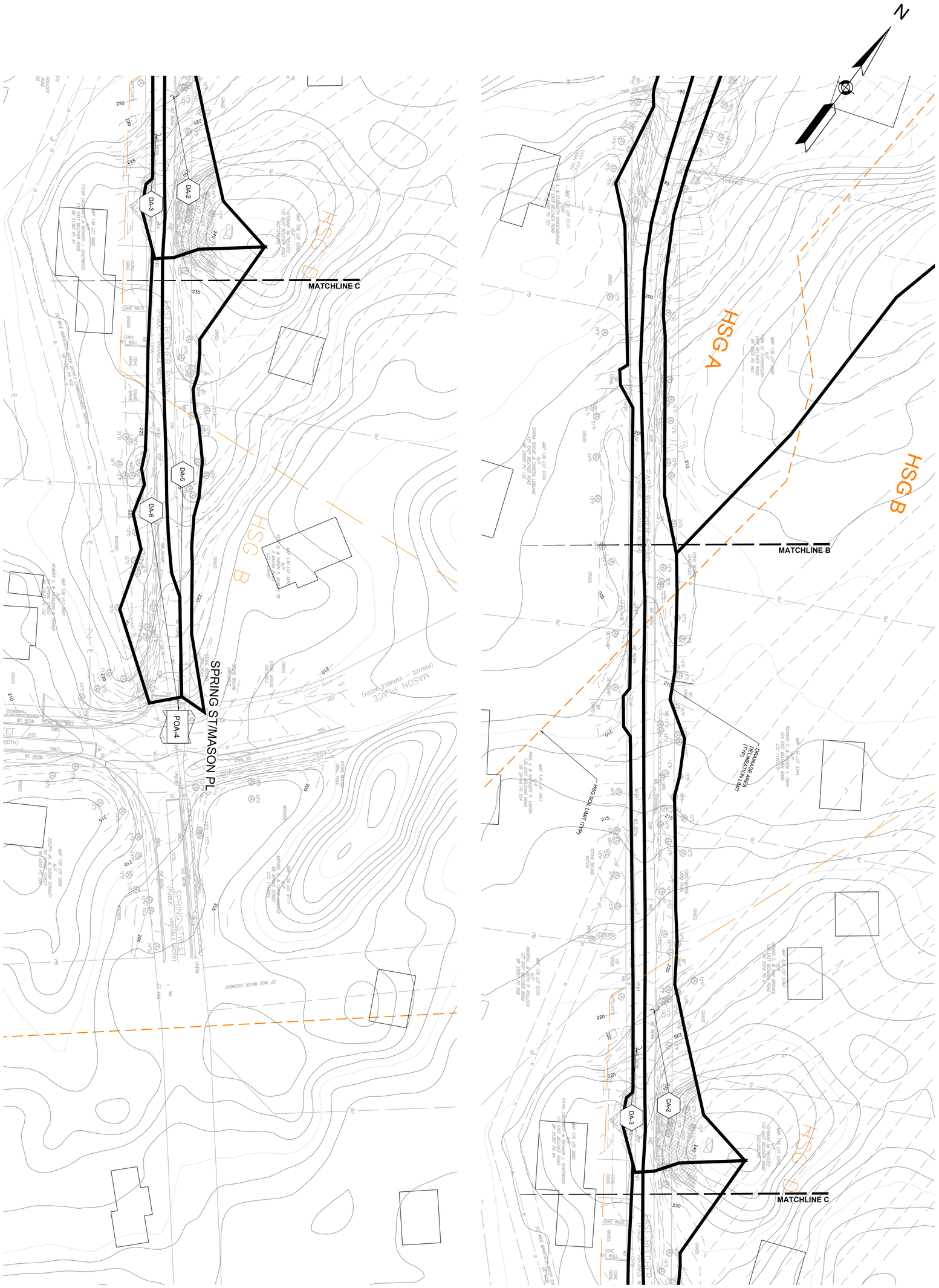

SHEET 2 OF 24

DA-E2

FILE NO. –

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

ROADWAY RECONSTRUCTION PROJECT

EXISTING DRAINAGE AREA PLAN

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	RP	RP	MK	LFK

No.	Date	Dr.By	Ck.By	App.By	Description
					A P P R O V E D

REGISTERED PROFESSIONAL ENGINEER

DATE

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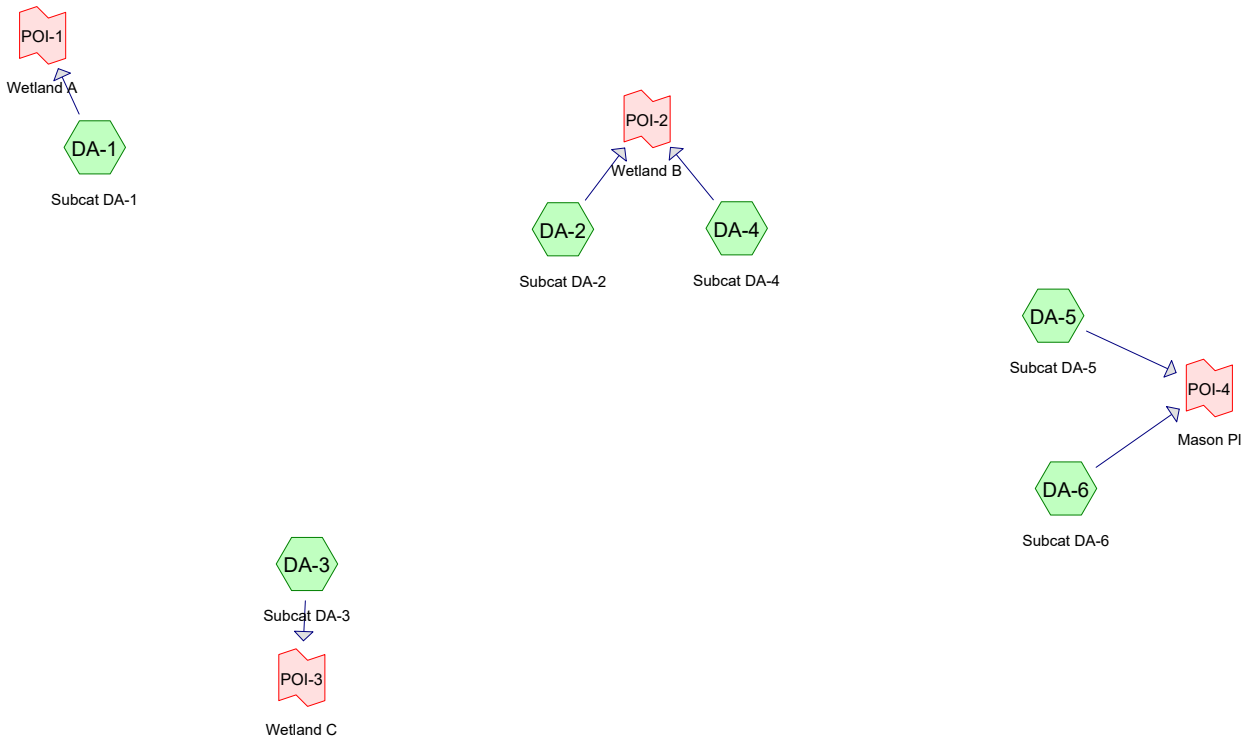


Subcat Reach Pond Link

Routing Diagram for E Belcher Rd - EX
Prepared by Weston & Sampson, Printed 12/29/2020

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
28,573	51	1 acre lots, 20% imp, HSG A (DA-2, DA-3, DA-4)
19,457	68	1 acre lots, 20% imp, HSG B (DA-2, DA-3, DA-4, DA-5, DA-6)
8	84	1 acre lots, 20% imp, HSG D (DA-3)
10,997	98	Paved roads w/curbs & sewers, HSG A (DA-2, DA-3, DA-4)
11,095	98	Paved roads w/curbs & sewers, HSG B (DA-1, DA-2, DA-3, DA-5, DA-6)
14,548	98	Paved roads w/curbs & sewers, HSG D (DA-1, DA-2, DA-3)
19,119	30	Woods, Good, HSG A (DA-2, DA-4)
8,294	55	Woods, Good, HSG B (DA-4)
9,967	32	Woods/grass comb., Good, HSG A (DA-2, DA-3, DA-4)
12,841	58	Woods/grass comb., Good, HSG B (DA-1, DA-2, DA-3, DA-4, DA-5, DA-6)
7,041	79	Woods/grass comb., Good, HSG D (DA-1, DA-2, DA-3, DA-4)
141,939	**64**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
68,655	HSG A	DA-2, DA-3, DA-4
51,686	HSG B	DA-1, DA-2, DA-3, DA-4, DA-5, DA-6
0	HSG C	
21,597	HSG D	DA-1, DA-2, DA-3, DA-4
0	Other	
141,939		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
28,573	19,457	0	8	0	48,038	1 acre lots, 20% imp
10,997	11,095	0	14,548	0	36,639	Paved roads w/curbs & sewers
19,119	8,294	0	0	0	27,413	Woods, Good
9,967	12,841	0	7,041	0	29,849	Woods/grass comb., Good
68,655	**51,686**	**0**	**21,597**	**0**	**141,939**	**TOTAL AREA**

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: Subcat DA-1 Runoff Area=4,356 sf 48.73% Impervious Runoff Depth>1.99"
Tc=6.0 min CN=87 Runoff=0.24 cfs 724 cf

SubcatchmentDA-2: Subcat DA-2 Runoff Area=29,720 sf 47.57% Impervious Runoff Depth>1.21"
Tc=6.0 min CN=76 Runoff=1.01 cfs 3,008 cf

SubcatchmentDA-3: Subcat DA-3 Runoff Area=21,298 sf 76.17% Impervious Runoff Depth>1.99"
Tc=6.0 min CN=87 Runoff=1.19 cfs 3,539 cf

SubcatchmentDA-4: Subcat DA-4 Runoff Area=73,234 sf 11.46% Impervious Runoff Depth>0.10"
Flow Length=325' Tc=19.3 min CN=48 Runoff=0.03 cfs 633 cf

SubcatchmentDA-5: Subcat DA-5 Runoff Area=7,339 sf 31.98% Impervious Runoff Depth>0.99"
Tc=6.0 min CN=72 Runoff=0.20 cfs 603 cf

SubcatchmentDA-6: Subcat DA-6 Runoff Area=5,992 sf 50.49% Impervious Runoff Depth>1.41"
Tc=0.0 min CN=79 Runoff=0.28 cfs 703 cf

Link POI-1: Wetland A Inflow=0.24 cfs 724 cf
Primary=0.24 cfs 724 cf

Link POI-2: Wetland B Inflow=1.01 cfs 3,640 cf
Primary=1.01 cfs 3,640 cf

Link POI-3: Wetland C Inflow=1.19 cfs 3,539 cf
Primary=1.19 cfs 3,539 cf

Link POI-4: Mason Pl Inflow=0.40 cfs 1,305 cf
Primary=0.40 cfs 1,305 cf

Total Runoff Area = 141,939 sf Runoff Volume = 9,208 cf Average Runoff Depth = 0.78"
67.42% Pervious = 95,692 sf 32.58% Impervious = 46,247 sf

Summary for Subcatchment DA-1: Subcat DA-1

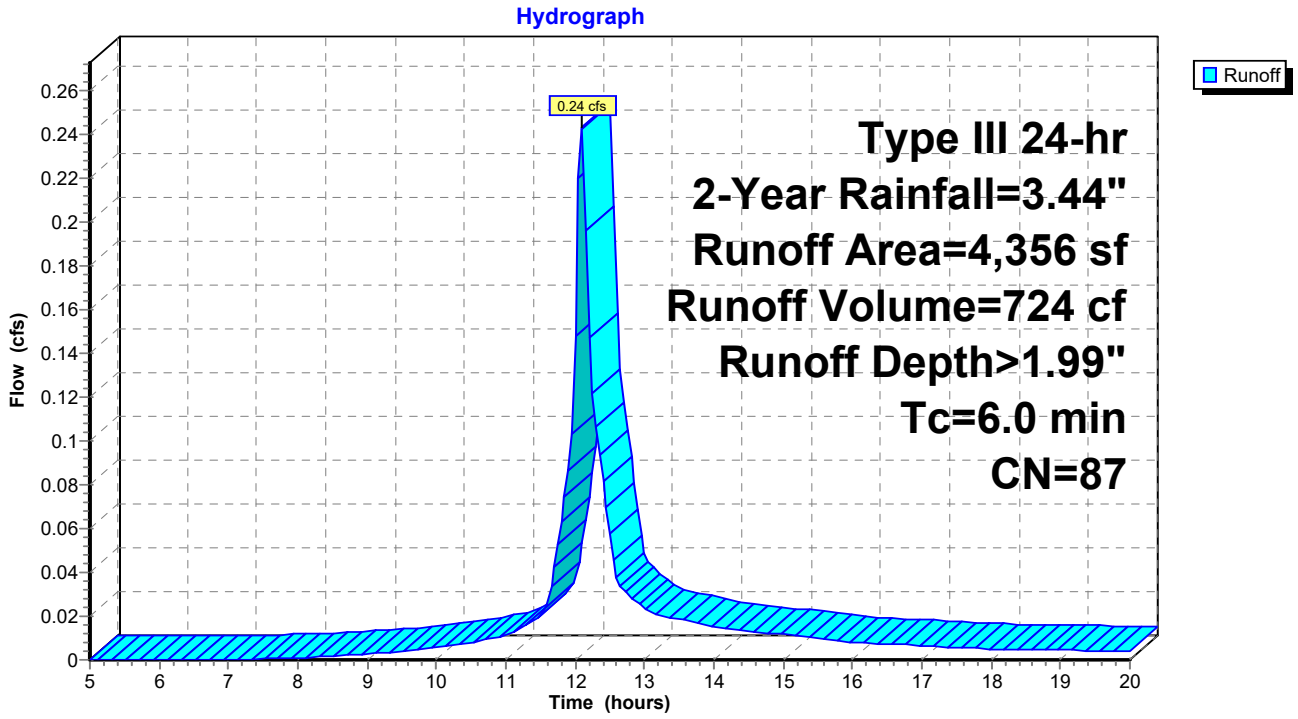
Runoff = 0.24 cfs @ 12.09 hrs, Volume= 724 cf, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
1,914	79	Woods/grass comb., Good, HSG D
1,826	98	Paved roads w/curbs & sewers, HSG D
320	58	Woods/grass comb., Good, HSG B
296	98	Paved roads w/curbs & sewers, HSG B
4,356	87	Weighted Average
2,234		51.27% Pervious Area
2,123		48.73% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-1: Subcat DA-1



Summary for Subcatchment DA-2: Subcat DA-2

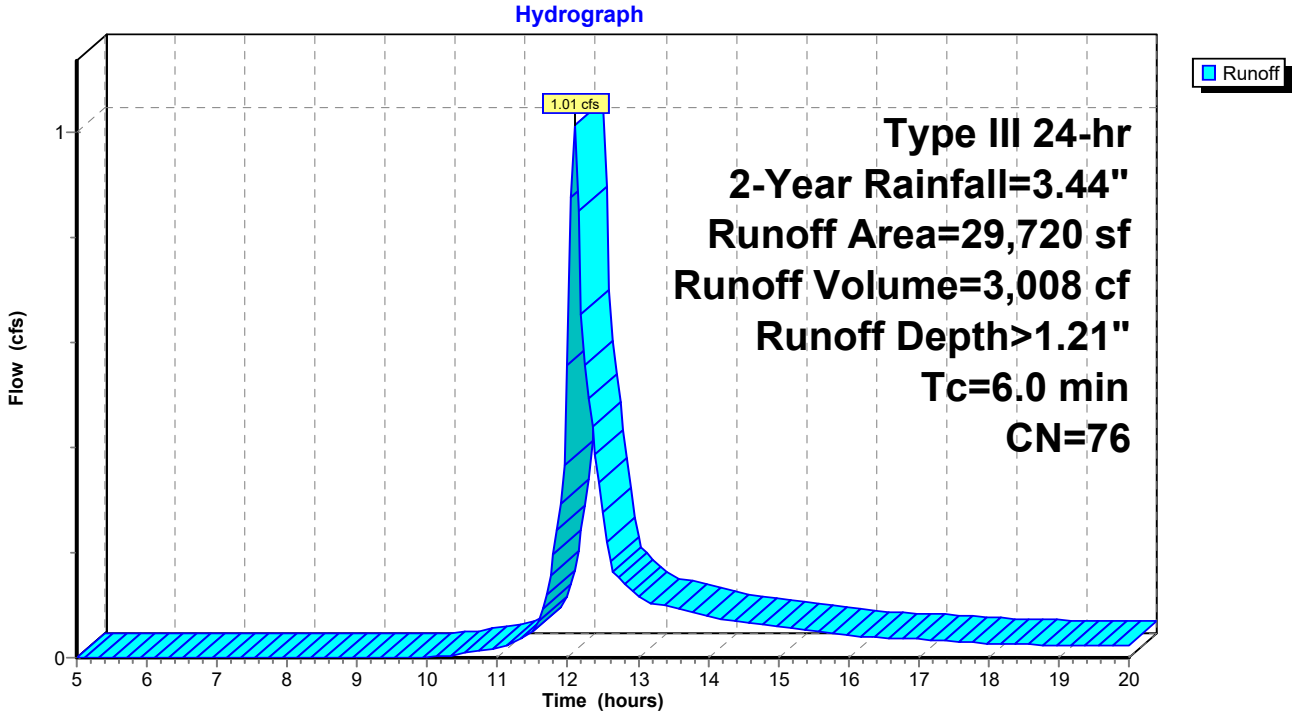
Runoff = 1.01 cfs @ 12.10 hrs, Volume= 3,008 cf, Depth> 1.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
261	51	1 acre lots, 20% imp, HSG A
27	51	1 acre lots, 20% imp, HSG A
5,111	98	Paved roads w/curbs & sewers, HSG A
1	51	1 acre lots, 20% imp, HSG A
5	30	Woods, Good, HSG A
2,890	32	Woods/grass comb., Good, HSG A
1,388	32	Woods/grass comb., Good, HSG A
5,265	98	Paved roads w/curbs & sewers, HSG D
13	79	Woods/grass comb., Good, HSG D
463	79	Woods/grass comb., Good, HSG D
598	79	Woods/grass comb., Good, HSG D
2,348	79	Woods/grass comb., Good, HSG D
3,164	98	Paved roads w/curbs & sewers, HSG B
2,695	68	1 acre lots, 20% imp, HSG B
1,561	58	Woods/grass comb., Good, HSG B
850	58	Woods/grass comb., Good, HSG B
2,329	58	Woods/grass comb., Good, HSG B
752	58	Woods/grass comb., Good, HSG B
29,720	76	Weighted Average
15,583		52.43% Pervious Area
14,137		47.57% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-2: Subcat DA-2



Summary for Subcatchment DA-3: Subcat DA-3

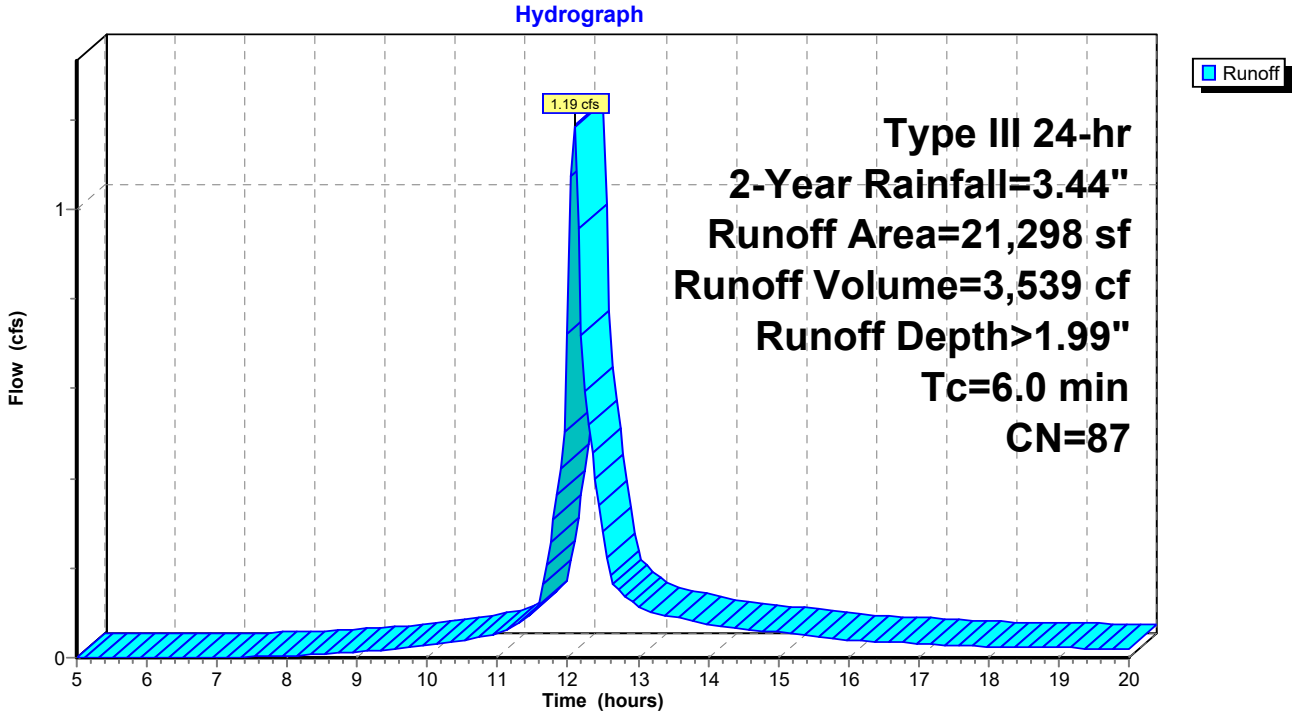
Runoff = 1.19 cfs @ 12.09 hrs, Volume= 3,539 cf, Depth> 1.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
5,516	98	Paved roads w/curbs & sewers, HSG A
671	32	Woods/grass comb., Good, HSG A
121	32	Woods/grass comb., Good, HSG A
1,161	32	Woods/grass comb., Good, HSG A
24	32	Woods/grass comb., Good, HSG A
0	51	1 acre lots, 20% imp, HSG A
187	51	1 acre lots, 20% imp, HSG A
611	51	1 acre lots, 20% imp, HSG A
11	51	1 acre lots, 20% imp, HSG A
13	51	1 acre lots, 20% imp, HSG A
7,456	98	Paved roads w/curbs & sewers, HSG D
1,689	79	Woods/grass comb., Good, HSG D
8	84	1 acre lots, 20% imp, HSG D
3,076	98	Paved roads w/curbs & sewers, HSG B
47	68	1 acre lots, 20% imp, HSG B
622	58	Woods/grass comb., Good, HSG B
1	58	Woods/grass comb., Good, HSG B
33	58	Woods/grass comb., Good, HSG B
52	58	Woods/grass comb., Good, HSG B
21,298	87	Weighted Average
5,075		23.83% Pervious Area
16,223		76.17% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-3: Subcat DA-3



Summary for Subcatchment DA-4: Subcat DA-4

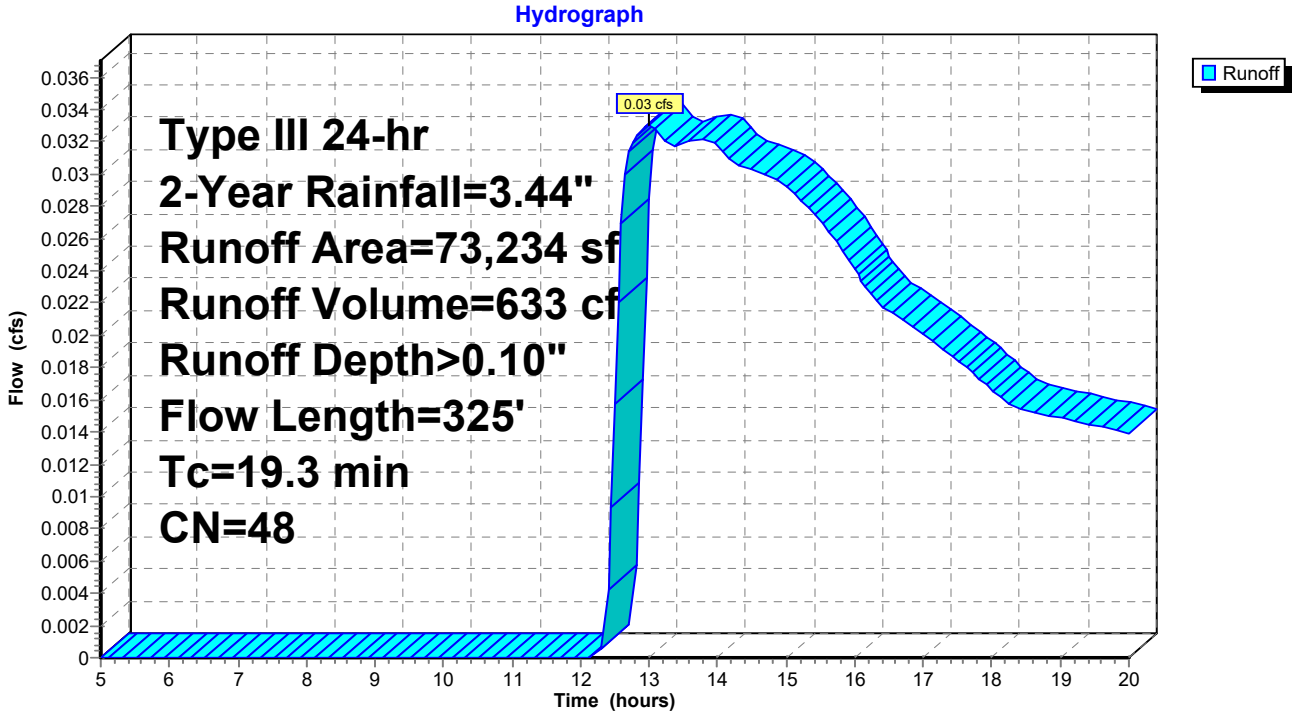
Runoff = 0.03 cfs @ 13.00 hrs, Volume= 633 cf, Depth> 0.10"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
369	98	Paved roads w/curbs & sewers, HSG A
27,463	51	1 acre lots, 20% imp, HSG A
19,113	30	Woods, Good, HSG A
1,748	32	Woods/grass comb., Good, HSG A
1,964	32	Woods/grass comb., Good, HSG A
18	79	Woods/grass comb., Good, HSG D
12,650	68	1 acre lots, 20% imp, HSG B
8,294	55	Woods, Good, HSG B
1,615	58	Woods/grass comb., Good, HSG B
73,234	48	Weighted Average
64,842		88.54% Pervious Area
8,392		11.46% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	100	0.1250	0.10		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.44"
2.0	225	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.3	325	Total			

Subcatchment DA-4: Subcat DA-4



Summary for Subcatchment DA-5: Subcat DA-5

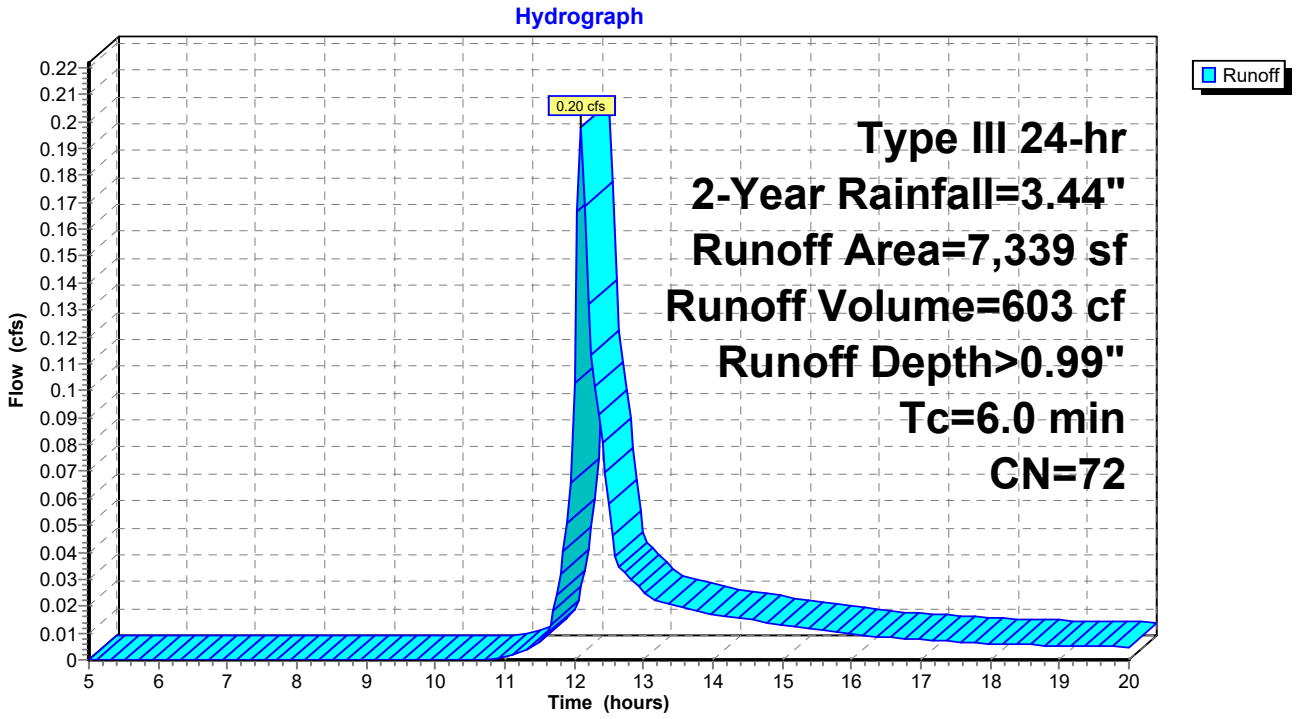
Runoff = 0.20 cfs @ 12.10 hrs, Volume= 603 cf, Depth> 0.99"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
1,822	98	Paved roads w/curbs & sewers, HSG B
2,625	68	1 acre lots, 20% imp, HSG B
1,848	58	Woods/grass comb., Good, HSG B
1,044	58	Woods/grass comb., Good, HSG B
7,339	72	Weighted Average
4,993		68.02% Pervious Area
2,347		31.98% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-5: Subcat DA-5



Summary for Subcatchment DA-6: Subcat DA-6

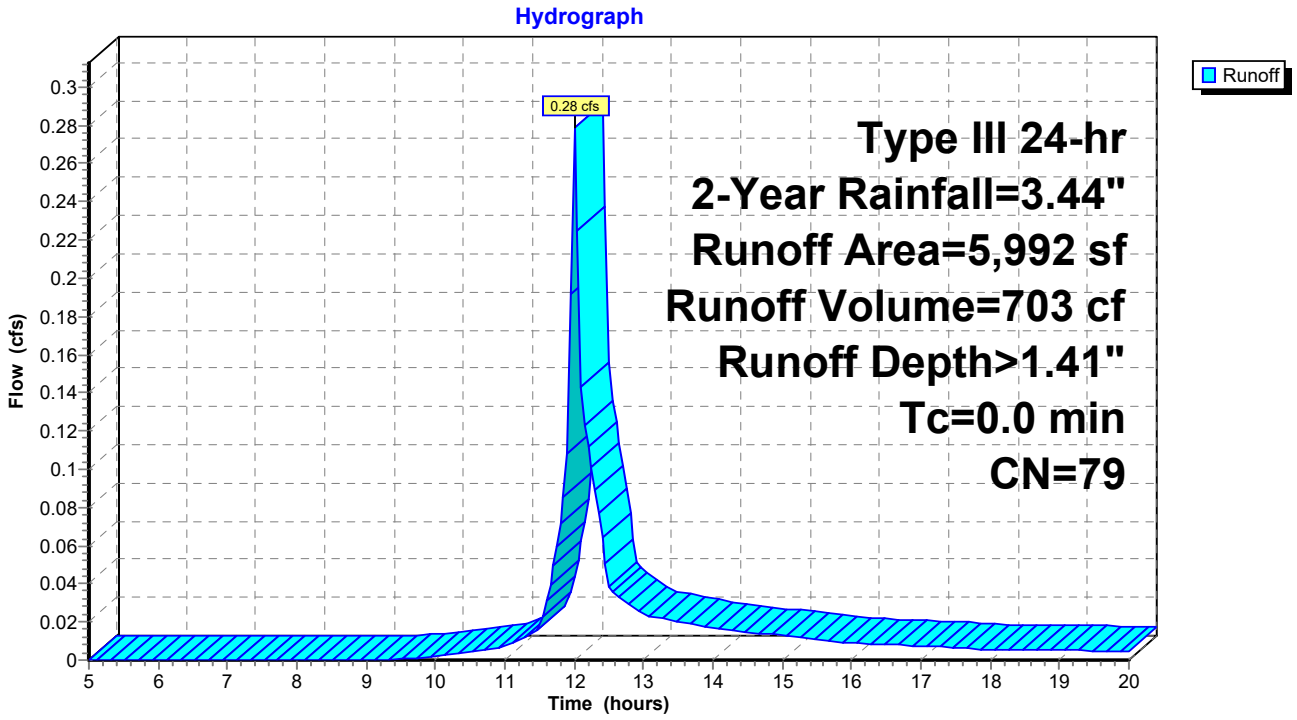
[46] Hint: Tc=0 (Instant runoff peak depends on dt)

Runoff = 0.28 cfs @ 12.01 hrs, Volume= 703 cf, Depth> 1.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
2,738	98	Paved roads w/curbs & sewers, HSG B
1,439	68	1 acre lots, 20% imp, HSG B
3	58	Woods/grass comb., Good, HSG B
18	58	Woods/grass comb., Good, HSG B
1,790	58	Woods/grass comb., Good, HSG B
1	58	Woods/grass comb., Good, HSG B
3	58	Woods/grass comb., Good, HSG B
5,992	79	Weighted Average
2,966		49.51% Pervious Area
3,025		50.49% Impervious Area

Subcatchment DA-6: Subcat DA-6

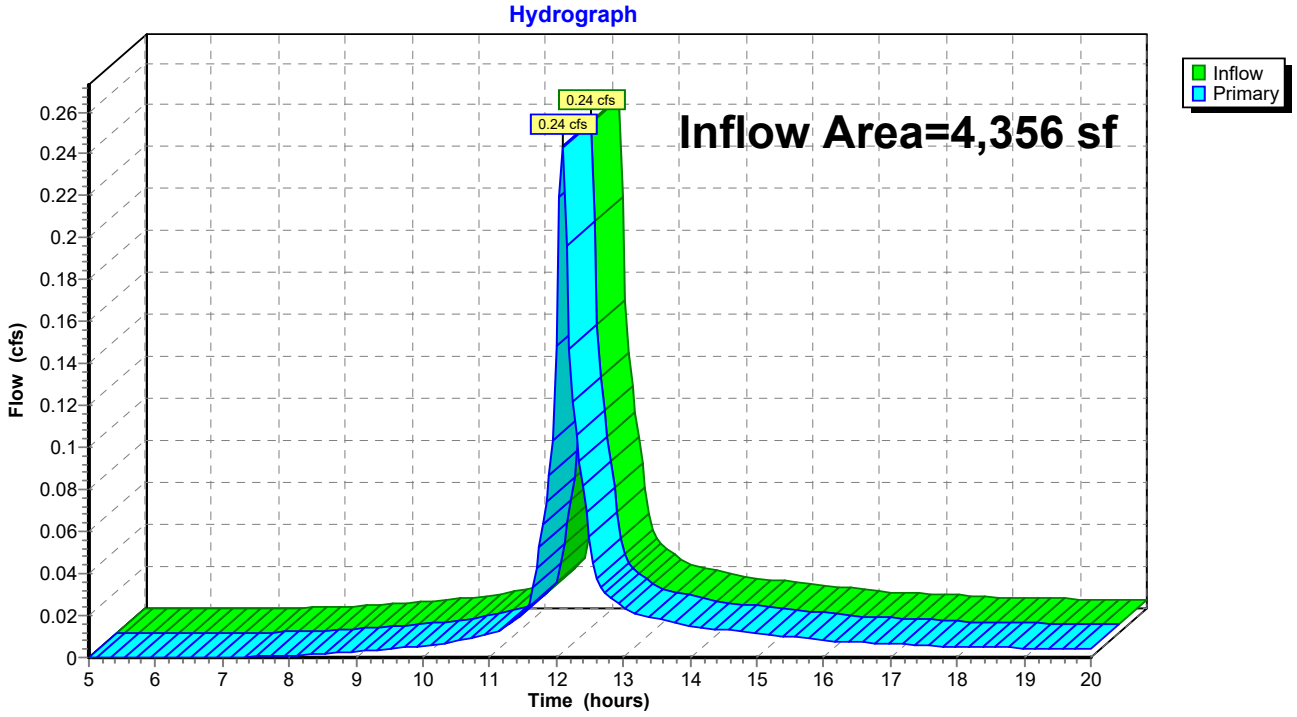


Summary for Link POI-1: Wetland A

Inflow Area = 4,356 sf, 48.73% Impervious, Inflow Depth > 1.99" for 2-Year event
Inflow = 0.24 cfs @ 12.09 hrs, Volume= 724 cf
Primary = 0.24 cfs @ 12.09 hrs, Volume= 724 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link POI-1: Wetland A

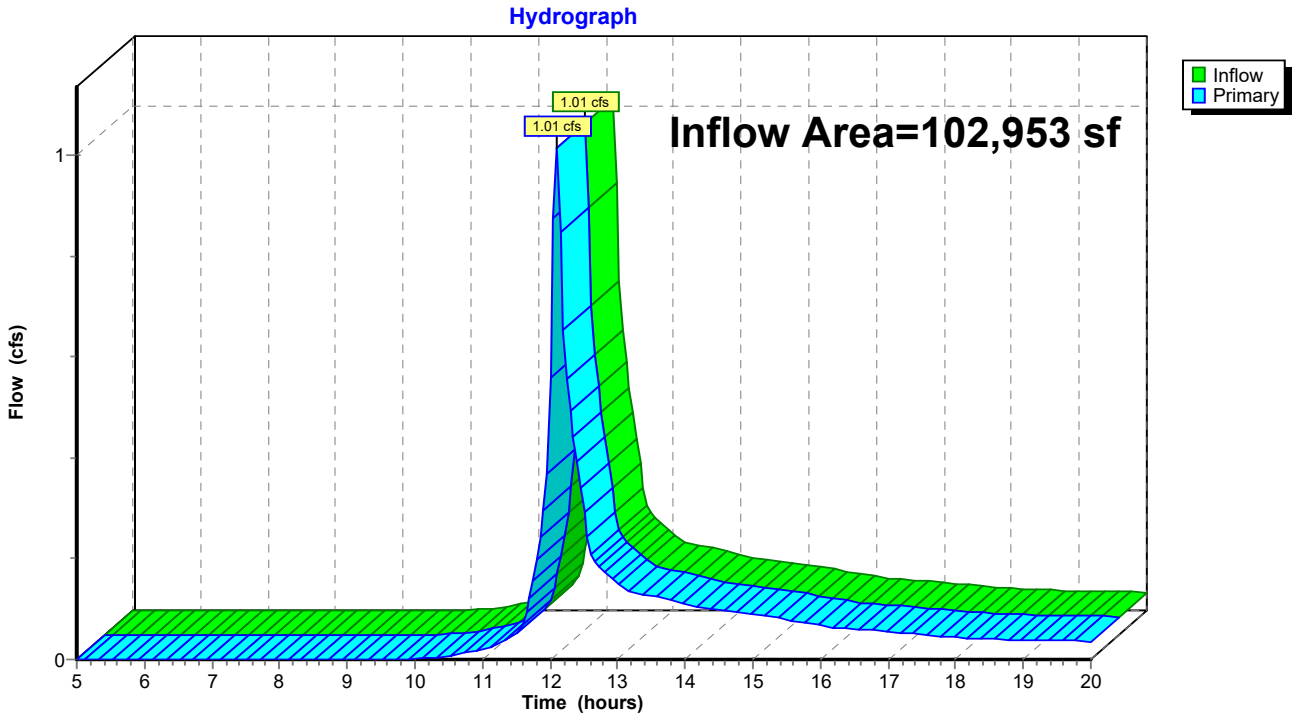


Summary for Link POI-2: Wetland B

Inflow Area = 102,953 sf, 21.88% Impervious, Inflow Depth > 0.42" for 2-Year event
Inflow = 1.01 cfs @ 12.10 hrs, Volume= 3,640 cf
Primary = 1.01 cfs @ 12.10 hrs, Volume= 3,640 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link POI-2: Wetland B

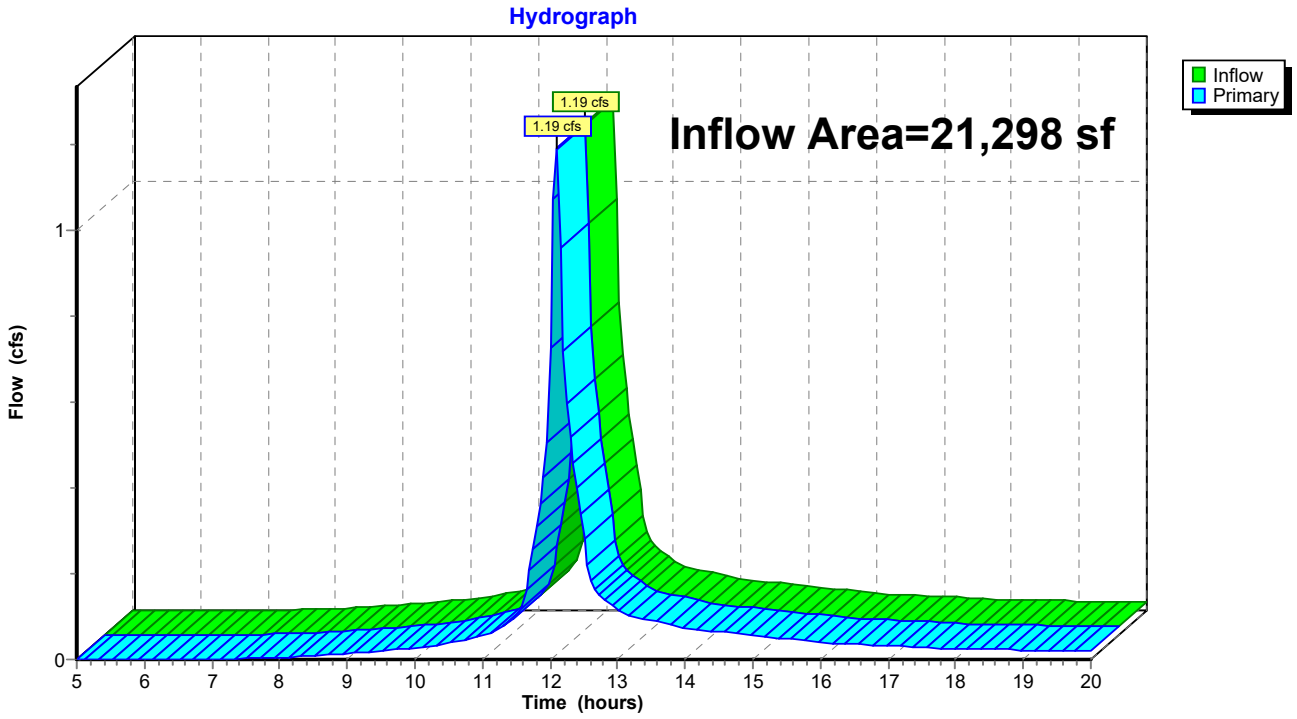


Summary for Link POI-3: Wetland C

Inflow Area = 21,298 sf, 76.17% Impervious, Inflow Depth > 1.99" for 2-Year event
Inflow = 1.19 cfs @ 12.09 hrs, Volume= 3,539 cf
Primary = 1.19 cfs @ 12.09 hrs, Volume= 3,539 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link POI-3: Wetland C

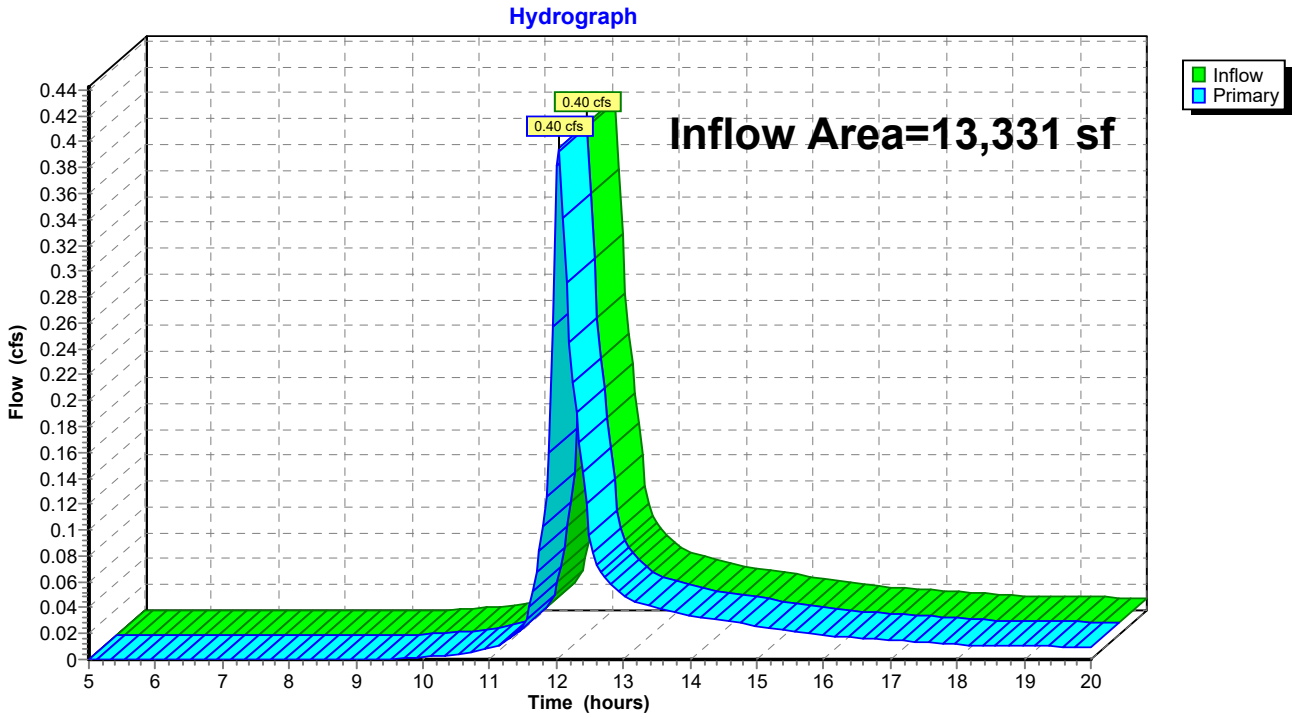


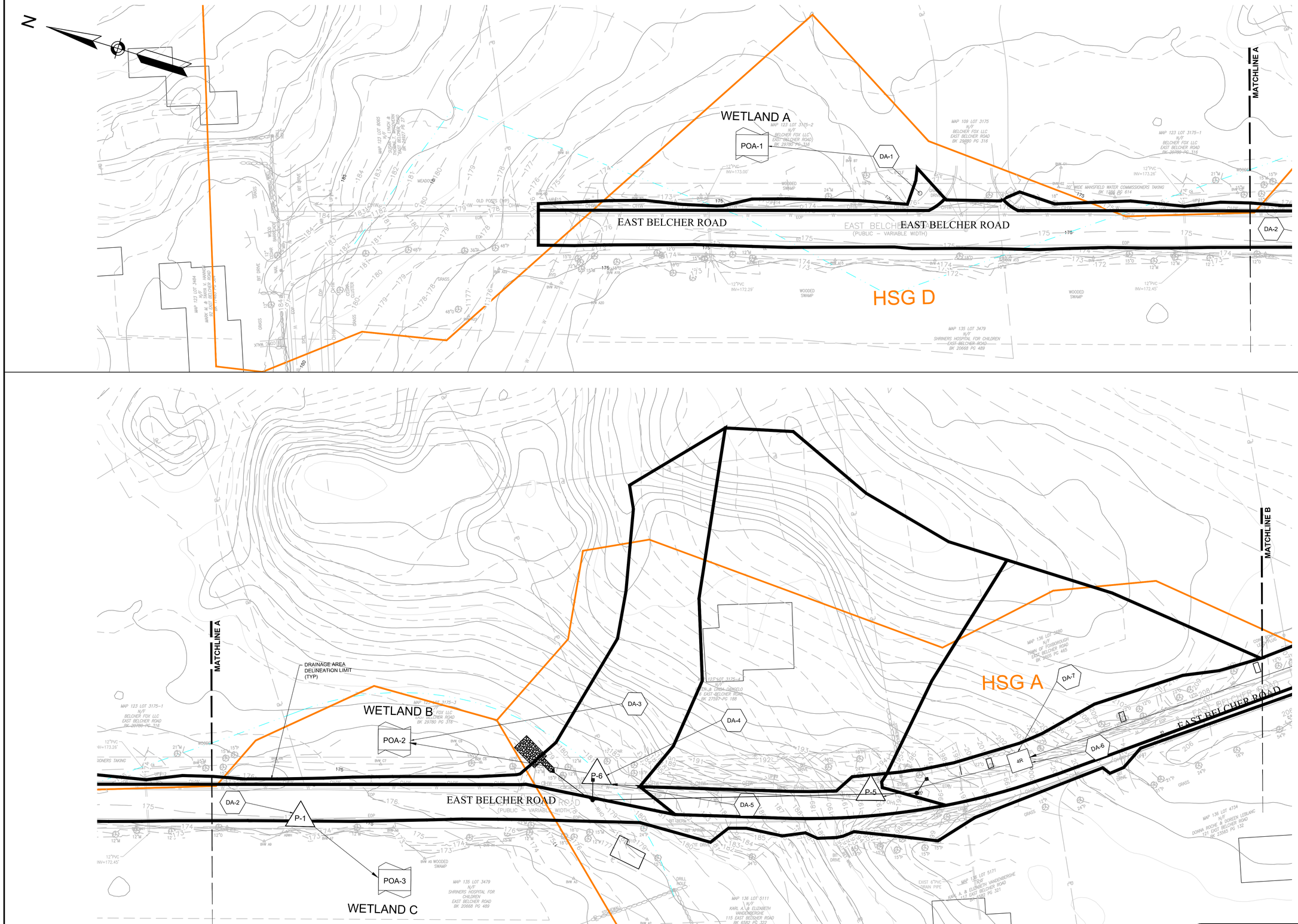
Summary for Link POI-4: Mason Pl

Inflow Area = 13,331 sf, 40.30% Impervious, Inflow Depth > 1.17" for 2-Year event
Inflow = 0.40 cfs @ 12.03 hrs, Volume= 1,305 cf
Primary = 0.40 cfs @ 12.03 hrs, Volume= 1,305 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Link POI-4: Mason Pl





Weston & Sampson
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No.	Date	Description	Dr.By	Ck.By	App.By
A	P	P	R	O	V	E	D			

REGISTERED PROFESSIONAL ENGINEER

DATE

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

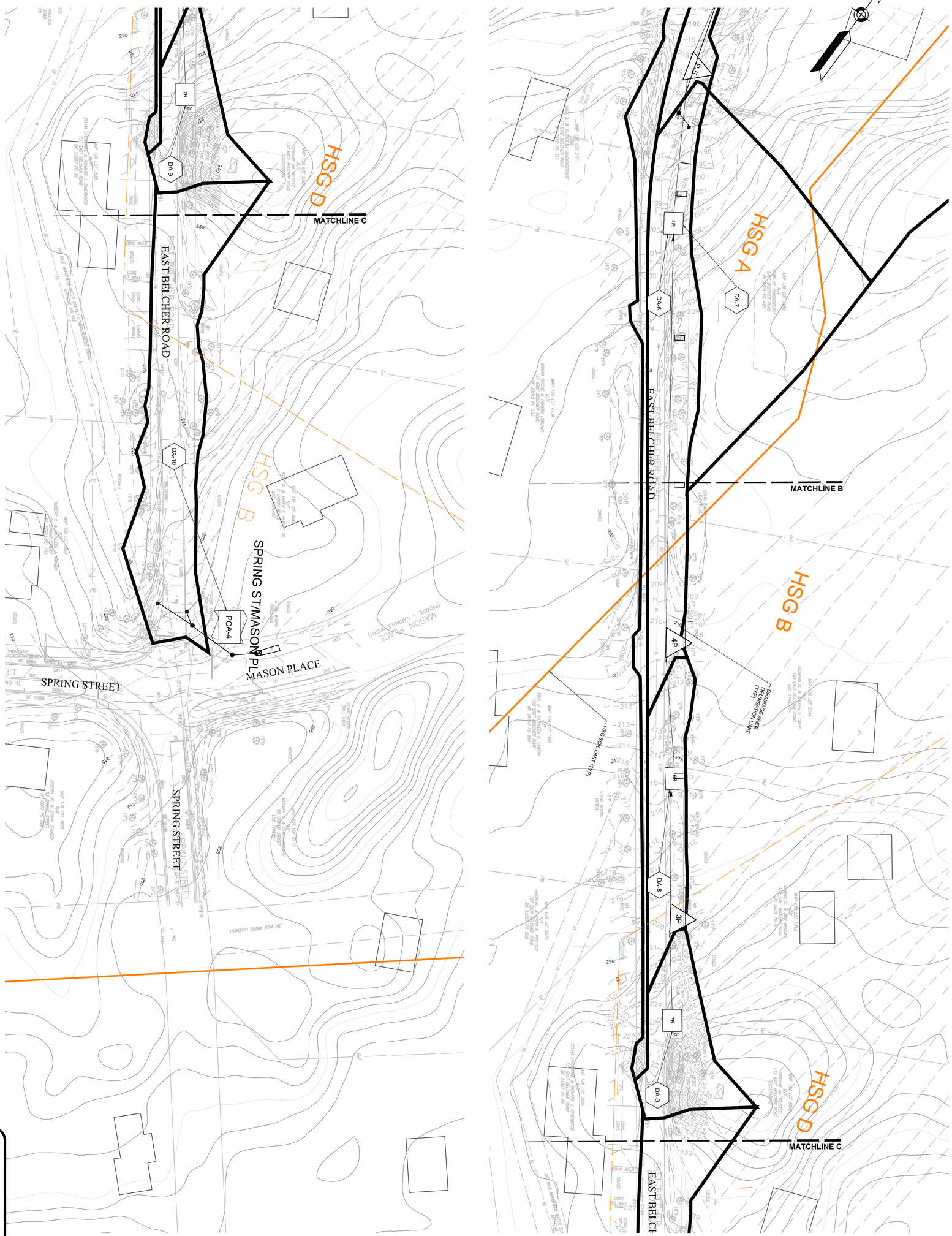
PROPOSED DRAINAGE AREA PLAN

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	RP	RP	MK	LFK

DA-P1

FILE NO. –

SHEET 1 OF



NOTICE OF INTENT

SHEET 2 OF

DA-P2

FILE NO. –

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

PROPOSED DRAINAGE AREA PLAN

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	RP	RP	MK	LFK

No.	Date	Dr.By	Ck.By	App.By	Description
		A	P	P	R O V E D

REGISTERED PROFESSIONAL ENGINEER

DATE

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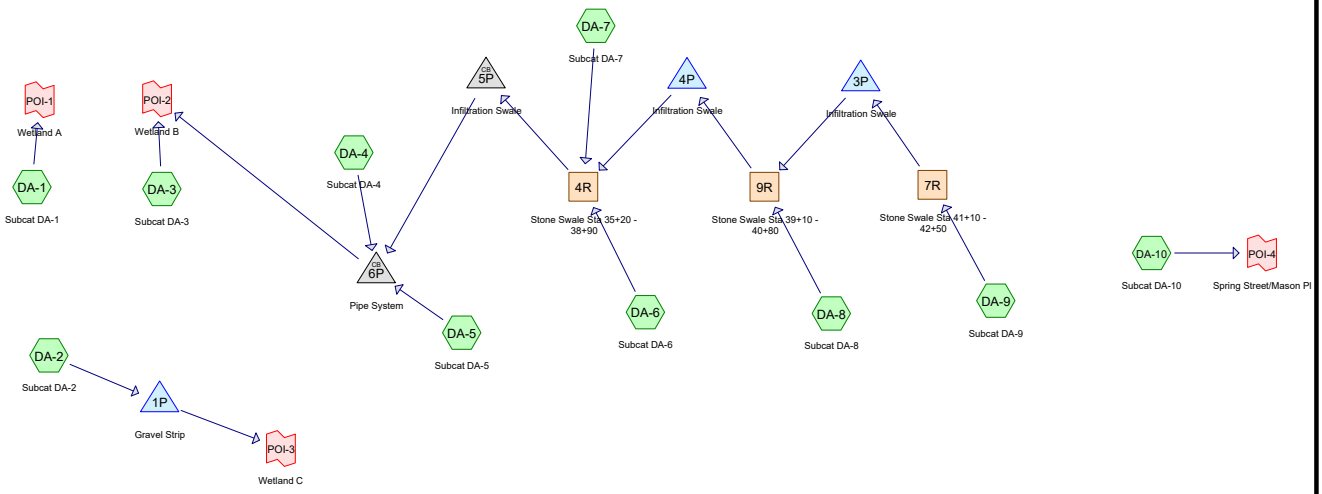


Subcat Reach Pond Link

Routing Diagram for E Belcher Rd - PR-Current
Prepared by Weston & Sampson, Printed 1/17/2021

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type III 24-hr		Default	24.00	1	3.44	2
2	10-Year	Type III 24-hr		Default	24.00	1	5.24	2
3	25-Year	Type III 24-hr		Default	24.00	1	6.37	2
4	100-Year	Type III 24-hr		Default	24.00	1	8.10	2

Area Listing (all nodes)

Area (sq-ft)	CN	Description (subcatchment-numbers)
28,721	51	1 acre lots, 20% imp, HSG A (DA-2, DA-3, DA-4, DA-5, DA-6, DA-7)
19,456	68	1 acre lots, 20% imp, HSG B (DA-10, DA-2, DA-3, DA-4, DA-6, DA-8, DA-9)
8	84	1 acre lots, 20% imp, HSG D (DA-2)
13,268	98	Paved roads w/curbs & sewers, HSG A (DA-2, DA-3, DA-4, DA-5, DA-6)
16,594	98	Paved roads w/curbs & sewers, HSG B (DA-10, DA-2, DA-3, DA-6, DA-8, DA-9)
15,704	98	Paved roads w/curbs & sewers, HSG D (DA-2, DA-3)
19,119	30	Woods, Good, HSG A (DA-4, DA-6, DA-7)
8,294	55	Woods, Good, HSG B (DA-4, DA-7)
7,548	32	Woods/grass comb., Good, HSG A (DA-2, DA-3, DA-4, DA-5, DA-6)
7,343	58	Woods/grass comb., Good, HSG B (DA-1, DA-10, DA-2, DA-3, DA-4, DA-6, DA-8, DA-9)
5,884	79	Woods/grass comb., Good, HSG D (DA-1, DA-2, DA-3)
141,937	**66**	**TOTAL AREA**

Soil Listing (all nodes)

Area (sq-ft)	Soil Group	Subcatchment Numbers
68,655	HSG A	DA-2, DA-3, DA-4, DA-5, DA-6, DA-7
51,686	HSG B	DA-1, DA-10, DA-2, DA-3, DA-4, DA-6, DA-7, DA-8, DA-9
0	HSG C	
21,595	HSG D	DA-1, DA-2, DA-3
0	Other	
141,937		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (sq-ft)	HSG-B (sq-ft)	HSG-C (sq-ft)	HSG-D (sq-ft)	Other (sq-ft)	Total (sq-ft)	Ground Cover
28,721	19,456	0	8	0	48,184	1 acre lots, 20% imp
13,268	16,594	0	15,704	0	45,566	Paved roads w/curbs & sewers
19,119	8,294	0	0	0	27,413	Woods, Good
7,548	7,343	0	5,884	0	20,774	Woods/grass comb., Good
68,655	**51,686**	**0**	**21,595**	**0**	**141,937**	**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3P	219.10	218.10	25.0	0.0400	0.013	12.0	0.0	0.0
2	4P	208.68	207.88	23.0	0.0348	0.013	12.0	0.0	0.0
3	5P	188.78	178.50	164.0	0.0627	0.013	12.0	0.0	0.0
4	6P	176.78	176.64	31.0	0.0045	0.013	15.0	0.0	0.0

Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

SubcatchmentDA-1: Subcat DA-1 Runoff Area=2,015 sf 0.00% Impervious Runoff Depth>1.28"
Tc=6.0 min CN=77 Runoff=0.07 cfs 214 cf

SubcatchmentDA-10: Subcat DA-10 Runoff Area=13,331 sf 58.31% Impervious Runoff Depth>1.61"
Tc=6.0 min CN=82 Runoff=0.62 cfs 1,788 cf

SubcatchmentDA-2: Subcat DA-2 Runoff Area=26,699 sf 77.04% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=88 Runoff=1.57 cfs 4,621 cf

SubcatchmentDA-3: Subcat DA-3 Runoff Area=18,166 sf 18.62% Impervious Runoff Depth>0.34"
Flow Length=305' Tc=12.3 min CN=57 Runoff=0.08 cfs 512 cf

SubcatchmentDA-4: Subcat DA-4 Runoff Area=38,558 sf 15.72% Impervious Runoff Depth>0.27"
Flow Length=325' Tc=19.3 min CN=55 Runoff=0.12 cfs 883 cf

SubcatchmentDA-5: Subcat DA-5 Runoff Area=3,689 sf 93.34% Impervious Runoff Depth>2.62"
Tc=6.0 min CN=94 Runoff=0.26 cfs 807 cf

SubcatchmentDA-6: Subcat DA-6 Runoff Area=11,809 sf 64.37% Impervious Runoff Depth>1.15"
Tc=6.0 min CN=75 Runoff=0.39 cfs 1,136 cf

SubcatchmentDA-7: Subcat DA-7 Runoff Area=17,422 sf 0.08% Impervious Runoff Depth=0.00"
Flow Length=106' Slope=0.0600 '/' Tc=14.0 min CN=32 Runoff=0.00 cfs 0 cf

SubcatchmentDA-8: Subcat DA-8 Runoff Area=5,163 sf 73.54% Impervious Runoff Depth>2.08"
Tc=6.0 min CN=88 Runoff=0.30 cfs 894 cf

SubcatchmentDA-9: Subcat DA-9 Runoff Area=5,084 sf 50.41% Impervious Runoff Depth>1.40"
Tc=6.0 min CN=79 Runoff=0.20 cfs 595 cf

Reach 4R: Stone Swale Sta 35+20 - Avg. Flow Depth=0.39' Max Vel=2.49 fps Inflow=0.80 cfs 1,956 cf
n=0.041 L=390.0' S=0.0490 '/' Capacity=27.66 cfs Outflow=0.74 cfs 1,950 cf

Reach 7R: Stone Swale Sta 41+10 - 42+50 Avg. Flow Depth=0.24' Max Vel=1.73 fps Inflow=0.20 cfs 595 cf
n=0.041 L=145.0' S=0.0448 '/' Capacity=26.46 cfs Outflow=0.20 cfs 593 cf

Reach 9R: Stone Swale Sta 39+10 - Avg. Flow Depth=0.32' Max Vel=2.32 fps Inflow=0.51 cfs 1,178 cf
n=0.041 L=170.0' S=0.0554 '/' Capacity=29.42 cfs Outflow=0.46 cfs 1,176 cf

Pond 1P: Gravel Strip Peak Elev=174.91' Storage=991 cf Inflow=1.57 cfs 4,621 cf
Discarded=0.00 cfs 102 cf Primary=1.66 cfs 3,711 cf Outflow=1.66 cfs 3,813 cf

Pond 3P: Infiltration Swale Peak Elev=219.36' Storage=81 cf Inflow=0.20 cfs 593 cf
Discarded=0.01 cfs 264 cf Primary=0.22 cfs 284 cf Outflow=0.23 cfs 548 cf

Pond 4P: Infiltration Swale Peak Elev=209.06' Storage=83 cf Inflow=0.46 cfs 1,176 cf
Discarded=0.01 cfs 302 cf Primary=0.46 cfs 820 cf Outflow=0.46 cfs 1,122 cf

Pond 5P: Infiltration Swale Peak Elev=189.28' Inflow=0.74 cfs 1,950 cf
12.0" Round Culvert n=0.013 L=164.0' S=0.0627 '/' Outflow=0.74 cfs 1,950 cf

Pond 6P: Pipe System Peak Elev=177.31' Inflow=0.93 cfs 3,640 cf
15.0" Round Culvert n=0.013 L=31.0' S=0.0045 '/' Outflow=0.93 cfs 3,640 cf

Link POI-1: Wetland A Inflow=0.07 cfs 214 cf
Primary=0.07 cfs 214 cf

Link POI-2: Wetland B Inflow=1.00 cfs 4,152 cf
Primary=1.00 cfs 4,152 cf

Link POI-3: Wetland C Inflow=1.66 cfs 3,711 cf
Primary=1.66 cfs 3,711 cf

Link POI-4: Spring Street/Mason Pl Inflow=0.62 cfs 1,788 cf
Primary=0.62 cfs 1,788 cf

Total Runoff Area = 141,937 sf Runoff Volume = 11,449 cf Average Runoff Depth = 0.97"
61.11% Pervious = 86,734 sf 38.89% Impervious = 55,203 sf

Summary for Subcatchment DA-1: Subcat DA-1

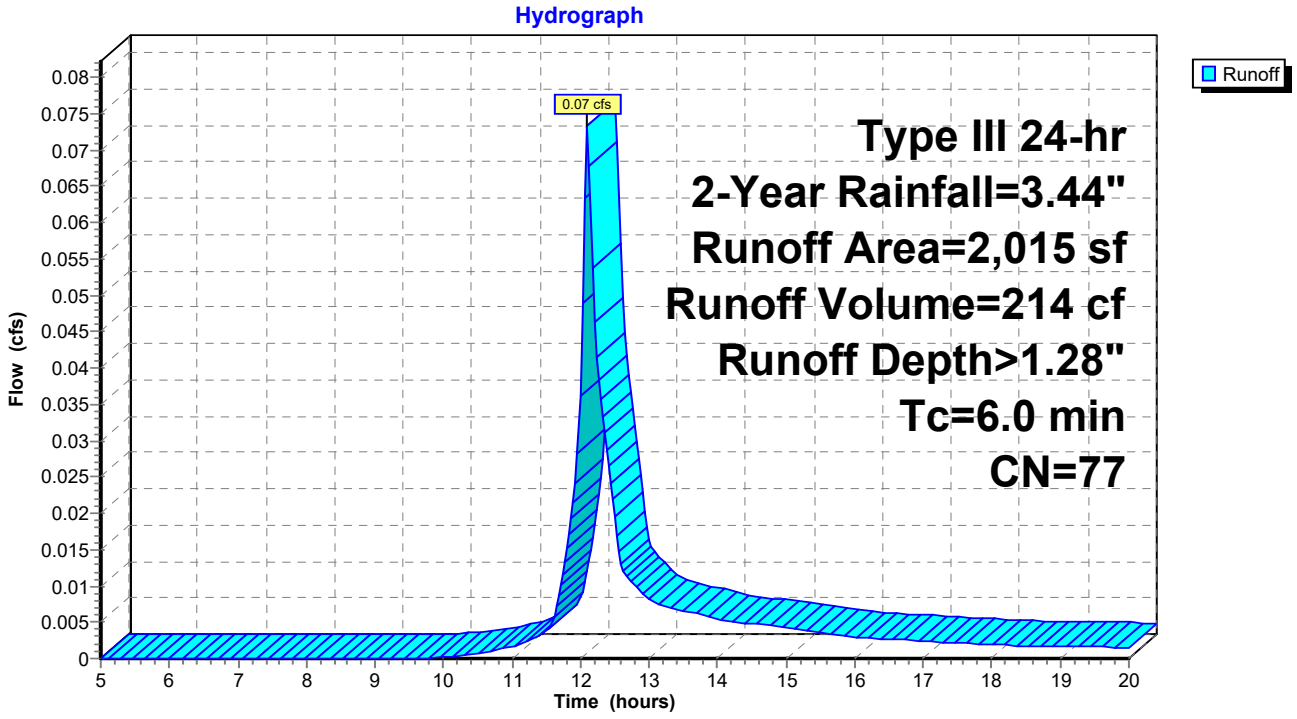
Runoff = 0.07 cfs @ 12.09 hrs, Volume= 214 cf, Depth> 1.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
1,784	79	Woods/grass comb., Good, HSG D
231	58	Woods/grass comb., Good, HSG B
2,015	77	Weighted Average
2,015		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-1: Subcat DA-1



Summary for Subcatchment DA-10: Subcat DA-10

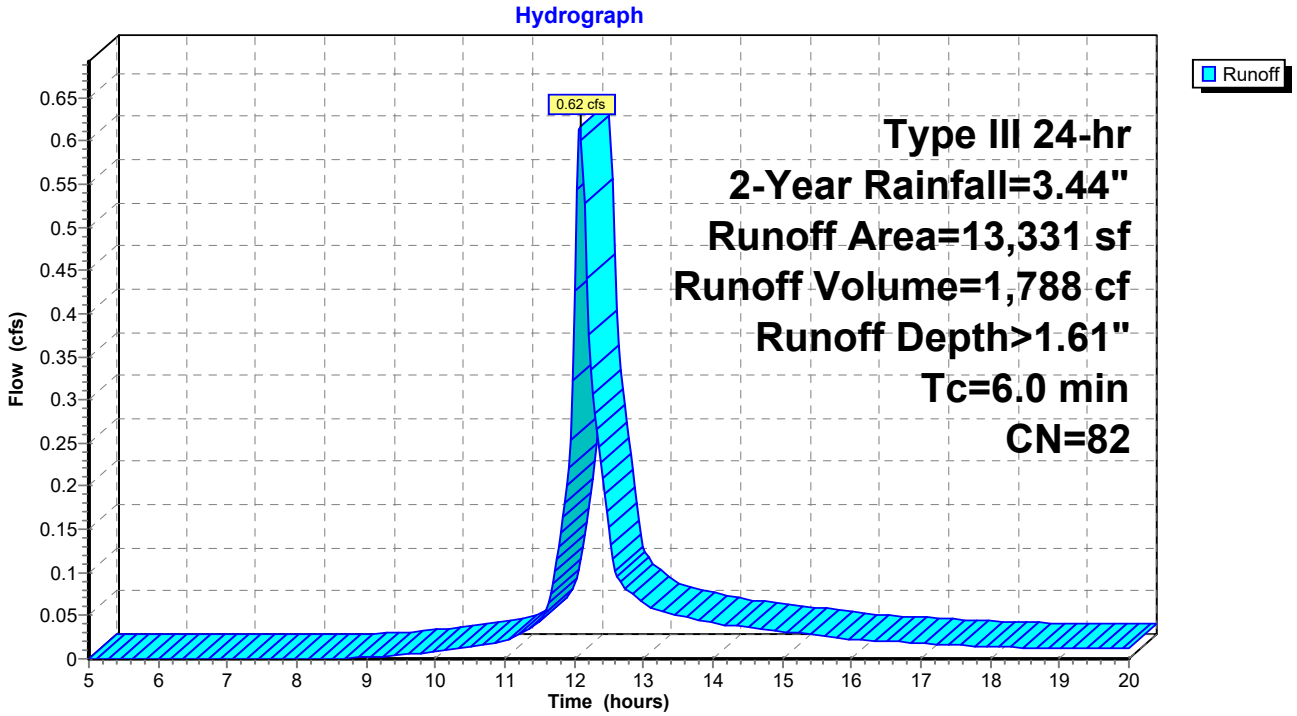
Runoff = 0.62 cfs @ 12.09 hrs, Volume= 1,788 cf, Depth> 1.61"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
6,961	98	Paved roads w/curbs & sewers, HSG B
1,439	68	1 acre lots, 20% imp, HSG B
2,625	68	1 acre lots, 20% imp, HSG B
0	58	Woods/grass comb., Good, HSG B
106	58	Woods/grass comb., Good, HSG B
413	58	Woods/grass comb., Good, HSG B
845	58	Woods/grass comb., Good, HSG B
941	58	Woods/grass comb., Good, HSG B
13,331	82	Weighted Average
5,557		41.69% Pervious Area
7,774		58.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-10: Subcat DA-10



Summary for Subcatchment DA-2: Subcat DA-2

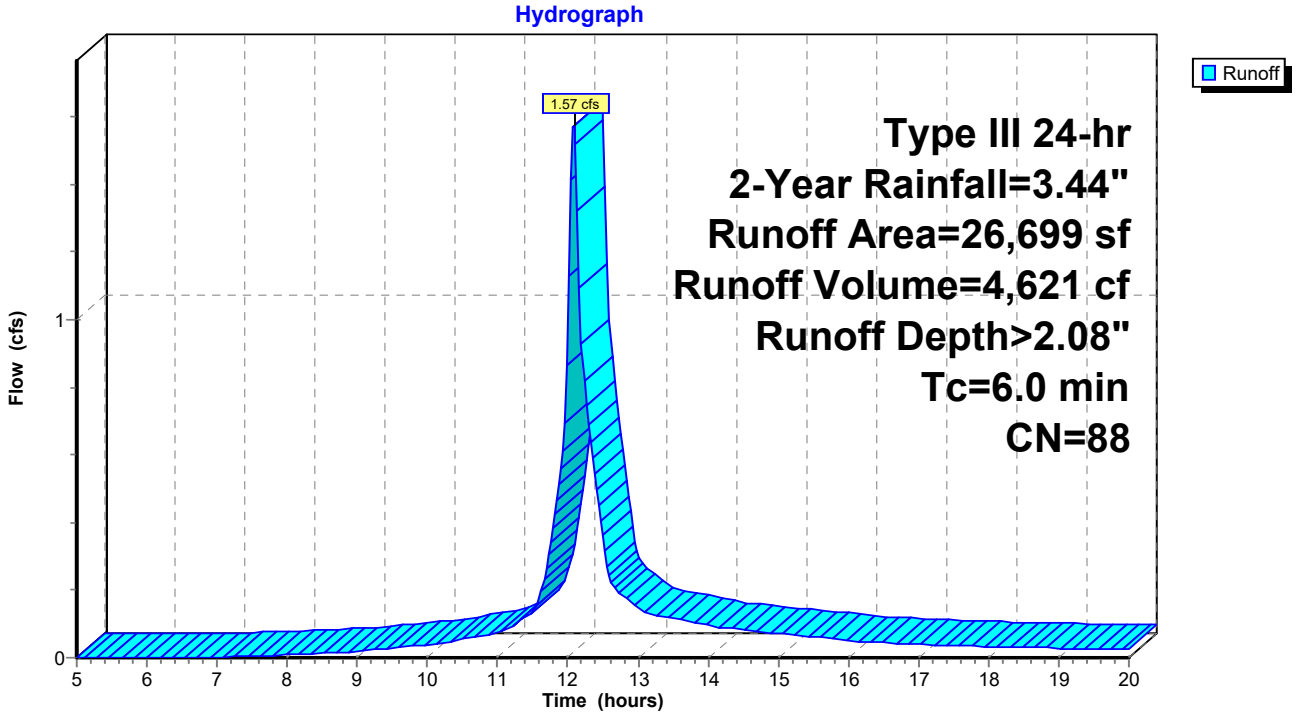
Runoff = 1.57 cfs @ 12.09 hrs, Volume= 4,621 cf, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
2,694	98	Paved roads w/curbs & sewers, HSG A
204	32	Woods/grass comb., Good, HSG A
1,166	32	Woods/grass comb., Good, HSG A
1,009	32	Woods/grass comb., Good, HSG A
785	51	1 acre lots, 20% imp, HSG A
0	51	1 acre lots, 20% imp, HSG A
187	51	1 acre lots, 20% imp, HSG A
15,623	98	Paved roads w/curbs & sewers, HSG D
1	79	Woods/grass comb., Good, HSG D
2,563	79	Woods/grass comb., Good, HSG D
0	79	Woods/grass comb., Good, HSG D
0	79	Woods/grass comb., Good, HSG D
8	84	1 acre lots, 20% imp, HSG D
2,046	98	Paved roads w/curbs & sewers, HSG B
43	68	1 acre lots, 20% imp, HSG B
0	58	Woods/grass comb., Good, HSG B
68	58	Woods/grass comb., Good, HSG B
31	58	Woods/grass comb., Good, HSG B
159	58	Woods/grass comb., Good, HSG B
112	58	Woods/grass comb., Good, HSG B
26,699	88	Weighted Average
6,131		22.96% Pervious Area
20,568		77.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-2: Subcat DA-2



Summary for Subcatchment DA-3: Subcat DA-3

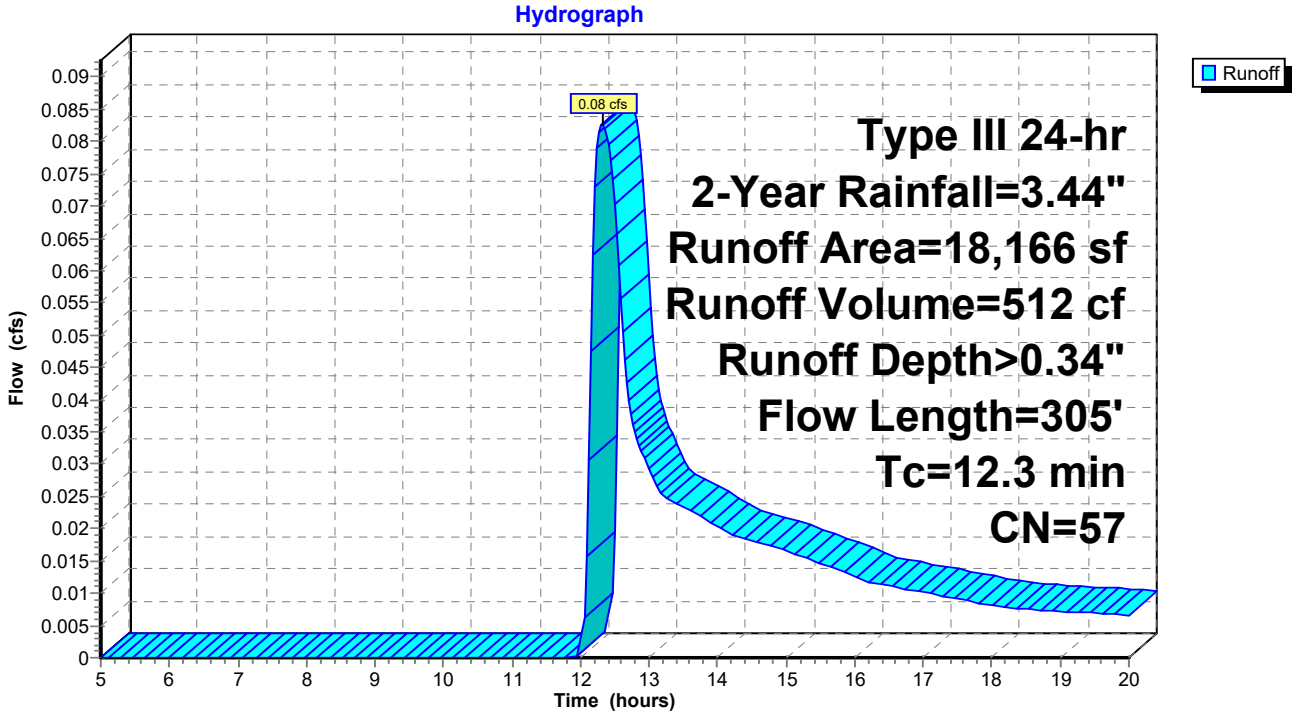
Runoff = 0.08 cfs @ 12.32 hrs, Volume= 512 cf, Depth> 0.34"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
756	98	Paved roads w/curbs & sewers, HSG A
9,528	51	1 acre lots, 20% imp, HSG A
1,971	32	Woods/grass comb., Good, HSG A
2	98	Paved roads w/curbs & sewers, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
48	98	Paved roads w/curbs & sewers, HSG D
13	79	Woods/grass comb., Good, HSG D
414	79	Woods/grass comb., Good, HSG D
1,109	79	Woods/grass comb., Good, HSG D
1	98	Paved roads w/curbs & sewers, HSG D
30	98	Paved roads w/curbs & sewers, HSG D
7	98	Paved roads w/curbs & sewers, HSG B
3,164	68	1 acre lots, 20% imp, HSG B
592	58	Woods/grass comb., Good, HSG B
531	58	Woods/grass comb., Good, HSG B
18,166	57	Weighted Average
14,783		81.38% Pervious Area
3,383		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1200	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.2	205	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	305	Total			

Subcatchment DA-3: Subcat DA-3



Summary for Subcatchment DA-4: Subcat DA-4

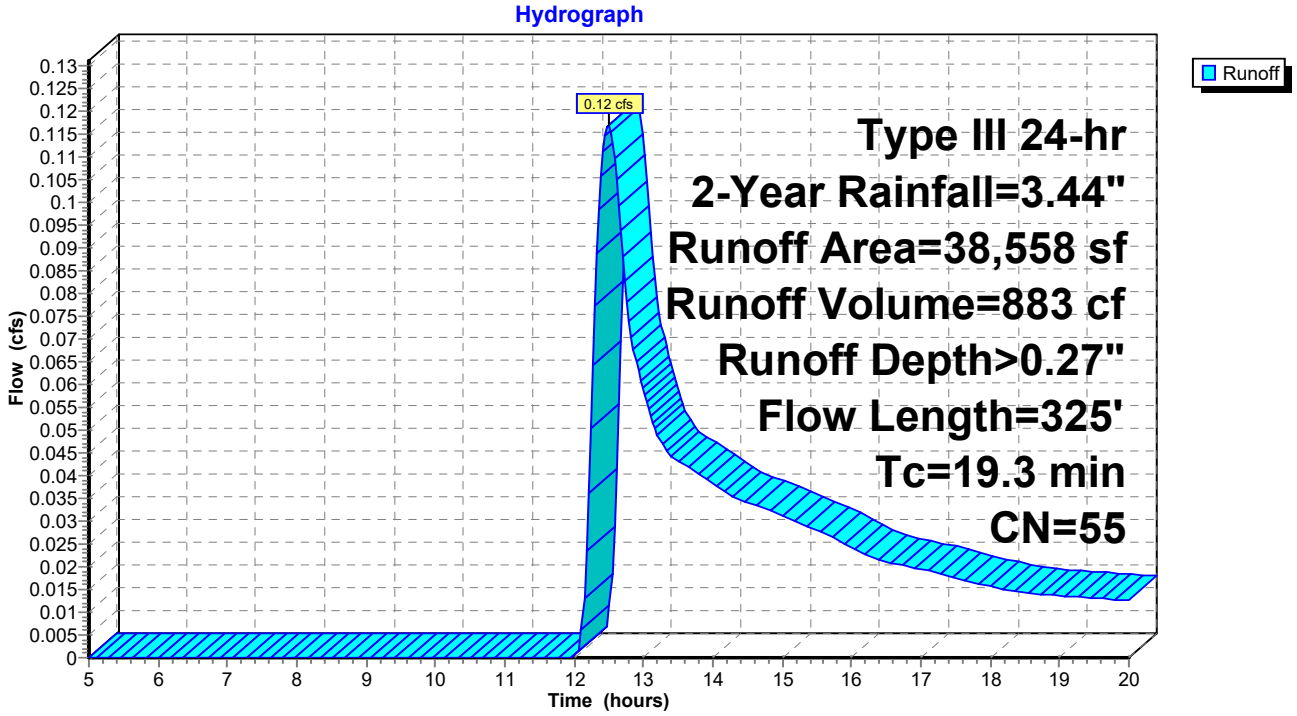
Runoff = 0.12 cfs @ 12.49 hrs, Volume= 883 cf, Depth> 0.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
18,017	51	1 acre lots, 20% imp, HSG A
546	98	Paved roads w/curbs & sewers, HSG A
13	98	Paved roads w/curbs & sewers, HSG A
2,257	30	Woods, Good, HSG A
409	32	Woods/grass comb., Good, HSG A
77	32	Woods/grass comb., Good, HSG A
9,486	68	1 acre lots, 20% imp, HSG B
6,669	55	Woods, Good, HSG B
1,083	58	Woods/grass comb., Good, HSG B
38,558	55	Weighted Average
32,498		84.28% Pervious Area
6,060		15.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	100	0.1250	0.10		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.44"
2.0	225	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.3	325	Total			

Subcatchment DA-4: Subcat DA-4



Summary for Subcatchment DA-5: Subcat DA-5

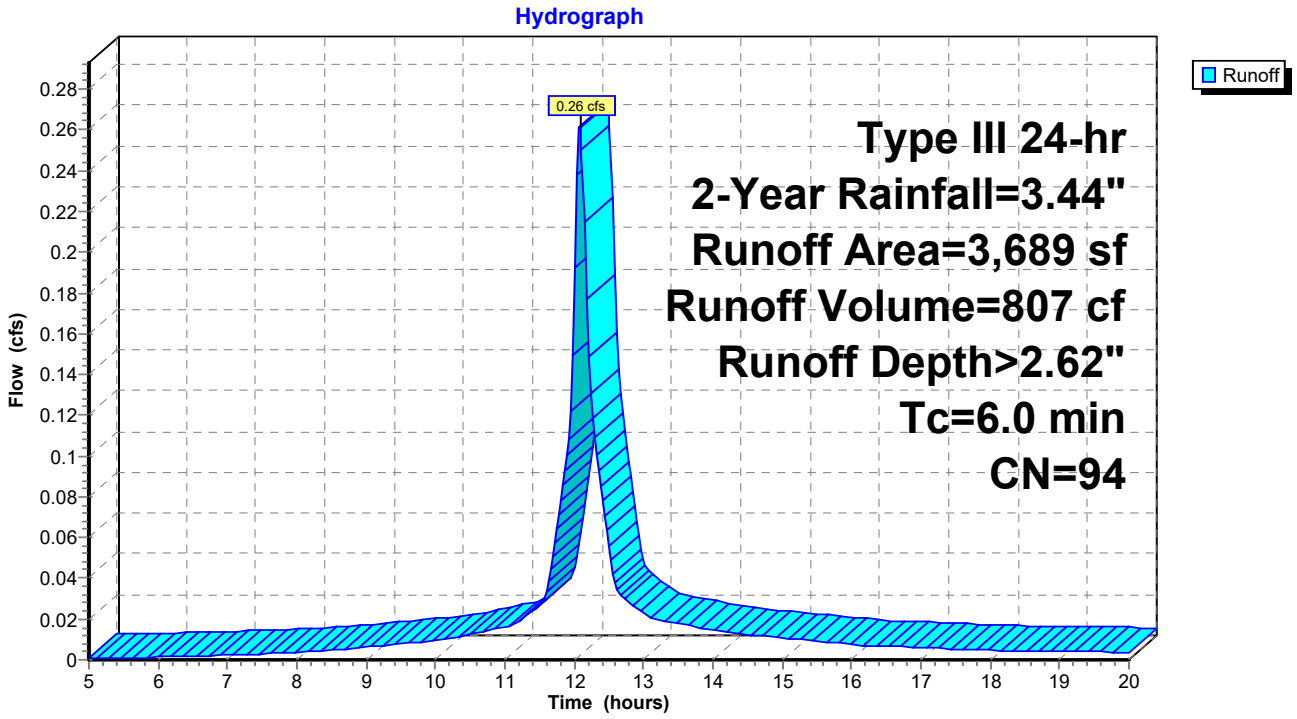
Runoff = 0.26 cfs @ 12.09 hrs, Volume= 807 cf, Depth> 2.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
3,427	98	Paved roads w/curbs & sewers, HSG A
83	51	1 acre lots, 20% imp, HSG A
0	32	Woods/grass comb., Good, HSG A
179	32	Woods/grass comb., Good, HSG A
3,689	94	Weighted Average
246		6.66% Pervious Area
3,444		93.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-5: Subcat DA-5



Summary for Subcatchment DA-6: Subcat DA-6

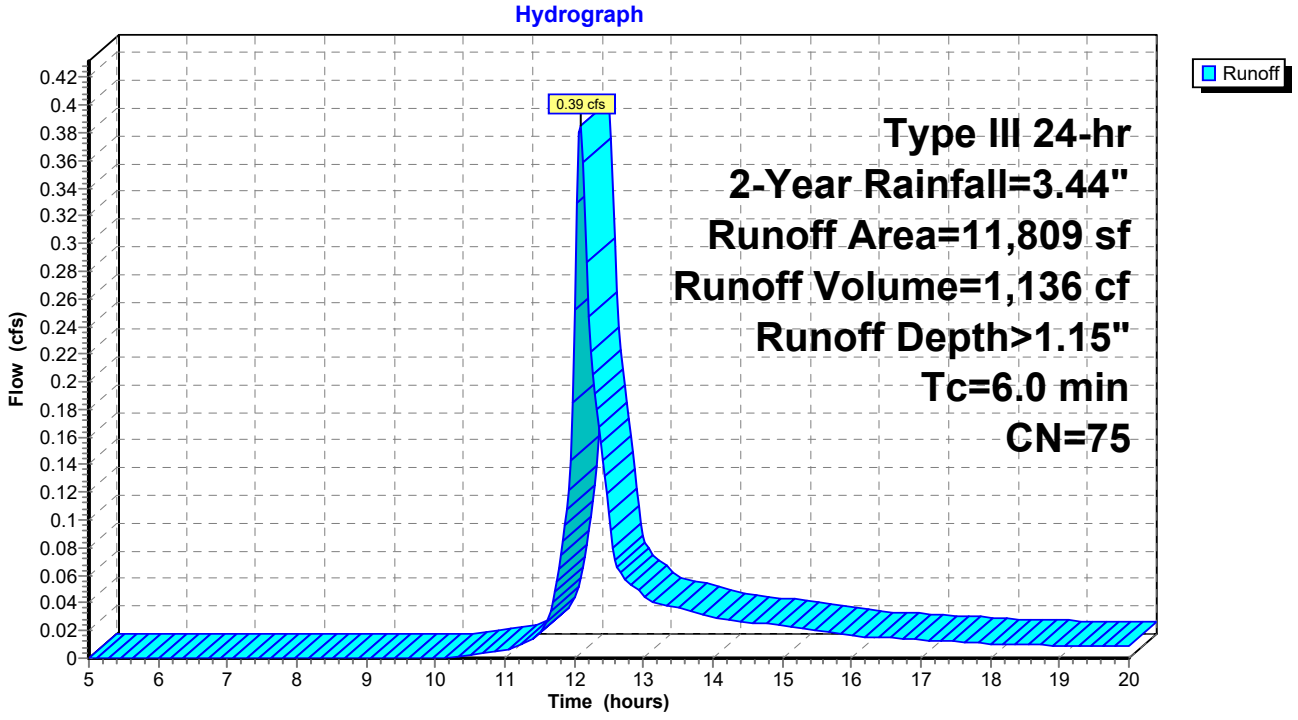
Runoff = 0.39 cfs @ 12.09 hrs, Volume= 1,136 cf, Depth> 1.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
5,831	98	Paved roads w/curbs & sewers, HSG A
1	51	1 acre lots, 20% imp, HSG A
53	51	1 acre lots, 20% imp, HSG A
1,131	30	Woods, Good, HSG A
2,533	32	Woods/grass comb., Good, HSG A
1,759	98	Paved roads w/curbs & sewers, HSG B
4	68	1 acre lots, 20% imp, HSG B
71	58	Woods/grass comb., Good, HSG B
426	58	Woods/grass comb., Good, HSG B
11,809	75	Weighted Average
4,208		35.63% Pervious Area
7,601		64.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-6: Subcat DA-6



Summary for Subcatchment DA-7: Subcat DA-7

[45] Hint: Runoff=Zero

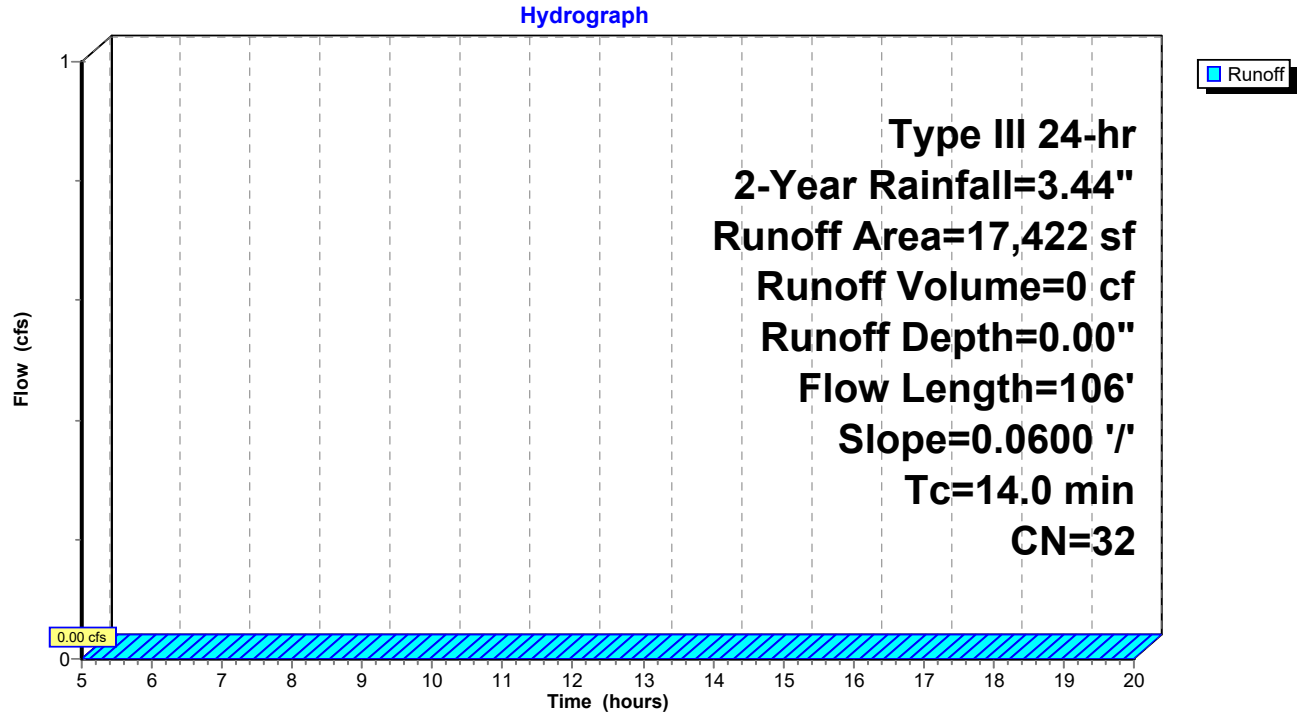
Runoff = 0.00 cfs @ 5.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
67	51	1 acre lots, 20% imp, HSG A
15,731	30	Woods, Good, HSG A
1,625	55	Woods, Good, HSG B
17,422	32	Weighted Average
17,409		99.92% Pervious Area
13		0.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	106	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"

Subcatchment DA-7: Subcat DA-7



Summary for Subcatchment DA-8: Subcat DA-8

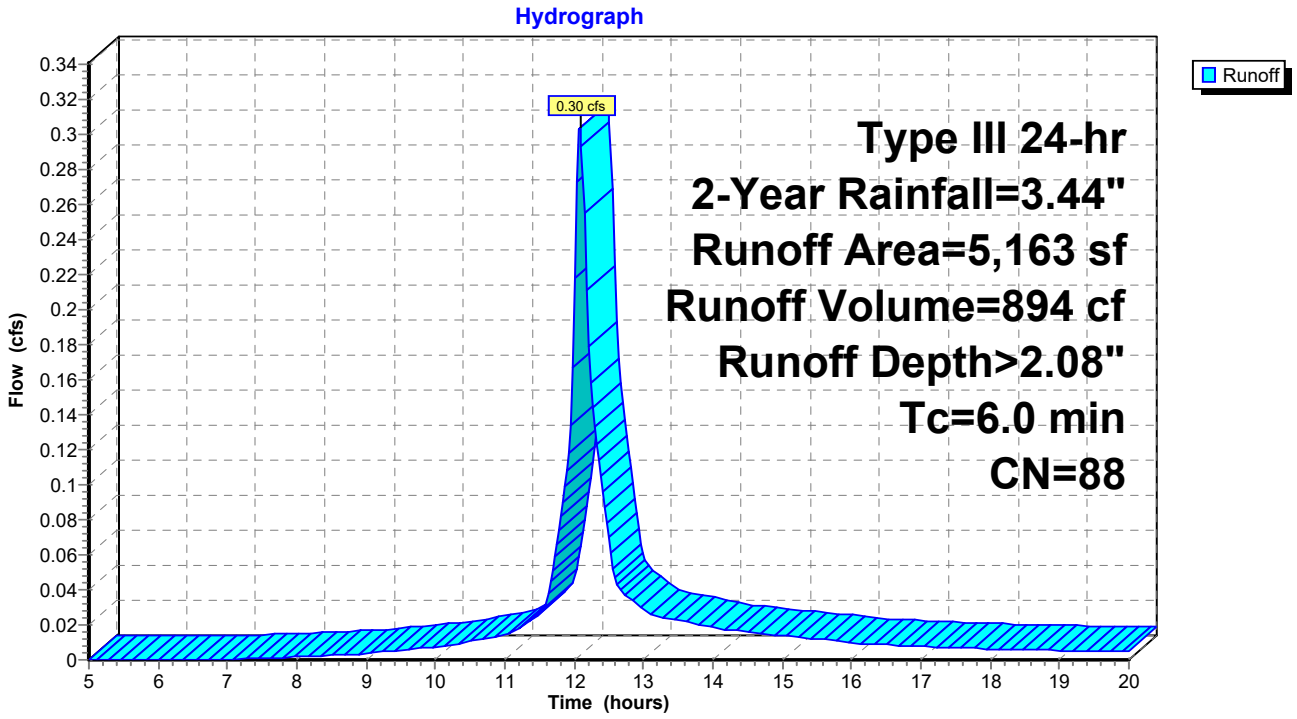
Runoff = 0.30 cfs @ 12.09 hrs, Volume= 894 cf, Depth> 2.08"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
3,711	98	Paved roads w/curbs & sewers, HSG B
429	68	1 acre lots, 20% imp, HSG B
1,002	58	Woods/grass comb., Good, HSG B
21	58	Woods/grass comb., Good, HSG B
5,163	88	Weighted Average
1,366		26.46% Pervious Area
3,797		73.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-8: Subcat DA-8



Summary for Subcatchment DA-9: Subcat DA-9

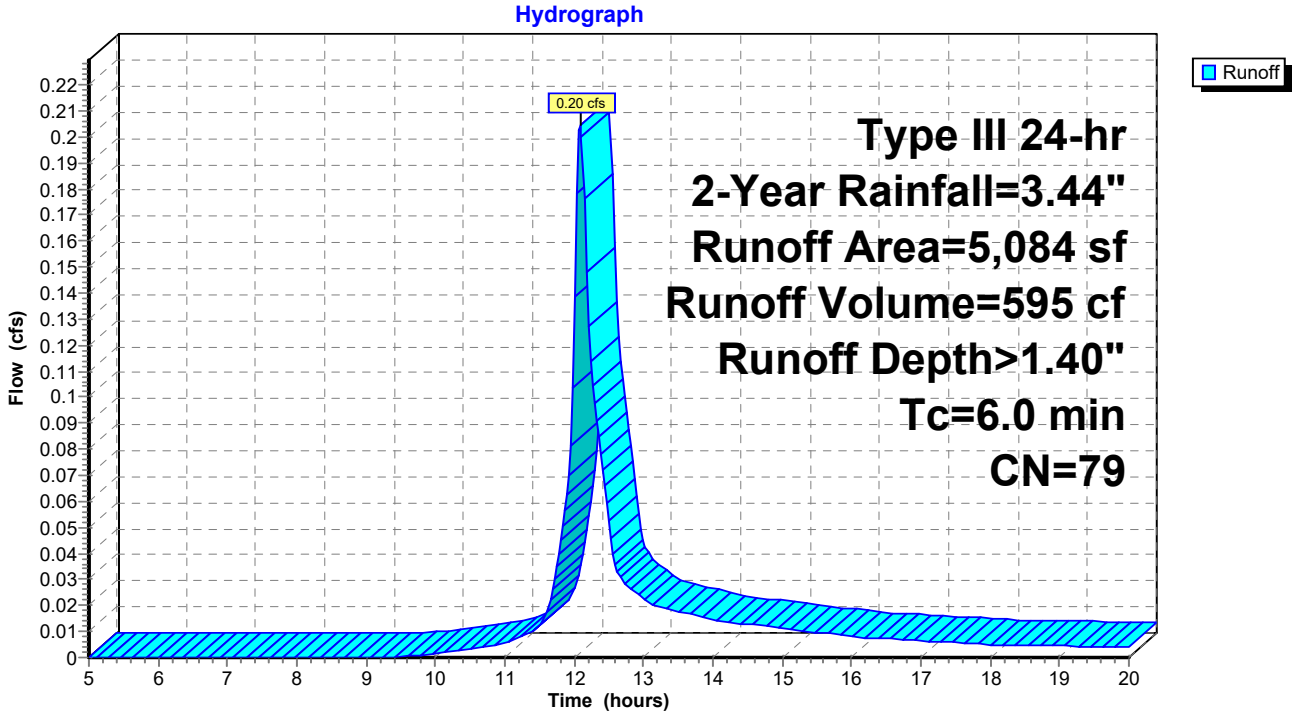
Runoff = 0.20 cfs @ 12.09 hrs, Volume= 595 cf, Depth> 1.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 2-Year Rainfall=3.44"

Area (sf)	CN	Description
2,110	98	Paved roads w/curbs & sewers, HSG B
2	68	1 acre lots, 20% imp, HSG B
2,263	68	1 acre lots, 20% imp, HSG B
638	58	Woods/grass comb., Good, HSG B
71	58	Woods/grass comb., Good, HSG B
5,084	79	Weighted Average
2,521		49.59% Pervious Area
2,563		50.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-9: Subcat DA-9



Summary for Reach 4R: Stone Swale Sta 35+20 - 38+90

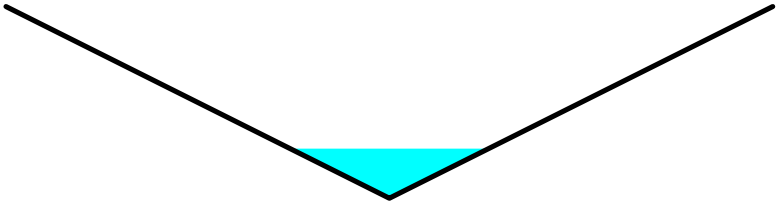
[79] Warning: Submerged Pond 4P Primary device # 2 OUTLET by 0.39'

Inflow Area = 39,479 sf, 35.40% Impervious, Inflow Depth > 0.59" for 2-Year event
Inflow = 0.80 cfs @ 12.13 hrs, Volume= 1,956 cf
Outflow = 0.74 cfs @ 12.21 hrs, Volume= 1,950 cf, Atten= 7%, Lag= 4.8 min

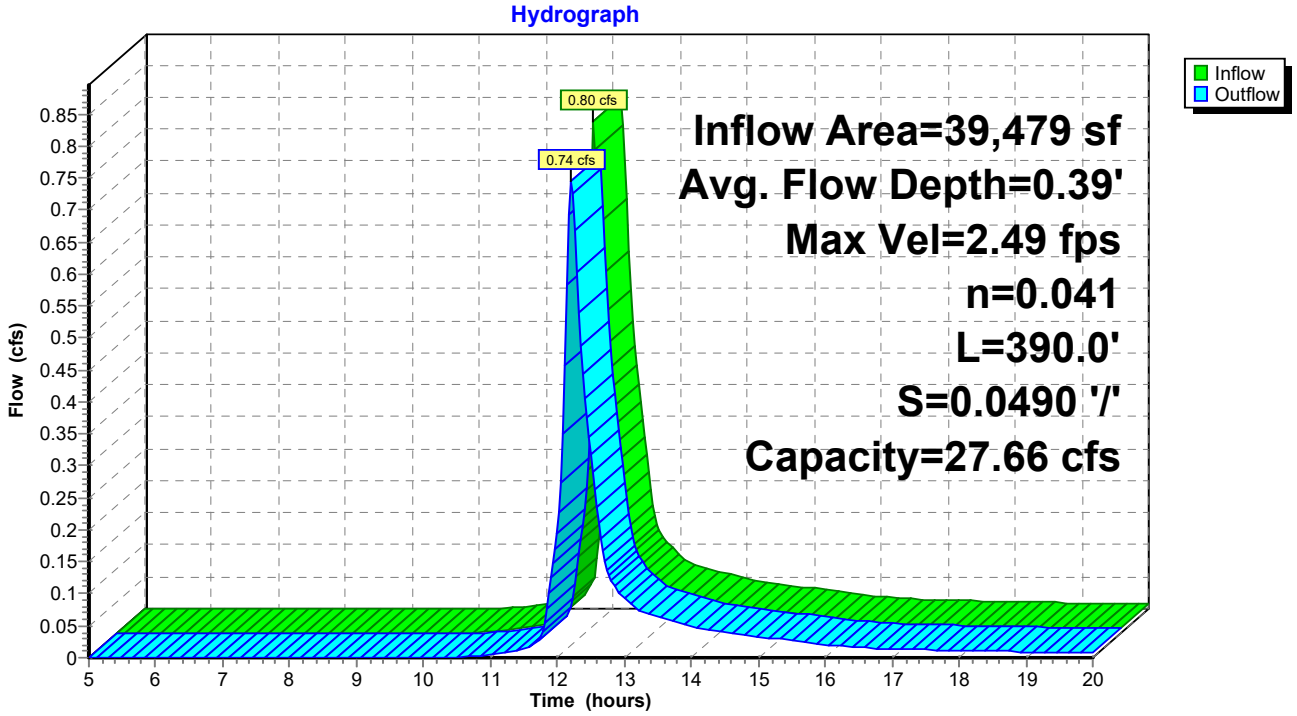
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 2.49 fps, Min. Travel Time= 2.6 min
Avg. Velocity = 1.08 fps, Avg. Travel Time= 6.0 min

Peak Storage= 117 cf @ 12.16 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 1.55'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 27.66 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 390.0' Slope= 0.0490 '/'
Inlet Invert= 207.88', Outlet Invert= 188.78'



Reach 4R: Stone Swale Sta 35+20 - 38+90



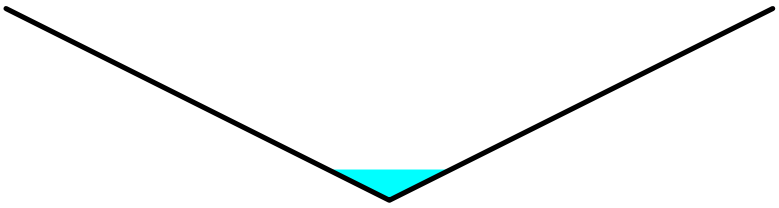
Summary for Reach 7R: Stone Swale Sta 41+10 - 42+50

Inflow Area = 5,084 sf, 50.41% Impervious, Inflow Depth > 1.40" for 2-Year event
Inflow = 0.20 cfs @ 12.09 hrs, Volume= 595 cf
Outflow = 0.20 cfs @ 12.14 hrs, Volume= 593 cf, Atten= 3%, Lag= 2.6 min

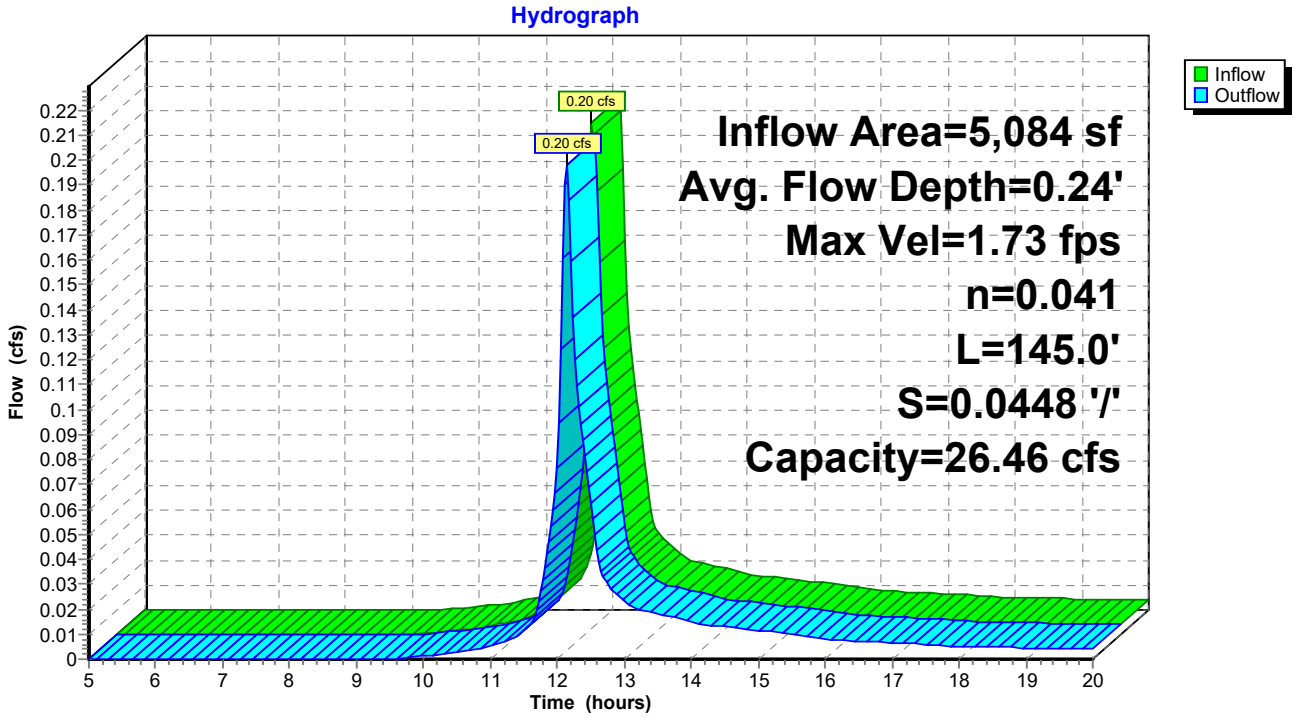
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 1.73 fps, Min. Travel Time= 1.4 min
Avg. Velocity = 0.81 fps, Avg. Travel Time= 3.0 min

Peak Storage= 17 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.24' , Surface Width= 0.96'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 26.46 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 145.0' Slope= 0.0448 '/'
Inlet Invert= 225.60', Outlet Invert= 219.10'



Reach 7R: Stone Swale Sta 41+10 - 42+50



Summary for Reach 9R: Stone Swale Sta 39+10 - 40+80

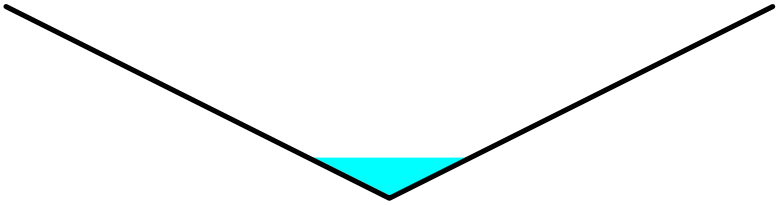
[79] Warning: Submerged Pond 3P Primary device # 2 OUTLET by 0.32'

Inflow Area = 10,247 sf, 62.07% Impervious, Inflow Depth > 1.38" for 2-Year event
Inflow = 0.51 cfs @ 12.09 hrs, Volume= 1,178 cf
Outflow = 0.46 cfs @ 12.14 hrs, Volume= 1,176 cf, Atten= 9%, Lag= 3.5 min

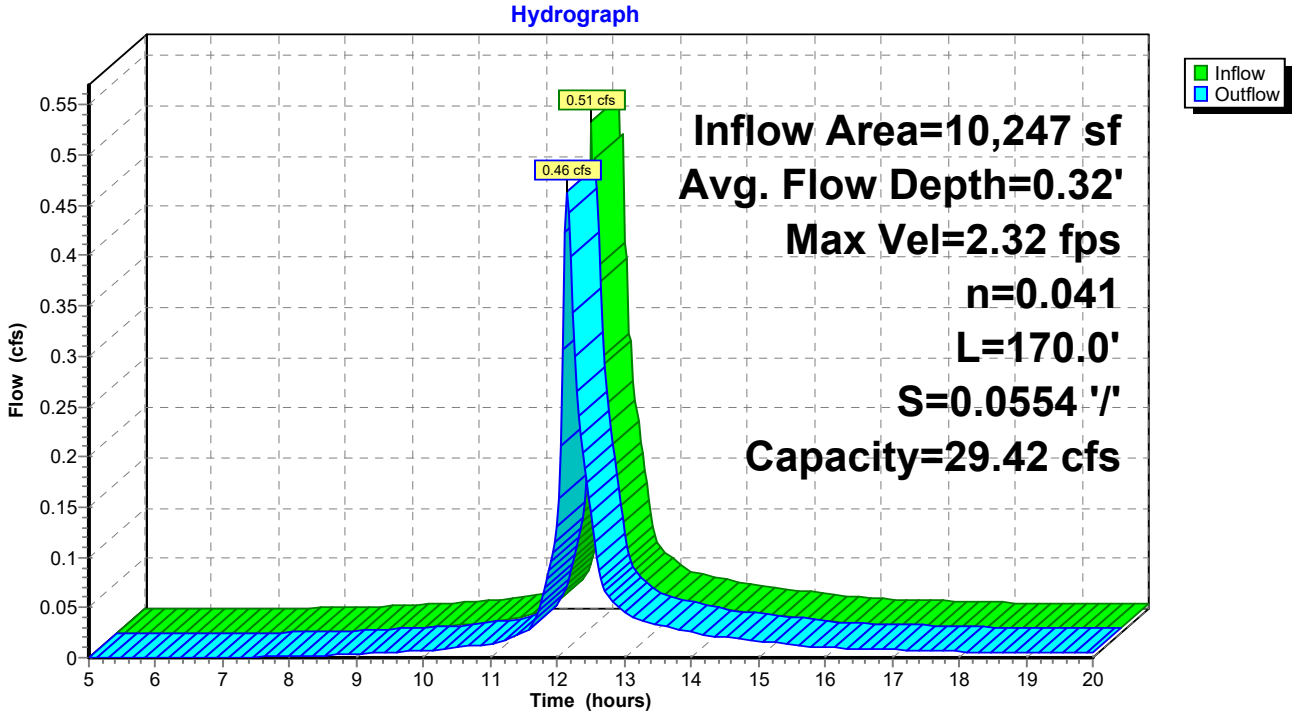
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 2.32 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.92 fps, Avg. Travel Time= 3.1 min

Peak Storage= 34 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.32' , Surface Width= 1.27'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 29.42 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 170.0' Slope= 0.0554 '/'
Inlet Invert= 218.10', Outlet Invert= 208.68'



Reach 9R: Stone Swale Sta 39+10 - 40+80



Summary for Pond 1P: Gravel Strip

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 26,699 sf, 77.04% Impervious, Inflow Depth > 2.08" for 2-Year event
Inflow = 1.57 cfs @ 12.09 hrs, Volume= 4,621 cf
Outflow = 1.66 cfs @ 12.08 hrs, Volume= 3,813 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 10.61 hrs, Volume= 102 cf
Primary = 1.66 cfs @ 12.08 hrs, Volume= 3,711 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 174.91' @ 12.08 hrs Surf.Area= 1,300 sf Storage= 991 cf

Plug-Flow detention time= 76.7 min calculated for 3,813 cf (83% of inflow)
Center-of-Mass det. time= 28.2 min (807.1 - 778.9)

Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	1,040 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,600 cf Overall x 40.0% Voids

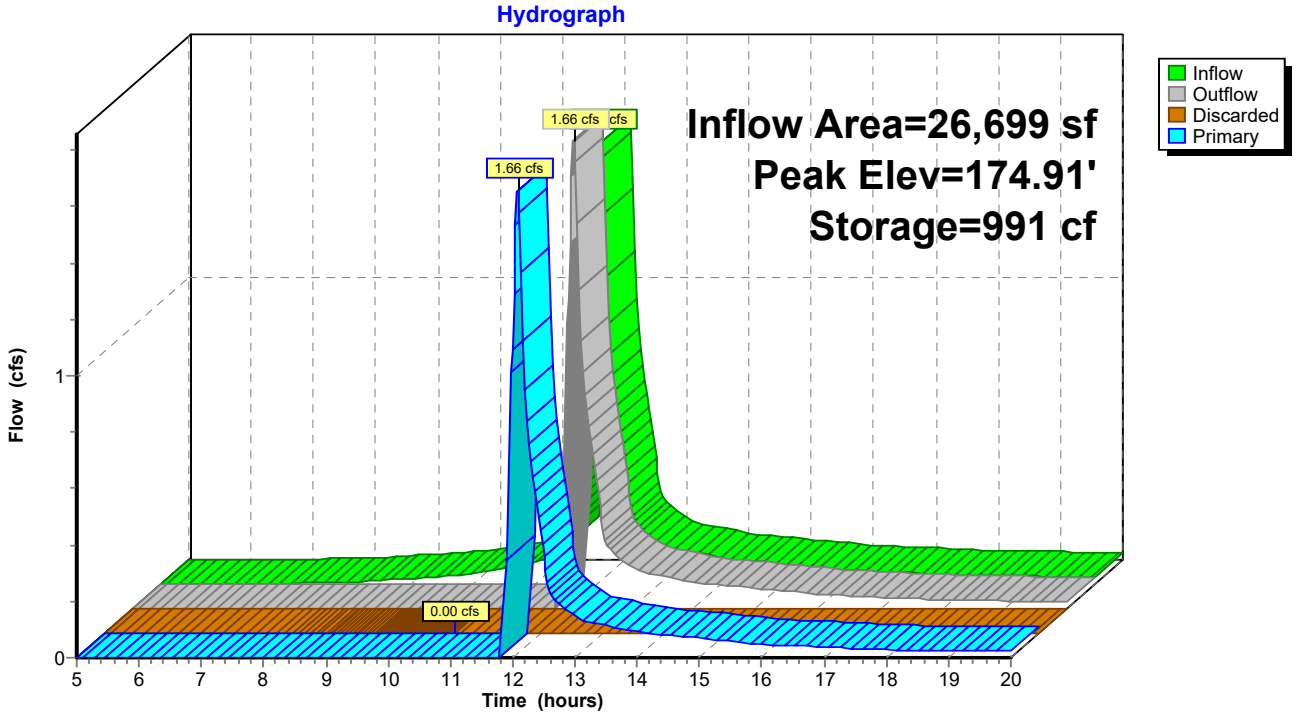
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.00	1,300	0	0
175.00	1,300	2,600	2,600

Device	Routing	Invert	Outlet Devices
#0	Primary	175.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	173.00'	**0.090 in/hr Exfiltration over Surface area** Phase-In= 0.50'
#2	Primary	174.90'	**650.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 10.61 hrs HW=173.51' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=0.95 cfs @ 12.08 hrs HW=174.91' (Free Discharge)
↑—**2=Broad-Crested Rectangular Weir** (Weir Controls 0.95 cfs @ 0.22 fps)

Pond 1P: Gravel Strip



Summary for Pond 3P: Infiltration Swale

[88] Warning: Qout>Qin may require smaller dt or Finer Routing
[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=3)
[62] Hint: Exceeded Reach 7R OUTLET depth by 0.02' @ 12.14 hrs

Inflow Area = 5,084 sf, 50.41% Impervious, Inflow Depth > 1.40" for 2-Year event
Inflow = 0.20 cfs @ 12.14 hrs, Volume= 593 cf
Outflow = 0.23 cfs @ 12.14 hrs, Volume= 548 cf, Atten= 0%, Lag= 0.3 min
Discarded = 0.01 cfs @ 12.14 hrs, Volume= 264 cf
Primary = 0.22 cfs @ 12.14 hrs, Volume= 284 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 219.36' @ 12.14 hrs Surf.Area= 146 sf Storage= 81 cf

Plug-Flow detention time= 58.1 min calculated for 547 cf (92% of inflow)
Center-of-Mass det. time= 32.5 min (838.5 - 806.0)

Volume	Invert	Avail.Storage	Storage Description
#1	216.10'	79 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 197 cf Overall x 40.0% Voids
#2	219.10'	77 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		156 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
216.10	3	0	0	3
217.10	45	20	20	48
218.10	90	66	86	101
219.10	134	111	197	159

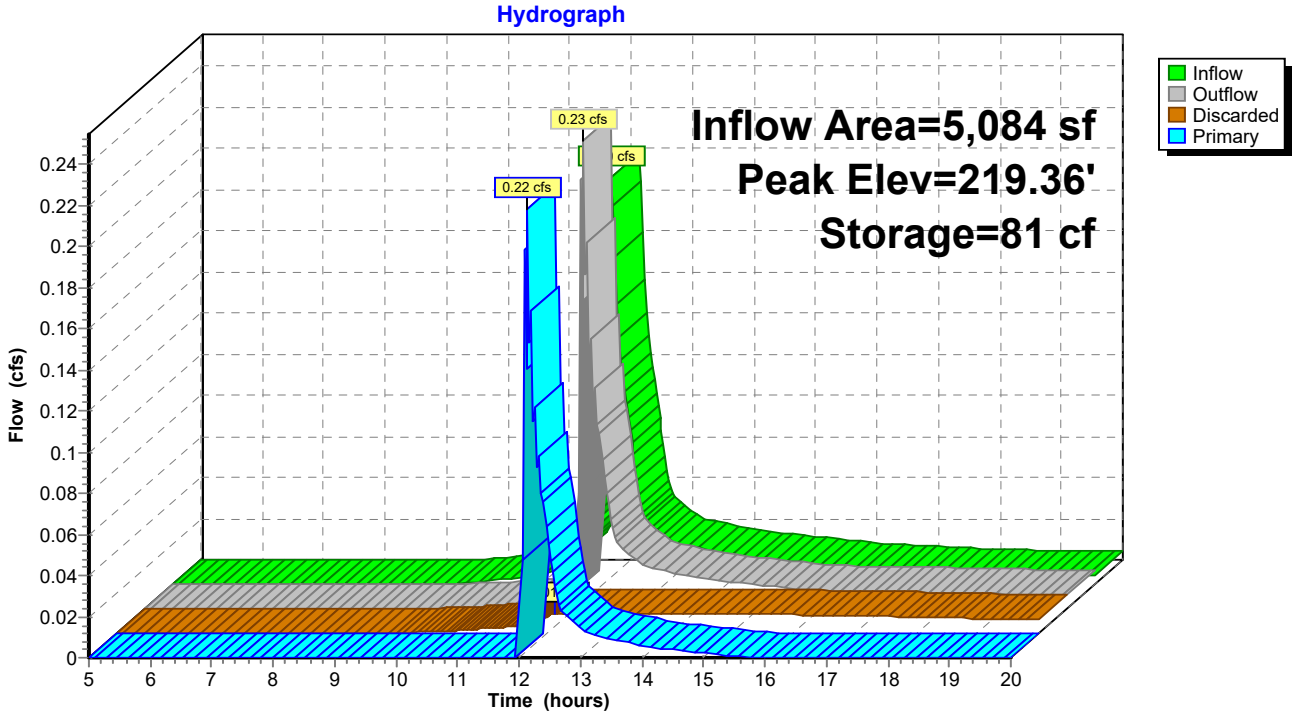
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
219.10	3	0	0	3
220.60	132	77	77	137

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.10'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	219.10'	**12.0" Round Culvert** L= 25.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 219.10' / 218.10' S= 0.0400 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.14 hrs HW=219.35' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.21 cfs @ 12.14 hrs HW=219.35' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.21 cfs @ 1.36 fps)

Pond 3P: Infiltration Swale



Summary for Pond 4P: Infiltration Swale

[62] Hint: Exceeded Reach 9R OUTLET depth by 0.07' @ 12.17 hrs

Inflow Area = 10,247 sf, 62.07% Impervious, Inflow Depth > 1.38" for 2-Year event
Inflow = 0.46 cfs @ 12.14 hrs, Volume= 1,176 cf
Outflow = 0.46 cfs @ 12.15 hrs, Volume= 1,122 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.15 hrs, Volume= 302 cf
Primary = 0.46 cfs @ 12.15 hrs, Volume= 820 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 209.06' @ 12.15 hrs Surf.Area= 146 sf Storage= 83 cf

Plug-Flow detention time= 32.1 min calculated for 1,120 cf (95% of inflow)
Center-of-Mass det. time= 15.8 min (791.9 - 776.0)

Volume	Invert	Avail.Storage	Storage Description
#1	205.80'	81 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 202 cf Overall x 40.0% Voids
#2	208.80'	77 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		158 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.80	3	0	0	3
206.70	45	18	18	47
207.80	90	73	91	102
208.80	134	111	202	160

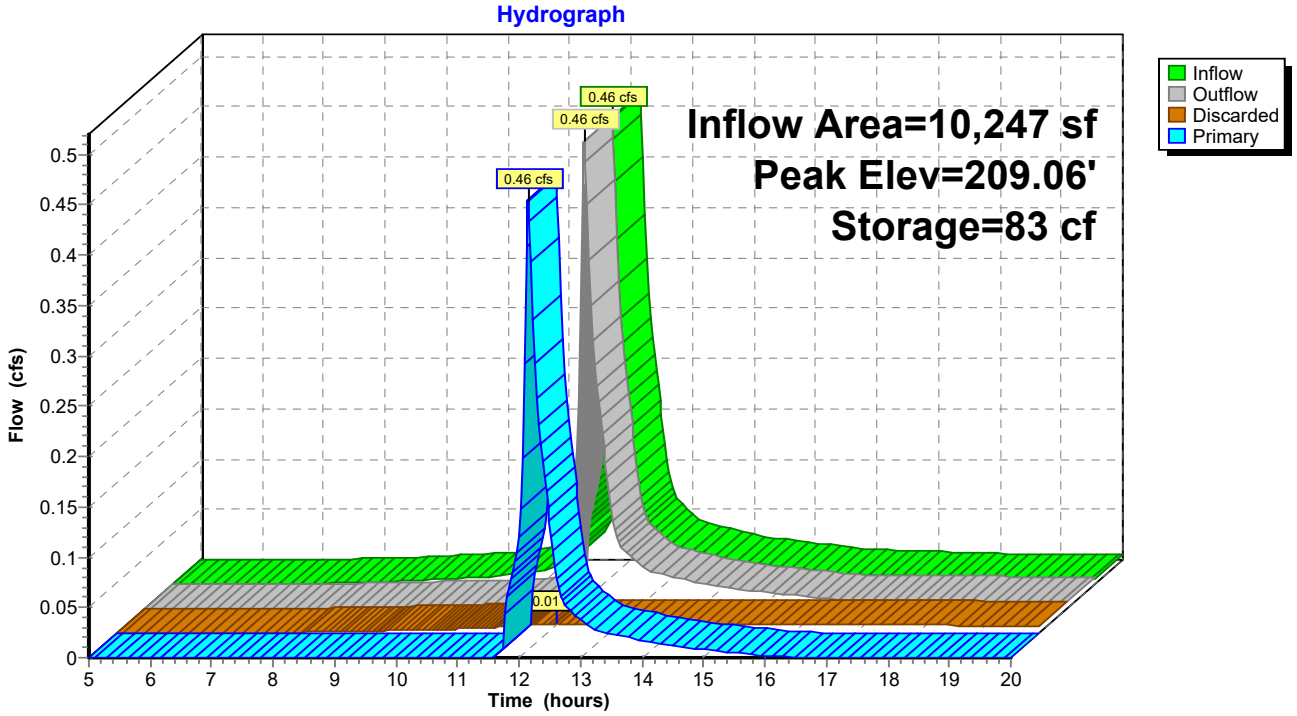
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.80	3	0	0	3
210.30	132	77	77	137

Device	Routing	Invert	Outlet Devices
#1	Discarded	205.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	208.68'	**12.0" Round Culvert** L= 23.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 208.68' / 207.88' S= 0.0348 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.15 hrs HW=209.06' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.45 cfs @ 12.15 hrs HW=209.06' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.45 cfs @ 1.65 fps)

Pond 4P: Infiltration Swale



Summary for Pond 5P: Infiltration Swale

[57] Hint: Peaked at 189.28' (Flood elevation advised)
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.13' @ 12.23 hrs

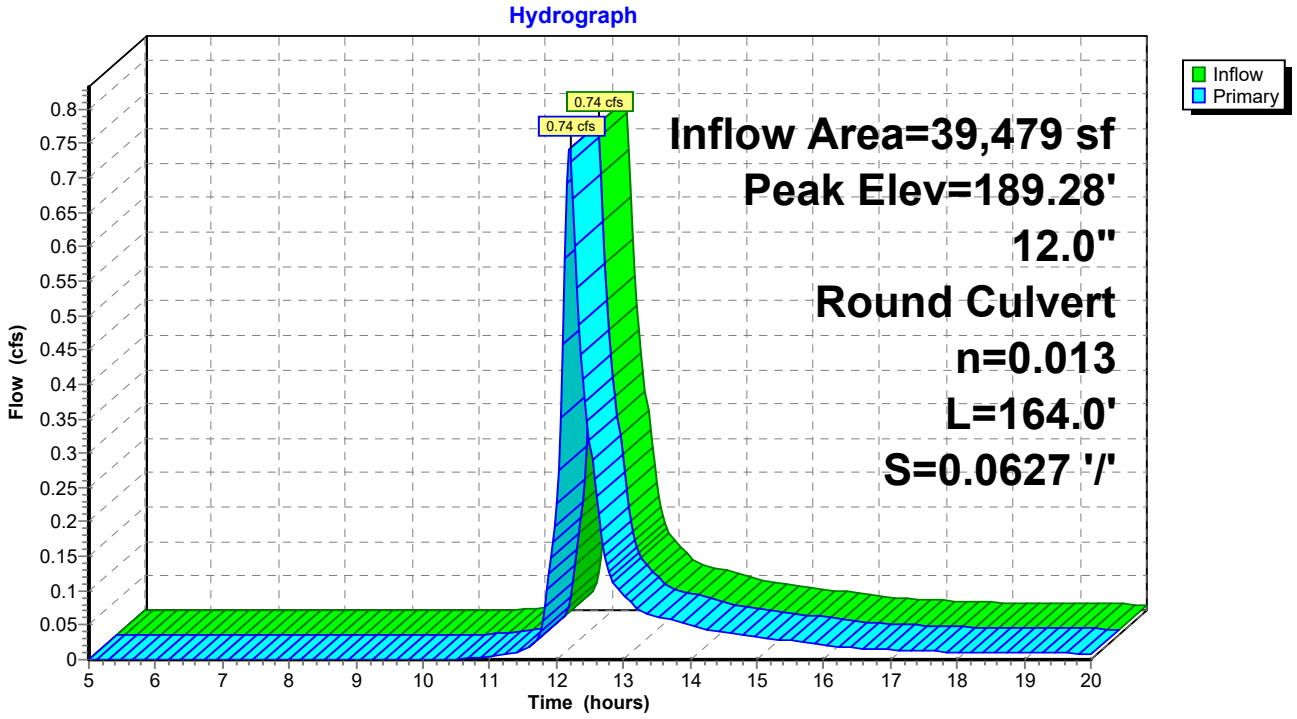
Inflow Area = 39,479 sf, 35.40% Impervious, Inflow Depth > 0.59" for 2-Year event
Inflow = 0.74 cfs @ 12.21 hrs, Volume= 1,950 cf
Outflow = 0.74 cfs @ 12.21 hrs, Volume= 1,950 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.74 cfs @ 12.21 hrs, Volume= 1,950 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 189.28' @ 12.21 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	188.78'	**12.0" Round Culvert** L= 164.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.78' / 178.50' S= 0.0627 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=0.74 cfs @ 12.21 hrs HW=189.28' (Free Discharge)
↑**1=Culvert** (Inlet Controls 0.74 cfs @ 1.89 fps)

Pond 5P: Infiltration Swale



Summary for Pond 6P: Pipe System

[57] Hint: Peaked at 177.31' (Flood elevation advised)

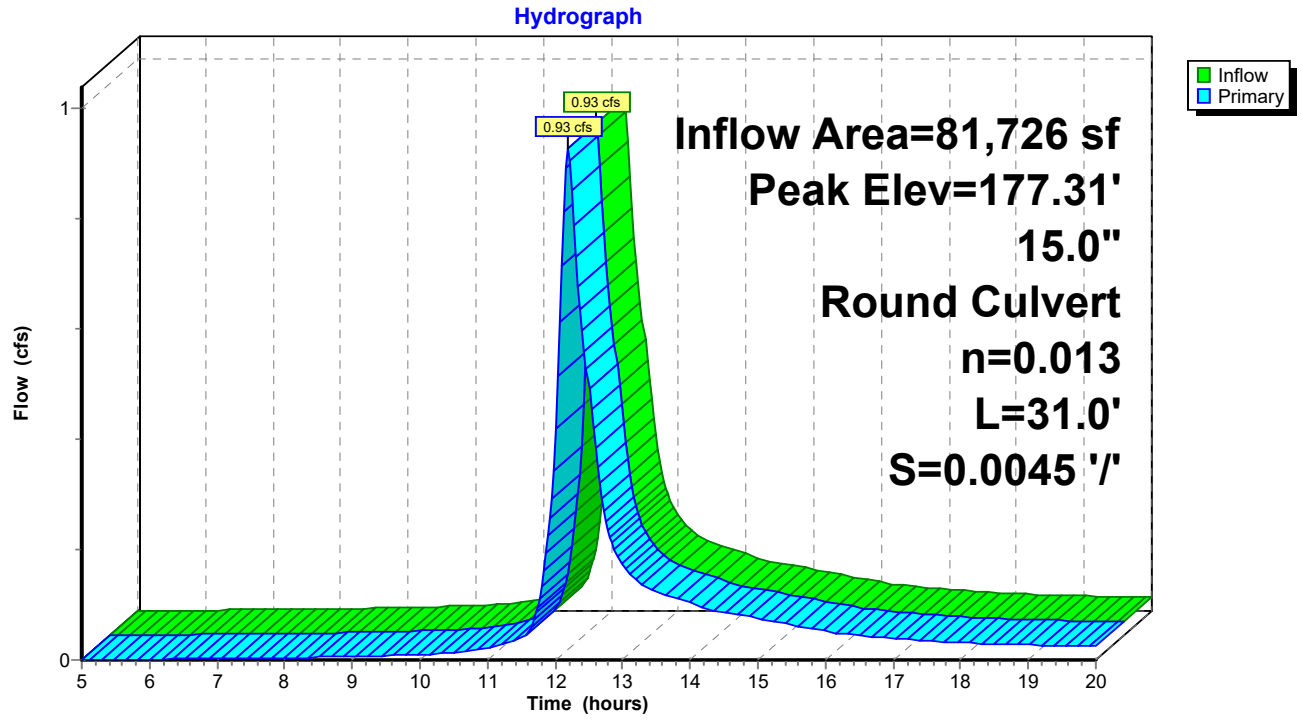
Inflow Area = 81,726 sf, 28.73% Impervious, Inflow Depth > 0.53" for 2-Year event
Inflow = 0.93 cfs @ 12.20 hrs, Volume= 3,640 cf
Outflow = 0.93 cfs @ 12.20 hrs, Volume= 3,640 cf, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.20 hrs, Volume= 3,640 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 177.31' @ 12.20 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	176.78'	**15.0" Round Culvert** L= 31.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 176.78' / 176.64' S= 0.0045 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=0.92 cfs @ 12.20 hrs HW=177.31' (Free Discharge)
1=Culvert (Barrel Controls 0.92 cfs @ 2.75 fps)

Pond 6P: Pipe System

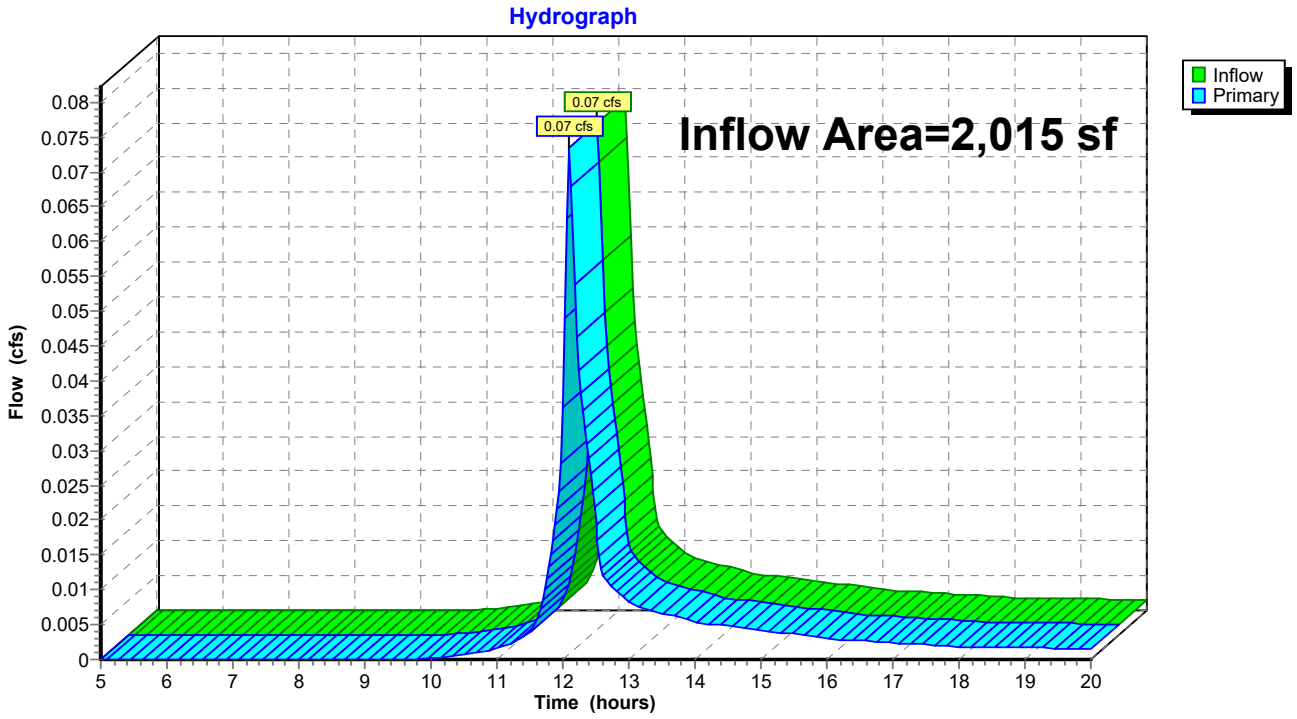


Summary for Link POI-1: Wetland A

Inflow Area = 2,015 sf, 0.00% Impervious, Inflow Depth > 1.28" for 2-Year event
Inflow = 0.07 cfs @ 12.09 hrs, Volume= 214 cf
Primary = 0.07 cfs @ 12.09 hrs, Volume= 214 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-1: Wetland A

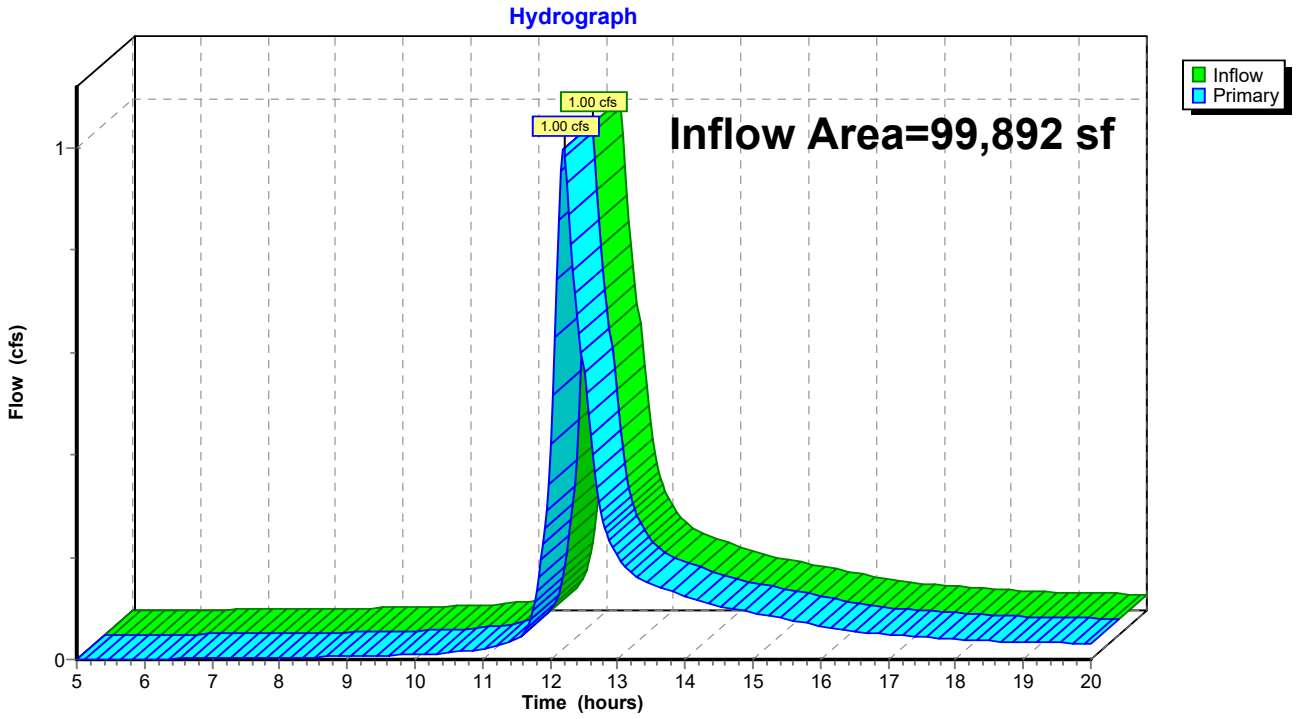


Summary for Link POI-2: Wetland B

Inflow Area = 99,892 sf, 26.89% Impervious, Inflow Depth > 0.50" for 2-Year event
Inflow = 1.00 cfs @ 12.21 hrs, Volume= 4,152 cf
Primary = 1.00 cfs @ 12.21 hrs, Volume= 4,152 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-2: Wetland B

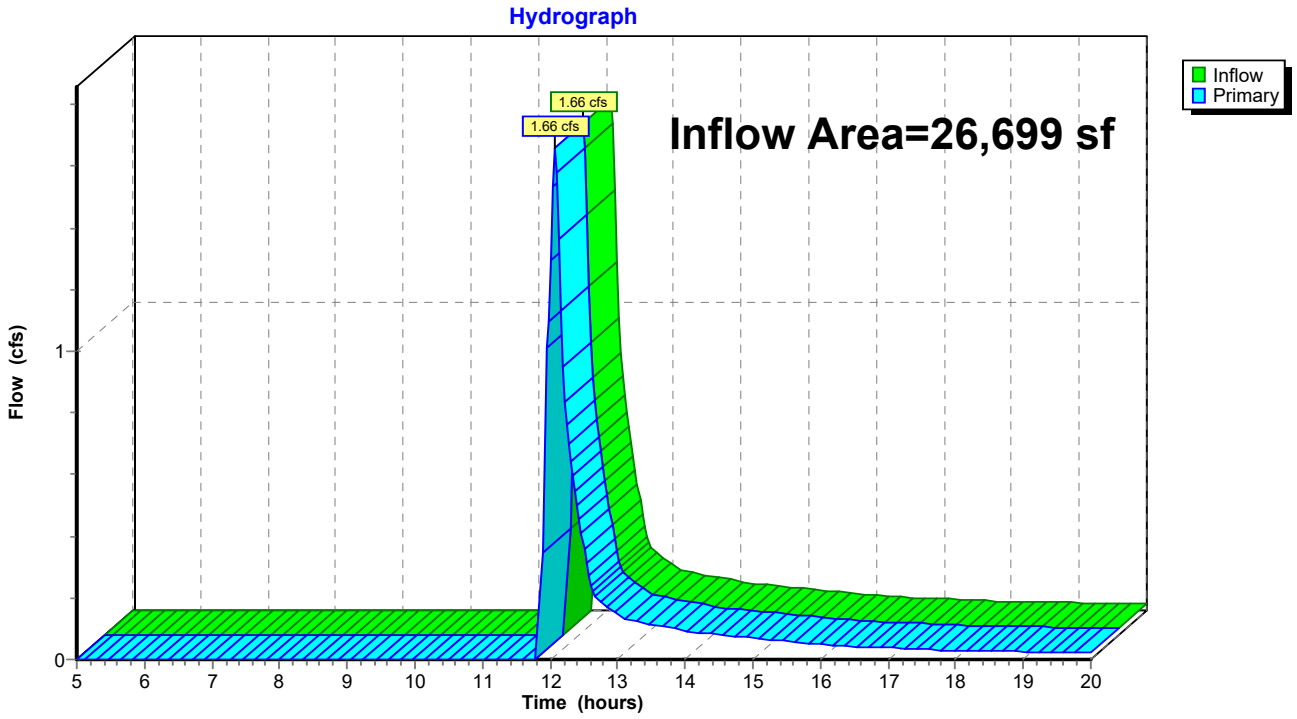


Summary for Link POI-3: Wetland C

Inflow Area = 26,699 sf, 77.04% Impervious, Inflow Depth > 1.67" for 2-Year event
Inflow = 1.66 cfs @ 12.08 hrs, Volume= 3,711 cf
Primary = 1.66 cfs @ 12.08 hrs, Volume= 3,711 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-3: Wetland C

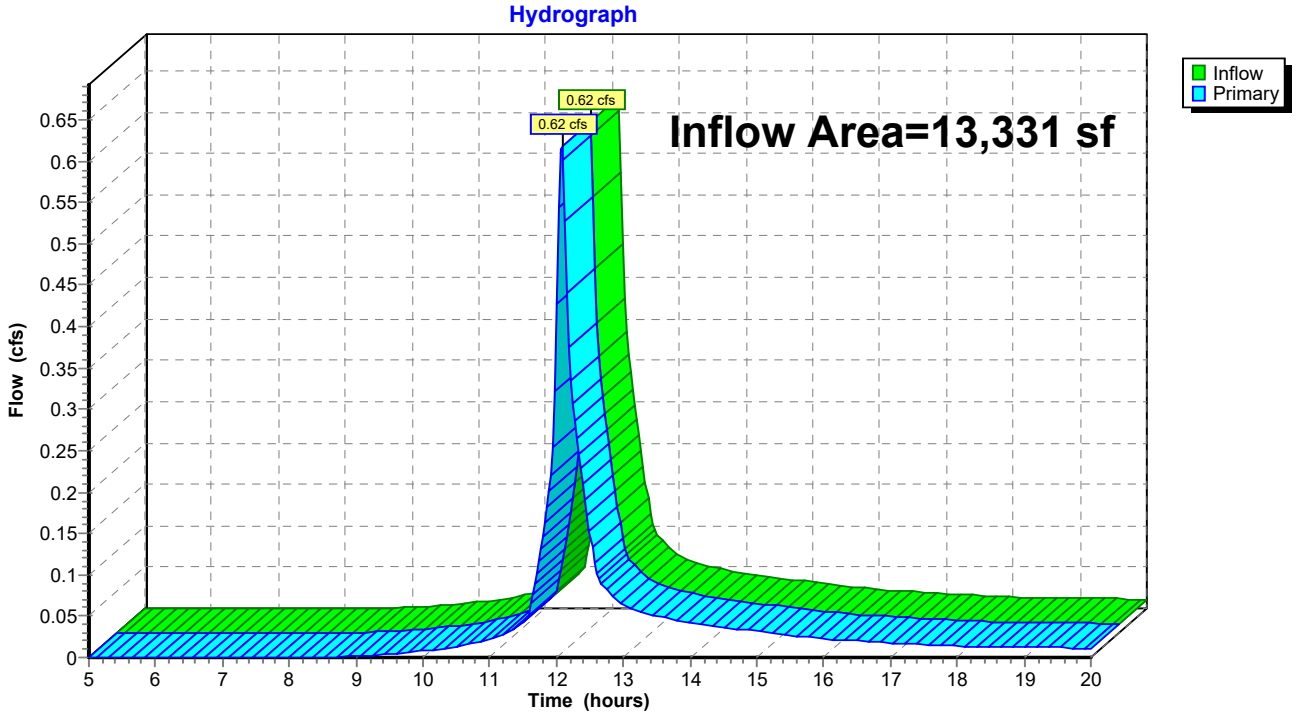


Summary for Link POI-4: Spring Street/Mason Pl

Inflow Area = 13,331 sf, 58.31% Impervious, Inflow Depth > 1.61" for 2-Year event
Inflow = 0.62 cfs @ 12.09 hrs, Volume= 1,788 cf
Primary = 0.62 cfs @ 12.09 hrs, Volume= 1,788 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-4: Spring Street/Mason Pl



Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: Subcat DA-1 Runoff Area=2,015 sf 0.00% Impervious Runoff Depth>2.63"
Tc=6.0 min CN=77 Runoff=0.15 cfs 442 cf

Subcatchment DA-10: Subcat DA-10 Runoff Area=13,331 sf 58.31% Impervious Runoff Depth>3.09"
Tc=6.0 min CN=82 Runoff=1.17 cfs 3,430 cf

Subcatchment DA-2: Subcat DA-2 Runoff Area=26,699 sf 77.04% Impervious Runoff Depth>3.68"
Tc=6.0 min CN=88 Runoff=2.72 cfs 8,182 cf

Subcatchment DA-3: Subcat DA-3 Runoff Area=18,166 sf 18.62% Impervious Runoff Depth>1.11"
Flow Length=305' Tc=12.3 min CN=57 Runoff=0.42 cfs 1,674 cf

Subcatchment DA-4: Subcat DA-4 Runoff Area=38,558 sf 15.72% Impervious Runoff Depth>0.98"
Flow Length=325' Tc=19.3 min CN=55 Runoff=0.64 cfs 3,141 cf

Subcatchment DA-5: Subcat DA-5 Runoff Area=3,689 sf 93.34% Impervious Runoff Depth>4.28"
Tc=6.0 min CN=94 Runoff=0.42 cfs 1,317 cf

Subcatchment DA-6: Subcat DA-6 Runoff Area=11,809 sf 64.37% Impervious Runoff Depth>2.46"
Tc=6.0 min CN=75 Runoff=0.84 cfs 2,418 cf

Subcatchment DA-7: Subcat DA-7 Runoff Area=17,422 sf 0.08% Impervious Runoff Depth>0.03"
Flow Length=106' Slope=0.0600 '/' Tc=14.0 min CN=32 Runoff=0.00 cfs 37 cf

Subcatchment DA-8: Subcat DA-8 Runoff Area=5,163 sf 73.54% Impervious Runoff Depth>3.68"
Tc=6.0 min CN=88 Runoff=0.53 cfs 1,582 cf

Subcatchment DA-9: Subcat DA-9 Runoff Area=5,084 sf 50.41% Impervious Runoff Depth>2.81"
Tc=6.0 min CN=79 Runoff=0.41 cfs 1,190 cf

Reach 4R: Stone Swale Sta 35+20 - Avg. Flow Depth=0.51' Max Vel=3.00 fps Inflow=1.63 cfs 4,400 cf
n=0.041 L=390.0' S=0.0490 '/' Capacity=27.66 cfs Outflow=1.56 cfs 4,390 cf

Reach 7R: Stone Swale Sta 41+10 - Avg. Flow Depth=0.31' Max Vel=2.07 fps Inflow=0.41 cfs 1,190 cf
n=0.041 L=145.0' S=0.0448 '/' Capacity=26.46 cfs Outflow=0.40 cfs 1,189 cf

Reach 9R: Stone Swale Sta 39+10 - Avg. Flow Depth=0.40' Max Vel=2.71 fps Inflow=0.88 cfs 2,382 cf
n=0.041 L=170.0' S=0.0554 '/' Capacity=29.42 cfs Outflow=0.86 cfs 2,380 cf

Pond 1P: Gravel Strip Peak Elev=174.91' Storage=994 cf Inflow=2.72 cfs 8,182 cf
Discarded=0.00 cfs 119 cf Primary=2.71 cfs 7,105 cf Outflow=2.71 cfs 7,223 cf

Pond 3P: Infiltration Swale Peak Elev=219.45' Storage=82 cf Inflow=0.40 cfs 1,189 cf
Discarded=0.01 cfs 316 cf Primary=0.39 cfs 800 cf Outflow=0.40 cfs 1,116 cf

Pond 4P: Infiltration Swale Peak Elev=209.22' Storage=85 cf Inflow=0.86 cfs 2,380 cf
Discarded=0.01 cfs 362 cf Primary=0.85 cfs 1,945 cf Outflow=0.86 cfs 2,307 cf

Pond 5P: Infiltration Swale Peak Elev=189.56' Inflow=1.56 cfs 4,390 cf
12.0" Round Culvert n=0.013 L=164.0' S=0.0627 '/' Outflow=1.56 cfs 4,390 cf

Pond 6P: Pipe System Peak Elev=177.66' Inflow=2.28 cfs 8,848 cf
15.0" Round Culvert n=0.013 L=31.0' S=0.0045 '/' Outflow=2.28 cfs 8,848 cf

Link POI-1: Wetland A Inflow=0.15 cfs 442 cf
Primary=0.15 cfs 442 cf

Link POI-2: Wetland B Inflow=2.70 cfs 10,523 cf
Primary=2.70 cfs 10,523 cf

Link POI-3: Wetland C Inflow=2.71 cfs 7,105 cf
Primary=2.71 cfs 7,105 cf

Link POI-4: Spring Street/Mason Pl Inflow=1.17 cfs 3,430 cf
Primary=1.17 cfs 3,430 cf

Total Runoff Area = 141,937 sf Runoff Volume = 23,414 cf Average Runoff Depth = 1.98"
61.11% Pervious = 86,734 sf 38.89% Impervious = 55,203 sf

Summary for Subcatchment DA-1: Subcat DA-1

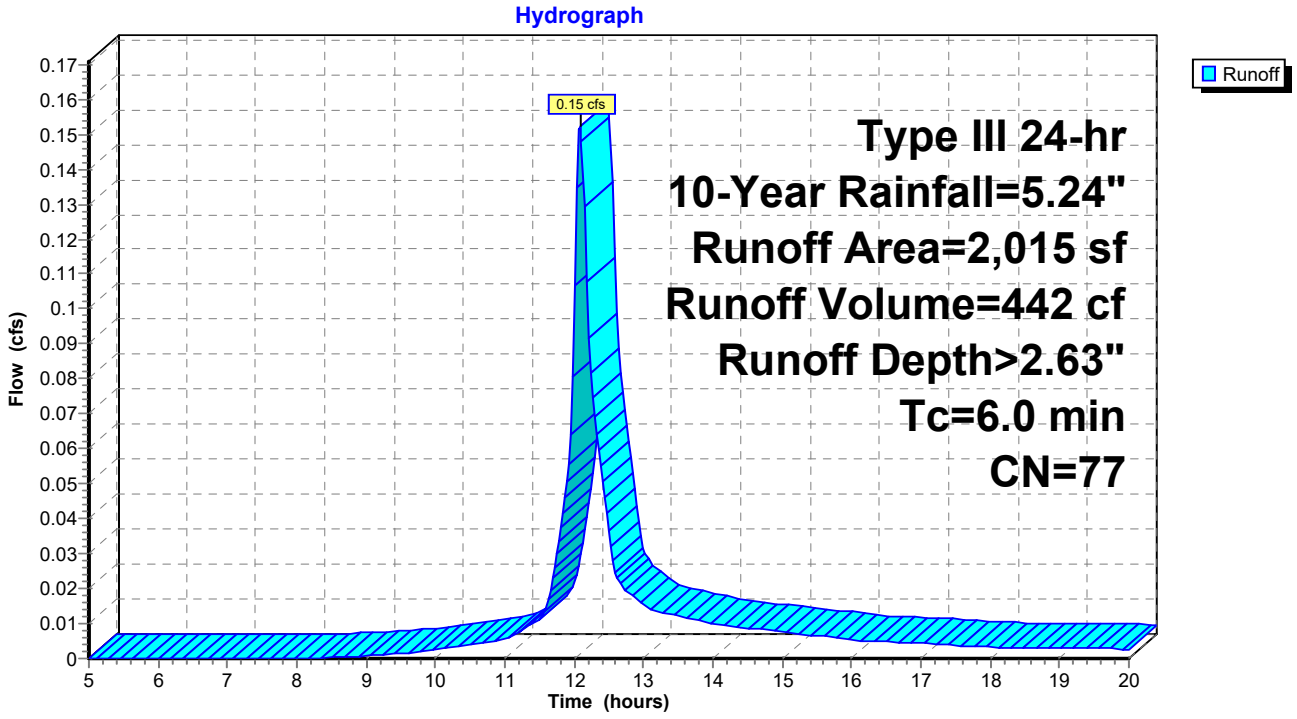
Runoff = 0.15 cfs @ 12.09 hrs, Volume= 442 cf, Depth> 2.63"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
1,784	79	Woods/grass comb., Good, HSG D
231	58	Woods/grass comb., Good, HSG B
2,015	77	Weighted Average
2,015		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-1: Subcat DA-1



Summary for Subcatchment DA-10: Subcat DA-10

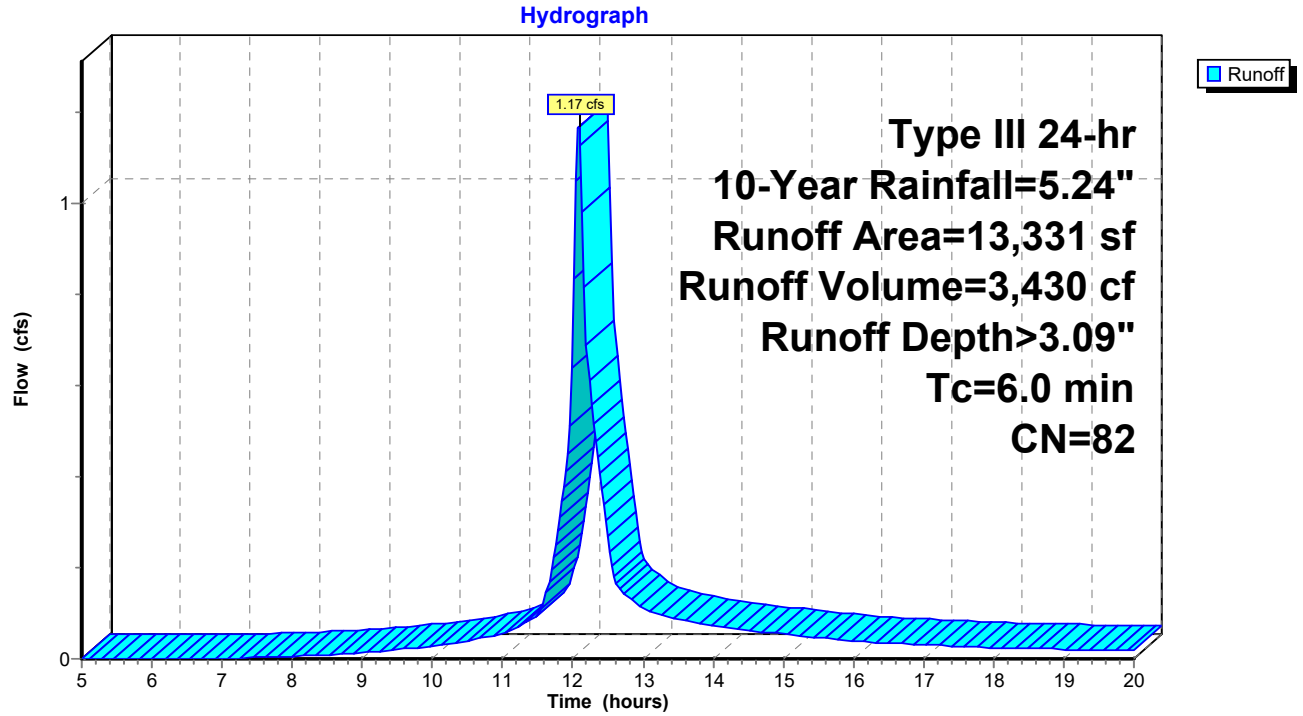
Runoff = 1.17 cfs @ 12.09 hrs, Volume= 3,430 cf, Depth> 3.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
6,961	98	Paved roads w/curbs & sewers, HSG B
1,439	68	1 acre lots, 20% imp, HSG B
2,625	68	1 acre lots, 20% imp, HSG B
0	58	Woods/grass comb., Good, HSG B
106	58	Woods/grass comb., Good, HSG B
413	58	Woods/grass comb., Good, HSG B
845	58	Woods/grass comb., Good, HSG B
941	58	Woods/grass comb., Good, HSG B
13,331	82	Weighted Average
5,557		41.69% Pervious Area
7,774		58.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-10: Subcat DA-10



Summary for Subcatchment DA-2: Subcat DA-2

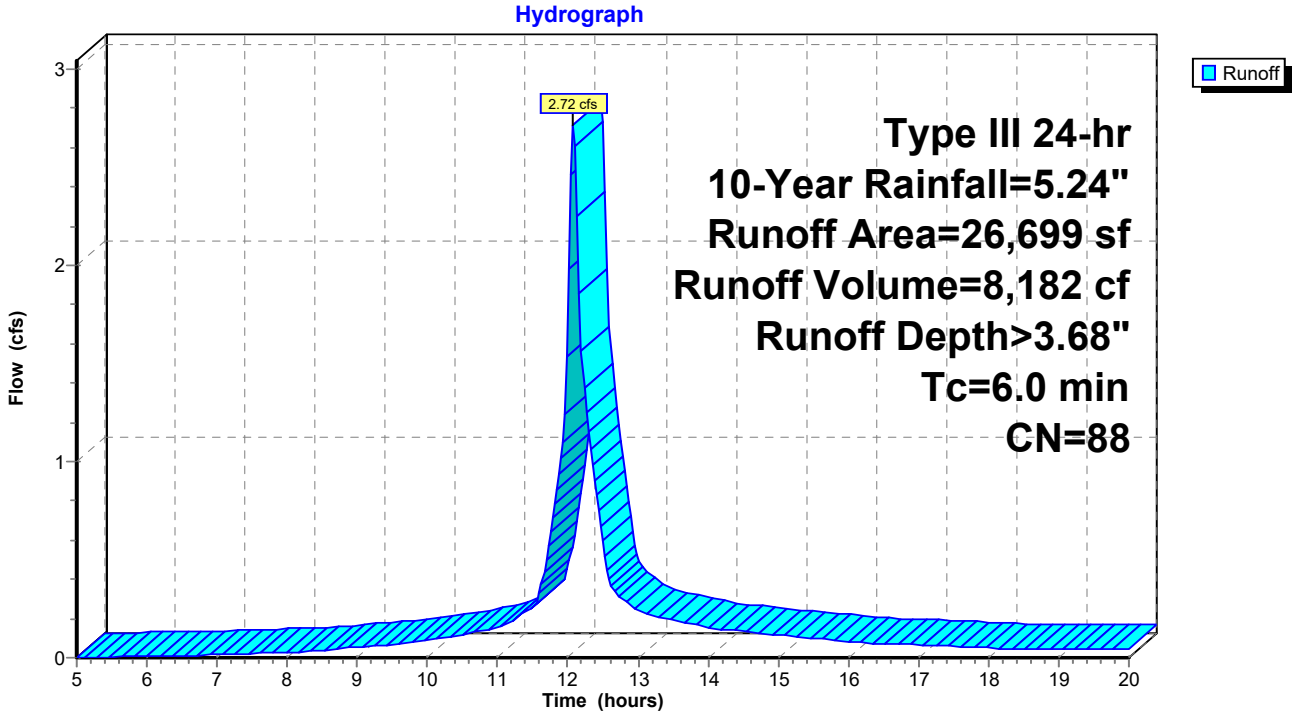
Runoff = 2.72 cfs @ 12.09 hrs, Volume= 8,182 cf, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
2,694	98	Paved roads w/curbs & sewers, HSG A
204	32	Woods/grass comb., Good, HSG A
1,166	32	Woods/grass comb., Good, HSG A
1,009	32	Woods/grass comb., Good, HSG A
785	51	1 acre lots, 20% imp, HSG A
0	51	1 acre lots, 20% imp, HSG A
187	51	1 acre lots, 20% imp, HSG A
15,623	98	Paved roads w/curbs & sewers, HSG D
1	79	Woods/grass comb., Good, HSG D
2,563	79	Woods/grass comb., Good, HSG D
0	79	Woods/grass comb., Good, HSG D
0	79	Woods/grass comb., Good, HSG D
8	84	1 acre lots, 20% imp, HSG D
2,046	98	Paved roads w/curbs & sewers, HSG B
43	68	1 acre lots, 20% imp, HSG B
0	58	Woods/grass comb., Good, HSG B
68	58	Woods/grass comb., Good, HSG B
31	58	Woods/grass comb., Good, HSG B
159	58	Woods/grass comb., Good, HSG B
112	58	Woods/grass comb., Good, HSG B
26,699	88	Weighted Average
6,131		22.96% Pervious Area
20,568		77.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-2: Subcat DA-2



Summary for Subcatchment DA-3: Subcat DA-3

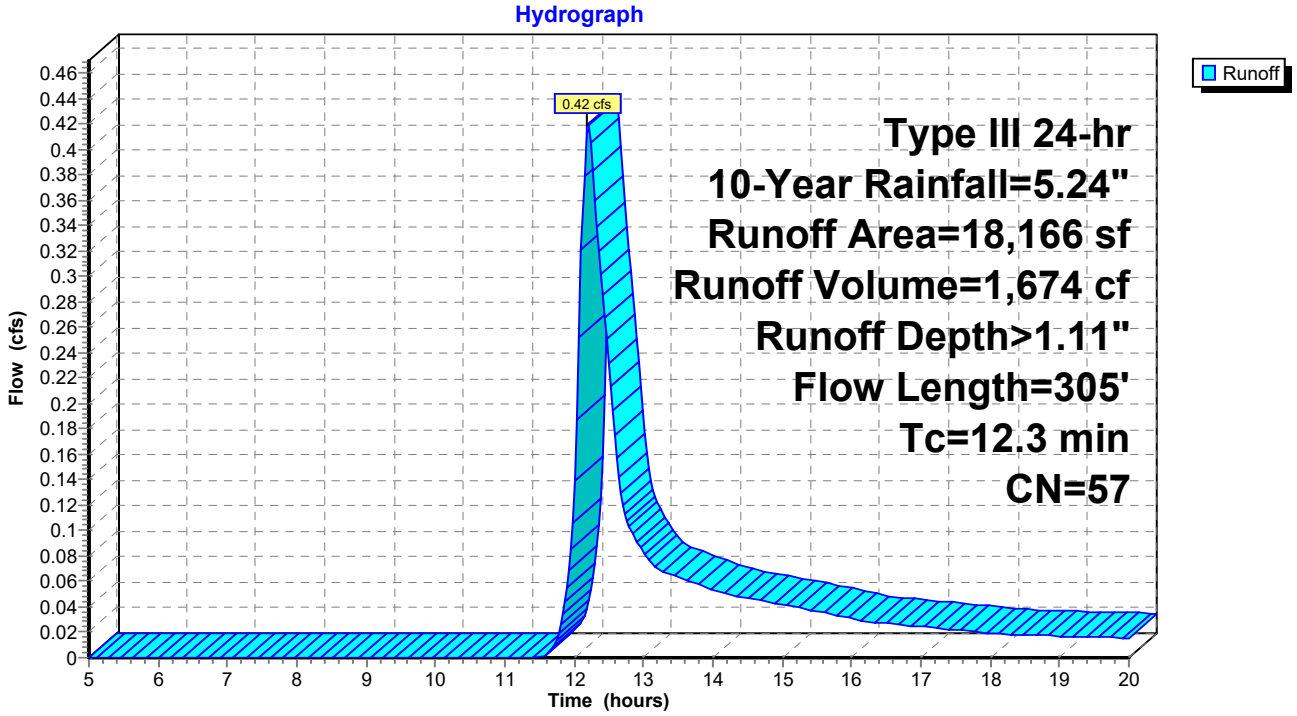
Runoff = 0.42 cfs @ 12.19 hrs, Volume= 1,674 cf, Depth> 1.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
756	98	Paved roads w/curbs & sewers, HSG A
9,528	51	1 acre lots, 20% imp, HSG A
1,971	32	Woods/grass comb., Good, HSG A
2	98	Paved roads w/curbs & sewers, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
48	98	Paved roads w/curbs & sewers, HSG D
13	79	Woods/grass comb., Good, HSG D
414	79	Woods/grass comb., Good, HSG D
1,109	79	Woods/grass comb., Good, HSG D
1	98	Paved roads w/curbs & sewers, HSG D
30	98	Paved roads w/curbs & sewers, HSG D
7	98	Paved roads w/curbs & sewers, HSG B
3,164	68	1 acre lots, 20% imp, HSG B
592	58	Woods/grass comb., Good, HSG B
531	58	Woods/grass comb., Good, HSG B
18,166	57	Weighted Average
14,783		81.38% Pervious Area
3,383		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1200	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.2	205	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	305	Total			

Subcatchment DA-3: Subcat DA-3



Summary for Subcatchment DA-4: Subcat DA-4

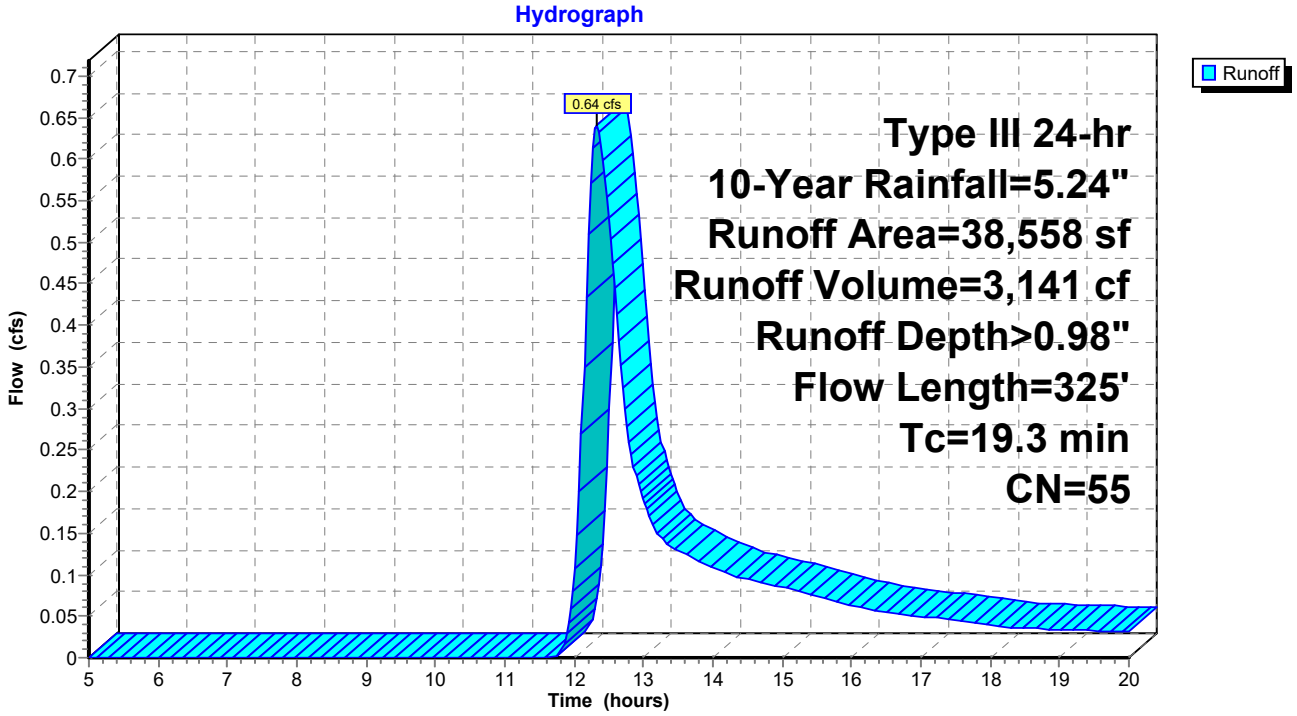
Runoff = 0.64 cfs @ 12.32 hrs, Volume= 3,141 cf, Depth> 0.98"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
18,017	51	1 acre lots, 20% imp, HSG A
546	98	Paved roads w/curbs & sewers, HSG A
13	98	Paved roads w/curbs & sewers, HSG A
2,257	30	Woods, Good, HSG A
409	32	Woods/grass comb., Good, HSG A
77	32	Woods/grass comb., Good, HSG A
9,486	68	1 acre lots, 20% imp, HSG B
6,669	55	Woods, Good, HSG B
1,083	58	Woods/grass comb., Good, HSG B
38,558	55	Weighted Average
32,498		84.28% Pervious Area
6,060		15.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	100	0.1250	0.10		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.44"
2.0	225	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.3	325	Total			

Subcatchment DA-4: Subcat DA-4



Summary for Subcatchment DA-5: Subcat DA-5

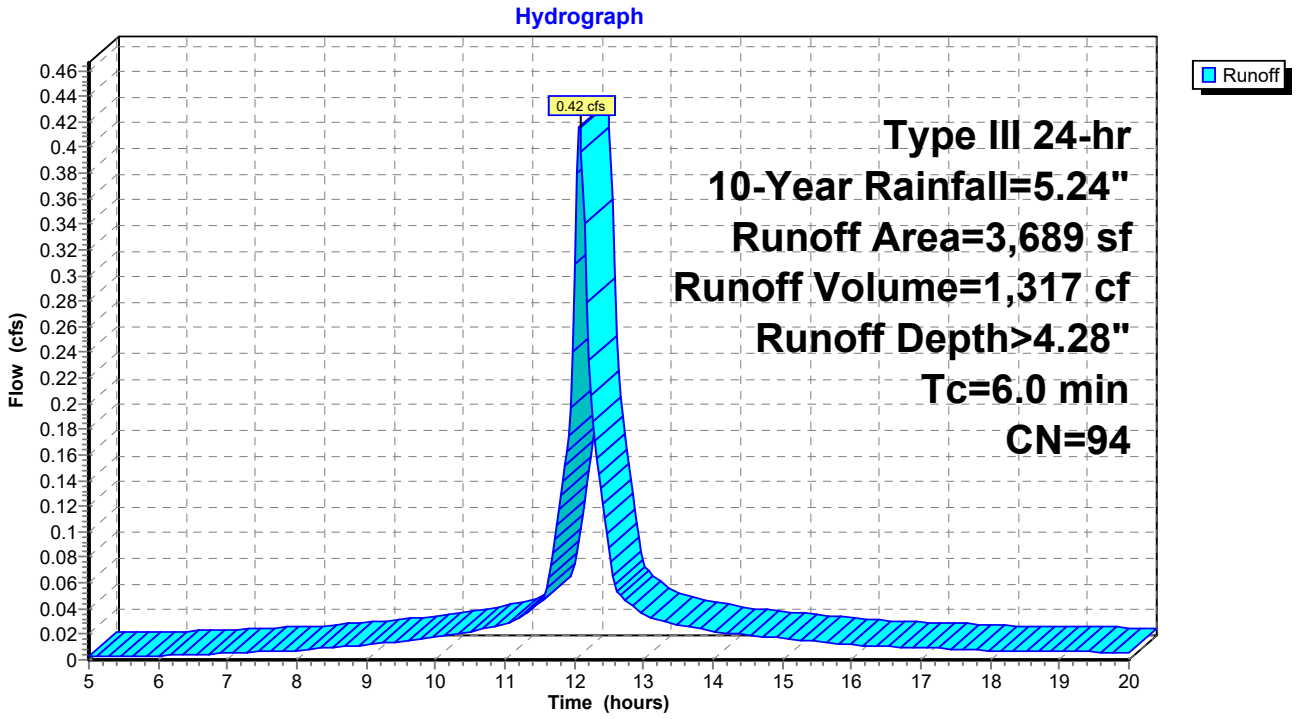
Runoff = 0.42 cfs @ 12.08 hrs, Volume= 1,317 cf, Depth> 4.28"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
3,427	98	Paved roads w/curbs & sewers, HSG A
83	51	1 acre lots, 20% imp, HSG A
0	32	Woods/grass comb., Good, HSG A
179	32	Woods/grass comb., Good, HSG A
3,689	94	Weighted Average
246		6.66% Pervious Area
3,444		93.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-5: Subcat DA-5



Summary for Subcatchment DA-6: Subcat DA-6

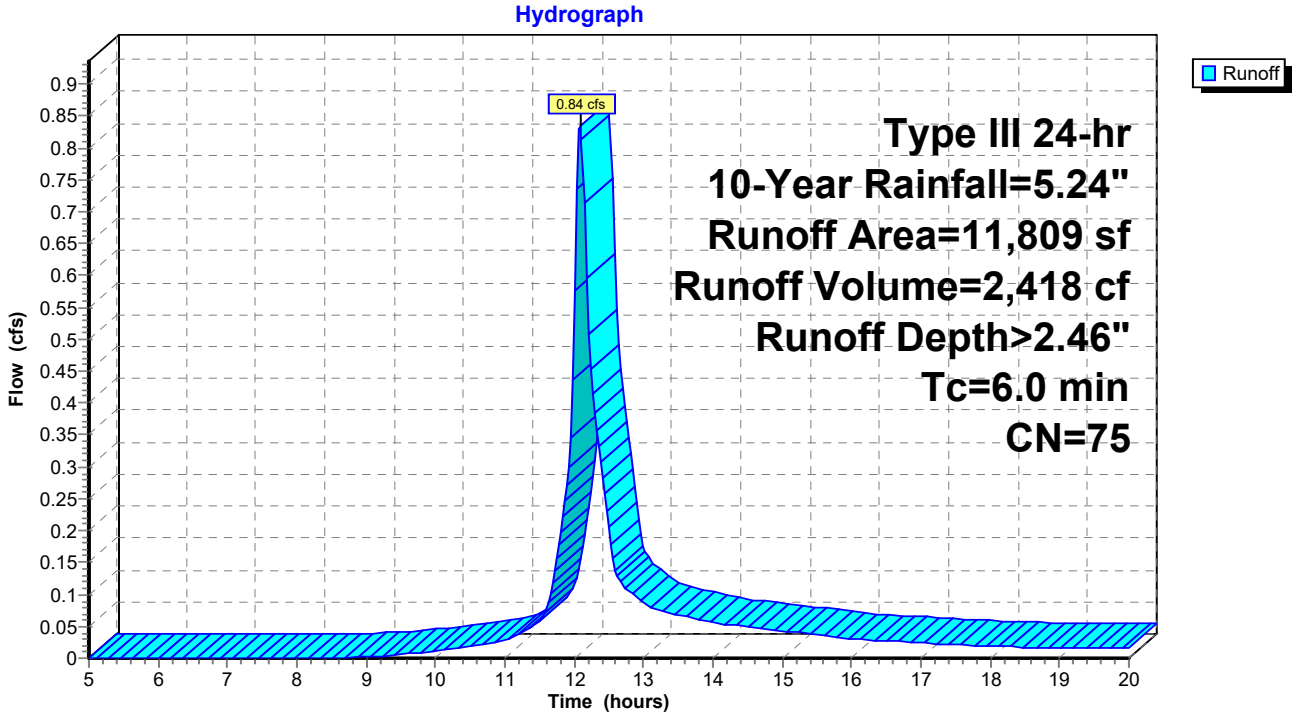
Runoff = 0.84 cfs @ 12.09 hrs, Volume= 2,418 cf, Depth> 2.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
5,831	98	Paved roads w/curbs & sewers, HSG A
1	51	1 acre lots, 20% imp, HSG A
53	51	1 acre lots, 20% imp, HSG A
1,131	30	Woods, Good, HSG A
2,533	32	Woods/grass comb., Good, HSG A
1,759	98	Paved roads w/curbs & sewers, HSG B
4	68	1 acre lots, 20% imp, HSG B
71	58	Woods/grass comb., Good, HSG B
426	58	Woods/grass comb., Good, HSG B
11,809	75	Weighted Average
4,208		35.63% Pervious Area
7,601		64.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-6: Subcat DA-6



Summary for Subcatchment DA-7: Subcat DA-7

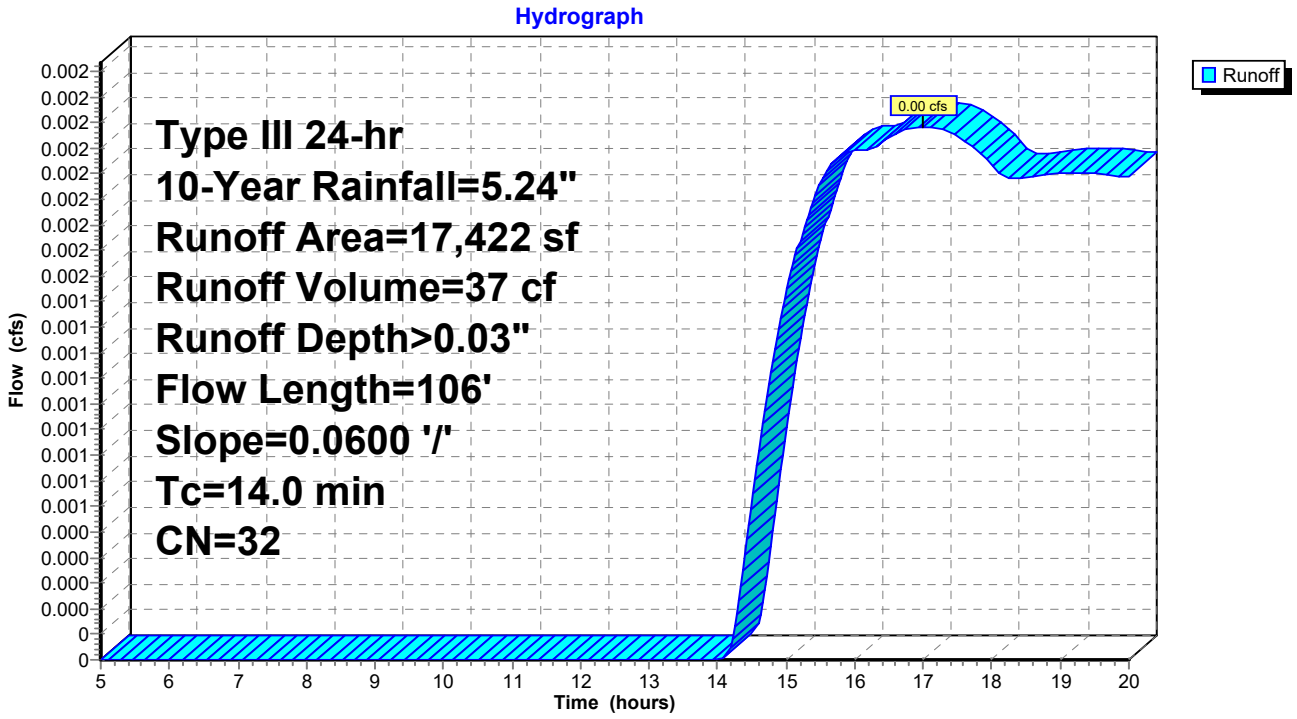
Runoff = 0.00 cfs @ 17.01 hrs, Volume= 37 cf, Depth> 0.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
67	51	1 acre lots, 20% imp, HSG A
15,731	30	Woods, Good, HSG A
1,625	55	Woods, Good, HSG B
17,422	32	Weighted Average
17,409		99.92% Pervious Area
13		0.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	106	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"

Subcatchment DA-7: Subcat DA-7



Summary for Subcatchment DA-8: Subcat DA-8

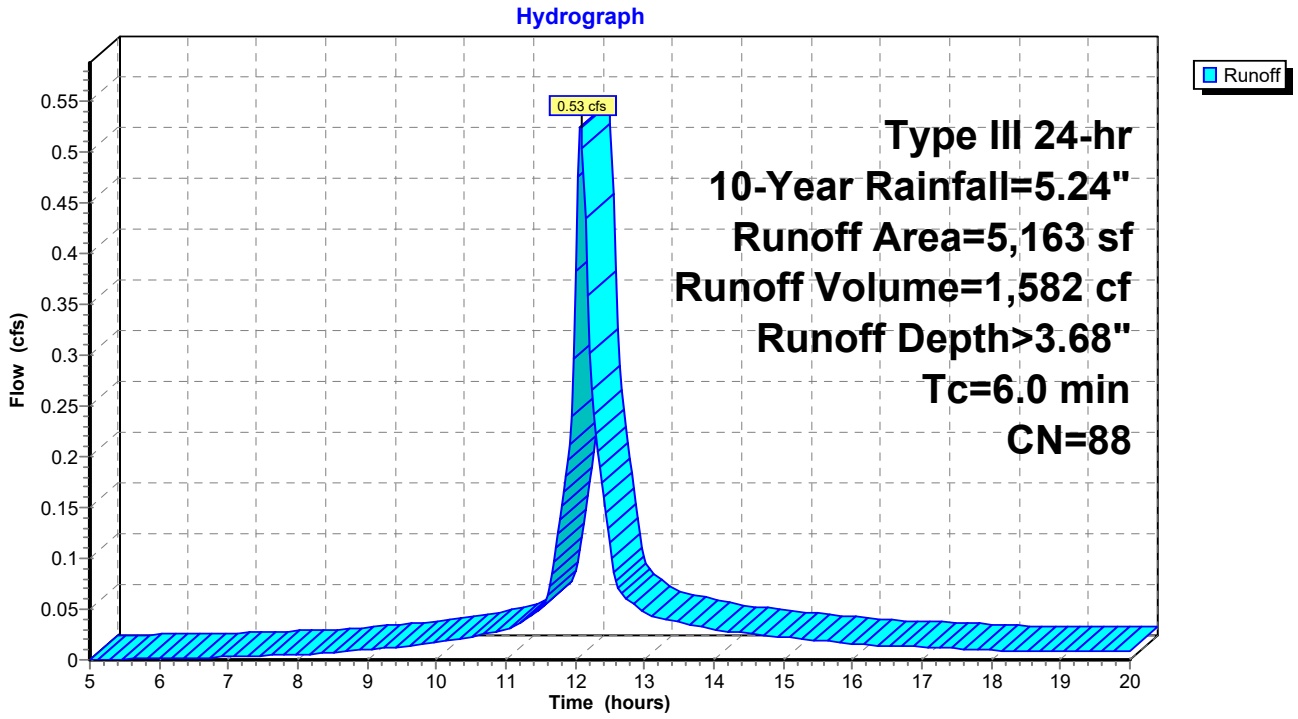
Runoff = 0.53 cfs @ 12.09 hrs, Volume= 1,582 cf, Depth> 3.68"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
3,711	98	Paved roads w/curbs & sewers, HSG B
429	68	1 acre lots, 20% imp, HSG B
1,002	58	Woods/grass comb., Good, HSG B
21	58	Woods/grass comb., Good, HSG B
5,163	88	Weighted Average
1,366		26.46% Pervious Area
3,797		73.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-8: Subcat DA-8



Summary for Subcatchment DA-9: Subcat DA-9

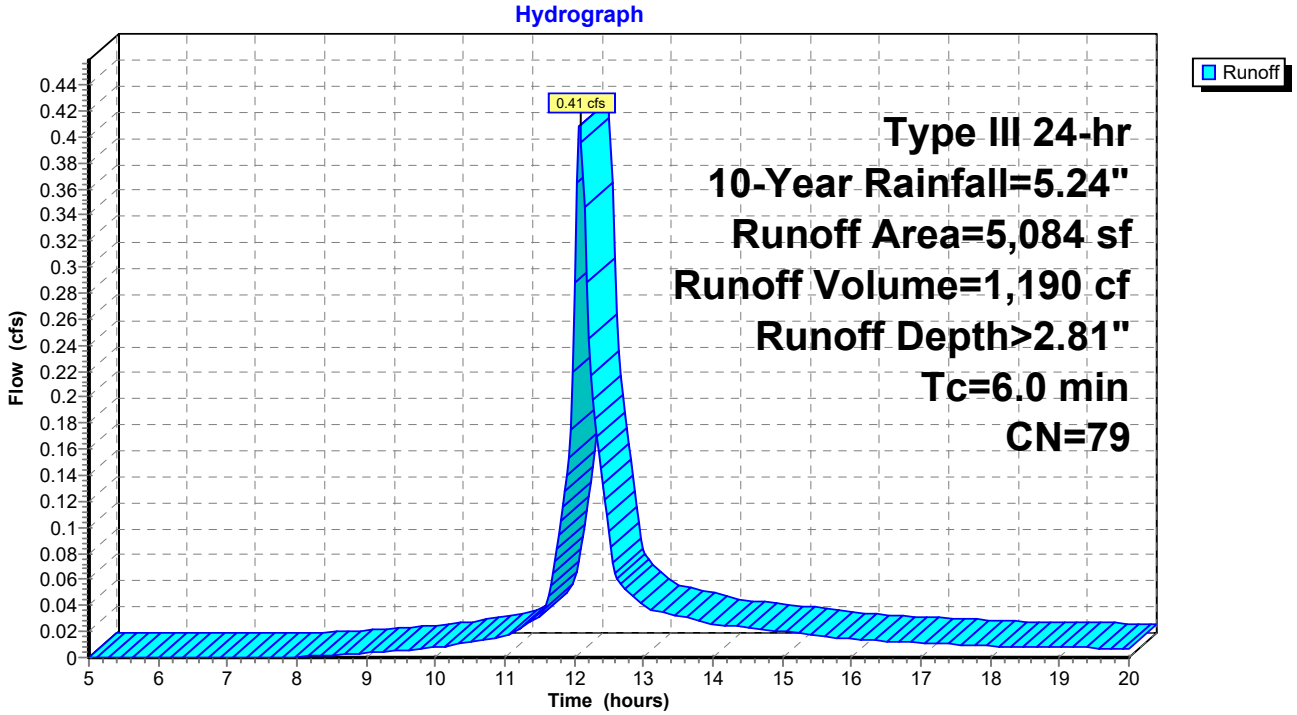
Runoff = 0.41 cfs @ 12.09 hrs, Volume= 1,190 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 10-Year Rainfall=5.24"

Area (sf)	CN	Description
2,110	98	Paved roads w/curbs & sewers, HSG B
2	68	1 acre lots, 20% imp, HSG B
2,263	68	1 acre lots, 20% imp, HSG B
638	58	Woods/grass comb., Good, HSG B
71	58	Woods/grass comb., Good, HSG B
5,084	79	Weighted Average
2,521		49.59% Pervious Area
2,563		50.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-9: Subcat DA-9



Summary for Reach 4R: Stone Swale Sta 35+20 - 38+90

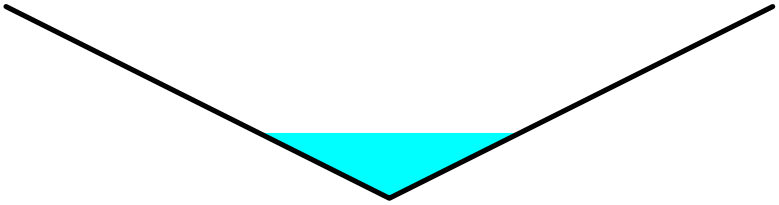
[79] Warning: Submerged Pond 4P Primary device # 2 OUTLET by 0.51'

Inflow Area = 39,479 sf, 35.40% Impervious, Inflow Depth > 1.34" for 10-Year event
Inflow = 1.63 cfs @ 12.11 hrs, Volume= 4,400 cf
Outflow = 1.56 cfs @ 12.18 hrs, Volume= 4,390 cf, Atten= 4%, Lag= 3.9 min

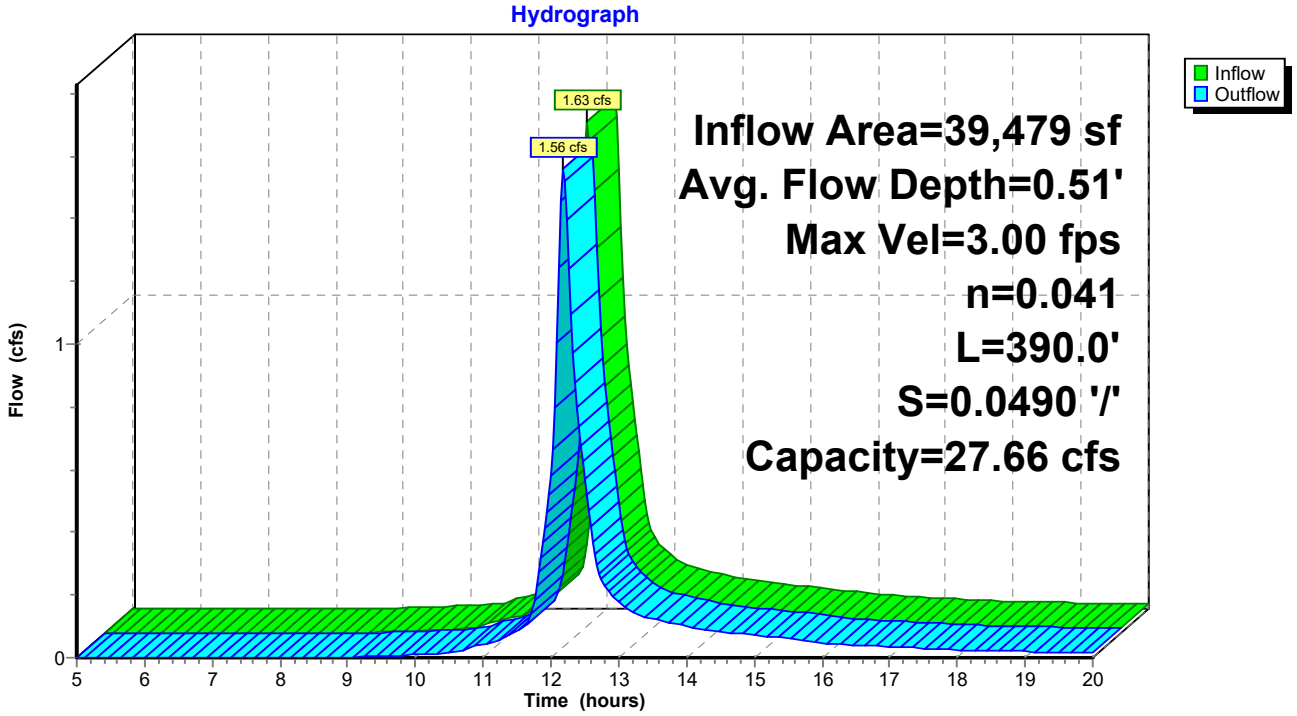
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 3.00 fps, Min. Travel Time= 2.2 min
Avg. Velocity = 1.27 fps, Avg. Travel Time= 5.1 min

Peak Storage= 204 cf @ 12.14 hrs
Average Depth at Peak Storage= 0.51' , Surface Width= 2.04'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 27.66 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 390.0' Slope= 0.0490 '/'
Inlet Invert= 207.88', Outlet Invert= 188.78'



Reach 4R: Stone Swale Sta 35+20 - 38+90



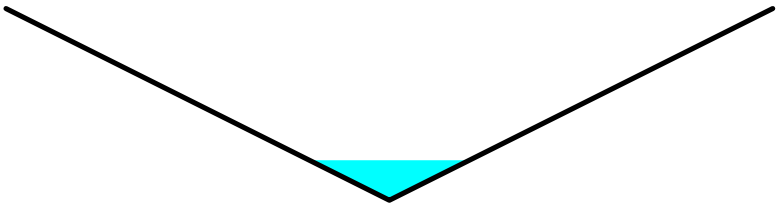
Summary for Reach 7R: Stone Swale Sta 41+10 - 42+50

Inflow Area = 5,084 sf, 50.41% Impervious, Inflow Depth > 2.81" for 10-Year event
Inflow = 0.41 cfs @ 12.09 hrs, Volume= 1,190 cf
Outflow = 0.40 cfs @ 12.12 hrs, Volume= 1,189 cf, Atten= 3%, Lag= 2.2 min

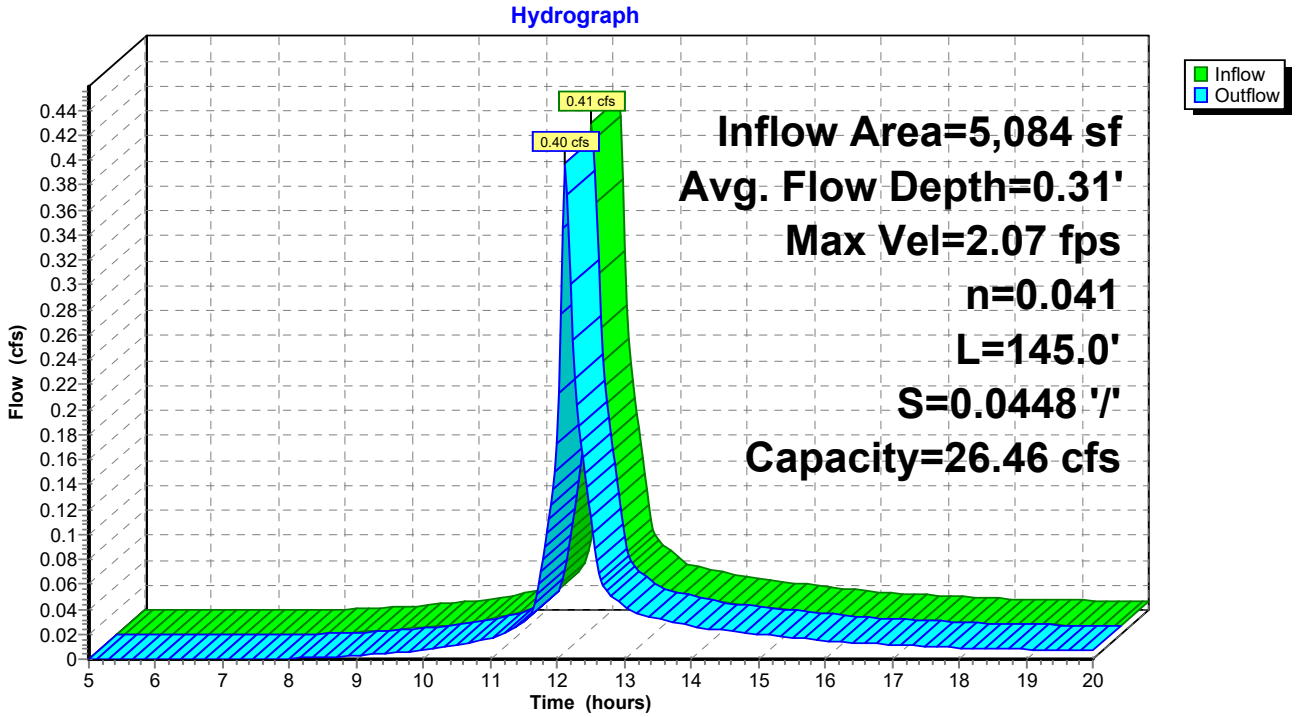
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 2.07 fps, Min. Travel Time= 1.2 min
Avg. Velocity = 0.91 fps, Avg. Travel Time= 2.7 min

Peak Storage= 28 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.31' , Surface Width= 1.25'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 26.46 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 145.0' Slope= 0.0448 '/'
Inlet Invert= 225.60', Outlet Invert= 219.10'



Reach 7R: Stone Swale Sta 41+10 - 42+50



Summary for Reach 9R: Stone Swale Sta 39+10 - 40+80

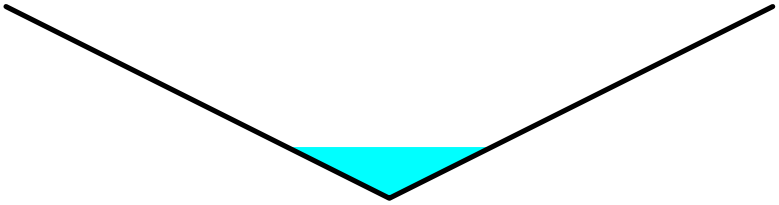
[79] Warning: Submerged Pond 3P Primary device # 2 OUTLET by 0.40'

Inflow Area = 10,247 sf, 62.07% Impervious, Inflow Depth > 2.79" for 10-Year event
Inflow = 0.88 cfs @ 12.10 hrs, Volume= 2,382 cf
Outflow = 0.86 cfs @ 12.14 hrs, Volume= 2,380 cf, Atten= 2%, Lag= 1.9 min

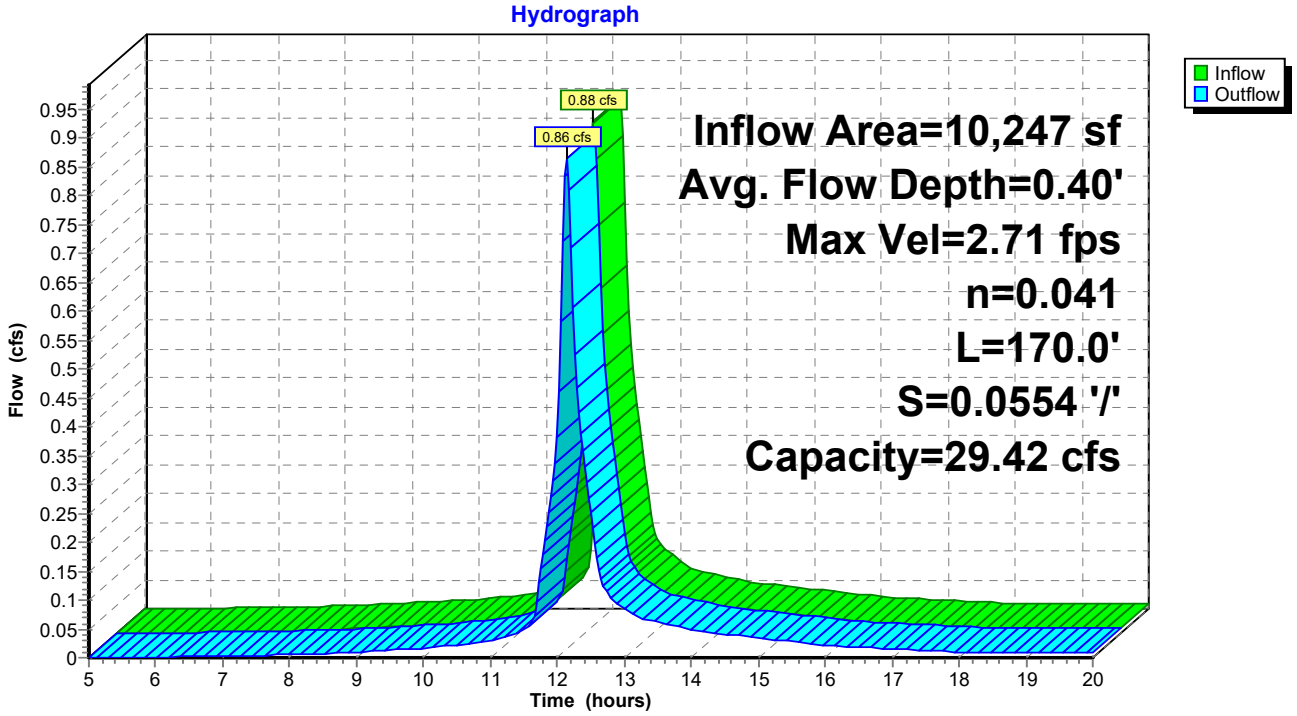
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 2.71 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.04 fps, Avg. Travel Time= 2.7 min

Peak Storage= 55 cf @ 12.12 hrs
Average Depth at Peak Storage= 0.40' , Surface Width= 1.61'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 29.42 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 170.0' Slope= 0.0554 '/'
Inlet Invert= 218.10', Outlet Invert= 208.68'



Reach 9R: Stone Swale Sta 39+10 - 40+80



Summary for Pond 1P: Gravel Strip

Inflow Area = 26,699 sf, 77.04% Impervious, Inflow Depth > 3.68" for 10-Year event
Inflow = 2.72 cfs @ 12.09 hrs, Volume= 8,182 cf
Outflow = 2.71 cfs @ 12.09 hrs, Volume= 7,223 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 9.02 hrs, Volume= 119 cf
Primary = 2.71 cfs @ 12.09 hrs, Volume= 7,105 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 174.91' @ 12.09 hrs Surf.Area= 1,300 sf Storage= 994 cf

Plug-Flow detention time= 62.0 min calculated for 7,209 cf (88% of inflow)
Center-of-Mass det. time= 25.3 min (790.6 - 765.3)

Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	1,040 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,600 cf Overall x 40.0% Voids

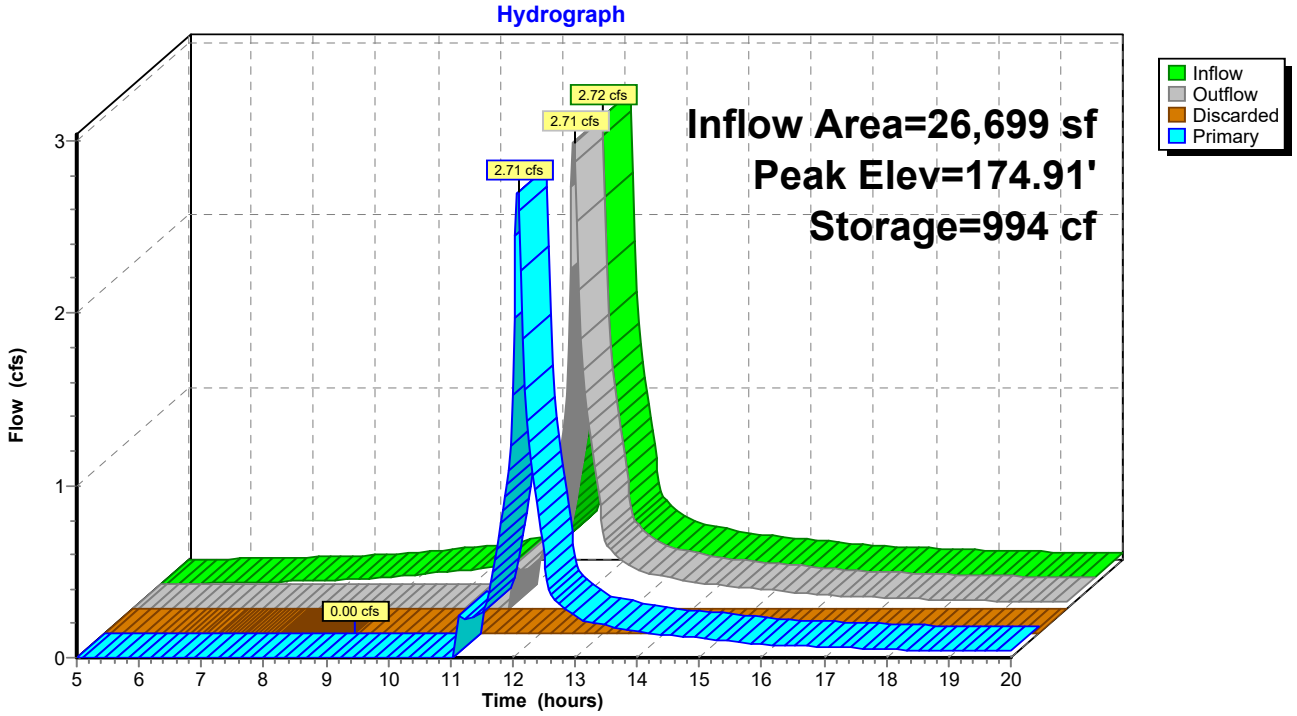
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.00	1,300	0	0
175.00	1,300	2,600	2,600

Device	Routing	Invert	Outlet Devices
#0	Primary	175.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	173.00'	**0.090 in/hr Exfiltration over Surface area** Phase-In= 0.50'
#2	Primary	174.90'	**650.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 9.02 hrs HW=173.51' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=1.97 cfs @ 12.09 hrs HW=174.91' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 1.97 cfs @ 0.28 fps)

Pond 1P: Gravel Strip



Summary for Pond 3P: Infiltration Swale

[62] Hint: Exceeded Reach 7R OUTLET depth by 0.04' @ 12.14 hrs

Inflow Area = 5,084 sf, 50.41% Impervious, Inflow Depth > 2.81" for 10-Year event
Inflow = 0.40 cfs @ 12.12 hrs, Volume= 1,189 cf
Outflow = 0.40 cfs @ 12.13 hrs, Volume= 1,116 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.13 hrs, Volume= 316 cf
Primary = 0.39 cfs @ 12.13 hrs, Volume= 800 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 219.45' @ 12.13 hrs Surf.Area= 150 sf Storage= 82 cf

Plug-Flow detention time= 33.6 min calculated for 1,114 cf (94% of inflow)
Center-of-Mass det. time= 12.3 min (802.2 - 789.9)

Volume	Invert	Avail.Storage	Storage Description
#1	216.10'	79 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 197 cf Overall x 40.0% Voids
#2	219.10'	77 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		156 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
216.10	3	0	0	3
217.10	45	20	20	48
218.10	90	66	86	101
219.10	134	111	197	159

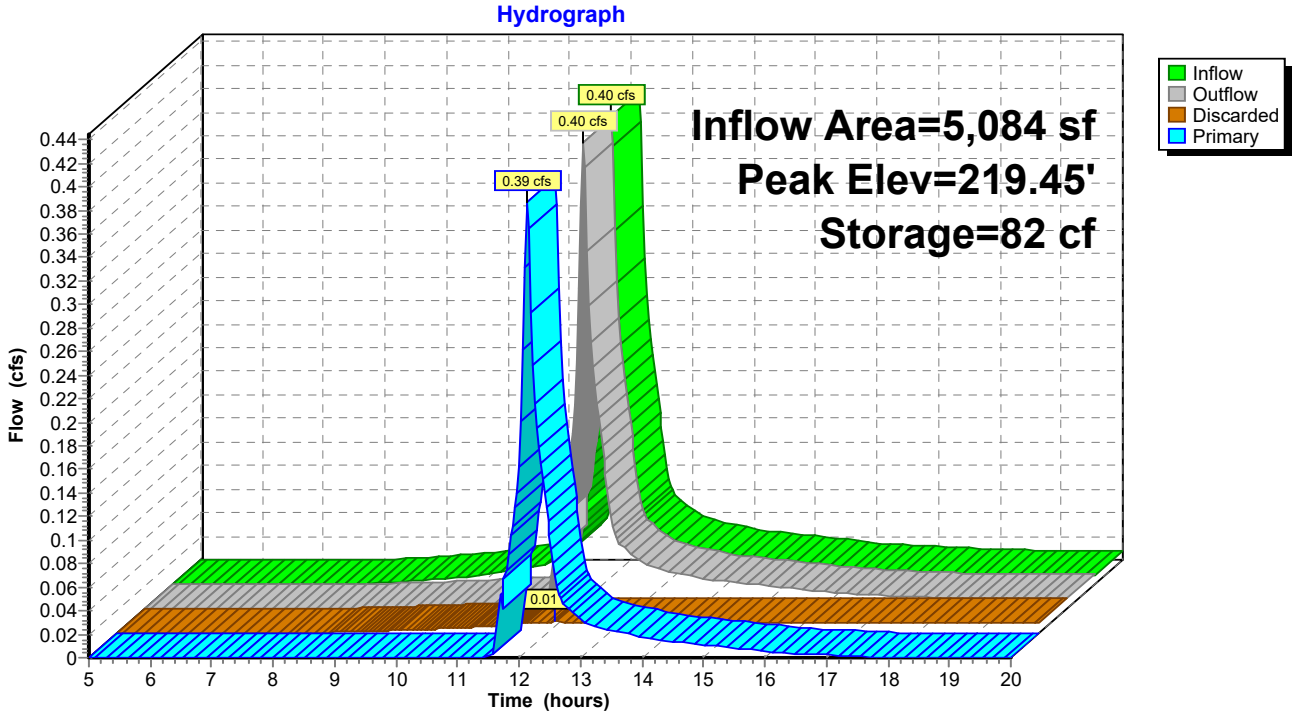
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
219.10	3	0	0	3
220.60	132	77	77	137

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.10'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	219.10'	**12.0" Round Culvert** L= 25.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 219.10' / 218.10' S= 0.0400 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=219.45' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.38 cfs @ 12.13 hrs HW=219.45' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.38 cfs @ 1.58 fps)

Pond 3P: Infiltration Swale



Summary for Pond 4P: Infiltration Swale

[62] Hint: Exceeded Reach 9R OUTLET depth by 0.14' @ 12.14 hrs

Inflow Area = 10,247 sf, 62.07% Impervious, Inflow Depth > 2.79" for 10-Year event
Inflow = 0.86 cfs @ 12.14 hrs, Volume= 2,380 cf
Outflow = 0.86 cfs @ 12.14 hrs, Volume= 2,307 cf, Atten= 0%, Lag= 0.1 min
Discarded = 0.01 cfs @ 12.14 hrs, Volume= 362 cf
Primary = 0.85 cfs @ 12.14 hrs, Volume= 1,945 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 209.22' @ 12.14 hrs Surf.Area= 154 sf Storage= 85 cf

Plug-Flow detention time= 19.3 min calculated for 2,307 cf (97% of inflow)
Center-of-Mass det. time= 7.7 min (774.5 - 766.8)

Volume	Invert	Avail.Storage	Storage Description
#1	205.80'	81 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 202 cf Overall x 40.0% Voids
#2	208.80'	77 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		158 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.80	3	0	0	3
206.70	45	18	18	47
207.80	90	73	91	102
208.80	134	111	202	160

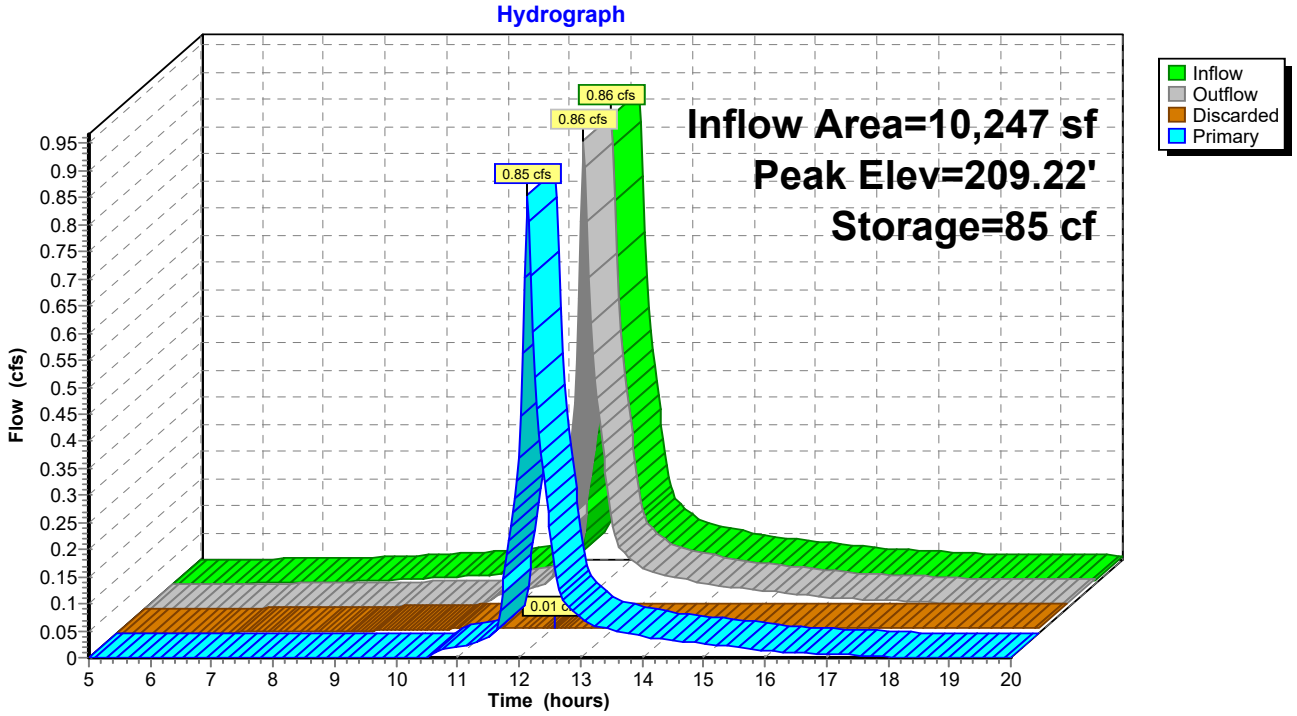
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.80	3	0	0	3
210.30	132	77	77	137

Device	Routing	Invert	Outlet Devices
#1	Discarded	205.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	208.68'	**12.0" Round Culvert** L= 23.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 208.68' / 207.88' S= 0.0348 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.14 hrs HW=209.22' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.85 cfs @ 12.14 hrs HW=209.22' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.85 cfs @ 1.97 fps)

Pond 4P: Infiltration Swale



Summary for Pond 5P: Infiltration Swale

[57] Hint: Peaked at 189.56' (Flood elevation advised)
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.28' @ 12.20 hrs

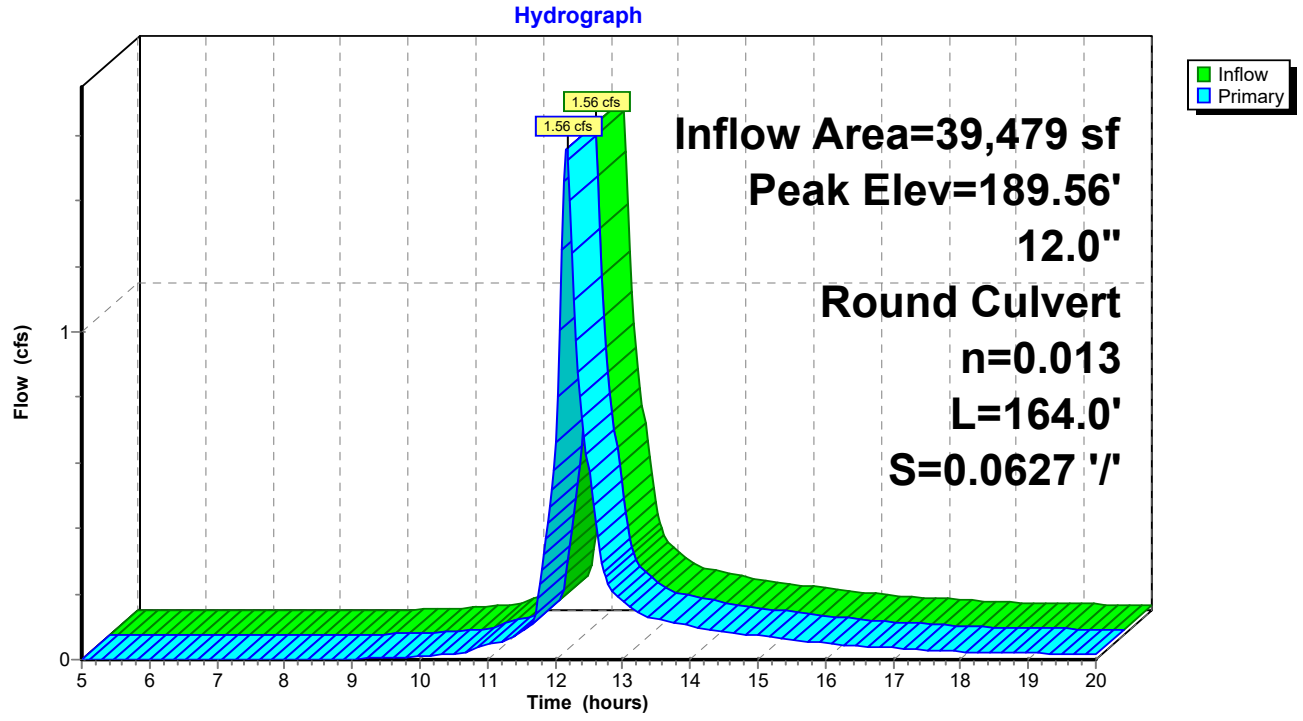
Inflow Area = 39,479 sf, 35.40% Impervious, Inflow Depth > 1.33" for 10-Year event
Inflow = 1.56 cfs @ 12.18 hrs, Volume= 4,390 cf
Outflow = 1.56 cfs @ 12.18 hrs, Volume= 4,390 cf, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.18 hrs, Volume= 4,390 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 189.56' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	188.78'	**12.0" Round Culvert** L= 164.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.78' / 178.50' S= 0.0627 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=1.54 cfs @ 12.18 hrs HW=189.55' (Free Discharge)
└**1=Culvert** (Inlet Controls 1.54 cfs @ 2.37 fps)

Pond 5P: Infiltration Swale



Summary for Pond 6P: Pipe System

[82] Warning: Early inflow requires earlier time span
[57] Hint: Peaked at 177.66' (Flood elevation advised)

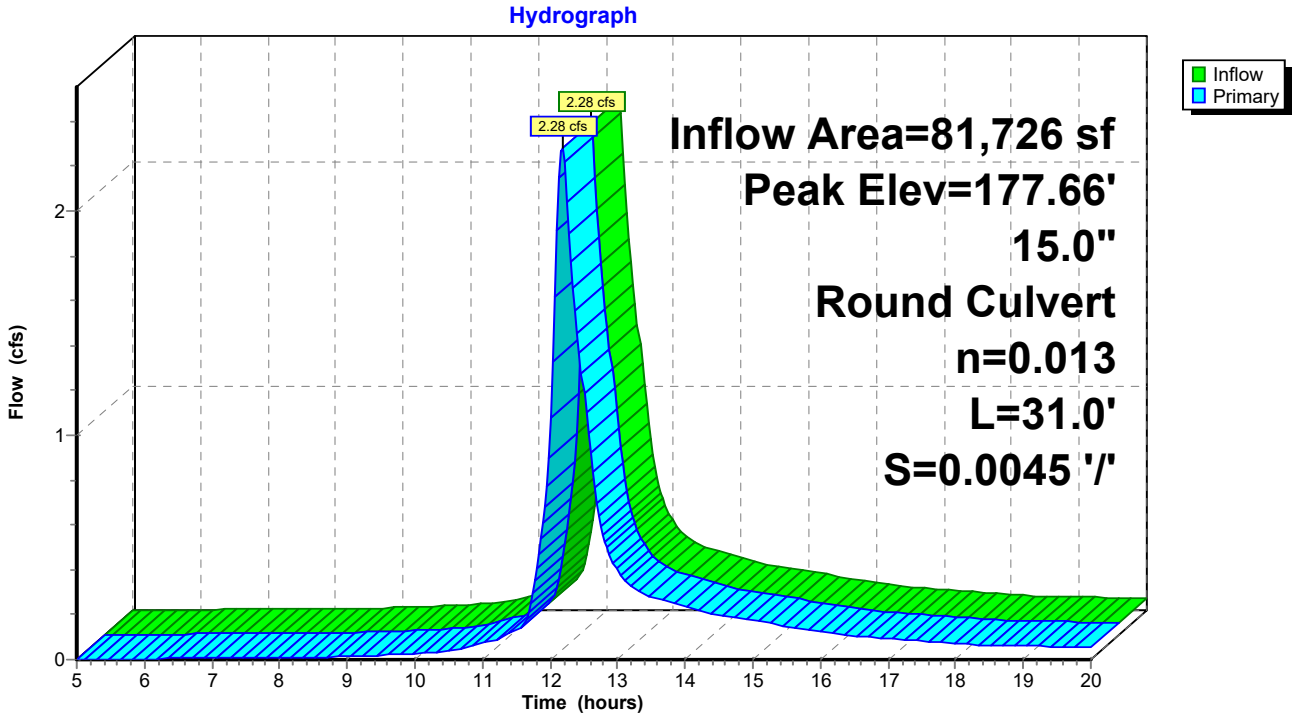
Inflow Area =	81,726 sf,	28.73% Impervious,	Inflow Depth >	1.30"	for 10-Year event
Inflow =	2.28 cfs @	12.18 hrs, Volume=	8,848 cf		
Outflow =	2.28 cfs @	12.18 hrs, Volume=	8,848 cf,	Atten= 0%,	Lag= 0.0 min
Primary =	2.28 cfs @	12.18 hrs, Volume=	8,848 cf		

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 177.66' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	176.78'	**15.0" Round Culvert** L= 31.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 176.78' / 176.64' S= 0.0045 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=2.27 cfs @ 12.18 hrs HW=177.65' (Free Discharge)
1=Culvert (Barrel Controls 2.27 cfs @ 3.49 fps)

Pond 6P: Pipe System

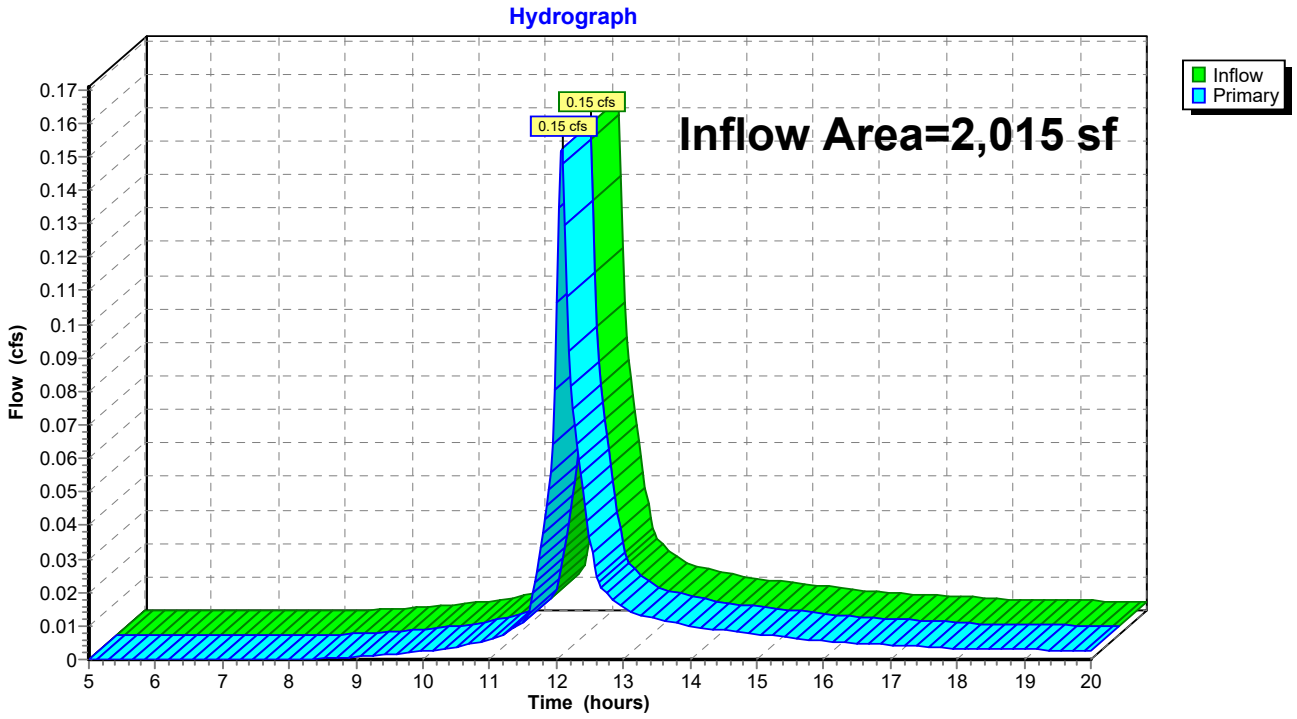


Summary for Link POI-1: Wetland A

Inflow Area = 2,015 sf, 0.00% Impervious, Inflow Depth > 2.63" for 10-Year event
Inflow = 0.15 cfs @ 12.09 hrs, Volume= 442 cf
Primary = 0.15 cfs @ 12.09 hrs, Volume= 442 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-1: Wetland A

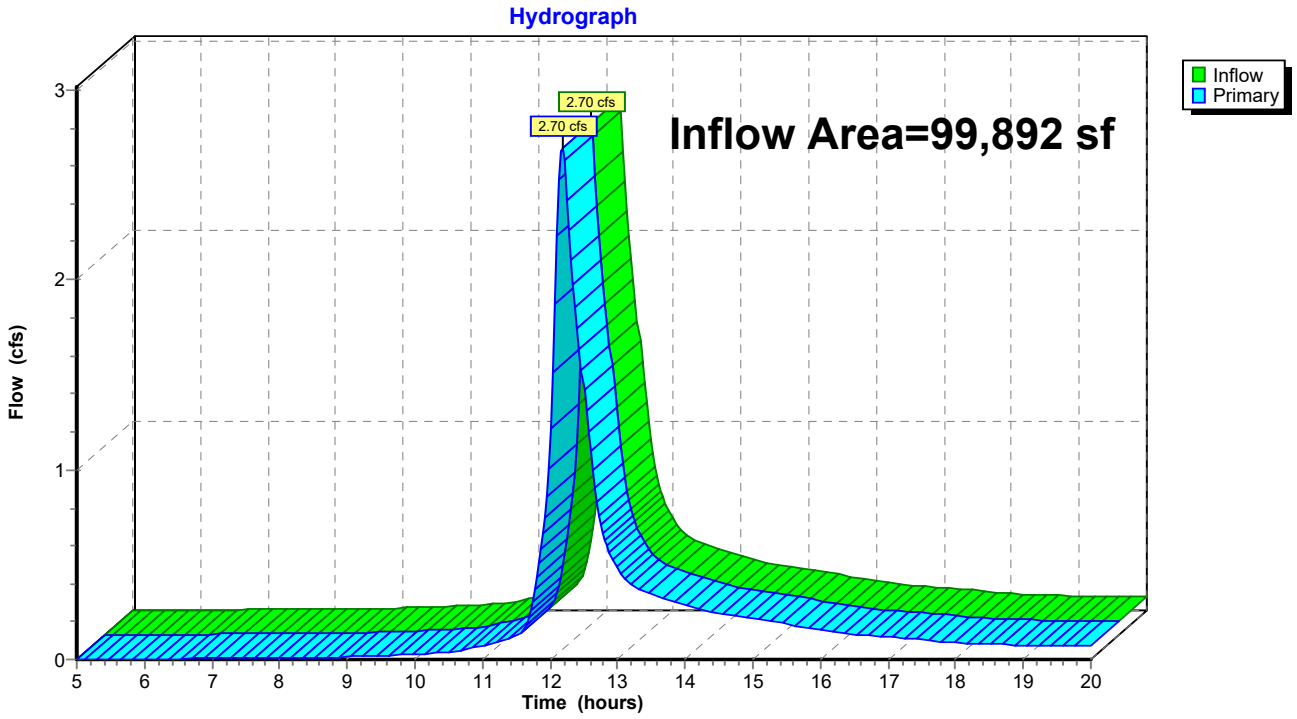


Summary for Link POI-2: Wetland B

Inflow Area = 99,892 sf, 26.89% Impervious, Inflow Depth > 1.26" for 10-Year event
Inflow = 2.70 cfs @ 12.19 hrs, Volume= 10,523 cf
Primary = 2.70 cfs @ 12.19 hrs, Volume= 10,523 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-2: Wetland B

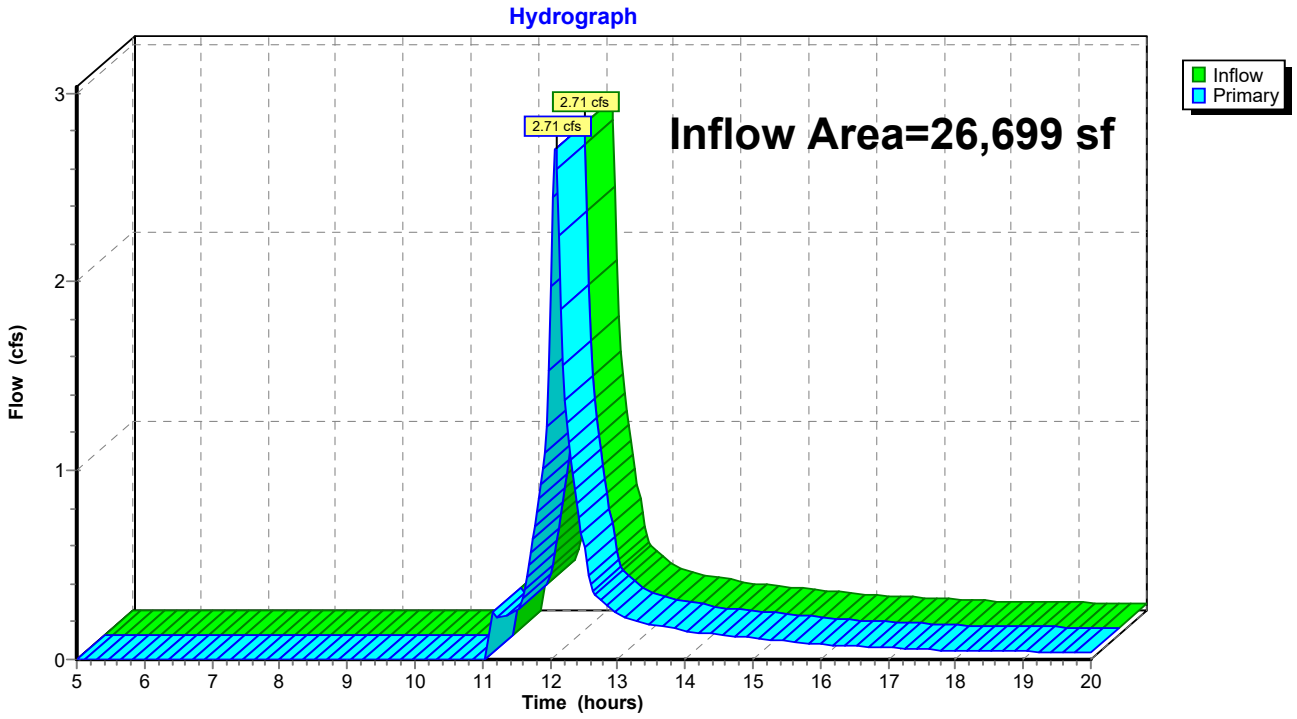


Summary for Link POI-3: Wetland C

Inflow Area = 26,699 sf, 77.04% Impervious, Inflow Depth > 3.19" for 10-Year event
Inflow = 2.71 cfs @ 12.09 hrs, Volume= 7,105 cf
Primary = 2.71 cfs @ 12.09 hrs, Volume= 7,105 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-3: Wetland C

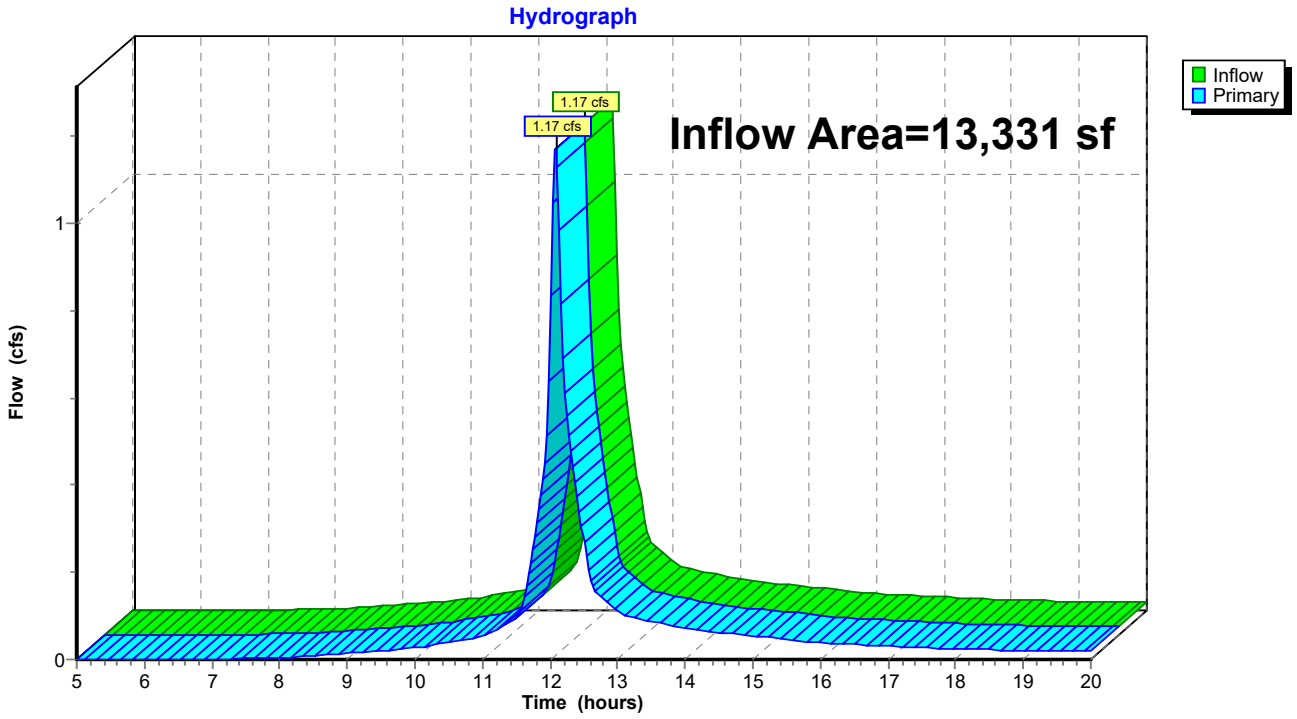


Summary for Link POI-4: Spring Street/Mason Pl

Inflow Area = 13,331 sf, 58.31% Impervious, Inflow Depth > 3.09" for 10-Year event
Inflow = 1.17 cfs @ 12.09 hrs, Volume= 3,430 cf
Primary = 1.17 cfs @ 12.09 hrs, Volume= 3,430 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-4: Spring Street/Mason Pl



Time span=5.00-20.00 hrs, dt=0.03 hrs, 501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment DA-1: Subcat DA-1 Runoff Area=2,015 sf 0.00% Impervious Runoff Depth>5.04"
Tc=6.0 min CN=77 Runoff=0.29 cfs 846 cf

Subcatchment DA-10: Subcat DA-10 Runoff Area=13,331 sf 58.31% Impervious Runoff Depth>5.62"
Tc=6.0 min CN=82 Runoff=2.08 cfs 6,239 cf

Subcatchment DA-2: Subcat DA-2 Runoff Area=26,699 sf 77.04% Impervious Runoff Depth>6.30"
Tc=6.0 min CN=88 Runoff=4.52 cfs 14,012 cf

Subcatchment DA-3: Subcat DA-3 Runoff Area=18,166 sf 18.62% Impervious Runoff Depth>2.81"
Flow Length=305' Tc=12.3 min CN=57 Runoff=1.18 cfs 4,260 cf

Subcatchment DA-4: Subcat DA-4 Runoff Area=38,558 sf 15.72% Impervious Runoff Depth>2.60"
Flow Length=325' Tc=19.3 min CN=55 Runoff=1.93 cfs 8,339 cf

Subcatchment DA-5: Subcat DA-5 Runoff Area=3,689 sf 93.34% Impervious Runoff Depth>6.92"
Tc=6.0 min CN=94 Runoff=0.66 cfs 2,128 cf

Subcatchment DA-6: Subcat DA-6 Runoff Area=11,809 sf 64.37% Impervious Runoff Depth>4.81"
Tc=6.0 min CN=75 Runoff=1.62 cfs 4,734 cf

Subcatchment DA-7: Subcat DA-7 Runoff Area=17,422 sf 0.08% Impervious Runoff Depth>0.49"
Flow Length=106' Slope=0.0600 '/' Tc=14.0 min CN=32 Runoff=0.08 cfs 711 cf

Subcatchment DA-8: Subcat DA-8 Runoff Area=5,163 sf 73.54% Impervious Runoff Depth>6.30"
Tc=6.0 min CN=88 Runoff=0.87 cfs 2,710 cf

Subcatchment DA-9: Subcat DA-9 Runoff Area=5,084 sf 50.41% Impervious Runoff Depth>5.27"
Tc=6.0 min CN=79 Runoff=0.75 cfs 2,233 cf

Reach 4R: Stone Swale Sta 35+20 - Avg. Flow Depth=0.65' Max Vel=3.51 fps Inflow=3.03 cfs 9,435 cf
n=0.041 L=390.0' S=0.0490 '/' Capacity=27.66 cfs Outflow=2.94 cfs 9,416 cf

Reach 7R: Stone Swale Sta 41+10 - Avg. Flow Depth=0.39' Max Vel=2.40 fps Inflow=0.75 cfs 2,233 cf
n=0.041 L=145.0' S=0.0448 '/' Capacity=26.46 cfs Outflow=0.73 cfs 2,230 cf

Reach 9R: Stone Swale Sta 39+10 - Avg. Flow Depth=0.50' Max Vel=3.13 fps Inflow=1.56 cfs 4,487 cf
n=0.041 L=170.0' S=0.0554 '/' Capacity=29.42 cfs Outflow=1.52 cfs 4,483 cf

Pond 1P: Gravel Strip Peak Elev=174.92' Storage=997 cf Inflow=4.52 cfs 14,012 cf
Discarded=0.00 cfs 132 cf Primary=4.50 cfs 12,842 cf Outflow=4.51 cfs 12,975 cf

Pond 3P: Infiltration Swale Peak Elev=219.59' Storage=85 cf Inflow=0.73 cfs 2,230 cf
Discarded=0.01 cfs 374 cf Primary=0.72 cfs 1,777 cf Outflow=0.73 cfs 2,151 cf

Pond 4P: Infiltration Swale Peak Elev=209.44' Storage=91 cf Inflow=1.52 cfs 4,483 cf
Discarded=0.01 cfs 417 cf Primary=1.51 cfs 3,990 cf Outflow=1.52 cfs 4,407 cf

Pond 5P: Infiltration Swale Peak Elev=190.25' Inflow=2.94 cfs 9,416 cf
12.0" Round Culvert n=0.013 L=164.0' S=0.0627 '/' Outflow=2.94 cfs 9,416 cf

Pond 6P: Pipe System Peak Elev=178.25' Inflow=4.91 cfs 19,883 cf
15.0" Round Culvert n=0.013 L=31.0' S=0.0045 '/' Outflow=4.91 cfs 19,883 cf

Link POI-1: Wetland A Inflow=0.29 cfs 846 cf
Primary=0.29 cfs 846 cf

Link POI-2: Wetland B Inflow=6.10 cfs 24,142 cf
Primary=6.10 cfs 24,142 cf

Link POI-3: Wetland C Inflow=4.50 cfs 12,842 cf
Primary=4.50 cfs 12,842 cf

Link POI-4: Spring Street/Mason Pl Inflow=2.08 cfs 6,239 cf
Primary=2.08 cfs 6,239 cf

Total Runoff Area = 141,937 sf Runoff Volume = 46,212 cf Average Runoff Depth = 3.91"
61.11% Pervious = 86,734 sf 38.89% Impervious = 55,203 sf

Summary for Subcatchment DA-1: Subcat DA-1

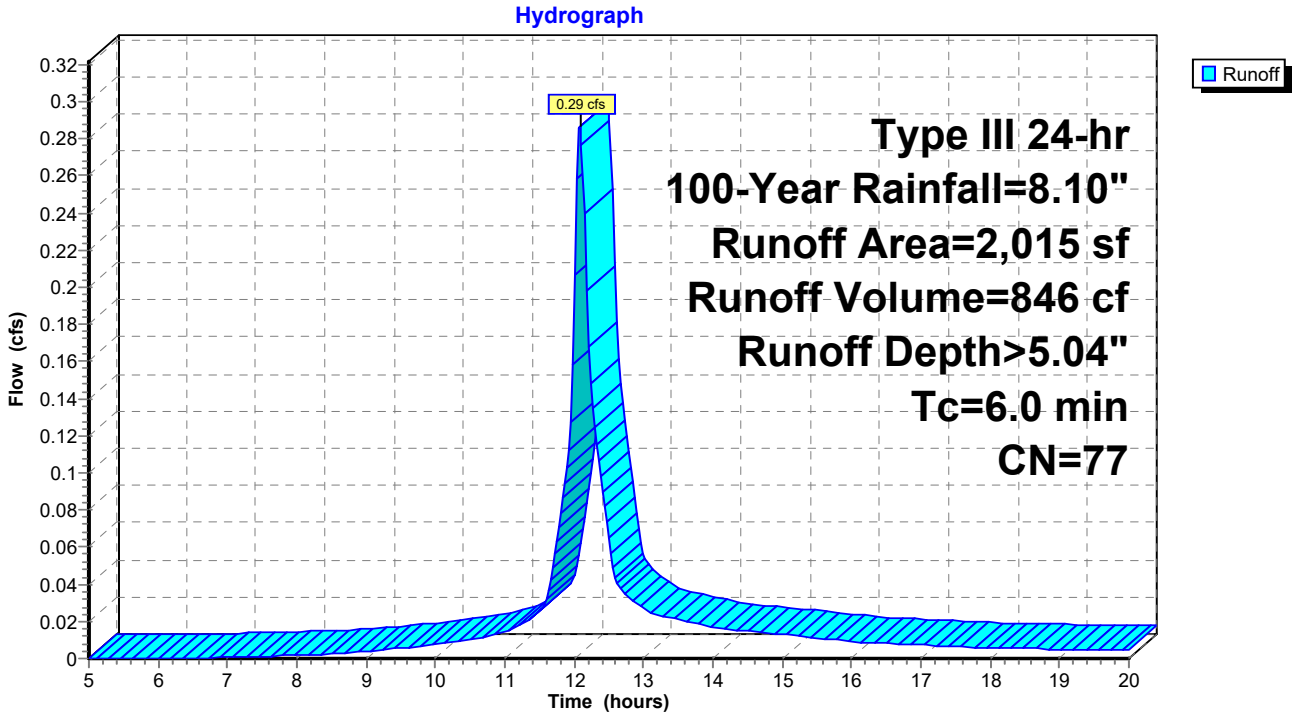
Runoff = 0.29 cfs @ 12.09 hrs, Volume= 846 cf, Depth> 5.04"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
1,784	79	Woods/grass comb., Good, HSG D
231	58	Woods/grass comb., Good, HSG B
2,015	77	Weighted Average
2,015		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-1: Subcat DA-1



Summary for Subcatchment DA-10: Subcat DA-10

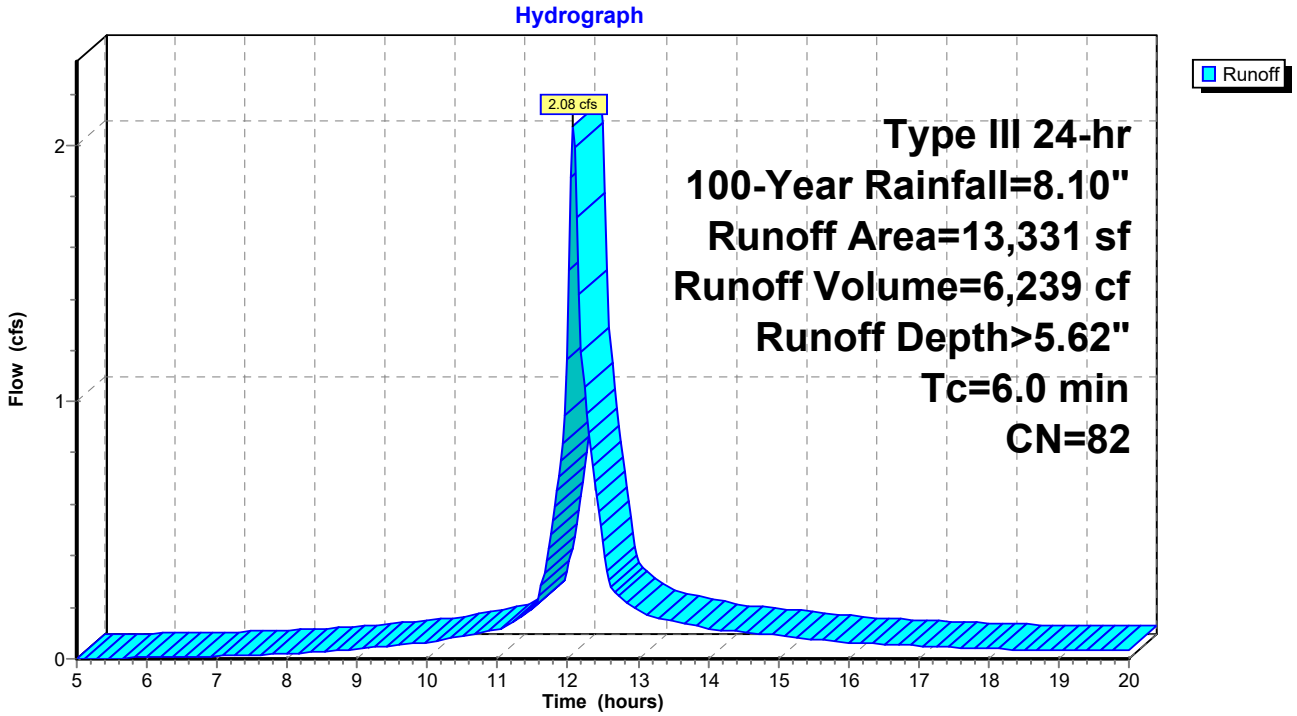
Runoff = 2.08 cfs @ 12.09 hrs, Volume= 6,239 cf, Depth> 5.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
6,961	98	Paved roads w/curbs & sewers, HSG B
1,439	68	1 acre lots, 20% imp, HSG B
2,625	68	1 acre lots, 20% imp, HSG B
0	58	Woods/grass comb., Good, HSG B
106	58	Woods/grass comb., Good, HSG B
413	58	Woods/grass comb., Good, HSG B
845	58	Woods/grass comb., Good, HSG B
941	58	Woods/grass comb., Good, HSG B
13,331	82	Weighted Average
5,557		41.69% Pervious Area
7,774		58.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-10: Subcat DA-10



Summary for Subcatchment DA-2: Subcat DA-2

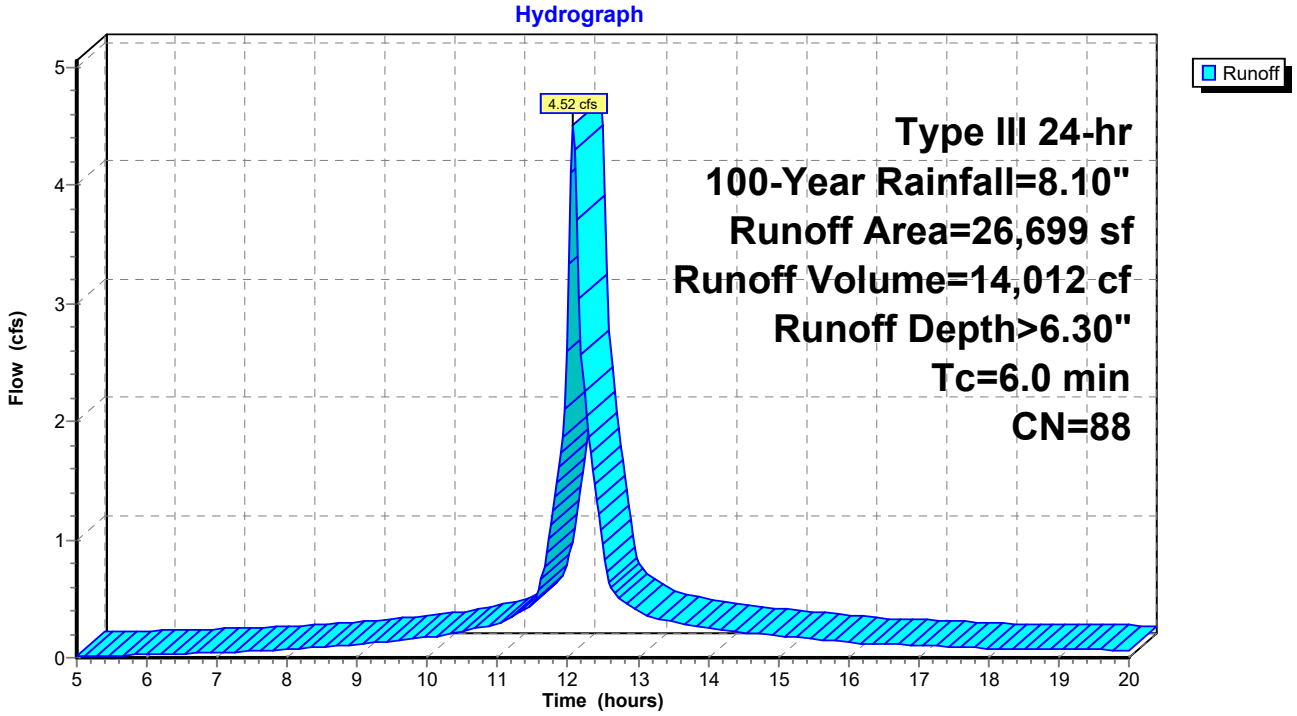
Runoff = 4.52 cfs @ 12.08 hrs, Volume= 14,012 cf, Depth> 6.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
2,694	98	Paved roads w/curbs & sewers, HSG A
204	32	Woods/grass comb., Good, HSG A
1,166	32	Woods/grass comb., Good, HSG A
1,009	32	Woods/grass comb., Good, HSG A
785	51	1 acre lots, 20% imp, HSG A
0	51	1 acre lots, 20% imp, HSG A
187	51	1 acre lots, 20% imp, HSG A
15,623	98	Paved roads w/curbs & sewers, HSG D
1	79	Woods/grass comb., Good, HSG D
2,563	79	Woods/grass comb., Good, HSG D
0	79	Woods/grass comb., Good, HSG D
0	79	Woods/grass comb., Good, HSG D
8	84	1 acre lots, 20% imp, HSG D
2,046	98	Paved roads w/curbs & sewers, HSG B
43	68	1 acre lots, 20% imp, HSG B
0	58	Woods/grass comb., Good, HSG B
68	58	Woods/grass comb., Good, HSG B
31	58	Woods/grass comb., Good, HSG B
159	58	Woods/grass comb., Good, HSG B
112	58	Woods/grass comb., Good, HSG B
26,699	88	Weighted Average
6,131		22.96% Pervious Area
20,568		77.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-2: Subcat DA-2



Summary for Subcatchment DA-3: Subcat DA-3

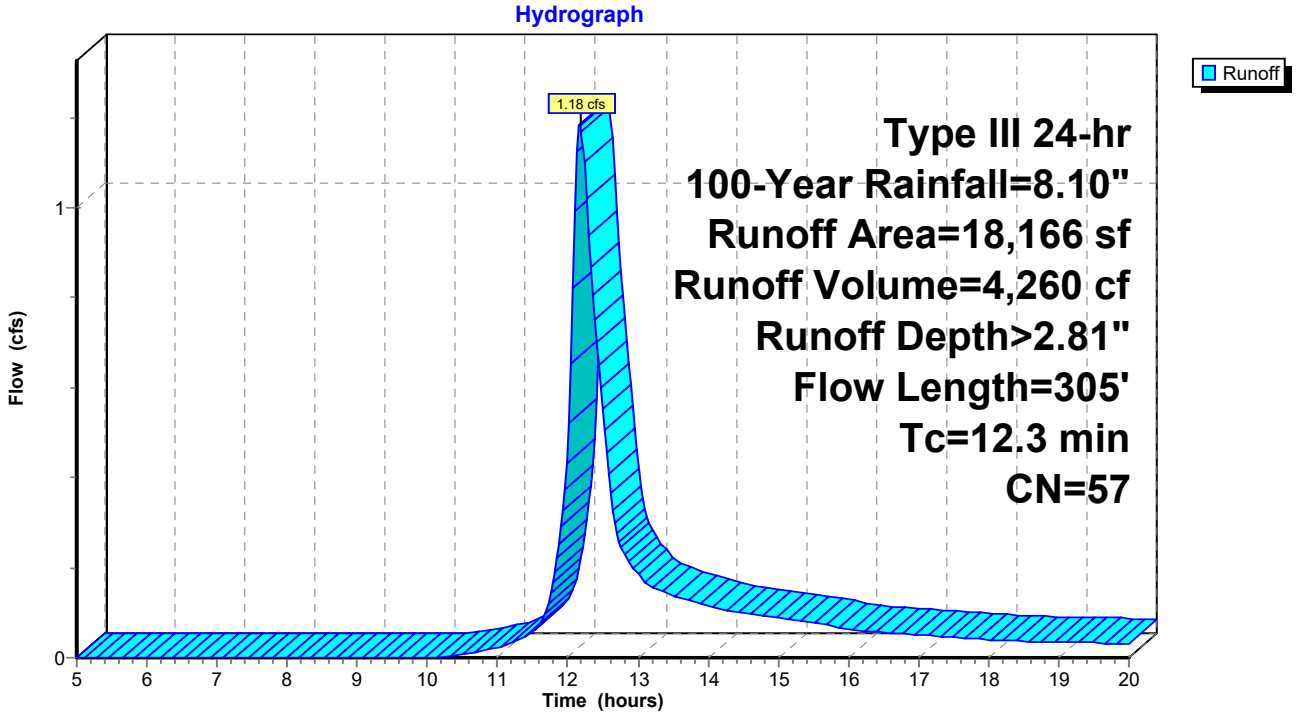
Runoff = 1.18 cfs @ 12.18 hrs, Volume= 4,260 cf, Depth> 2.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
756	98	Paved roads w/curbs & sewers, HSG A
9,528	51	1 acre lots, 20% imp, HSG A
1,971	32	Woods/grass comb., Good, HSG A
2	98	Paved roads w/curbs & sewers, HSG D
0	98	Paved roads w/curbs & sewers, HSG D
48	98	Paved roads w/curbs & sewers, HSG D
13	79	Woods/grass comb., Good, HSG D
414	79	Woods/grass comb., Good, HSG D
1,109	79	Woods/grass comb., Good, HSG D
1	98	Paved roads w/curbs & sewers, HSG D
30	98	Paved roads w/curbs & sewers, HSG D
7	98	Paved roads w/curbs & sewers, HSG B
3,164	68	1 acre lots, 20% imp, HSG B
592	58	Woods/grass comb., Good, HSG B
531	58	Woods/grass comb., Good, HSG B
18,166	57	Weighted Average
14,783		81.38% Pervious Area
3,383		18.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.1	100	0.1200	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"
2.2	205	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
12.3	305	Total			

Subcatchment DA-3: Subcat DA-3



Summary for Subcatchment DA-4: Subcat DA-4

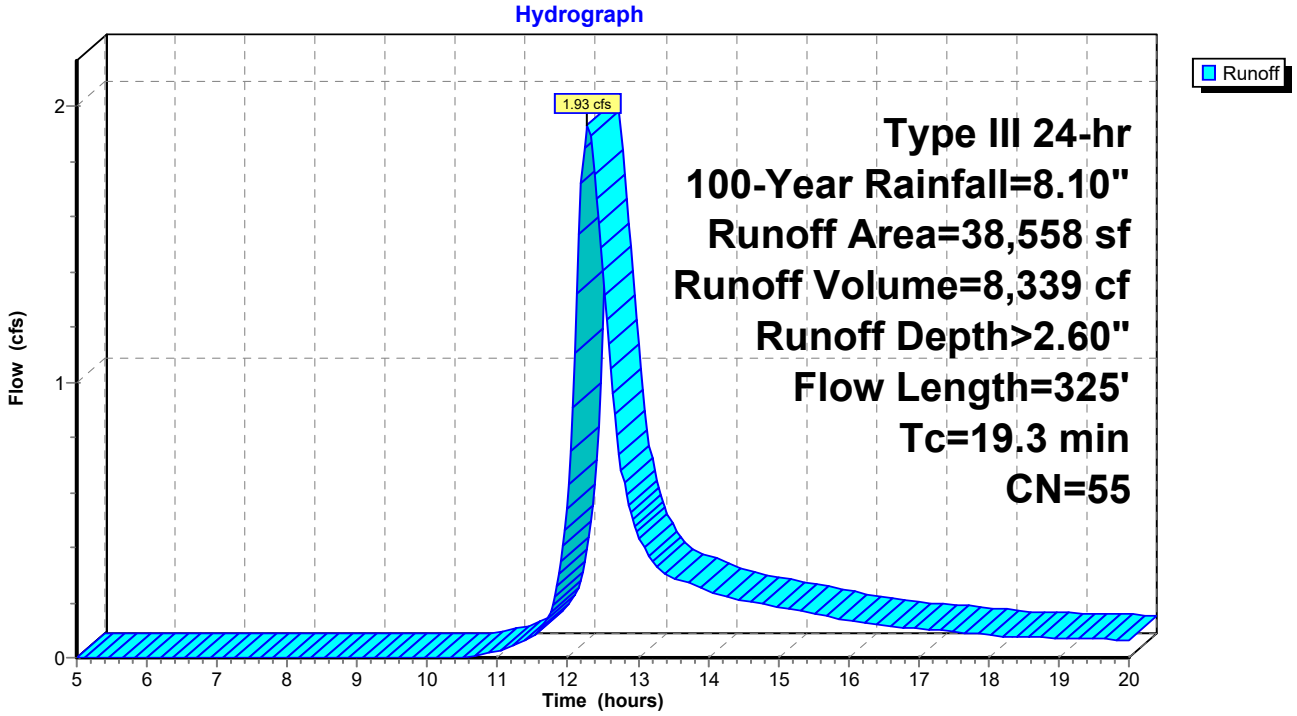
Runoff = 1.93 cfs @ 12.28 hrs, Volume= 8,339 cf, Depth> 2.60"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
18,017	51	1 acre lots, 20% imp, HSG A
546	98	Paved roads w/curbs & sewers, HSG A
13	98	Paved roads w/curbs & sewers, HSG A
2,257	30	Woods, Good, HSG A
409	32	Woods/grass comb., Good, HSG A
77	32	Woods/grass comb., Good, HSG A
9,486	68	1 acre lots, 20% imp, HSG B
6,669	55	Woods, Good, HSG B
1,083	58	Woods/grass comb., Good, HSG B
38,558	55	Weighted Average
32,498		84.28% Pervious Area
6,060		15.72% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.3	100	0.1250	0.10		**Sheet Flow,** Woods: Dense underbrush n= 0.800 P2= 3.44"
2.0	225	0.1400	1.87		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
19.3	325	Total			

Subcatchment DA-4: Subcat DA-4



Summary for Subcatchment DA-5: Subcat DA-5

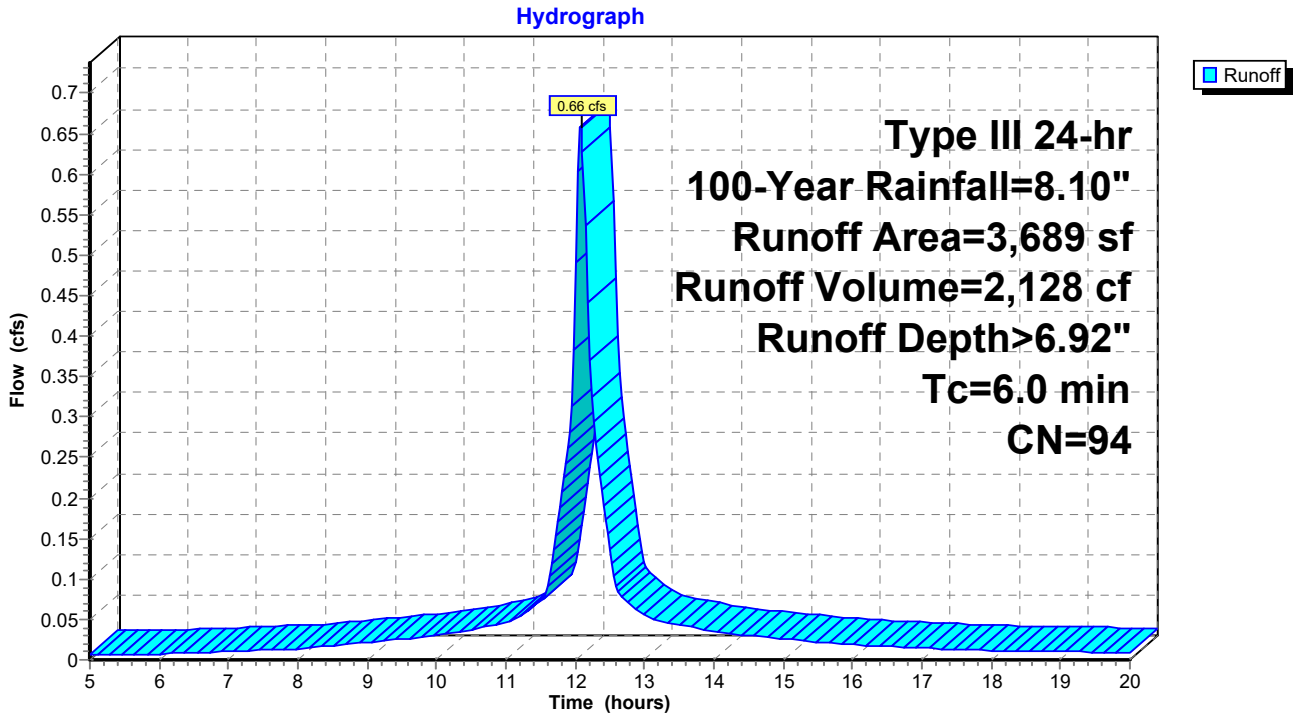
Runoff = 0.66 cfs @ 12.08 hrs, Volume= 2,128 cf, Depth> 6.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
3,427	98	Paved roads w/curbs & sewers, HSG A
83	51	1 acre lots, 20% imp, HSG A
0	32	Woods/grass comb., Good, HSG A
179	32	Woods/grass comb., Good, HSG A
3,689	94	Weighted Average
246		6.66% Pervious Area
3,444		93.34% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-5: Subcat DA-5



Summary for Subcatchment DA-6: Subcat DA-6

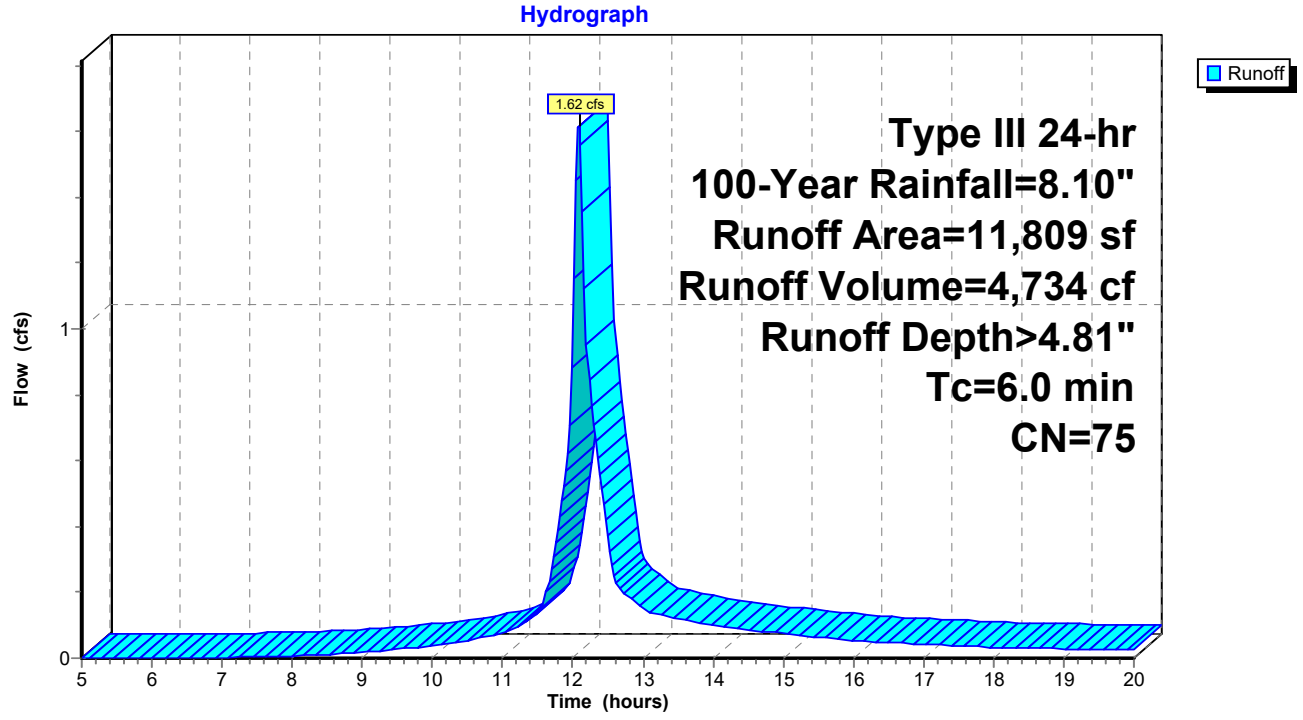
Runoff = 1.62 cfs @ 12.09 hrs, Volume= 4,734 cf, Depth> 4.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
5,831	98	Paved roads w/curbs & sewers, HSG A
1	51	1 acre lots, 20% imp, HSG A
53	51	1 acre lots, 20% imp, HSG A
1,131	30	Woods, Good, HSG A
2,533	32	Woods/grass comb., Good, HSG A
1,759	98	Paved roads w/curbs & sewers, HSG B
4	68	1 acre lots, 20% imp, HSG B
71	58	Woods/grass comb., Good, HSG B
426	58	Woods/grass comb., Good, HSG B
11,809	75	Weighted Average
4,208		35.63% Pervious Area
7,601		64.37% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-6: Subcat DA-6



Summary for Subcatchment DA-7: Subcat DA-7

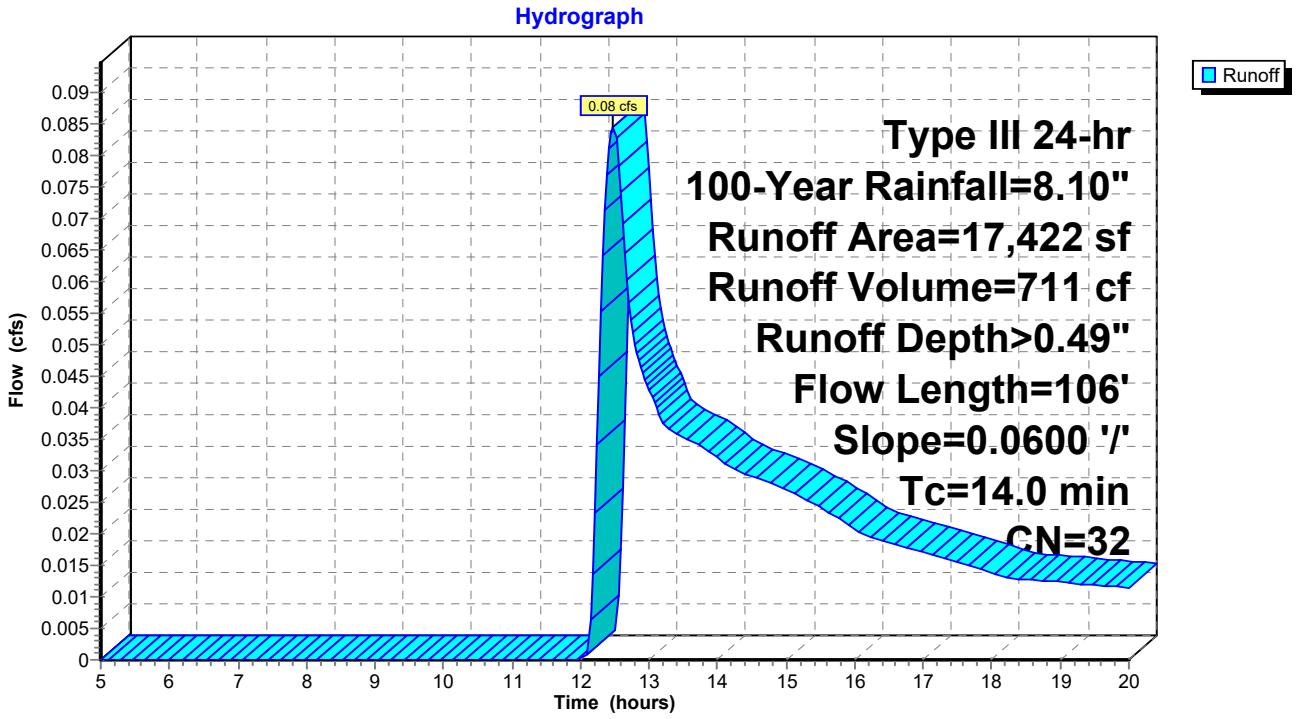
Runoff = 0.08 cfs @ 12.47 hrs, Volume= 711 cf, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
67	51	1 acre lots, 20% imp, HSG A
15,731	30	Woods, Good, HSG A
1,625	55	Woods, Good, HSG B
17,422	32	Weighted Average
17,409		99.92% Pervious Area
13		0.08% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.0	106	0.0600	0.13		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.44"

Subcatchment DA-7: Subcat DA-7



Summary for Subcatchment DA-8: Subcat DA-8

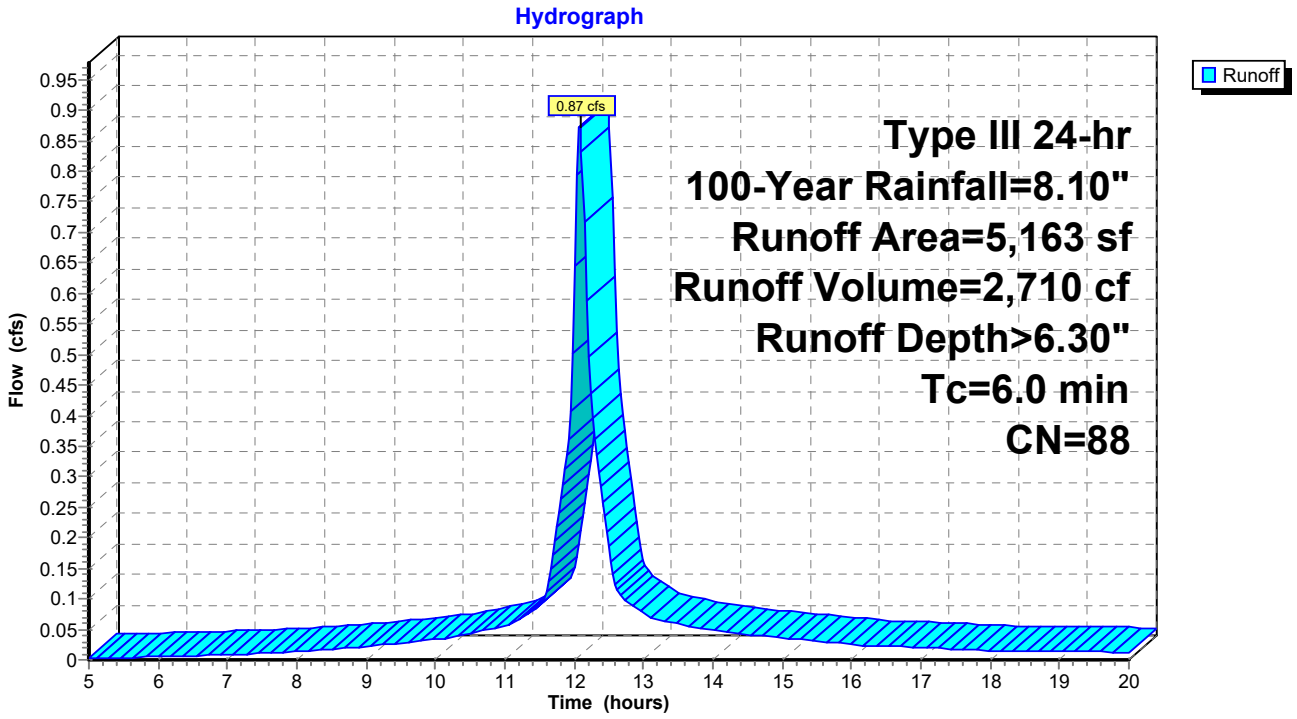
Runoff = 0.87 cfs @ 12.08 hrs, Volume= 2,710 cf, Depth> 6.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
3,711	98	Paved roads w/curbs & sewers, HSG B
429	68	1 acre lots, 20% imp, HSG B
1,002	58	Woods/grass comb., Good, HSG B
21	58	Woods/grass comb., Good, HSG B
5,163	88	Weighted Average
1,366		26.46% Pervious Area
3,797		73.54% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-8: Subcat DA-8



Summary for Subcatchment DA-9: Subcat DA-9

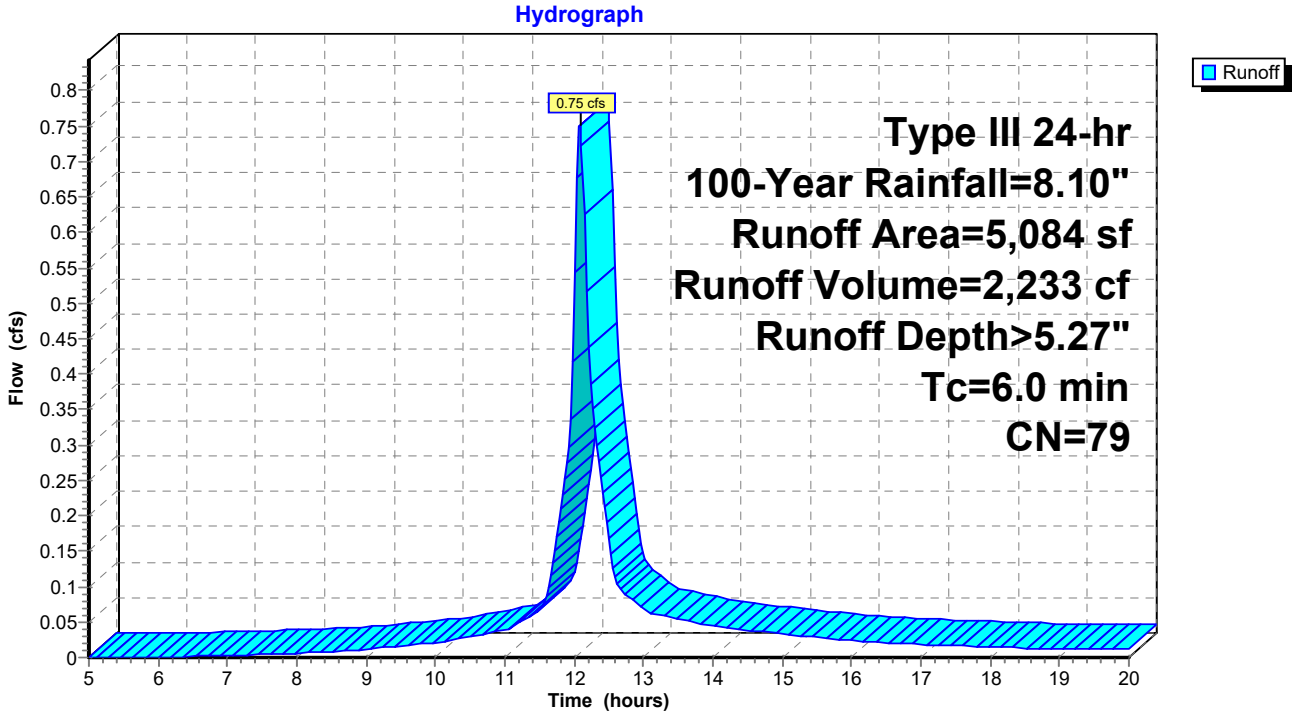
Runoff = 0.75 cfs @ 12.09 hrs, Volume= 2,233 cf, Depth> 5.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Type III 24-hr 100-Year Rainfall=8.10"

Area (sf)	CN	Description
2,110	98	Paved roads w/curbs & sewers, HSG B
2	68	1 acre lots, 20% imp, HSG B
2,263	68	1 acre lots, 20% imp, HSG B
638	58	Woods/grass comb., Good, HSG B
71	58	Woods/grass comb., Good, HSG B
5,084	79	Weighted Average
2,521		49.59% Pervious Area
2,563		50.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment DA-9: Subcat DA-9



Summary for Reach 4R: Stone Swale Sta 35+20 - 38+90

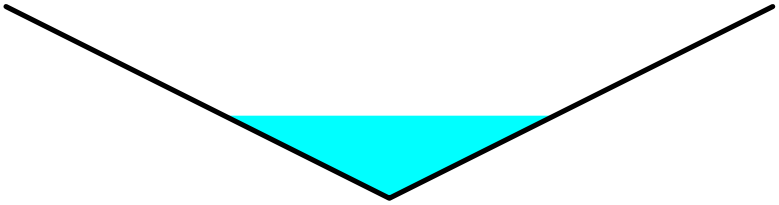
[79] Warning: Submerged Pond 4P Primary device # 2 OUTLET by 0.65'

Inflow Area = 39,479 sf, 35.40% Impervious, Inflow Depth > 2.87" for 100-Year event
Inflow = 3.03 cfs @ 12.11 hrs, Volume= 9,435 cf
Outflow = 2.94 cfs @ 12.16 hrs, Volume= 9,416 cf, Atten= 3%, Lag= 3.3 min

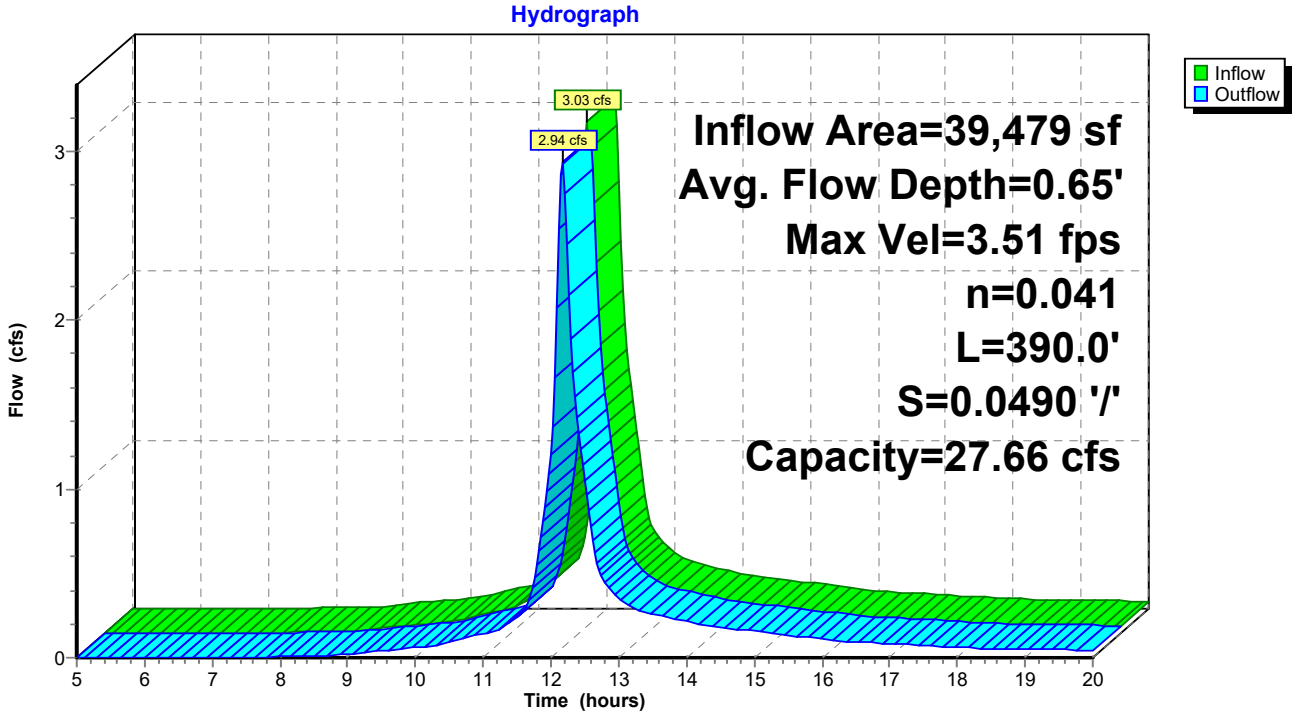
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 3.51 fps, Min. Travel Time= 1.9 min
Avg. Velocity = 1.49 fps, Avg. Travel Time= 4.4 min

Peak Storage= 327 cf @ 12.13 hrs
Average Depth at Peak Storage= 0.65' , Surface Width= 2.59'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 27.66 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 390.0' Slope= 0.0490 '/'
Inlet Invert= 207.88', Outlet Invert= 188.78'



Reach 4R: Stone Swale Sta 35+20 - 38+90



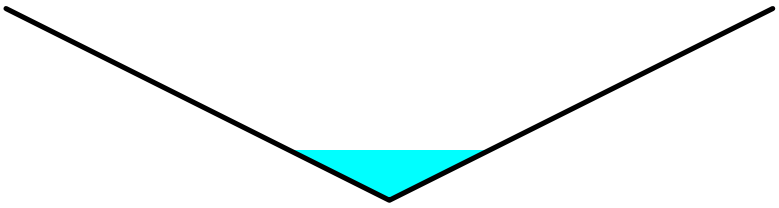
Summary for Reach 7R: Stone Swale Sta 41+10 - 42+50

Inflow Area = 5,084 sf, 50.41% Impervious, Inflow Depth > 5.27" for 100-Year event
Inflow = 0.75 cfs @ 12.09 hrs, Volume= 2,233 cf
Outflow = 0.73 cfs @ 12.12 hrs, Volume= 2,230 cf, Atten= 3%, Lag= 1.9 min

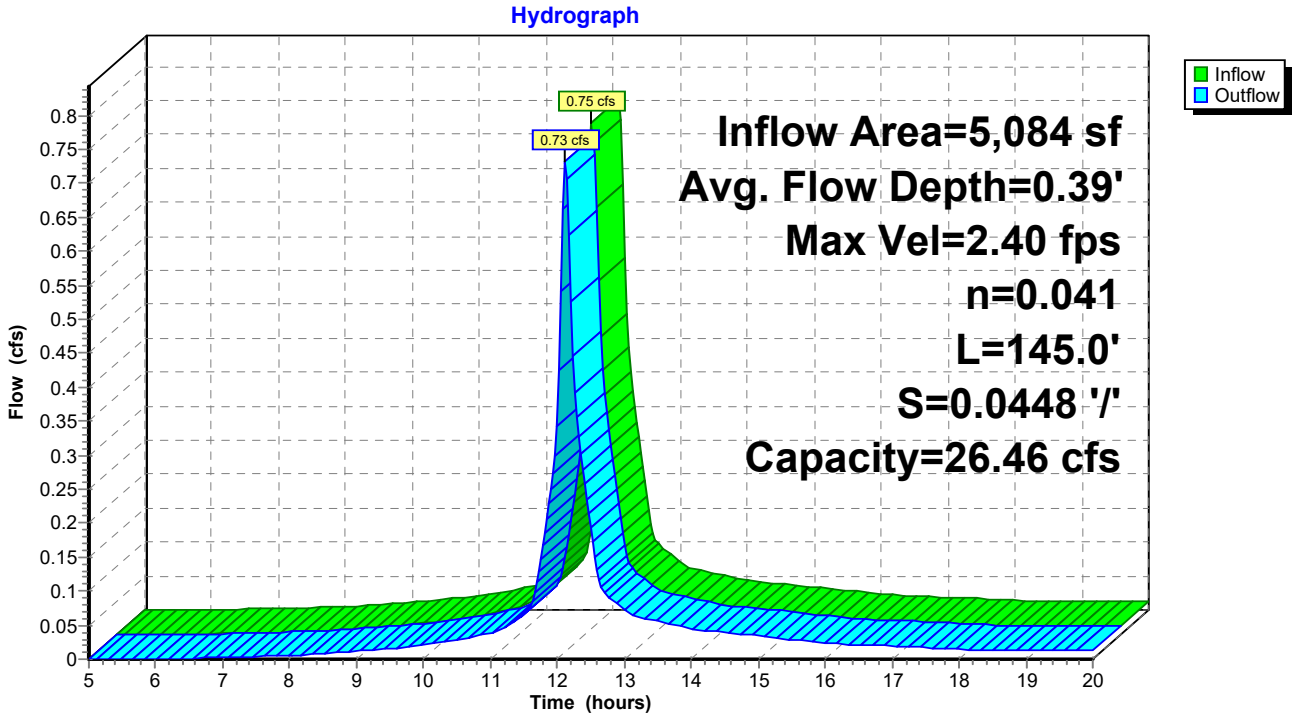
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 2.40 fps, Min. Travel Time= 1.0 min
Avg. Velocity = 1.01 fps, Avg. Travel Time= 2.4 min

Peak Storage= 45 cf @ 12.10 hrs
Average Depth at Peak Storage= 0.39' , Surface Width= 1.57'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 26.46 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 145.0' Slope= 0.0448 '/'
Inlet Invert= 225.60', Outlet Invert= 219.10'



Reach 7R: Stone Swale Sta 41+10 - 42+50



Summary for Reach 9R: Stone Swale Sta 39+10 - 40+80

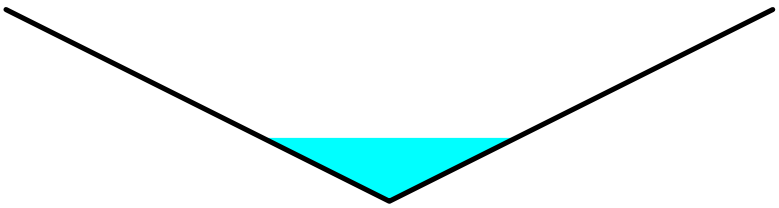
[82] Warning: Early inflow requires earlier time span
[79] Warning: Submerged Pond 3P Primary device # 2 OUTLET by 0.50'

Inflow Area = 10,247 sf, 62.07% Impervious, Inflow Depth > 5.25" for 100-Year event
Inflow = 1.56 cfs @ 12.10 hrs, Volume= 4,487 cf
Outflow = 1.52 cfs @ 12.13 hrs, Volume= 4,483 cf, Atten= 2%, Lag= 1.7 min

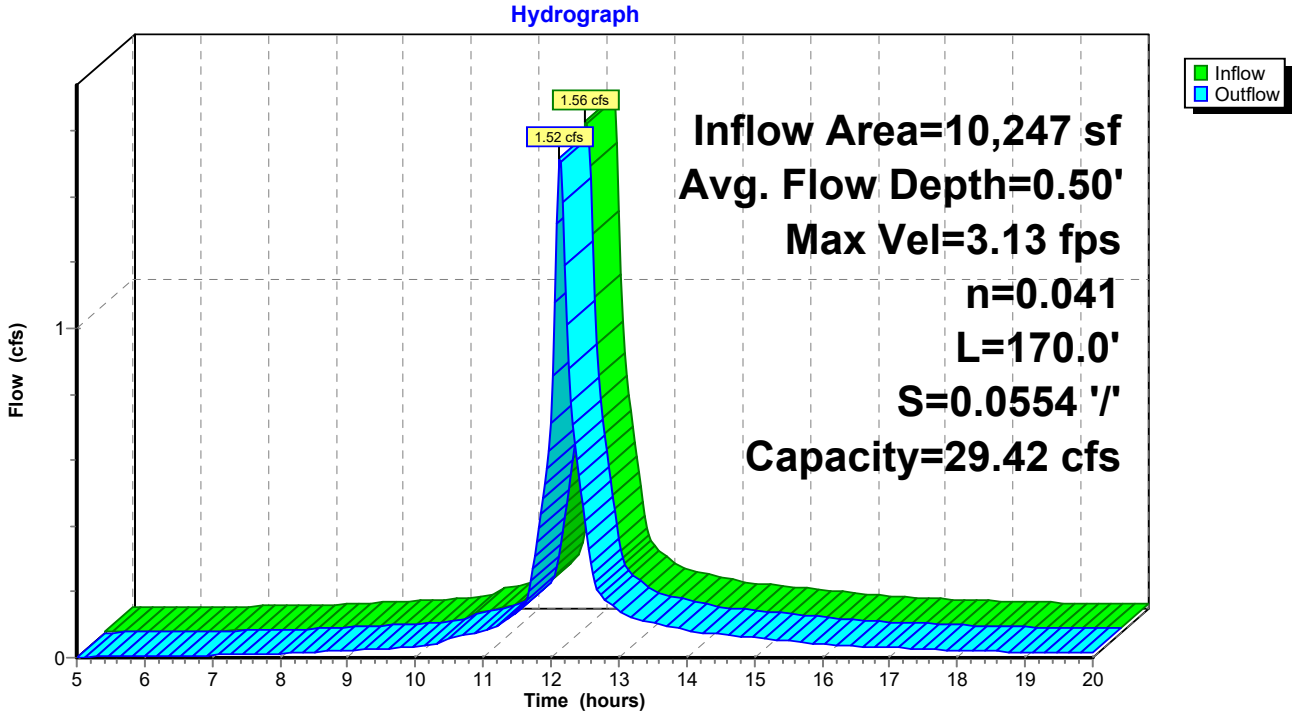
Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Max. Velocity= 3.13 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 1.26 fps, Avg. Travel Time= 2.3 min

Peak Storage= 84 cf @ 12.11 hrs
Average Depth at Peak Storage= 0.50' , Surface Width= 1.99'
Bank-Full Depth= 1.50' Flow Area= 4.5 sf, Capacity= 29.42 cfs

0.00' x 1.50' deep channel, n= 0.041 Riprap, 2-inch
Side Slope Z-value= 2.0 '/' Top Width= 6.00'
Length= 170.0' Slope= 0.0554 '/'
Inlet Invert= 218.10', Outlet Invert= 208.68'



Reach 9R: Stone Swale Sta 39+10 - 40+80



Summary for Pond 1P: Gravel Strip

[82] Warning: Early inflow requires earlier time span

Inflow Area = 26,699 sf, 77.04% Impervious, Inflow Depth > 6.30" for 100-Year event
Inflow = 4.52 cfs @ 12.08 hrs, Volume= 14,012 cf
Outflow = 4.51 cfs @ 12.09 hrs, Volume= 12,975 cf, Atten= 0%, Lag= 0.0 min
Discarded = 0.00 cfs @ 7.43 hrs, Volume= 132 cf
Primary = 4.50 cfs @ 12.09 hrs, Volume= 12,842 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs / 2
Peak Elev= 174.92' @ 12.09 hrs Surf.Area= 1,300 sf Storage= 997 cf

Plug-Flow detention time= 47.5 min calculated for 12,974 cf (93% of inflow)
Center-of-Mass det. time= 21.0 min (774.9 - 753.8)

Volume	Invert	Avail.Storage	Storage Description
#1	173.00'	1,040 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) 2,600 cf Overall x 40.0% Voids

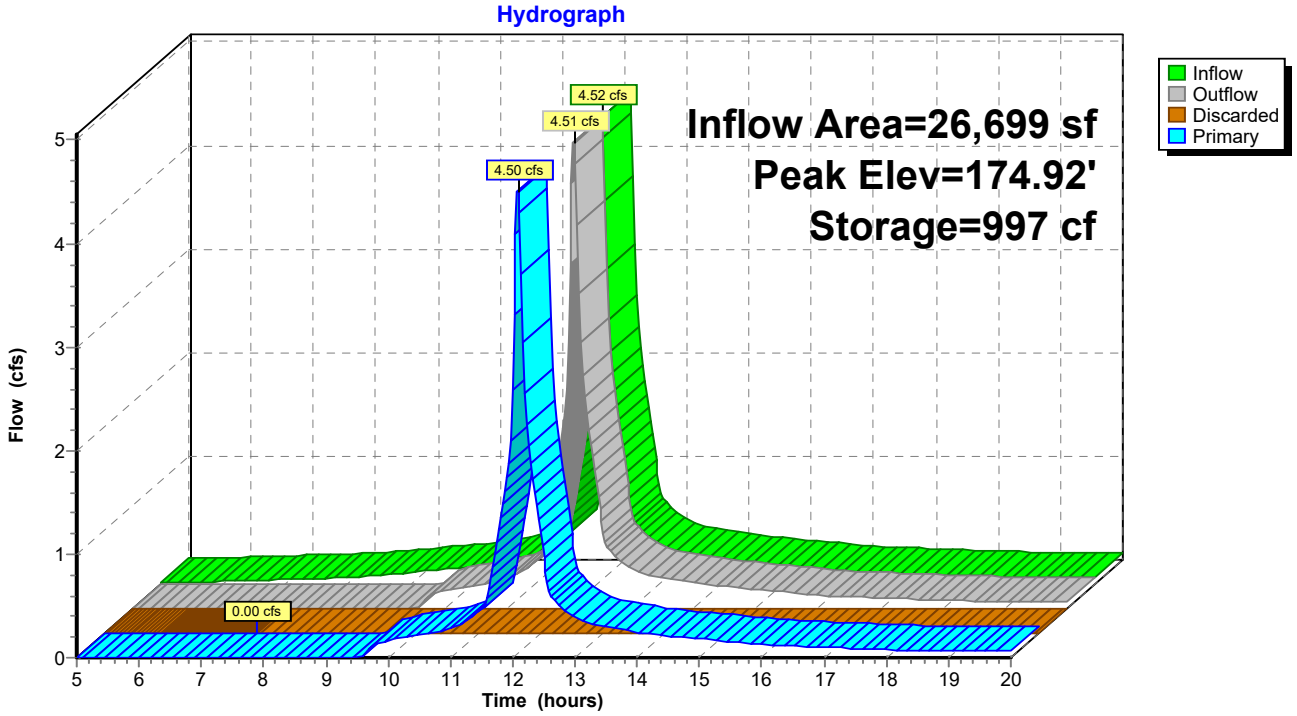
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
173.00	1,300	0	0
175.00	1,300	2,600	2,600

Device	Routing	Invert	Outlet Devices
#0	Primary	175.00'	**Automatic Storage Overflow** (Discharged without head)
#1	Discarded	173.00'	**0.090 in/hr Exfiltration over Surface area** Phase-In= 0.50'
#2	Primary	174.90'	**650.0' long x 1.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 Coef. (English) 2.69 2.72 2.75 2.85 2.98 3.08 3.20 3.28 3.31 3.30 3.31 3.32

Discarded OutFlow Max=0.00 cfs @ 7.43 hrs HW=173.51' (Free Discharge)
↑**1=Exfiltration** (Exfiltration Controls 0.00 cfs)

Primary OutFlow Max=4.24 cfs @ 12.09 hrs HW=174.92' (Free Discharge)
↑**2=Broad-Crested Rectangular Weir** (Weir Controls 4.24 cfs @ 0.36 fps)

Pond 1P: Gravel Strip



Summary for Pond 3P: Infiltration Swale

[62] Hint: Exceeded Reach 7R OUTLET depth by 0.11' @ 12.14 hrs

Inflow Area = 5,084 sf, 50.41% Impervious, Inflow Depth > 5.26" for 100-Year event
Inflow = 0.73 cfs @ 12.12 hrs, Volume= 2,230 cf
Outflow = 0.73 cfs @ 12.12 hrs, Volume= 2,151 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.01 cfs @ 12.12 hrs, Volume= 374 cf
Primary = 0.72 cfs @ 12.12 hrs, Volume= 1,777 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 219.59' @ 12.12 hrs Surf.Area= 158 sf Storage= 85 cf

Plug-Flow detention time= 21.7 min calculated for 2,147 cf (96% of inflow)
Center-of-Mass det. time= 8.2 min (783.0 - 774.9)

Volume	Invert	Avail.Storage	Storage Description
#1	216.10'	79 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 197 cf Overall x 40.0% Voids
#2	219.10'	77 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		156 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
216.10	3	0	0	3
217.10	45	20	20	48
218.10	90	66	86	101
219.10	134	111	197	159

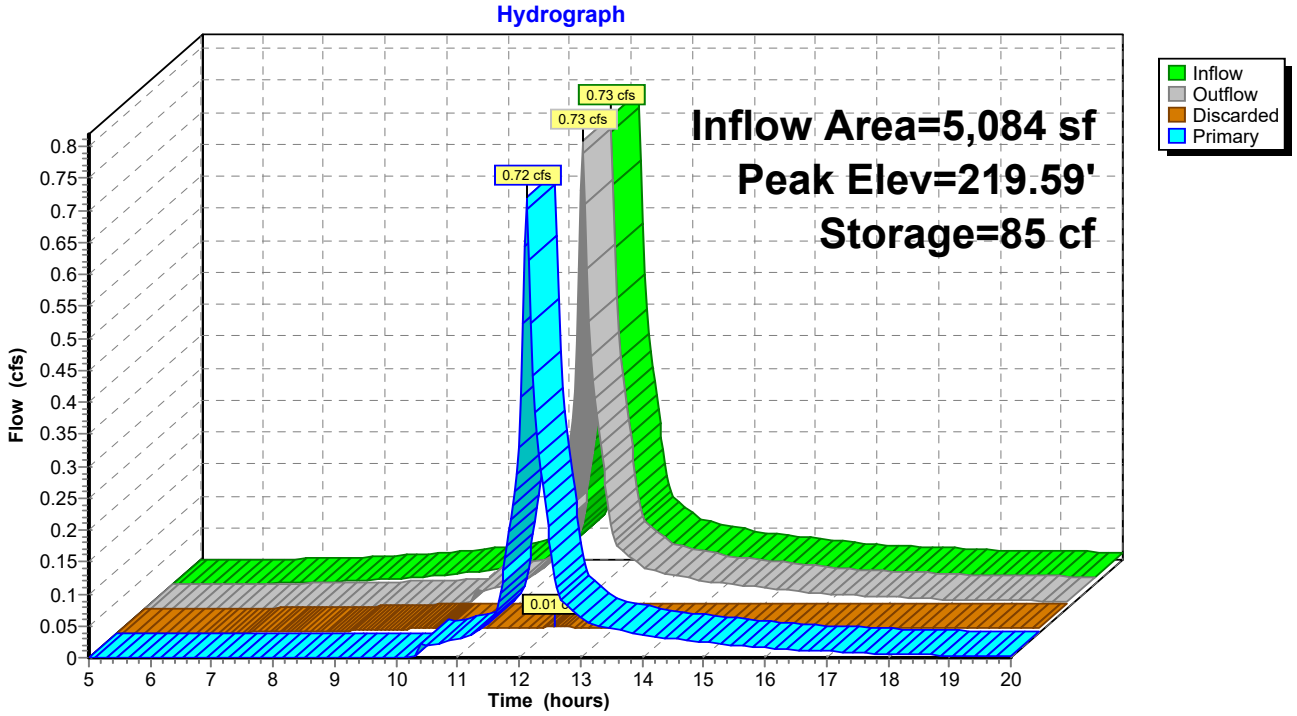
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
219.10	3	0	0	3
220.60	132	77	77	137

Device	Routing	Invert	Outlet Devices
#1	Discarded	216.10'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	219.10'	**12.0" Round Culvert** L= 25.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 219.10' / 218.10' S= 0.0400 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.12 hrs HW=219.59' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.71 cfs @ 12.12 hrs HW=219.59' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 0.71 cfs @ 1.87 fps)

Pond 3P: Infiltration Swale



Summary for Pond 4P: Infiltration Swale

[62] Hint: Exceeded Reach 9R OUTLET depth by 0.27' @ 12.14 hrs

Inflow Area = 10,247 sf, 62.07% Impervious, Inflow Depth > 5.25" for 100-Year event
Inflow = 1.52 cfs @ 12.13 hrs, Volume= 4,483 cf
Outflow = 1.52 cfs @ 12.13 hrs, Volume= 4,407 cf, Atten= 0%, Lag= 0.2 min
Discarded = 0.01 cfs @ 12.13 hrs, Volume= 417 cf
Primary = 1.51 cfs @ 12.13 hrs, Volume= 3,990 cf

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 209.44' @ 12.13 hrs Surf.Area= 169 sf Storage= 91 cf

Plug-Flow detention time= 12.5 min calculated for 4,398 cf (98% of inflow)
Center-of-Mass det. time= 5.7 min (767.1 - 761.5)

Volume	Invert	Avail.Storage	Storage Description
#1	205.80'	81 cf	**Custom Stage Data (Conic)** Listed below (Recalc) 202 cf Overall x 40.0% Voids
#2	208.80'	77 cf	**Custom Stage Data (Conic)** Listed below (Recalc)
		158 cf	Total Available Storage

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
205.80	3	0	0	3
206.70	45	18	18	47
207.80	90	73	91	102
208.80	134	111	202	160

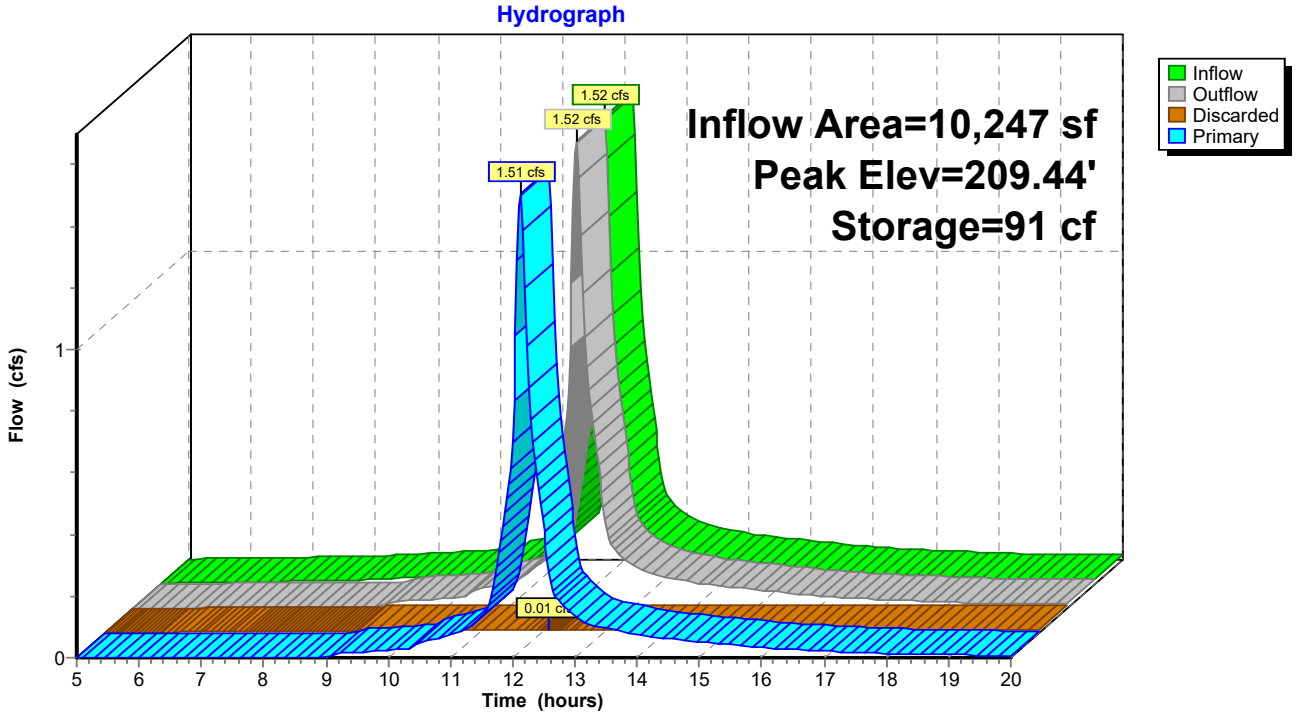
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.80	3	0	0	3
210.30	132	77	77	137

Device	Routing	Invert	Outlet Devices
#1	Discarded	205.80'	**2.410 in/hr Exfiltration over Wetted area**
#2	Primary	208.68'	**12.0" Round Culvert** L= 23.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 208.68' / 207.88' S= 0.0348 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Discarded OutFlow Max=0.01 cfs @ 12.13 hrs HW=209.44' (Free Discharge)
↑—**1=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=1.50 cfs @ 12.13 hrs HW=209.44' (Free Discharge)
↑—**2=Culvert** (Inlet Controls 1.50 cfs @ 2.34 fps)

Pond 4P: Infiltration Swale



Summary for Pond 5P: Infiltration Swale

[57] Hint: Peaked at 190.25' (Flood elevation advised)
[62] Hint: Exceeded Reach 4R OUTLET depth by 0.83' @ 12.17 hrs

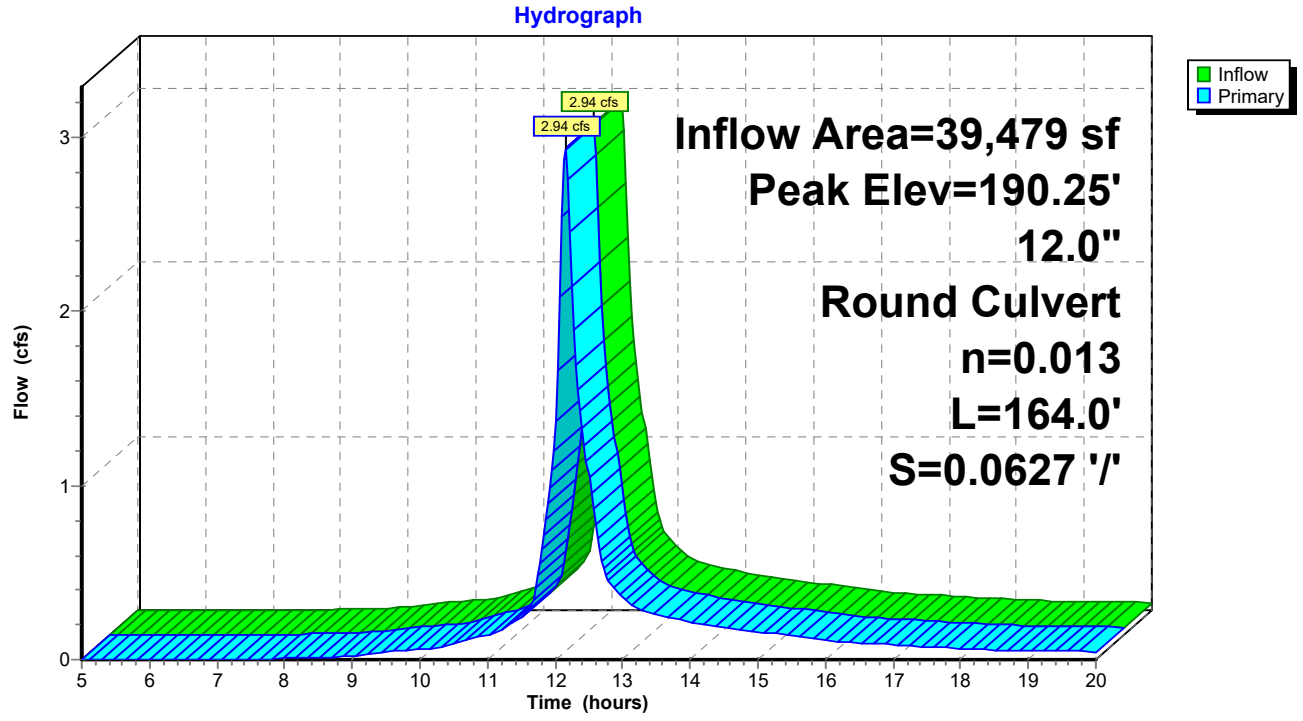
Inflow Area =	39,479 sf,	35.40% Impervious,	Inflow Depth >	2.86"	for 100-Year event
Inflow =	2.94 cfs @	12.16 hrs,	Volume=	9,416 cf	
Outflow =	2.94 cfs @	12.16 hrs,	Volume=	9,416 cf,	Atten= 0%, Lag= 0.0 min
Primary =	2.94 cfs @	12.16 hrs,	Volume=	9,416 cf	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 190.25' @ 12.16 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	188.78'	**12.0" Round Culvert** L= 164.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 188.78' / 178.50' S= 0.0627 '/' Cc= 0.900 n= 0.013 Cast iron, coated, Flow Area= 0.79 sf

Primary OutFlow Max=2.91 cfs @ 12.16 hrs HW=190.23' (Free Discharge)
1=Culvert (Inlet Controls 2.91 cfs @ 3.71 fps)

Pond 5P: Infiltration Swale



Summary for Pond 6P: Pipe System

[82] Warning: Early inflow requires earlier time span
[57] Hint: Peaked at 178.25' (Flood elevation advised)

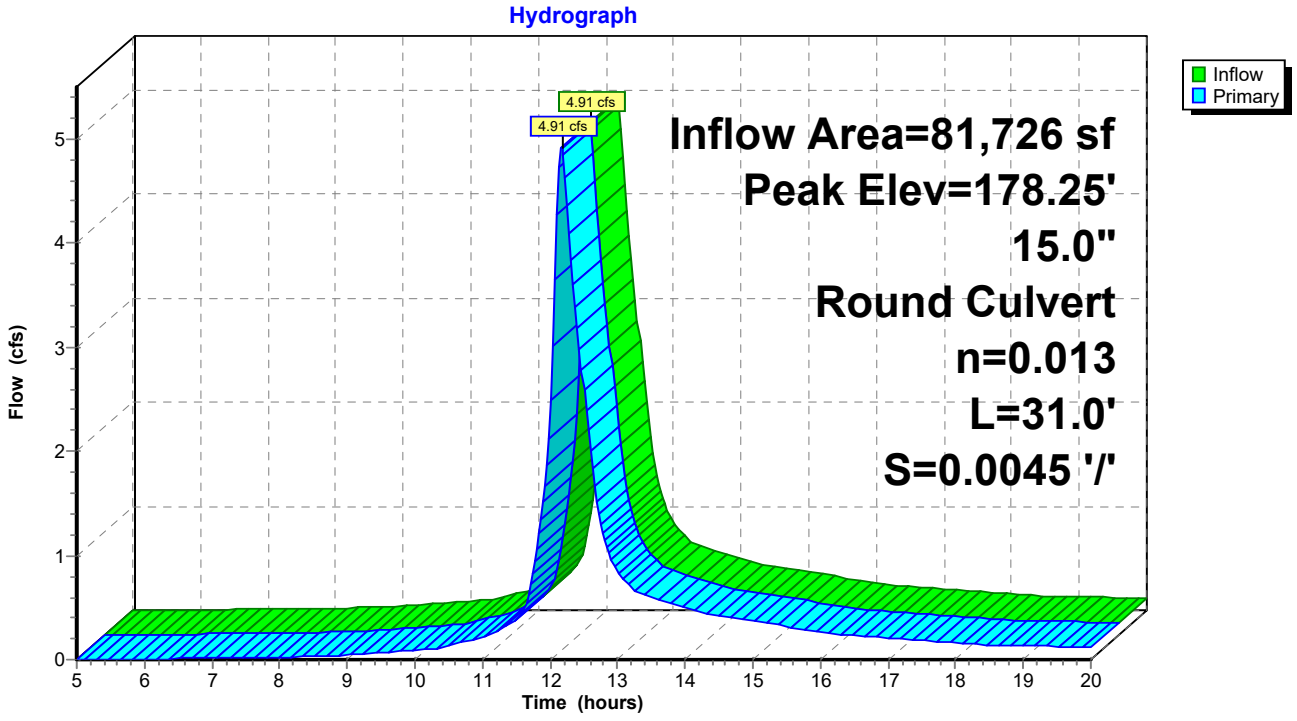
Inflow Area =	81,726 sf,	28.73% Impervious,	Inflow Depth >	2.92"	for 100-Year event
Inflow =	4.91 cfs @	12.18 hrs,	Volume=	19,883 cf	
Outflow =	4.91 cfs @	12.18 hrs,	Volume=	19,883 cf,	Atten= 0%, Lag= 0.0 min
Primary =	4.91 cfs @	12.18 hrs,	Volume=	19,883 cf	

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs
Peak Elev= 178.25' @ 12.18 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	176.78'	**15.0" Round Culvert** L= 31.0' RCP, groove end projecting, Ke= 0.200 Inlet / Outlet Invert= 176.78' / 176.64' S= 0.0045 '/' Cc= 0.900 n= 0.013 Concrete pipe, bends & connections, Flow Area= 1.23 sf

Primary OutFlow Max=4.89 cfs @ 12.18 hrs HW=178.24' (Free Discharge)
1=Culvert (Barrel Controls 4.89 cfs @ 4.29 fps)

Pond 6P: Pipe System

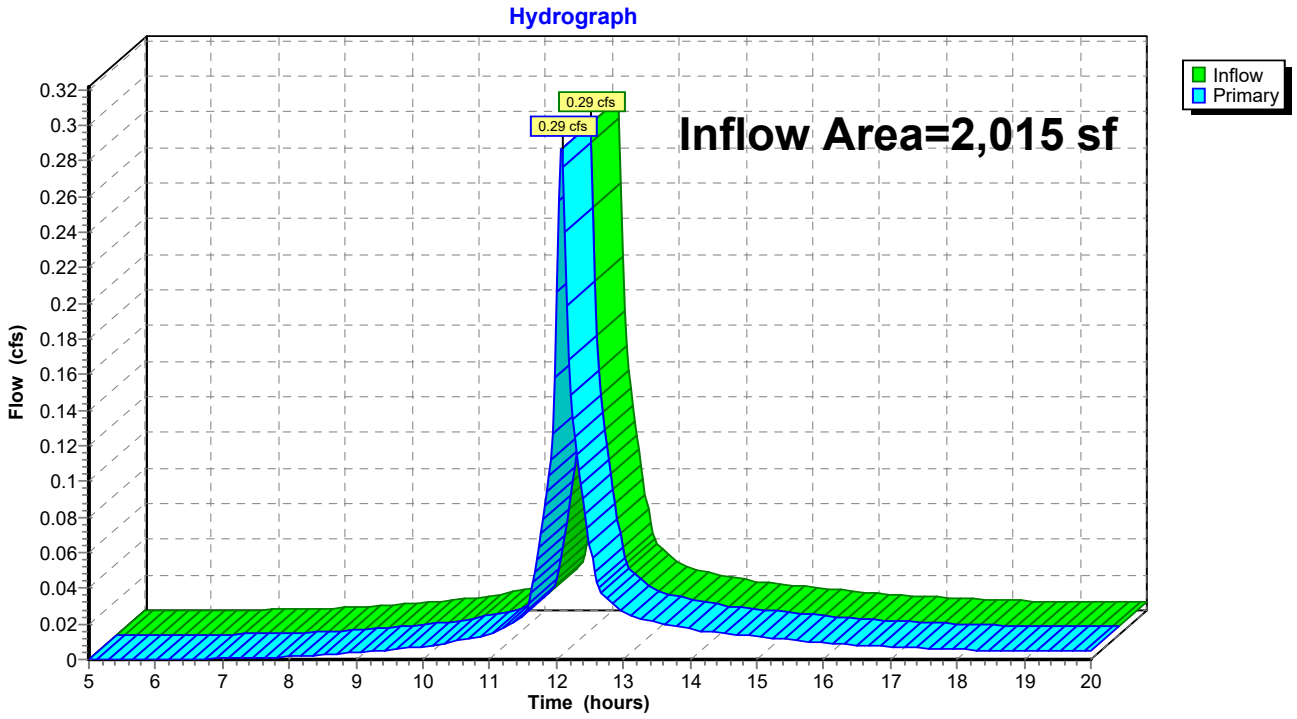


Summary for Link POI-1: Wetland A

Inflow Area = 2,015 sf, 0.00% Impervious, Inflow Depth > 5.04" for 100-Year event
Inflow = 0.29 cfs @ 12.09 hrs, Volume= 846 cf
Primary = 0.29 cfs @ 12.09 hrs, Volume= 846 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-1: Wetland A

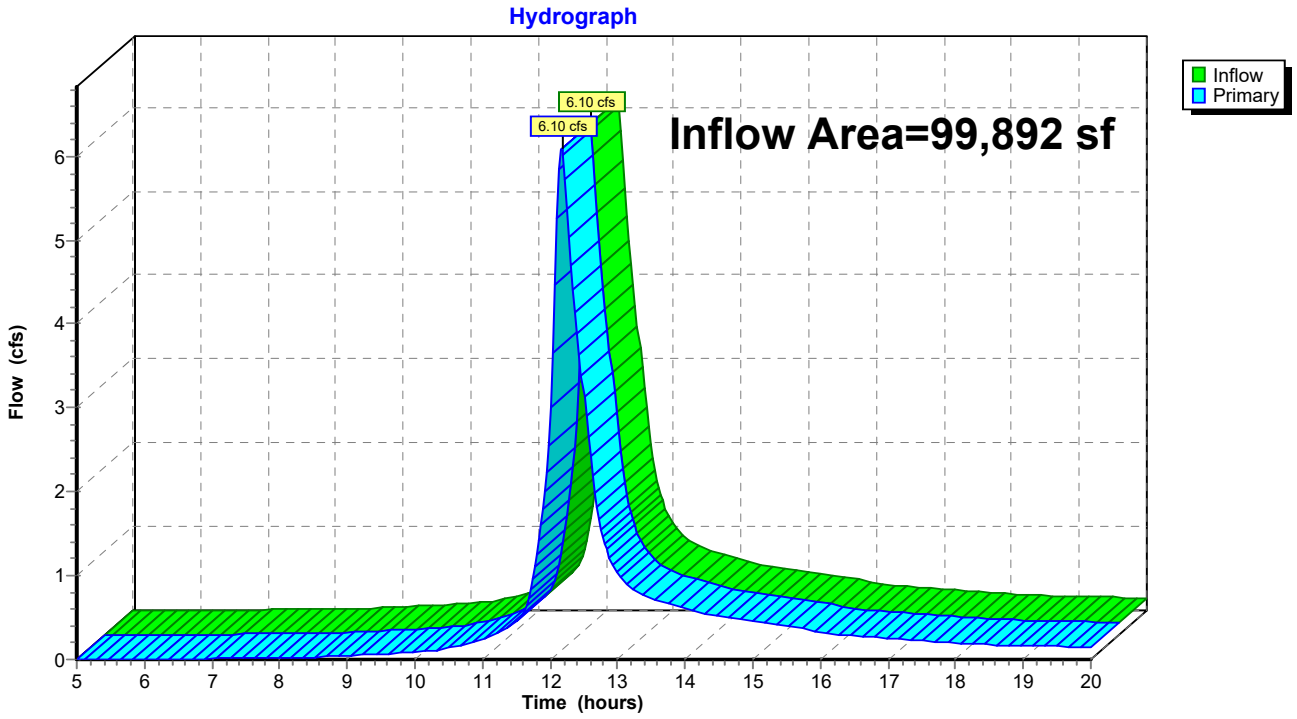


Summary for Link POI-2: Wetland B

Inflow Area = 99,892 sf, 26.89% Impervious, Inflow Depth > 2.90" for 100-Year event
Inflow = 6.10 cfs @ 12.18 hrs, Volume= 24,142 cf
Primary = 6.10 cfs @ 12.18 hrs, Volume= 24,142 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-2: Wetland B

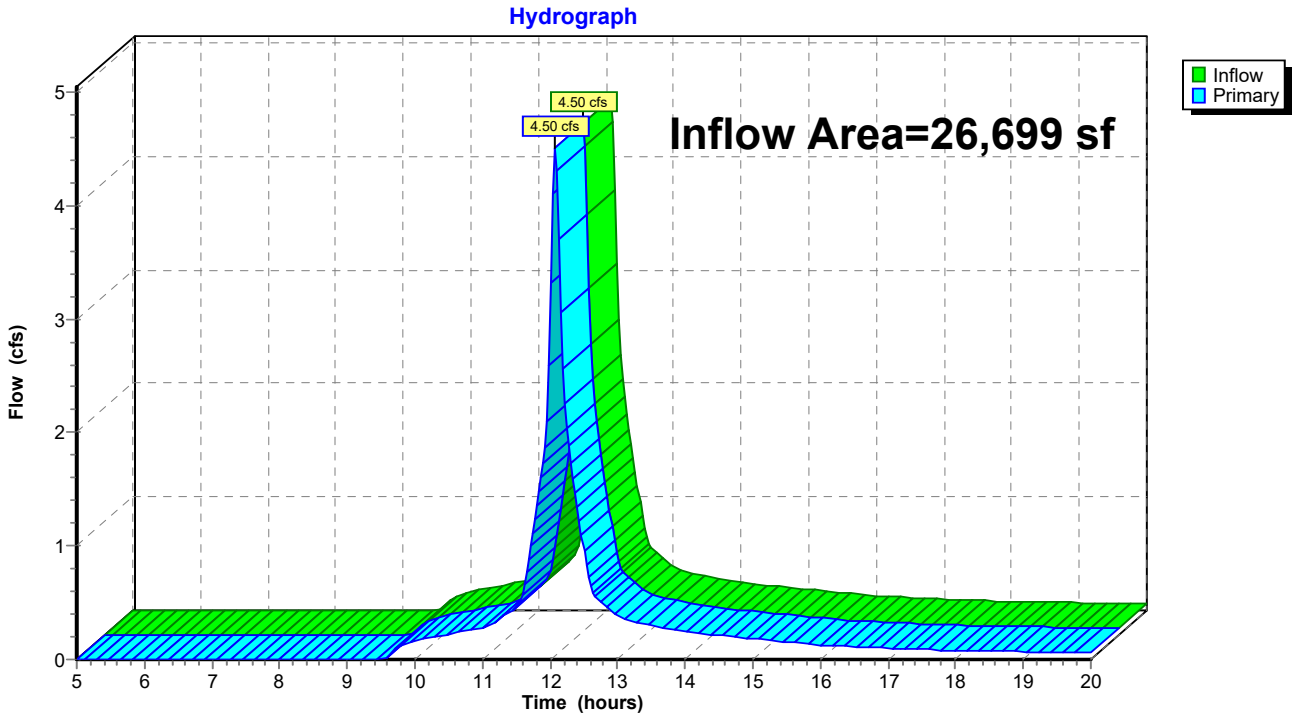


Summary for Link POI-3: Wetland C

Inflow Area = 26,699 sf, 77.04% Impervious, Inflow Depth > 5.77" for 100-Year event
Inflow = 4.50 cfs @ 12.09 hrs, Volume= 12,842 cf
Primary = 4.50 cfs @ 12.09 hrs, Volume= 12,842 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-3: Wetland C

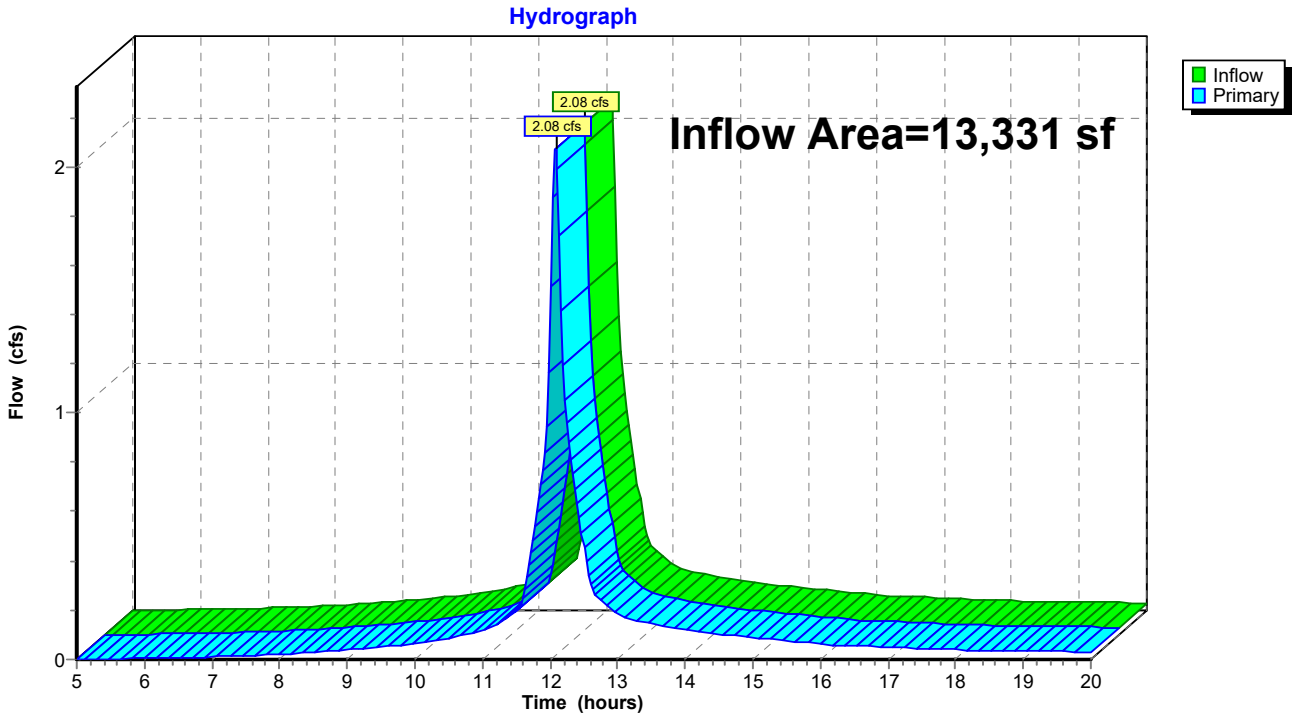


Summary for Link POI-4: Spring Street/Mason Pl

Inflow Area = 13,331 sf, 58.31% Impervious, Inflow Depth > 5.62" for 100-Year event
Inflow = 2.08 cfs @ 12.09 hrs, Volume= 6,239 cf
Primary = 2.08 cfs @ 12.09 hrs, Volume= 6,239 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.03 hrs

Link POI-4: Spring Street/Mason Pl



E. Belcher Road Reconstruction
Recharge Calculation

Required Recharge

Area Summary	
	Area (SF)*
Existing Impervious	36,640
Proposed Impervious	45,566
Required Recharge Area *(Proposed - Existing)*	8,926

* See Note

Note (1) Site consists of combination of HSG A, HSG B, and HSG D soils; therefore 0.35 Target Depth Factor will be used for calculation as the median value.

Hydrologic Soil Group Summary		
Group	Target Depth Factor (in)	Area (SF)
A	0.6	0
B	0.35	8,926
C	0.25	0
D	0.1	0

Required Recharge (*Rv*) Calculation:

Rv = Target Depth Factor x Δ Impervious Area
Rv = 0.35 x (1/12) x 8,926
Rv = 260 CF

Proposed Recharge Summary
Detailed calculations included on following pages

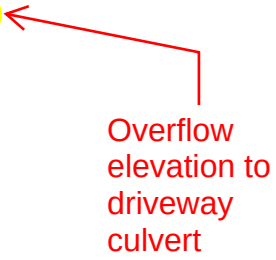
Location	Volume (CF)	
4P Infiltration Swale	79	From HydroCAD (see Attached)
4P Infiltration Swale	76	From HydroCAD (see Attached)
Gravel Strip	988	From HydroCAD (see Attached)
Total	1,143	

Rv = 260 CF
Provided recharge = 1,143 CF

Recharge Requirement is met.

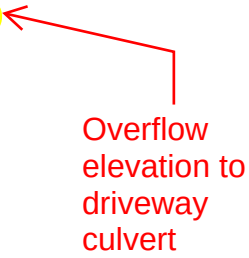
Stage-Area-Storage for Pond 4P: Infiltration Swale

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
205.80	3	0
205.85	4	0
205.90	5	0
205.95	7	0
206.00	8	0
206.05	10	1
206.10	12	1
206.15	14	1
206.20	16	1
206.25	19	2
206.30	21	2
206.35	24	2
206.40	27	3
206.45	30	4
206.50	33	4
206.55	36	5
206.60	40	5
206.65	43	6
206.70	47	7
206.75	49	8
206.80	51	9
206.85	53	10
206.90	56	11
206.95	58	12
207.00	60	13
207.05	63	14
207.10	65	15
207.15	67	17
207.20	70	18
207.25	72	19
207.30	75	21
207.35	77	22
207.40	80	23
207.45	83	25
207.50	85	26
207.55	88	28
207.60	91	29
207.65	93	31
207.70	96	33
207.75	99	35
207.80	102	36
207.85	105	38
207.90	107	40
207.95	110	42
208.00	113	44
208.05	115	46
208.10	118	48
208.15	121	50
208.20	124	52
208.25	127	54
208.30	129	56
208.35	132	59
208.40	135	61
208.45	138	63
208.50	141	66
208.55	144	68
208.60	147	70
208.65	150	73
208.70	153	76
208.75	157	78
208.80	163	81
208.85	164	81
208.90	166	81
208.95	167	82
209.00	169	82
209.05	171	82
209.10	174	83
209.15	176	84
209.20	179	85
209.25	182	86
209.30	185	87
209.35	189	88
209.40	193	90
209.45	196	91
209.50	201	93
209.55	205	95
209.60	210	98
209.65	214	100
209.70	219	103
209.75	225	106
209.80	230	109
209.85	236	113
209.90	242	117
209.95	248	121
210.00	254	125
210.05	260	130
210.10	267	135
210.15	274	140
210.20	281	146
210.25	289	152
210.30	**296**	**158**



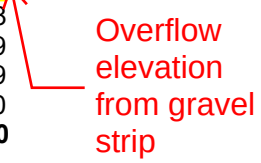
Stage-Area-Storage for Pond 3P: Infiltration Swale

Elevation (feet)	Wetted (sq-ft)	Storage (cubic-feet)
216.10	3	0
216.15	4	0
216.20	5	0
216.25	6	0
216.30	8	0
216.35	9	1
216.40	11	1
216.45	13	1
216.50	15	1
216.55	17	2
216.60	19	2
216.65	21	2
216.70	23	3
216.75	26	3
216.80	29	4
216.85	32	4
216.90	34	5
216.95	38	6
217.00	41	6
217.05	44	7
217.10	48	8
217.15	50	9
217.20	52	10
217.25	54	11
217.30	57	12
217.35	59	13
217.40	62	14
217.45	64	15
217.50	67	16
217.55	69	18
217.60	72	19
217.65	75	20
217.70	77	22
217.75	80	23
217.80	83	25
217.85	86	26
217.90	89	28
217.95	92	29
218.00	95	31
218.05	98	33
218.10	101	34
218.15	104	36
218.20	106	38
218.25	109	40
218.30	112	42
218.35	114	44
218.40	117	46
218.45	120	48
218.50	123	50
218.55	126	52
218.60	128	54
218.65	131	57
218.70	134	59
218.75	137	61
218.80	140	64
218.85	143	66
218.90	146	69
218.95	149	71
219.00	152	74
219.05	156	76
219.10	162	79
219.15	163	79
219.20	164	79
219.25	166	80
219.30	168	80
219.35	170	81
219.40	173	81
219.45	175	82
219.50	178	83
219.55	181	84
219.60	184	85
219.65	188	86
219.70	191	88
219.75	195	90
219.80	200	91
219.85	204	93
219.90	208	96
219.95	213	98
220.00	218	101
220.05	223	104
220.10	229	107
220.15	235	111
220.20	240	115
220.25	247	119
220.30	253	123
220.35	259	128
220.40	266	133
220.45	273	138
220.50	280	144
220.55	288	150
220.60	**295**	**156**



Stage-Area-Storage for Pond 1P: Gravel Strip

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
173.00	**1,300**	0
173.02	1,300	10
173.04	1,300	21
173.06	1,300	31
173.08	1,300	42
173.10	1,300	52
173.12	1,300	62
173.14	1,300	73
173.16	1,300	83
173.18	1,300	94
173.20	1,300	104
173.22	1,300	114
173.24	1,300	125
173.26	1,300	135
173.28	1,300	146
173.30	1,300	156
173.32	1,300	166
173.34	1,300	177
173.36	1,300	187
173.38	1,300	198
173.40	1,300	208
173.42	1,300	218
173.44	1,300	229
173.46	1,300	239
173.48	1,300	250
173.50	1,300	260
173.52	1,300	270
173.54	1,300	281
173.56	1,300	291
173.58	1,300	302
173.60	1,300	312
173.62	1,300	322
173.64	1,300	333
173.66	1,300	343
173.68	1,300	354
173.70	1,300	364
173.72	1,300	374
173.74	1,300	385
173.76	1,300	395
173.78	1,300	406
173.80	1,300	416
173.82	1,300	426
173.84	1,300	437
173.86	1,300	447
173.88	1,300	458
173.90	1,300	468
173.92	1,300	478
173.94	1,300	489
173.96	1,300	499
173.98	1,300	510
174.00	1,300	520
174.02	1,300	530
174.04	1,300	541
174.06	1,300	551
174.08	1,300	562
174.10	1,300	572
174.12	1,300	582
174.14	1,300	593
174.16	1,300	603
174.18	1,300	614
174.20	1,300	624
174.22	1,300	634
174.24	1,300	645
174.26	1,300	655
174.28	1,300	666
174.30	1,300	676
174.32	1,300	686
174.34	1,300	697
174.36	1,300	707
174.38	1,300	718
174.40	1,300	728
174.42	1,300	738
174.44	1,300	749
174.46	1,300	759
174.48	1,300	770
174.50	1,300	780
174.52	1,300	790
174.54	1,300	801
174.56	1,300	811
174.58	1,300	822
174.60	1,300	832
174.62	1,300	842
174.64	1,300	853
174.66	1,300	863
174.68	1,300	874
174.70	1,300	884
174.72	1,300	894
174.74	1,300	905
174.76	1,300	915
174.78	1,300	926
174.80	1,300	936
174.82	1,300	946
174.84	1,300	957
174.86	1,300	967
174.88	1,300	978
174.90	1,300	988
174.92	1,300	998
174.94	1,300	1,009
174.96	1,300	1,019
174.98	1,300	1,030
175.00	1,300	**1,040**



APPENDIX C

This plan will be provided at the completion of construction. To meet the requirements of Standard 4 of the Massachusetts Stormwater Handbook, this Long-Term Pollution Prevention Plan is provided to identify the proper procedures of practices for source control and pollution prevention.

STORAGE AND HANDLING OF OIL AND OTHER HAZARDOUS MATERIALS

No oil products or other hazardous materials will be stored in the project area.

VEHICLE STORAGE AND WASHING

No vehicles will be stored within the project area.

OPERATION AND MAINTENANCE OF STORMWATER CONTROL STRUCTURES

Foxborough DPW will be responsible for periodic inspection and maintenance of the stormwater control structures as part of the standard DPW roadway maintenance. No separate Operation and Maintenance is prepared for this project.

MATERIAL STORAGE AREA

No materials will be stored in the project area.

LANDSCAPING

There are no landscaped areas within the project area.

PET WASTE MANAGEMENT

There are no design accommodations for management of pet waste. Residents of the area may walk their pets along this roadway; however, they'll be expected to remove any deposited pet waste.

SEPTIC SYSTEM

No wastewater will be generated in the project area.

DE-ICING & SNOW DISPOSAL

Foxborough DPW will utilize salt and sand to treat the paved surfaces. No salt will be stored in the project area. Snow storage will consist of pushing the snow on the shoulders of the roadway and adjacent landscaped areas.

SECTION 1 – INTRODUCTION

The project consists of the reconstruction and widening of 1,800 linear feet section of East Belcher Road in Foxborough MA. It is a local road that connects Cocasset Street and Spring Street. The southern portion of the East Belcher Road is in disrepair with variable width between 19.5 feet to 16.3 feet. This project proposes reconstruction of the roadway with a consistent width of 22 feet, allowing a save access to a two-way traffic. Approximately 800 feet section of East Belcher Road from the beginning of the project traverses a wetland area. The remaining section of the roadway climbs approximately 50 feet toward Spring Street. The work includes clearing and grubbing, full-depth pavement construction and curbing, stone swale, gravel filter strip guardrail, fencing, pavement markings, signage, loam and seed, and other incidental work.

As part of this project, this "Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan" has been created to ensure that no disturbance to the wetland resource is created during the construction of these repairs.

SECTION 2 – CONSTRUCTION PERIOD POLLUTION PREVENTION MEASURES

Best Management Practices (BMPs) will be utilized as Construction Period Pollution Prevention Measures to reduce potential pollutants and prevent any off-site discharge. The objectives of the BMPs for construction activity are to minimize the disturbed areas, stabilize any disturbed areas, control the site perimeter and retain sediment. Both erosion and sedimentation controls and non-stormwater best management measures will be used to minimize site disturbance and ensure compliance with the performance standards of the Wetlands Protection Act (WPA) and MassDEP Stormwater Standards. Measures will be taken to minimize the area disturbed by construction activities to reduce the potential for soil erosion and stormwater pollution problems. In addition, good housekeeping measures will be followed for the day-to-day operation of the construction site under the control of the contractor to minimize the impact of construction. This section describes the control practices that will be in place during construction activities. All recommended control practices will comply with the standards set in the MassDEP Stormwater Handbook.

2.1 Minimize Disturbed Area and Protect Natural Features and Soil

To minimize disturbed areas, all work will be completed within well-defined work limits. These work limits are shown on the site plans included with this submission. The Contractor shall not disturb native vegetation in any undisturbed wetland area without prior approval from the Engineer. The Contractor will be responsible to make sure that all workers know the proper work limits and do not extend their work into the undisturbed areas. The protective measures are described in more detail in the following sections.

2.2 Control Stormwater Flowing onto and through the project

The Contractor will be required to install compost mulch filter tubes and silt fence between the work area and the wetland resource area.

2.3 Stabilize Soils

The Contractor shall limit the area of land which is exposed and free from vegetation during the project. The soils will be exposed for no longer than one week.

2.4 Proper storage and cover of any stockpiles

The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site, or areas to be cleared as a part of this project, and shall require written approval of the Engineer.

Adequate measures for erosion and sediment control such as the placement of straw wattles around the downstream perimeter of stockpiles, and silt fence behind straw wattles and in front of water body, shall be employed to protect any downstream areas from siltation.

There shall be no storage of equipment or materials in areas designated as wetlands.

The Engineer may designate an area or areas where the Contractor may store materials used in his operations.

2.5 Perimeter Controls and Sediment Barriers

Erosion control lines as described in Section 5 will be utilized to ensure that no sedimentation occurs outside the perimeter of the work area.

2.6 Storm Drain Inlet Protection

Catch basin protection will be implemented for all catch basins affected by the work area. Inlet sediment control will be placed within the catch basin to minimize sediment loading into the catch basin.

2.7 Retain Sediment On-Site

The Contractor will be responsible to monitor all erosion control measures. Whenever necessary, the Contractor will clear all sediment from the compost mulch filter tubes and silt fence. Daily monitoring should be conducted using the attached Inspection Form.

2.8 Material Handling and Waste Management

All materials stored on-site will be stored in a neat, orderly manner in appropriate containers. All materials will be kept in their original containers with the original manufacturer's label. Substances will not be mixed with one another unless recommended by the manufacturer.

All waste materials will be collected and stored in a securely lidded metal container from a licensed management company. The waste and any construction debris from the site will be hauled off-site daily and disposed of properly. The contractor will be responsible for all waste removal. Manufacturer's recommendations for proper use and disposal will be followed for all materials.

2.9 Designated Washout Areas

The Contractor shall use washout facilities at their own plants, unless otherwise directed by the Engineer.

2.10 Proper Equipment/Vehicle Fueling and Maintenance Practices

On-site vehicles will be monitored for leaks and receive regular preventative maintenance to reduce the risk of leakage. To ensure that leaks on stored equipment do not contaminate the site oil-absorbing mats will be placed under all equipment during storage. Regular fueling and service of the equipment may be performed using approved methods and with care taken to minimize chance of spills. Repair of equipment or machinery within the 100' water resources area shall not be allowed without the prior approval of the Engineer. Any petroleum products will be stored in tightly sealed containers that are clearly labeled.

2.11 Equipment/Vehicle Washing

The Contractor will be responsible to ensure that no equipment is washed on-site except to remove sediments prior to transport from the site.

SECTION 3 – SPILL PREVENTION AND CONTROL PLAN

The Contractor will be responsible for preventing spills in accordance with the project specifications and applicable federal, state and local regulations. The Contractor will identify a properly trained site employee, involved with the day-to-day site operations to be the spill prevention and cleanup coordinator. The name(s) of the responsible spill personnel will be posted on-site. Each employee will be instructed that all spills are to be reported to the spill prevention and cleanup coordinator.

3.1 Spill Control Equipment

Spill control/containment equipment will be kept in the Work Area. Materials and equipment necessary for spill cleanup will be kept either in the Work Area or in an otherwise accessible on-site location. Equipment and materials will include, but not be limited to, absorbent booms/mats, brooms, dust pans, mops, rags, gloves, goggles, sand, plastic and metal containers specifically for this purpose. It is the responsibility of the Contractor to ensure the inventory will be readily accessible and maintained.

3.2 Notification

All workers will be directed to inform the on-site supervisor of a spill event. The supervisor will assess the incident and initiate proper containment and response procedures immediately upon notification. Workers should avoid direct contact with spilled materials during the containment procedures. Primary notification of a spill should be made to the local Fire Department and Police Departments. Secondary Notification will be to the certified cleanup contractor if deemed necessary by Fire and/or Police personnel. The third level of notification is to the DEP. The specific cleanup contractor to be used will be identified by the Contractor prior to commencement of construction activities.

3.3 Spill Containment and Clean-Up Measures

Spills will be contained with granular sorbent material, sand, sorbent pads, booms or all of the above to prevent spreading. Certified cleanup contractors should complete spill cleanup. The material manufacturer's recommended methods for spill cleanup will be clearly posted and on-site personnel will be made aware of the procedures and the location of the information and cleanup supplies.

3.4 Hazardous Materials Spill Report

The Contractor will report and record any spill. The spill report will present a description of the release, including the quantity and type of material, date of the spill, circumstances leading to the release, location of spill, response actions and personnel, documentation of notifications and corrective measures implemented to prevent reoccurrence.

This document does not relieve the Contractor of the Federal reporting requirements of 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302 and the State requirements specified under the Massachusetts Contingency Plan (M.C.P) relating to spills or other releases of oils or hazardous substances. Where a release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR Part 110, 40 CFR Part 117 or 40 CFR Part 302, occurs during a twenty-four (24) hour period, the Contractor is required to comply with the response requirements of the above-mentioned regulations. Spills of oil or hazardous material in excess of the reportable quantity will be reported to the National Response Center (NRC).

SECTION 4 – CONTACT INFORMATION/RESPONSIBLE PARTIES

Contractor:
TBD

Engineer:
Paul Carter
Weston & Sampson, Inc.
100 Foxborough Blvd., Suite 250
Foxborough, MA 02035
800-SAMPSON

Site Inspector:
TBD

SECTION 5 – EROSION AND SEDIMENTATION CONTROL

Erosion and Sedimentation Control details and layout can be found in the attached plan set. In addition, a technical specification (Environmental Protection) has been included with this report, which details all Erosion and Sedimentation controls.

SECTION 6 – SITE DEVELOPMENT PLAN

The Site Development Plan is included in the attached plan set.

SECTION 7 – OPERATION AND MAINTENANCE OF EROSION CONTROL

The erosion control measures will be installed as detailed in the technical specification. Environmental Protection. If there is a failure to the controls, the Contractor will be required to stop work until the failure is repaired.

Periodically throughout the work, whenever the Engineer deems it necessary, the sediment that has been deposited against the controls will be removed to ensure that the controls are working properly.

SECTION 8 – OPERATION AND MAINTENANCE OF EROSION CONTROL

During construction the erosion and sedimentation controls will be inspected daily. Once the contractor is selected, an on-site inspector will be selected to work closely with the Engineer to ensure that all erosion and sedimentation controls are in place and working properly. An Inspection Form is included.

Inspection Form

Inspected By: _____ Date: _____Time:_____

YES	NO	DOES NOT APPLY	ITEM
			Do any erosion/siltation control measures require repair or clean out to maintain adequate function?
			Is there any evidence that sediment is leaving the site and entering the wetlands?
			Are any temporary soil stockpiles or construction materials located in non-approved areas?
			Are on-site construction traffic routes, parking, and storage of equipment and supplies located in areas not specifically designed for them?

Specific location, current weather conditions, and action to be taken:

_____

_____

_____

_____

_____

Other Comments:

_____

_____

Pending the actions noted above I certify that the site is in compliance with the Construction Period Pollution Prevention and Erosion and Sedimentation Control Plan.

Signature:_____ Date: _____

SECTION I – PURPOSE/INTENT

The purpose of this document is to provide for the health, safety, and general welfare of the citizens of Foxborough, Massachusetts through the regulation of non-stormwater discharges into existing outstanding resource areas near the East Belcher Road Reconstruction project site to the maximum extent practicable, as required by federal and state law. This document establishes methods for controlling the introduction of pollutants into existing outstanding resource areas to comply with requirements of the National Pollutant Discharge Elimination System (NPDES) permit process.

SECTION II - DEFINITIONS

For the purposes of this statement, the following shall mean:

Best Management Practices (BMPs): Schedules of activities, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, maintenance procedures, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

Clean Water Act: The federal Water Pollution Control Act (33 U.S.C § 1251 et seq.), and any subsequent amendments thereto.

Construction Activity: Activities subject to the Massachusetts Erosion and Sedimentation Control Act or NPDES Construction Permits. Such activities include but are not limited to clearing and grubbing, grading, excavating, and demolition.

Hazardous Materials: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

Illegal Connection: An illegal connection is defined as either of the following:

a. Any pipe, open channel, drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter the outstanding resource area including but not limited to any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water, regardless of whether said drain or connection has been previously allowed, permitted, or approved by an authorized enforcement agency; or
b. Any pipe, open channel, drain or conveyance connected to the Town of Foxborough storm water treatment system which has not been documented in plans, maps, or equivalent records and approved by an authorized enforcement agency.

Illicit Discharge: Any direct or indirect non-stormwater discharge to the Town of Foxborough stormwater treatment system, except as exempted in Section II of this ordinance.

Industrial Activity: Activities subject to NPDES Industrial Permits as defined in 40CFR, Section 122.26 (b) (14).

National Pollutant Discharge Elimination System (NPDES) Stormwater Discharge Permit: A permit issued by MassDEP under authority delegated pursuant to 33 USC § 1342 (b) that authorizes the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

Town of Foxboro Stormwater Treatment System: Any facility, owned or maintained by the town, designed or used for collecting and/or conveying stormwater, including but not limited to roads with drainage systems, Town of Foxborough streets, curbs, gutters, inlets, catch basins, piped storm drains, pumping facilities, infiltration, retention and detention basins, natural and man-made or altered drainage channels, reservoirs, and other drainage structures.

Non-Stormwater Discharge: Any discharge to the storm drain system that is not composed entirely of stormwater.

Person: Any individual, association, organization, partnership, firm, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, city, county or other political subdivision of the State, interstate body, or any other legal entity.

Pollutant: Anything which causes or contributes to pollution. Pollutants may include, but are not limited to: paints, varnishes, and solvents; petroleum hydrocarbons; automotive fluids; cooking grease; detergents (biodegradable or otherwise); degreasers; cleaning chemicals; non-hazardous liquid and solid wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects and accumulations, so that same may cause or contribute to pollution; floatables; pesticides, herbicides, and fertilizers; liquid and solid wastes; sewage, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes and residues that result from constructing a building or structure; concrete and cement; and noxious or offensive matter of any kind.

Pollution: Contamination or other alteration of any water's physical, chemical, or biological properties by addition of any constituent including but not limited to a change in temperature, taste, color, turbidity, or odor of such waters, or the discharge of any liquid, gaseous, solid, radioactive, or other substance into any such waters as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety, welfare, or environment, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, fish or other aquatic life.

Premises: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent sidewalks and parking strips.

Stormwater: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation and resulting from such precipitation.

Wastewater: Any water or other liquid discharged from a facility, that has been used, as for washing, flushing, or in a manufacturing process, and so contains waste products.

SECTION III - PROHIBITIONS

Prohibition of Illicit Discharges:

No person shall throw, drain, or otherwise discharge, cause or allow others under its control to throw, drain, or otherwise discharge into the Town of Foxborough stormwater treatment system or watercourses any materials, including but not limited to, any pollutants or waters containing any pollutants, other than stormwater. The commencement, conduct, or continuance of any illicit discharge to the storm drain system is prohibited except as described as follows:

1. Water line flushing performed by a government agency, other potable water sources, landscape irrigation or lawn watering, diverted stream flows, rising ground water, ground water infiltration to storm drains, uncontaminated pumped ground water, foundation or footing drains (not including active groundwater dewatering systems), crawl space pumps, air conditioning condensation, springs, natural riparian habitat or wetland flows, and any other water source not containing pollutants;

2. Discharges or flows from firefighting, and other discharges specified in writing by the Town of Foxborough as being necessary to protect public health and safety;

3. Dye testing is an allowable discharge, but requires a verbal notification to the Town of Foxborough prior to the time of the test;

4. Any non-stormwater discharge permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the Federal Environmental Protection Agency, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted for a discharge to the Town of Foxborough stormwater treatment system.

SECTION IV – INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Town of Foxborough Department of Public Works prior to allowing discharges to the Foxborough stormwater treatment system.

SECTION V – NOTIFICATION OF SPILLS AND ACCIDENTAL DISCHARGES

Notwithstanding other requirements of law, as soon as any person responsible for a facility, activity or operation, or responsible for emergency response for a facility, activity or operation has information of any known or suspected release of pollutants or non-stormwater discharges from that facility, activity, or operation which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the Town of Foxborough stormwater treatment system, State Waters, or Waters of the U.S., said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release so as to minimize the effects of the discharge. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via

emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Town of Foxborough Department of Public Works in person or by phone no later than the next business day, including the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice, via certified mail return receipt requested addressed to the Town of Foxborough Department of Public Works within three (3) business days of the initial notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

IN WITNESS WHEREOF the parties hereto have executed copies of this Agreement on the _____ day of _____, _____.

_____
Christopher Gallagher, Director
Department of Public Work

emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Town of Foxborough Department of Public Works in person or by phone no later than the next business day, including the nature, quantity and time of occurrence of the discharge. Notifications in person or by phone shall be confirmed by written notice, via certified mail return receipt requested addressed to the Town of Foxborough Department of Public Works within three (3) business days of the initial notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three years.

IN WITNESS WHEREOF the parties hereto have executed copies of this Agreement on the _____ day of _____, _____.

_____
Christopher Gallagher, Director
Department of Public Work

Operations and Maintenance Plan

East Belcher Road Reconstruction

Foxborough, Massachusetts

December 2020

Weston & Sampson

Table of Contents

1.0 Introduction

The following document has been written to comply with the stormwater guidelines set forth by the Massachusetts Department of Environmental Protection (MassDEP). The intent of these guidelines is to encourage Low Impact Development techniques to improve the quality of the stormwater runoff. These techniques, also known as Best Management Practices (BMPs) collect, store, and treat the runoff before discharging to adjacent environmental resources.

2.0 Maintenance Agreement

This Operation and Maintenance Plan (O&M Plan) is intended to provide a mechanism for the consistent inspection and maintenance of each BMP installed on the project site. Included in this O&M Plan is a description of each BMP type and an inspection form for each BMP. Town of Foxborough is the owner and operator of the system and is responsible for its upkeep, maintenance, and repair. This work will be funded on an annual basis by the Town of Foxborough Department of Public Works.

3.0 BMP Description and Locations

Following are the proposed BMP's included in this project.

3.1 Deep Sump Catch Basins

There are several deep sump catch basins that collect stormwater runoff in the project area. Deep sump catch basins are part are collection systems that are designed to remove trash, debris, and coarse sediment from the stormwater runoff. Catch basins will be equipped with "Eliminator" hoods, which is designed to trap oil and debris within a catch basin preventing pollutants from traveling downstream.

3.2 Street Sweeping

Street Sweeping involves the use of mechanical street sweeping equipment which utilizes brooms or rotary brushes to scour the pavement to improve TSS removal from strormwater. Street sweeping is part of good housekeeping measures that help to keep the pavement clear of sediment buildup.

3.3 Stone Infiltration Swales

There are several stone infiltration swales on site that are used for conveyance of stormwater. Stone swales are low impact development features that convey the runoff from the roadway via sheet flow. The sheet flow increases the hydraulic

residence time of runoff and allows gravity separation of solids sediment removal while allowing the stormwater to infiltrate through the soil.

3.5 Outlet structures, gravel filter strip and level spreader

Outlet structures, such as flared end section, gravel filter strip and level, while not BMP's shall be inspected regularly and kept clean from debris and sediment. This project includes a level spreader, one flared end section, and approximately 700 linear feet of gravel filter strip.

4.0 Inspection, Maintenance Checklist and Schedule

4.1 Deep Sump Catch Basins

Inspect and/or clean catch basins at least two times per year, at the end of foliage and snow removal seasons. Sediments must be removed whenever the depth of deposits is greater than or equal to one half the depth from the bottom of the invert of the lowest pipe in the basin. Each catch basin should be cleaned a minimum of four times per year regardless of the amount of sediment in the basin. They shall be cleaned using clamshell buckets or vacuum trucks.

In the event of contamination by a spill or other means, all cleanings must be evaluated in accordance with the Hazardous Waste Regulations, 310 CMR 30.000 and handled as hazardous waste.

In the absence of evidence of contamination, catch basin cleanings may be taken to a landfill or other facility permitted by MassDEP to accept Solid Waste without any prior approval by MassDEP. Please note that current MassDEP regulations prevent landfills from accepting materials that contain free-draining liquids.

4.2 Stone Infiltration Swales

Stone Infiltration Swales shall be inspected semi-annually the first year, and at least once a year thereafter. Inspect the side slopes for signs of erosion and formation of rills and gullies as well as vegetation growth. Remove accumulated trash and debris from check dams. Check for sediment accumulation on a yearly basis and clean as need. Use hand methods (i.e., a person with a shovel) when cleaning to minimize disturbance to stone and underlying soils. Driveway culverts shall be checked to ensure culverts are clear of trash, debris, and sediment. All accumulated sediment and debris should be removed and disposed of according to local, state and federal regulations.

4.3 Flared End and Level Spreader

Flared end structure and level spreader shall be inspected and cleaned twice a year and after heavy rainstorms. Sediment and debris should be removed by hand and disposed of in accordance with local, state and federal regulations. Areas downstream of the outfalls shall be inspected for signs of erosion. Any bare spots immediately downstream of the outfalls shall be reseeded as needed.

5.0 Documentation and Record Keeping

- An inspection form should be filled out every time maintenance work is performed.

- A binder should be kept at the Foxborough DPW that contains all the completed inspection forms and any other related materials. All operation and maintenance log forms for the last three years, at a minimum, shall be kept at Foxborough DPW.

- A review of all Operation & Maintenance actions should take place annually to ensure that these Stormwater BMPs are being taken care of in the manner illustrated in this Operation & Maintenance Plan.

- The inspection and maintenance schedule may be refined in the future based on the findings and results of this operation and maintenance program or policy.

- The owner of the property shall maintain a log of disposal activities which shall include the types of material disposed and disposal locations.

East Belcher Road Reconstruction
Foxborough, MA
Permanent BMP Inspection Checklist

Street Sweeping

Frequency:	Street sweeping shall be done quarterly.
Inspected By:	_____ Date: _____
Observations:	_____
	_____
	_____
Actions Taken:	_____
	_____
	_____
Instructions:	Sweep all paved areas of sediment and debris. Dispose of sediment and debris in accordance with local, state, and federal laws.

Deep Sump Catch Basins

Frequency:	Inspect and clean deep sump catch basins in March, June, September and December.
Structure Number:	_____
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Clean unit four times per year or whenever the depth of the deposits is greater than or equal to one half the depth from the bottom of the invert to lowest pipe in the basin/galley.

Infiltration Swales

Frequency: Infiltration swales shall be inspected and/or cleaned at least two times per year and after major storm events.

Structure Number: _____

Inspected By: _____ Date: _____
Observations: _____
_____
_____

Actions Taken: _____
_____
_____

Instructions: Inspect swale for signs of erosion and accumulated sediment. Remove accumulated trash and debris. All trash and debris should be disposed of in accordance with local, state, and federal regulations.

Level Spreader and Proposed Outfall

Frequency:	The level spreader and proposed outfall shall be inspected at least 4 times per year. The channel shall be inspected for any accumulated sediment and signs of erosion.
Inspected By:	_____ Date: _____
Observations:	_____ _____ _____
Actions Taken:	_____ _____ _____
Instructions:	Inspect channel for signs of erosion and accumulated sediment. Remove accumulated sediment, trash and debris. If any erosion is noted downstream of outfalls, the area shall be stabilized by permanent seeding. Any removed sediment shall be disposed of in accordance with local, state, and federal regulations.

APPENDIX D

MAPS

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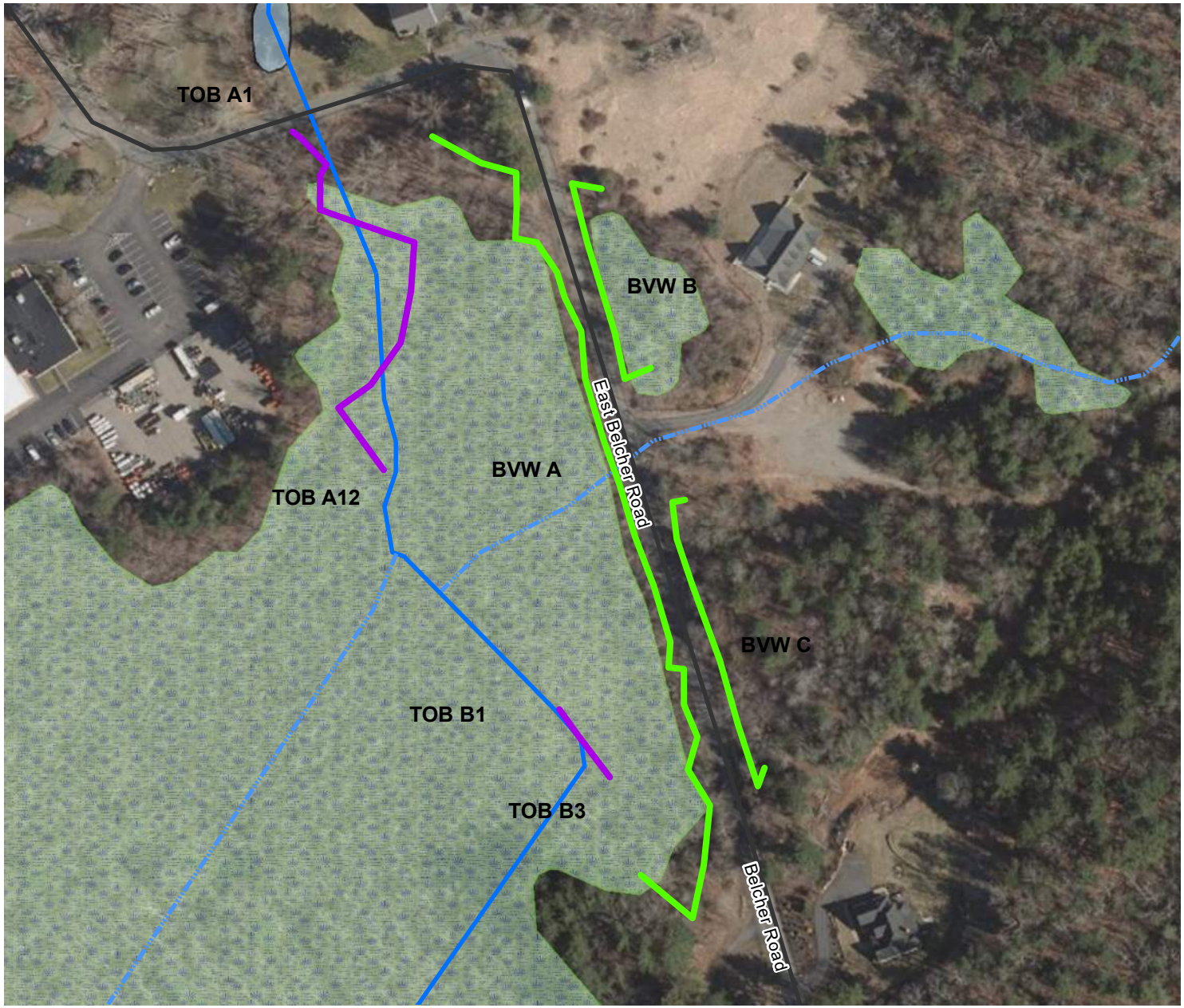

N
W E
S

100 50 0 100
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Bordering Vegetated Wetlands
- Perennial Stream
- USGS Perennial Stream
- USGS Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune

FIGURE 1

East Belcher Road
Foxborough MA

Wetland Field Map

Weston & Sampson

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S

1,000 500 0 1,000
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 2

East Belcher Road
Foxborough MA

USGS Topographic Map

Weston & Sampson

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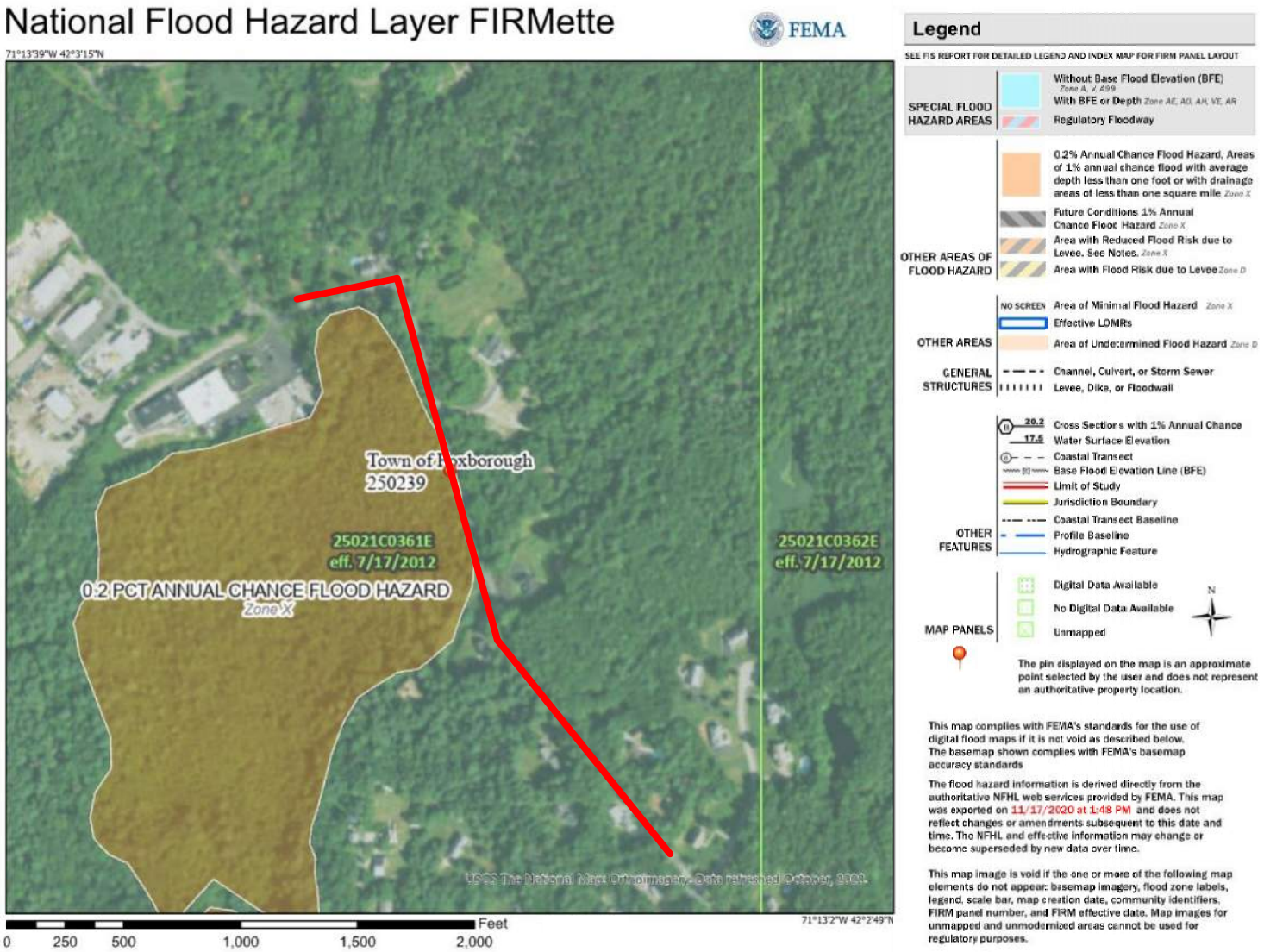

Legend

Investigation Area

FIGURE 3

East Belcher Road
Foxborough MA

FEMA Map

Weston & Sampson

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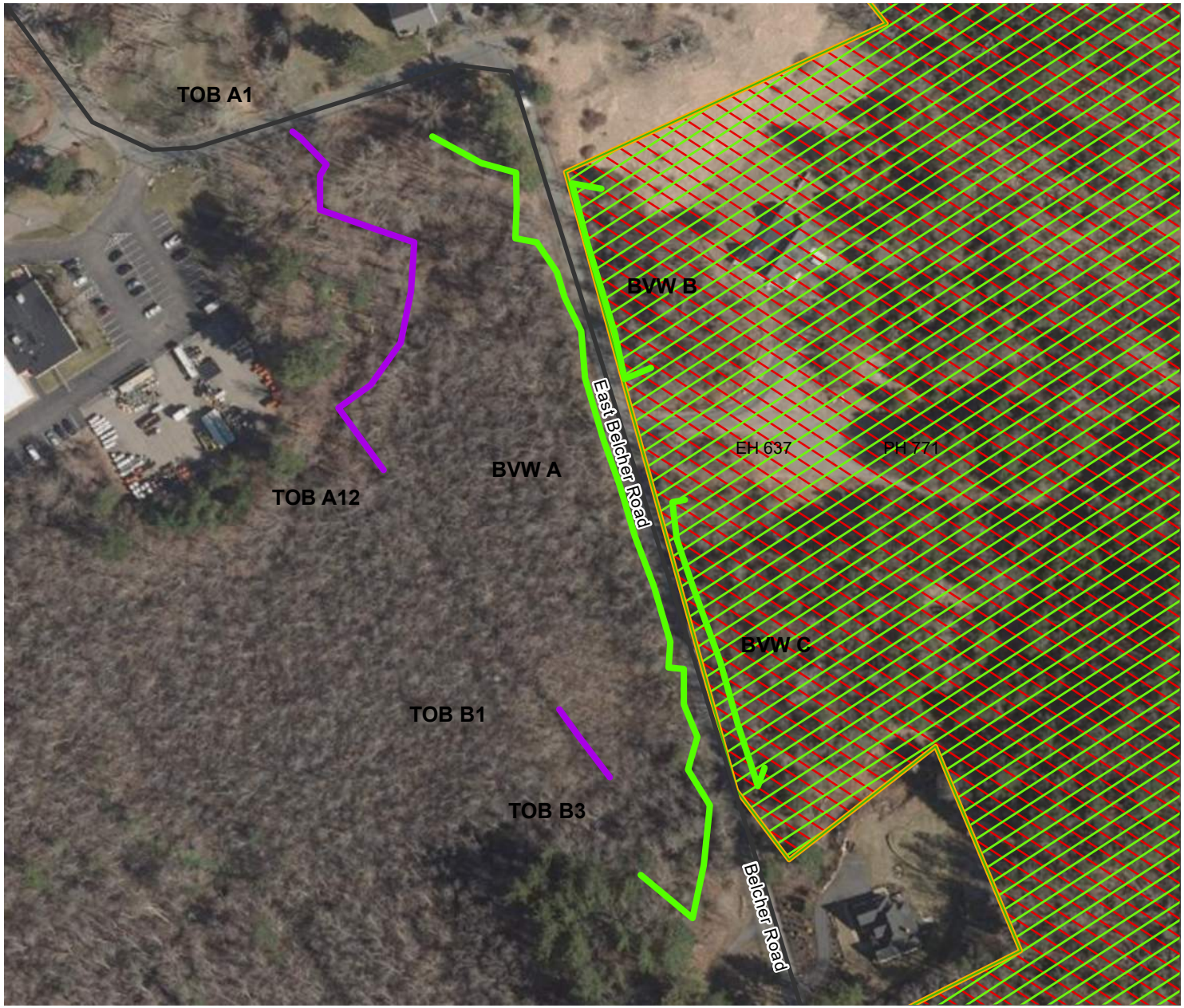

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Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Bordering Vegetated Wetlands
- Perennial Stream

ACECs

- ACECs

NHESP Habitats

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

Outstanding Resource Waters

- Public Water Supply Contributor
- ORW for ACEC
- ORW for both Water Supply and Other

FIGURE 4

East Belcher Road
Foxborough MA

Environmental Resources Map

Weston & Sampson

APPENDIX E

CONTRACT SPECIFICATIONS

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

This section of the specification covers the control of dust via water, complete.

PART 2 - PRODUCTS

2.01 WATER:

A. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

PART 3 - EXECUTION

3.01 APPLICATION:

A. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.

B. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

END OF SECTION

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SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.

B. The requirements set forth in this section of the specifications apply to construction in and adjacent to wetlands, unless otherwise specifically stated.

C. All work under this Contract shall be in accordance with the Conservation Commissions' Orders of Conditions as well as any conditional requirements applied, all of which are attached to Section 00890, PERMITS.

D. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 SUBMITTALS:

A. The Contractor shall submit for approval six sets of details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 100 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 COMPOST FILTER TUBES:

A. Silt socks shall be a tubular filter sock of mesh fabric. The fabric will have openings of between 1/8" to ¼" diameter. The mesh material will either photo degrade within one year or be made of nylon with a life expectancy of 24 months. The sock shall be filled with a mix of composted leaf mulch, bark mulch and wood chips that have been composted for at least one year. The sock will have a minimum diameter of 12-inches.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or his authorized representative at the site of the work, shall be deemed sufficient for the

purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

A. Insofar as possible, the Contractor shall confine his construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.

B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 CONSTRUCTION IN AREAS DESIGNATED AS WETLANDS ON THE DRAWINGS:

A. Insofar as possible, the Contractor shall make every effort to minimize disturbance within areas designated as wetlands or within 100-feet of wetland resource areas.

B. The Contractor shall perform his work in such a way that these areas are left in the condition existing prior to construction.

C. The elevations of areas designated as wetlands shall not be unduly disturbed by the Contractor's operations.

3.06 DUST CONTROL:

A. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed. Calcium chloride shall be as specified under Section 01562, DUST CONTROL.

B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.07 COMPOST FILTER TUBES:

A. The filter tubes will be staked in the ground using wooden stakes driven at 4-foot intervals. The wooden stakes will be placed at a minimum depth of 24-inches into the ground.

END OF SECTION

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SECTION 01740

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of its work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

1.02 RELATED WORK:

A. Section 00700 GENERAL CONDITIONS

B. Section 01110 CONTROL OF WORK AND MATERIALS

C. Section 01140 SPECIAL PROVISIONS

D. Section 01570 ENVIRONMENTAL PROTECTION

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 DAILY CLEANUP:

A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.

B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.

C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

3.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be

entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

3.03 REMOVAL OF TEMPORARY BUILDINGS, STRUCTURES AND EQUIPMENT:

A. On or before completion of the work, the Contractor shall, unless otherwise specifically required or permitted in writing, tear down and remove all temporary buildings and structures it built; shall remove all temporary works, tools and machinery or other construction equipment it furnished; shall remove all rubbish from any grounds which it has occupied; shall remove silt fences and hay bales used for trapping sediment; and shall leave the roads and all parts of the property and adjacent property affected by its operations in a neat and satisfactory condition.

3.04 RESTORATION OF DAMAGED PROPERTY:

A. The Contractor shall restore or replace, when and as required, any property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

3.05 FINAL CLEANUP:

A. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off of the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

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APPENDIX F

ABUTTERS LIST

AFFIDAVIT OF SERVICE

I, Devin Batchelder, Weston & Sampson Engineers, hereby certify under the pains and penalties of perjury that, on January 22, 2021 *(date),* I gave Notification to Abutters in compliance with the second paragraph of the Massachusetts General Laws, Chapter 131, Section 40 and the DEP Guide to Abutter Notification in connection with the following matter:

> A Notice of Intent application was filed under the Massachusetts Wetlands Protection Act and the Foxborough Wetlands Protection Bylaw, Chapter 267 *(formerly Article IX)* with the Foxborough Conservation Commission by Weston & Sampson Engineers for the Town of Foxborough Highway Department on January 22, 2021 *(date)* for the property located at East Belcher Road *(address)*, Foxborough, Massachusetts (Assessor's map 123 & 136, parcel(s) N/A).

The form of notification and the list of abutters to whom it was given and their addresses are attached to this Affidavit of Service.

Signature

1/22/2021
Date

RECEIVED
BOARD OF ASSESSORS

NOV 12 2020

TOWN OF FOXBOROUGH

BOARD OF ASSESSORS
TOWN OF FOXBOROUGH
40 SOUTH STREET
FOXBOROUGH MASSACHUSETTS 02035

(508) 543-1215 Fax: (508) 543-6278

CERTIFICATION OF ABUTTERS

PROPERTY OWNER: Town of Foxborough

MAILING ADDESSS: 70 Elm Street, Foxborough MA

PROPERTY LOCATION: East Belcher Road Foxborough MA (Spring street to the Comcast driveway

ASSESSORS MAP/PARCEL: No parcel # in roadway between Spring Street and Comcast Driveway.

APPLICANT: Town of Foxborough PHONE: 508-543-1200

AUTHORITY REQUESTING LIST: Sara Nichols-Weston and Sampson

DATE SUBMITTED: November 2, 2020

LIST REQUESTED: ____500 FT ____300 FT __X__100FT___ABUTTER TO ABUTTER

==========

I, Hannelore Simonds, Chief Assessor acting as a custodian of assessment records, do hereby certify that the attached documents contain true and complete information from the most recent tax list of the Town of Foxborough, Massachusetts.

I further state that these documents include the names and addresses of abutters to the abutters 100 ft Spring St to Comcast Driveway

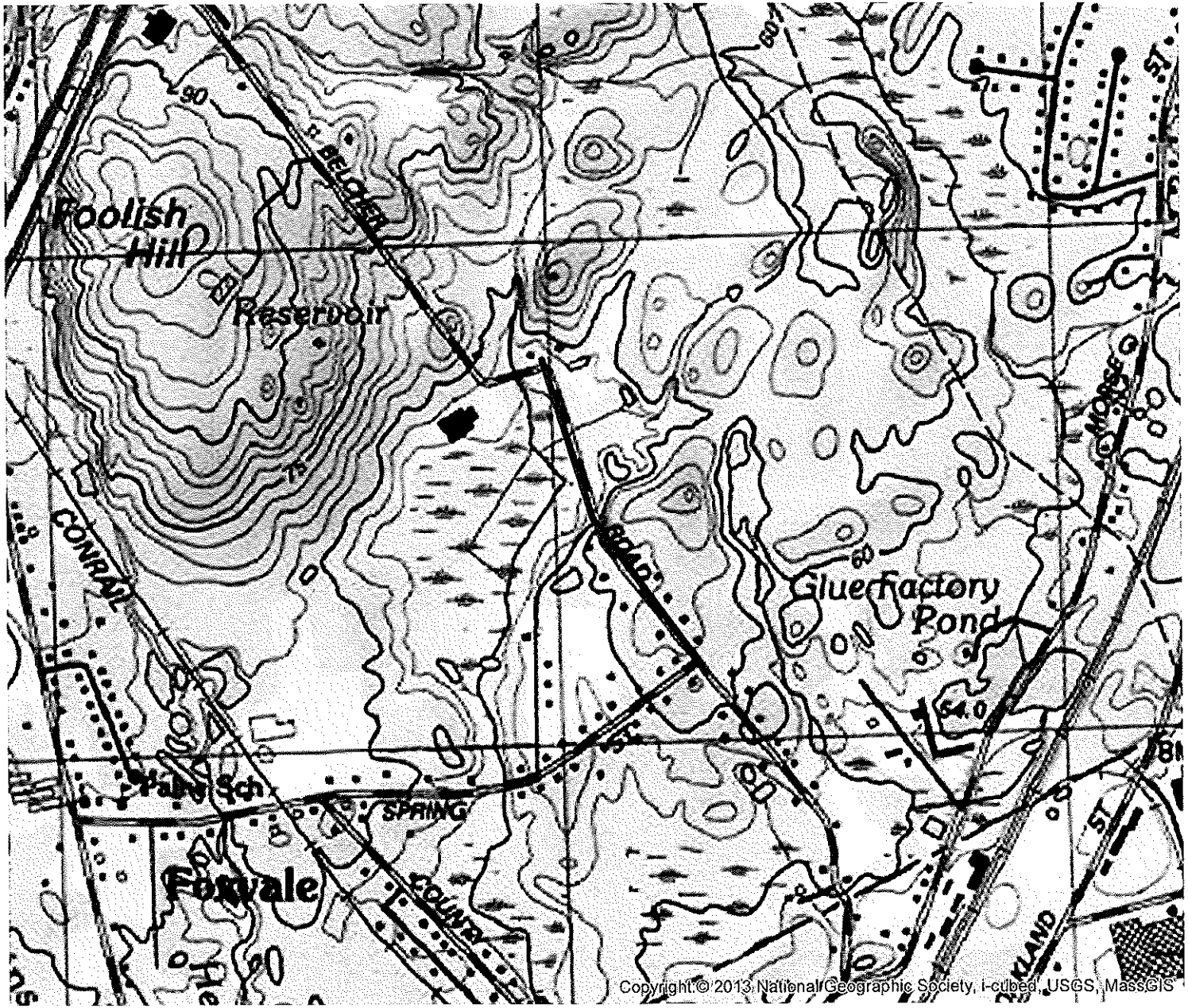
Date: 11/12/20

BOARD OF ASSESSORS
FOXBOROUGH MASSACHUSETTS

Massachusetts General Law c. 40A, s.11, "The assessors maintaining any applicable tax list shall certify to the permit granting authority or special permit granting authority the names and addresses of parties in interest and such certification shall be conclusive for all purposes."

The Assessors Office will complete the abutters list within 7-10 business days. There is a $25.00 fee for an abutters list.

"The applicant is solely responsible for requesting the appropriate abutters list required by the applicable Mass General Law."



work area

FIGURE 1
East Belcher Road
Foxborough MA

Location Map

Weston & Sampson

Abutting Properties for
SPRING STREET TO THE COMCAST DRIVEWAY
FOXBOROUGH MA 02035
(100 feet)
11/12/2020
****

Location:
136/039
SPRING STREET
Owner:
TOWN OF FOXBOROUGH
40 SOUTH STREET
FOXBOROUGH, MA 02035

Location:
123/010
85 EAST BELCHER ROAD
Owner:
MEDIAONE OF OHIO INC
C/O PROPERTY TAX DEPT
ONE COMCAST CENTER
32ND FLOOR
PHILADELPHIA, PA 19103-2838

Location:
136/037
115 EAST BELCHER ROAD
Owner:
VANDENBERGHE LANCE R & VICTORIA
115 BELCHER RD
FOXBORO, MA 02035

Location:
136/002
116 BELCHER ROAD
Owner:
DANGELO PETER & LINDA
116 BELCHER RD
FOXBORO, MA 02035

Location:
123/006
108 BELCHER ROAD
Owner:
CIL REALTY OF MASSACHUSETTS INC
157 CHARTER OAK AVE
3RD FLR
HARTFORD, CT 06106

Location:
123/008
112 BELCHER ROAD
Owner:
BELCHER FOX LLC
534 WHITMAN STREET
HANSON, MA 02341

Location:
136/001
114 BELCHER ROAD
Owner:
BELCHER FOX LLC
534 WHITMAN STREET
HANSON, MA 02341

Location:
123/009
BELCHER ROAD
Owner:
SHRINERS HOSPITAL FOR CHILDREN
2900 ROCKY POINT DRIVE
TAMPA, FL 33607

Location:
136/003
BELCHER ROAD
Owner:
TOWN OF FOXBOROUGH
40 SOUTH STREET
FOXBOROUGH, MA 02035

Location:
136/034
121 EAST BELCHER ROAD
Owner:
MARGOLIS ADAM S & HEATHER M TE
121 EAST BELCHER RD
FOXBORO, MA 02035

Location:
136/035
117 EAST BELCHER ROAD
Owner:
VANDENBERGHE KARL A & ELIZABETH M
117 E BELCHER RD
FOXBORO, MA 02035

Location:
136/004
124 EAST BELCHER ROAD
Owner:
TRIPP RICHARD G & ARLEEN V
124 EAST BELCHER ROAD
FOXBOROUGH, MA 02035

Location:
136/038
117 EAST BELCHER ROAD
Owner:
VANDENBERGHE KARL A & ELIZABETH
117 EAST BELCHER RD
FOXBORO, MA 02035

Location:
122/002
77 EAST BELCHER ROAD
Owner:
DEGIROLAMO PETER M JR & SUSAN
145 FRUIT ST
MANSFIELD, MA 02048

Location:
136/033
125 BELCHER ROAD
Owner:
LAWSON KATHLEEN K & PAUL J
125 BELCHER RD
FOXBOROUGH, MA 02035

Location:
136/007
2 MASON PLACE
Owner:
MOLINA WILLIAM JR & STACEY E RIVOIRA
2 MASON PLACE
FOXBOROUGH, MA 02035

Location:
136/031
131 EAST BELCHER ROAD
Owner:
LAVORANTE SYLVIA &
RICHARD J ISHERWOOD
C/O KYLE R LAVORANTE
131 BELCHER ROAD
FOXBOROUGH, MA 02035

Location:
136/029
84 SPRING STREET
Owner:
GREIM DOUGLAS
84 SPRING STREET
FOXBORO, MA 02035

Location:
136/028
82 SPRING STREET
Owner:
LANDOLPHI NANCY E
82 SPRING ST
FOXBORO, MA 02035

Location:
136/005
128 EAST BELCHER ROAD
Owner:
RINN ROBERT W SR &
PATRICIA A
128 EAST BELCHER RD
FOXBORO, MA 02035

Location:
136/032
127 EAST BELCHER ROAD
Owner:
POLLOCK ANDREA L &
KEITH R
127 EAST BELCHER ROAD
FOXBOROUGH, MA 02035

Location:
123/004
96 EAST BELCHER ROAD
Owner:
TH BELCHER FOX LLC
195 WHITING STREET
SUITE 2B
HINGHAM, MA 02043

Location:
123/002
92 EAST BELCHER ROAD
Owner:
HANNON MARK M
& TANYA V
92 EAST BELCHER RD
FOXBORO, MA 02035

Location:
123/007/001
BELCHER ROAD
Owner:
THE BELCHER FOX LLC
SUITE 2B
195 WHTING STREET
HINGHAM, MA 02043

PLEASE NOTE:
MAP 136 PARCEL 030 ON
THE ASSESSORS MAPS IS
COMBINED WITH MAP 136
PARCEL 029

NOTIFICATION TO ABUTTERS

Under the
Massachusetts Wetlands Protection Act &
Chapter 267, Wetland Protection Code of Foxborough

(This form must be completed and mailed, certified mail return receipt requested, to all abutters within 100 feet of the proposed project's activity.)

In accordance with the second paragraph of Massachusetts Wetlands Protection Act (G.L. Ch. 131, §40), and §10.05 of 310 CMR 10.00, and Chapter 267, the Wetland Protection Code of Foxborough *(formerly Article IX)* and regulations, you are hereby notified of a public hearing on the matter described below:

A. The applicant has filed a Notice of Intent with the Foxborough Conservation Commission for proposed work within areas subject to protection under the Wetlands Protection Act and the Wetland Protection Code of Foxborough.

B. The name of the applicant is Town of Foxborough – Highway Department

C. The address of the land where the activity is proposed is East Belcher Road, Foxborough.

D. Copies of the Notice of Intent may be examined at the Conservation Commission's office, 40 South Street, Foxborough Town Hall, between 9 am and 4 pm, Monday through Thursday.

E. Copies of the Notice of Intent may be obtained from either *(check one)* the ☐ applicant or the ☒ applicant's representative Weston & Sampson Engineers by calling Devin Batchelder 978-532-1900 ext. 2117 from *[times]* 8:00am – 4:30pm on *[days]* Mon through Fri.

F. Information regarding the date, time and place of the public hearing may be obtained from either *(check one)* the ☐ applicant or the ☒ applicant's representative Weston & Sampson Engineers by calling Devin Batchelder 978-532-1900 ext. 2117 from *[times]* 8:00am – 4:30pm on *[day]* Mon through Fri.

Please Note: Notice of the public hearing, including date, time and place, will be published at least five business days in advance in The Foxboro Reporter and will be posted in the Town Hall and on the Town's website at least 48 hours in advance.

Conservation Commission meeting agendas may be viewed online at:
http://www.foxboroughma.gov/Pages/FoxboroughMA_ConsAgendas/

For additional information about this application or the Wetland Protection Code of Foxborough, please contact the Foxborough Conservation Commission at 508-543-1251 or visit: www.foxboroughma.gov/conservation

For more information about this application or the Wetlands Protection Act, please contact the Department of Environmental Protection (DEP) Southeast Regional Office (Lakeville) at 508-946-2836.

The Conservation Commission

Permitting Process; An Abutter's Guide

The Foxborough Conservation Commission has prepared this guide to explain what you, as an abutter to a proposal to conduct work in or near wetlands, can expect during the process of review of this project. It is not intended as a legal guide, but to help you understand how to participate in hearings, get information, and best communicate any concerns you may have.

To reach the Conservation Commission, please call the office at 508-543-1251 or send an email to Diana Gray (dgray@foxboroughma.gov) or Jane Sears Pierce (jpierce@foxboroughma.gov). The Conservation Office is located on the second floor of Town Hall, 40 South Street.

Why am I Receiving This Notice?

You are receiving this notice because you are an abutter (as defined by law) to a proposal to conduct work in or near wetlands that is being reviewed by the Foxborough Conservation Commission. The notice is required by law to let you know that a public hearing will be held regarding this activity.

How Can I Find out More about What is Proposed?

An application and supporting materials are on file at the Conservation Office. You are welcome to come to the office to review this information. Our office is generally open on weekdays from 8:30-4:00 pm, except on Fridays when we are open until 12:30 pm. Since the Conservation Agent may be conducting site visits or at off-site meetings, it is best to make an appointment to review a file to ensure that staff will be available to assist you.

What Should I Expect at the Public Hearing?

At the first hearing, the property owner or their representative will present plans and explain what is being proposed for the Commission and audience. The Conservation Chair, who directs the meeting, will first ask the Commission for their questions. The Chair will then give the audience an opportunity to ask questions or offer opinions. Comments may also be submitted in writing at or before the hearing.

Since the Commission often hears several projects in an evening, hearings last a specified period of time. At the end of this time, the hearing may be either closed, or continued (if the Commission needs additional information to make a decision). Continued hearings may be several weeks or months in the future, depending on how long it will take the applicant to gather the required information. You will not receive notice of the continued hearing date, but the date will be announced at the end of the hearing.

Occasionally, the hearing process may be delayed due to weather, the absence of a Commission member, or at the applicant's request. To verify that a hearing is being held on a scheduled date, you can call the conservation office, or go to the Commission's website (foxboroughma.gov/conservation) to review the posted agenda. You can also sign up to receive various town agendas via email.

How Can I Make My Concerns Known if I Cannot Attend?

Comments can be submitted in writing prior to the close of the public hearing. Copies will be provided to the Commission members. As with all testimony (oral and written), it is most helpful to raise concerns early in the process.

(This document is based upon the Acton Conservation Commission's Guide)

What Happens After the Hearing?

After the hearing and the record are closed, no new information can be submitted. The Commission deliberates and issues a decision – called an Order of Conditions – at a Commission meeting, usually within 21 days of closing the hearing. The Commission generally either approves a plan with conditions or denies it if it cannot be adequately conditioned to protect wetland resource areas. Interested individuals are welcome to attend and listen to the Commission's deliberations, but may not make further comments.

What Issues Does the Commission Consider?

The scope of issues that the Commission can consider in reviewing proposed projects is defined by state and local law and regulations. In presenting testimony (oral or written) it is most helpful to focus on these issues.

Will I Be Notified of the Decision?

Copies of decisions are not sent to abutters. You may request a copy of any decision from the conservation office. The owner is also required to record their decision/permit at the Registry of Deeds. Permits are generally valid for three years and may be extended by the Commission.

How Can I Appeal?

Appeals of the Conservation Commission's decisions are handled in two ways. Appeals of decisions under the Wetlands Protection Act (called a Request for a Superseding Order of Conditions) must be made to the Department of Environmental Protection (DEP) within 10 business days, using forms supplied by the DEP. Appeals may be made by abutters, 10 residents of the community or the DEP. Appeals under the Town of Foxborough Wetlands Protection Bylaw must be made to Superior Court by an aggrieved party.

Suggestions for Presenting Testimony at Public Hearings

- State your name and address for the record before you speak and each time you speak.
- Feel free to use the proposed plan to point out concerns you may have and try to stand so that the Commission can see the area to which you are referring.
- Try to state all of your questions or concerns at once and then allow the next person to speak;
- Be polite and respectful of differing opinions.
- While you may have questions of the applicant, you should address them to the Commission.
- Avoid personal attacks and stick to issues relating to the project that are within the Commission's jurisdiction (within 100 feet of a wetland or 200 feet of a river; issues like traffic and noise are outside of the Commission's purview).
- Don't ask to speak again unless everyone has had a chance to be heard.
- It is fine to just say "I agree with Mr. Smith about that drainage issue" rather than restating the same concerns.

Comments made at one hearing need not be repeated at subsequent ones unless they have not been addressed.

(This document is based upon the Acton Conservation Commission's Guide)

APPENDIX G

WETLAND DELINEATION REPORT

Weston & Sampson

westonandsampson.com

55 Walkers Brook Drive, Suite 100
Reading, MA 01867
tel: 978.532.1900

Wetland Delineation Report

September 2020

Foxborough, Massachusetts
Project # ENG20-0719

East Belcher Road
Foxborough, MA

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APPENDICES

https://westonandsampson-my.sharepoint.com/personal/batchelder_devin_wseinc_com/Documents/Desktop/Foxboro/Wetland Delineation Report/2 Wetlands Report Body.docx

1.0 SITE DESCRIPTION

On September 11th 2020, the presence of wetland resources was investigated near East Belcher Road in Foxborough, MA. This investigation area is located along the existing roadway with residential properties and undeveloped woodlands nearby. Please see Figure 1 (Wetlands Field Map) and Figure 2 (USGS Topographic Map) of this report for the investigation area.

Wetland resource areas including, three bordering vegetated wetlands and a single perennial stream, were identified and flagged in the field using pink flagging by a Weston & Sampson employee who is trained in the wetland delineation process using the Massachusetts Department of Environmental Protection (MassDEP) and the US Army Corps of Engineers methodology. A further description of these wetland resource areas are presented in the following sections.

2.0 DELINEATION OF WETLAND RESOURCES

2.1 Site Observations

The Weston & Sampson wetland scientist, trained in the ACOE Wetland Delineation Manual and Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetland Protection Act guidance document, observed the following protected wetland resources at the site:

- Bordering Vegetated Wetlands (BVW)
- Bank – Perennial Stream

Field data were recorded on ACOE Wetland Determination Data Forms. See Appendix A for completed data forms and Appendix B for site photographs.

2.2 Wetland Delineation Methodology

Wetland delineation assessment was conducted in accordance to the Massachusetts Wetland Protection Act Regulations (310 CMR 10.55(2)(c)), Massachusetts Department of Environmental Protection (MassDEP) Delineating Bordering Vegetated Wetlands Under the Massachusetts Protection Act (March 1995), and ACOE Wetland Manual (Technical Report Y-87-1).

The bordering vegetated wetlands (BVW) delineation methodology included the characterization of vegetation, soil any hydrologic conditions in both wetland and upland areas to identify the transitional area, which was used as the wetland limit. Pink flags with distinct flag numbers are left in the field to show wetland resource area limits.

Vegetation, hydrology and soils are assessed in both wetland and upland areas to accurately place the wetland limits at each site. The percentage of vegetative species was estimated by creating sample plots. Sample plot radius for trees, saplings, shrubs, groundcover and woody vine strata was 30', 15', 15', 5' and 30', respectively. After creating the sample plot areas, the percent basal area coverage of each species within the monitoring plot was recorded. Using these field observations, the percent dominance of each species within its stratum was calculated. The 50/20 Rule was then used to determine dominance. Dominant species were considered the most abundant plant species (when

ranked in descending order of abundance and cumulatively totaled) that immediately exceeds 50% of the total dominance measure (basal area) for the stratum, plus any additional species comprising 20% or more of the total dominance measure for the stratum. Once the dominant species were determined, they were treated equally to determine the presence of hydrophytic vegetation. If the number of dominant species with a Wetland Indicator Status of FAC (excluding FAC-), FACW or OBL is greater than, or equal to, the number of remaining dominant species, the area was considered a jurisdictional wetland resource area based on vegetation.

A soil sample from each wetland sample plot is also taken. Each soil sample goes to a depth of at least 12-24 inches. The soil is characterized to determine if the soil sample is considered a hydric (wetland) soil. Soil samples, including mottles, are characterized based on color using Munsell Soil-Color charts as a color reference.

The general area is then assessed for hydrologic conditions, including, but not limited to, site inundation, depth to free water, depth of soil saturation, water marks, drift lines, sediment deposits, water stained leaves.

2.3 Bordering Vegetated Wetlands (BVW)

Three BVW series were delineated at the site. The limit of the BVW resource areas were determined by locating the transitional area between wetland and upland vegetation, soils and hydrologic conditions. Wetland flags left in the field included:

- BVW-A1 through BVW-A24 stop (BVW "A" Series)
- BVW-B1 through BVW-B7 stop (BVW "B" Series)
- BVW-C1 through BVW-C9 stop (BVW "C" Series)

Dominant vegetation within the wetland resource area included red maple (Acer rubrum), glossy buckthorn (Frangula alnus), speckled alder (*Alnus incana*), highbush blueberry (*Vaccinium corymbosum*), multiflora rose (*Rosa multiflora*), upright sedge (*Carex stricta*), royal fern (*Osmunda regalis*), sensitive fern (*Onoclea sensibilis*), and eastern poison ivy (*Toxicodendron radicans*), species that generally thrive in hydric conditions. Soils within the BVW's were composed of thick organic layers

and fine sandy loam with redoximorphic features. Other indicators of wetland hydrology included water stained leaves, surface water, highwater table and saturation.

Dominant upland vegetation in the area included red maple (Acer rubrum), green ash (Fraxinus pennsylvanica), eastern redcedar (Juniperus virginiana), red pine (Pinus resinosa), eastern white pine (Pinus strobus), northern red oak (Quercus rubra), glossy buckthorn (Frangula alnus), staghorn sumac (Rhus typhina), Canada goldenrod (Solidago canadensis), eastern poison ivy (Toxicodendron radicans), and Asiatic bittersweet (Celastrus orbiculatus). Soils within the upland were composed of fine sandy loam with no evidence of mottling or hydrology within the top 12 inches.

A 100-foot buffer zone is associated with the BVW resource area.

2.4 Bank

Water bodies, including perennial streams, intermittent streams, ponds and lakes, have banks which are protected by the Massachusetts Wetland Protection Act. Bank is a wetland resource area defined by 310 CMR 10.54(2)(a) as "the potion of land surface which normally abuts and confines a water body. It occurs between a waterbody and a vegetated bordering wetland and adjacent floodplain, or, in absence of these, it occurs between a waterbody and an upland." Vegetated banks provide valuable functions such as flood control, stormwater prevention, fisheries protection, and water quality protection. The limit of this resource area is identified by Top of Bank (TOB) which is located at the first observable break in slope or the Mean Annual Flood Level (MAFL), whichever is lower. TOB is easily identified in the field so that indicator was utilized for this wetland delineation.

Perennial Stream Banks

A single perennial stream known was identified within the investigation area. The boundary of the perennial stream was identified in the field utilizing Top of Bank (TOB), identified by flag line TOB-A and TOB-B. These flag lines are discontinuous along the same perennial stream due to deep mud in the adjacent BVW which made access to the stream banks impossible along portions of the reach. Using the current United States Geographical Survey (USGS) map and aerial photos, the remaining unreachable stream bank was interpolated on the plan set. The unnamed perennial stream is shown as perennial on the current USGS map which classifies the stream as perennial per 310 CMR 10.58 (2)(a)(1)(b-c). No water was observed in the stream channel at the time of the investigation. The

boundary of the perennial stream was identified in the field by the first observable break in slope (TOB). Wetland flags left in the field included:

- TOB-A1 through TOB-A12 (Perennial Stream Bank "A" Series)
- TOB-B1 through TOB-B3 (Perennial Stream Bank "A" Series)

Perennial streams are subject to a 200ft Riverfront Area under the Massachusetts Wetland Protection Act per 301 CMR 10.58(2)(a)(2)(c).

2.5 Other Protected Areas

Weston & Sampson created environmental resources maps (see Figure 4) of the site to determine the presence of other protected areas. The data source of these map layers was the Massachusetts Geographic Information System (MassGIS). These areas included:

- NHESP Priority Habitats of Rare Species
- NHESP Estimated Habitats of Rare Wildlife
- NHESP Certified and Potential Vernal Pools
- Areas of Critical Environmental Concern (ACEC)
- Outstanding Resource Waters (ORW)

Wetland resources identified in the field were also added to these maps. Based on the MassGIS information, the portions of the site are located within/immediately adjacent to NHESP Priority Habitats of Rare Species and NHESP Estimated Habitat of Rare Wildlife.

FEMA Flood Insurance Rate Maps (FIRM) were created online from the FEMA website to determine if there is a 100-year flood zone at the site. See Figure 3 for FIRM map. Based on FEMA flood maps the investigation area is not located within the 100-year flood zone.

3.0 SUMMARY

On September 11th, 2020, the presence of wetland resources was investigated near East Belcher Road in Foxborough, MA. Three bordering vegetated wetlands and a single perennial stream were identified and flagged at the site.

Additional environmental mapping was conducted using MassGIS data layers and FEMA FIRM mapping. This additional mapping indicates that the portions of the site are located within/immediately adjacent to NHESP Priority Habitats of Rare Species and NHESP Estimated Habitat of Rare Wildlife. Based on FEMA flood maps the investigation area is not located within the 100-year flood zone.

This Wetlands Delineation Report has been reviewed and approved by a Professional Wetland Scientist PWS.

4.0 REFERENCES

Jackson, Scott. 1995. "Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act." Massachusetts Department of Environmental Protection.

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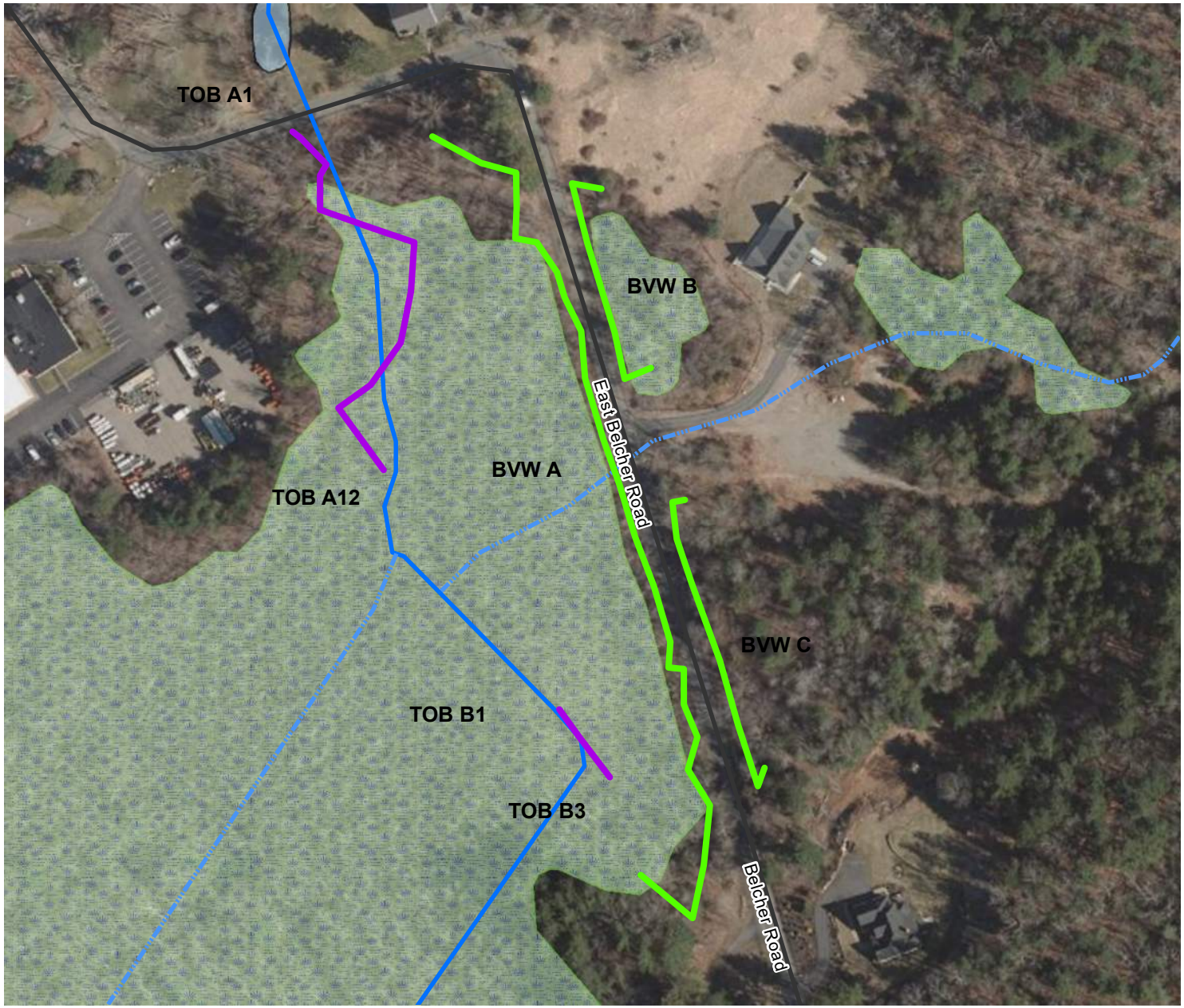

N
W E
S

100 50 0 100
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Bordering Vegetated Wetlands
- Perennial Stream
- USGS Perennial Stream
- USGS Intermittent Stream
- Marsh/Bog
- Wooded marsh
- Cranberry Bog
- Salt Marsh
- Open Water
- Reservoir (with PWSID)
- Tidal Flats
- Beach/Dune

FIGURE 1

East Belcher Road
Foxborough MA

Wetland Field Map

Weston & Sampson

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N
W E
S

1,000 500 0 1,000
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

Investigation Area

FIGURE 2

East Belcher Road
Foxborough MA

USGS Topographic Map

Weston & Sampson

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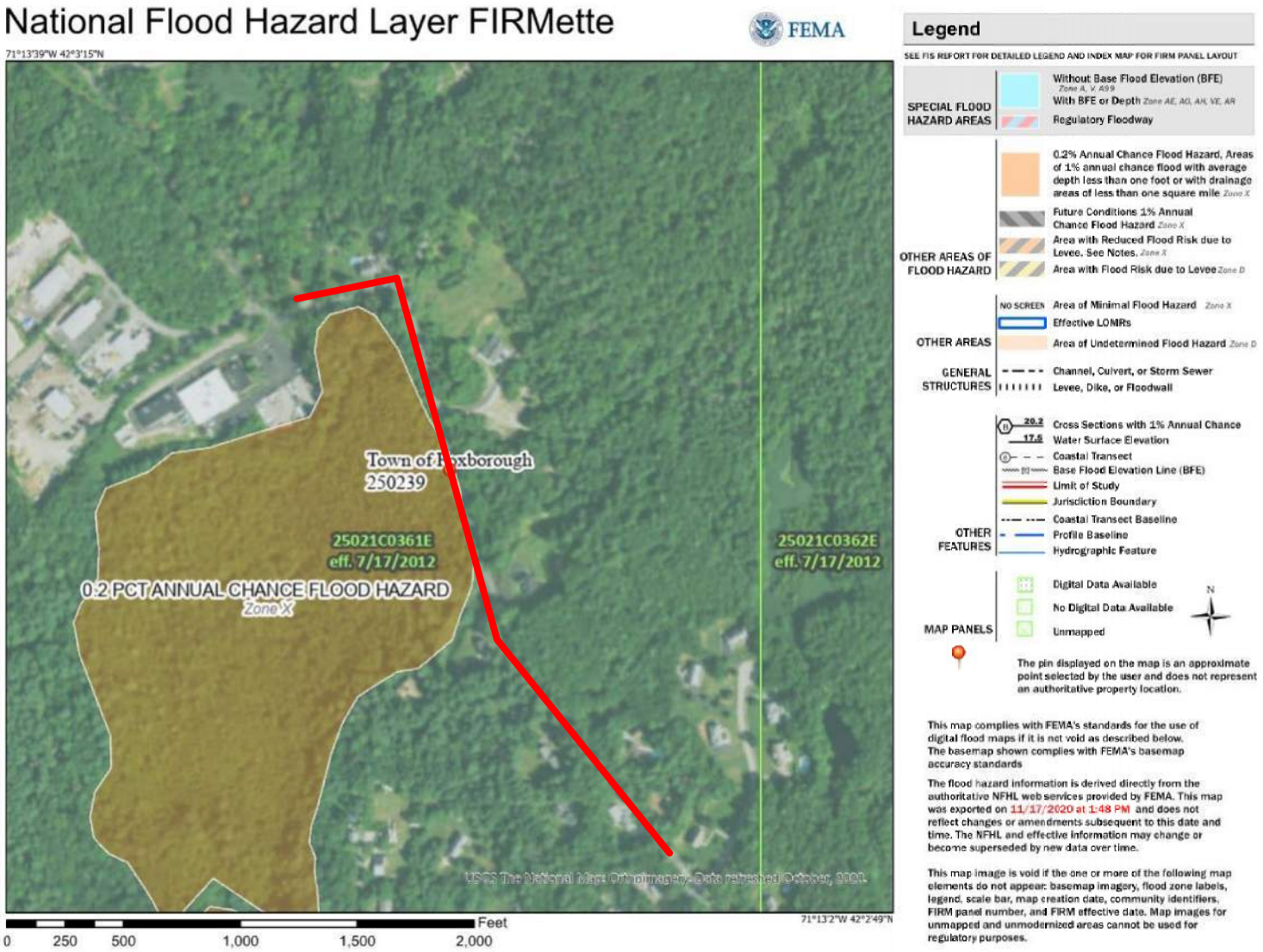


Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth Zone AE, AO, AH, VE, AR
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/17/2020 at 1:48 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Legend

Investigation Area

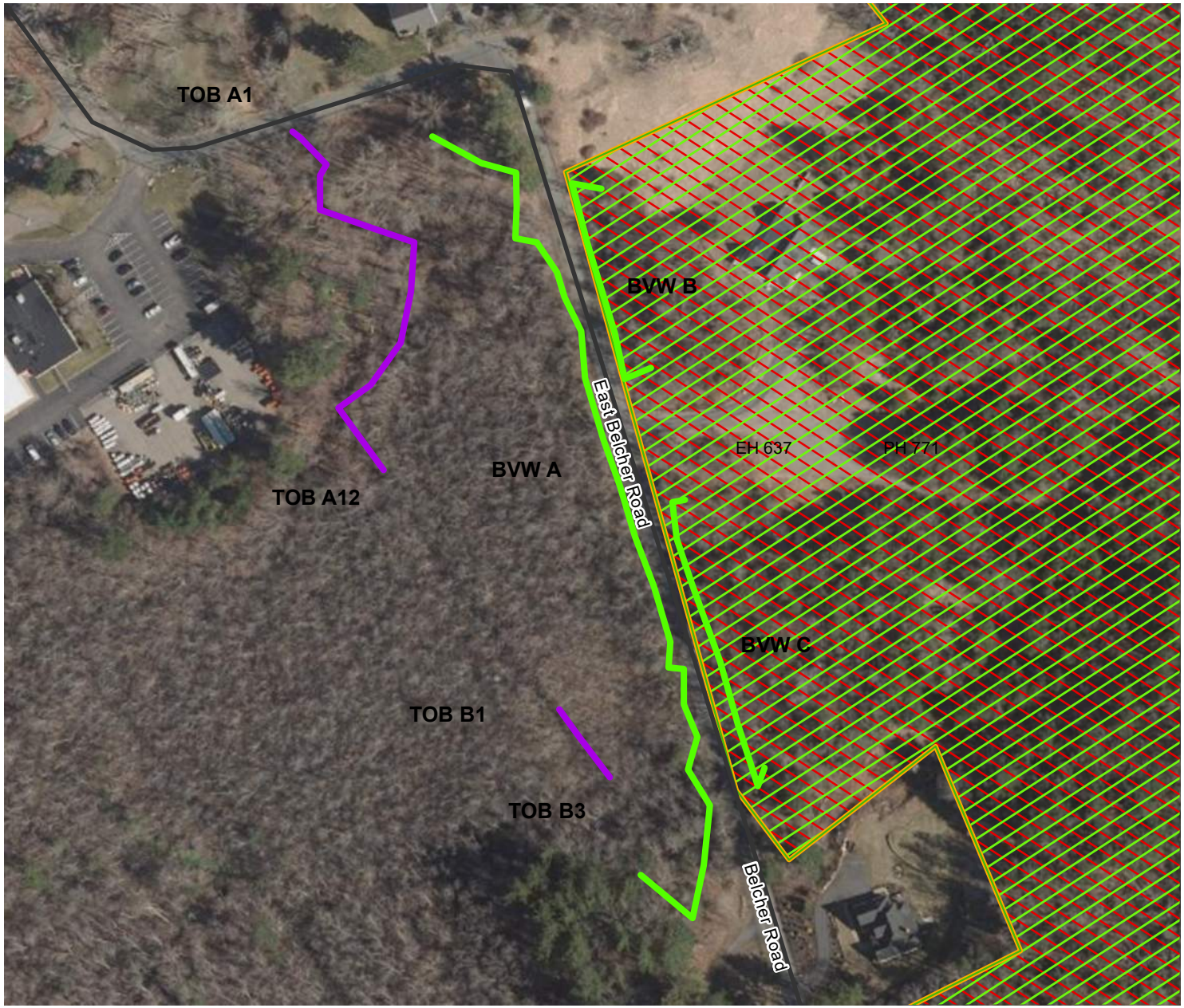
FIGURE 3

East Belcher Road
Foxborough MA

FEMA Map

Weston & Sampson

<BOL>Path:</BOL> C:\Users\batchelder.devin\OneDrive - WESTON & SAMPSON ENGINEERS, Inc\Desktop\Foxboro\GIS\Maps\Environmental Receptor.mxd <BOL>User:</BOL> Batchelder.Devin <BOL>Saved:</BOL> 11/17/2020 1:44:14 PM <BOL>Opened:</BOL> 11/17/2020 1:44:19 PM



N
W E
S

100 50 0 100
Feet

Data Source: Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts Executive Office of Environmental Affairs

Legend

- Bordering Vegetated Wetlands
- Perennial Stream

ACECs

- ACECs

NHESP Habitats

- NHESP Estimated Habitats of Rare Wildlife
- NHESP Priority Habitats of Rare Species
- NHESP Certified Vernal Pools
- NHESP Potential Vernal Pools

Outstanding Resource Waters

- Public Water Supply Contributor
- ORW for ACEC
- ORW for both Water Supply and Other

FIGURE 4

East Belcher Road
Foxborough MA

Environmental Resources Map

Weston & Sampson

APPENDIX A

ACOE Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: East Belcher Road City/County: Foxborough Sampling Date: 9/11/2020

Applicant/Owner: Town of Foxborough State: MA Sampling Point: BVW-A20 UP

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2-8% Lat: 42° 3'7.23"N Long: 71°13'23.47"W Datum: _____

Soil Map Unit Name: Sudbury Fine Sandy Loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW-A20 UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (Acer rubrum)	10	Yes	FAC
2. green ash (Fraxinus pennsylvanica)	5	Yes	FACW
3. eastern redcedar (Juniperus virginiana)	5	Yes	FACU
4. red pine (Pinus resinosa)	5	Yes	FACU
5. eastern white pine (Pinus strobus)	5	Yes	FACU
6.			
7.			
	30	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. glossy buckthorn (Frangula alnus)	25	Yes	FAC
2. staghorn sumac (Rhus typhina)	10	Yes	N/A
3. multiflora rose (Rosa multiflora)	5	No	FACU
4.			
5.			
6.			
7.			
	40	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Canada goldenrod (Solidago canadensis)	10	Yes	FACU
2. eastern poison ivy (Toxicodendron radicans)	10	Yes	FAC
3. sensitive fern (Onoclea sensibilis)	1	No	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	21	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. Asiatic bittersweet (Celastrus orbiculatus)	5	Yes	UPL
2. eastern poison ivy (Toxicodendron radicans)	5	Yes	FAC
3.			
4.			
	10	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 45 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	6	x 2 =	12
FAC species	50	x 3 =	150
FACU species	30	x 4 =	120
UPL species	5	x 5 =	25
Column Totals:	91 (A)		307 (B)

Prevalence Index = B/A = 3.4

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-A20 UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	10YR2/2	100					FSL	
4-12	10YR4/3	100					FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: East Belcher Road City/County: Foxborough Sampling Date: 9/11/2020

Applicant/Owner: Town of Foxborough State: MA Sampling Point: BVW-A20WET

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2-8% Lat: 42° 3'7.23"N Long: 71°13'23.47"W Datum: _____

Soil Map Unit Name: Sudbury Fine Sandy Loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes X	No _____	Depth (inches): 0"
Water Table Present?	Yes X	No _____	Depth (inches): 0"
Saturation Present? (includes capillary fringe)	Yes X	No _____	Depth (inches): 0"

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW-A20WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (Acer rubrum)	15	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	15 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. highbush blueberry (Vaccinium corymbosum)	25	Yes	FACW
2. glossy buckthorn (Frangula alnus)	10	Yes	FAC
3. multiflora rose (Rosa multiflora)	10	Yes	FACU
4.			
5.			
6.			
7.			
	45 = Total Cover		
Herb Stratum (Plot size: 5')			
1. upright sedge (Carex stricta)	5	Yes	OBL
2. jewelweed(Impatiens capensis)	1	No	FACW
3. skunk cabbage (Symplocarpus foetidus)	1	No	OBL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	7 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1. eastern poison ivy (Toxicodendron radicans)	1	Yes	FAC
2.			
3.			
4.			
	1 = Total Cover		

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 83 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- ___ Rapid Test for Hydrophytic Vegetation
- X Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-A20WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-18	10YR2/1	100					Organic	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- X Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: East Belcher Road City/County: Foxborough Sampling Date: 9/11/2020

Applicant/Owner: Town of Foxborough State: MA Sampling Point: BVW-B6 UP

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2-8% Lat: 42° 3'7.17"N Long: 71°13'21.61"W Datum: _____

Soil Map Unit Name: Sudbury Fine Sandy Loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW-B6 UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. northern red oak (Quercus rubra)	25	Yes	FACW
2. red maple (Acer rubrum)	10	Yes	FAC
3. eastern redcedar (Juniperus virginiana)	5	No	FACU
4.			
5.			
6.			
7.			
	40	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. glossy buckthorn (Frangula alnus)	25	Yes	FAC
2. Morrow's honeysuckle (Lonicera morrowii)	5	No	FACU
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size: 5')			
1. eastern poison ivy (Toxicodendron radicans)	15	Yes	FAC
2. Canada goldenrod (Solidago canadensis)	1	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	16	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. N/A			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 11 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 45 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	6	x 2 =	12
FAC species	50	x 3 =	150
FACU species	30	x 4 =	120
UPL species	5	x 5 =	25
Column Totals:	91 (A)		307 (B)

Prevalence Index = B/A = 3.4

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-B6 UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	10YR2/2	100					FSL	
5-12	10YR4/3	100					FSL	Stony

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: East Belcher Road City/County: Foxborough Sampling Date: 9/11/2020

Applicant/Owner: Town of Foxborough State: MA Sampling Point: BVW-B6WET

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2-8% Lat: 42° 3'7.28"N Long: 71°13'21.73"W Datum: _____

Soil Map Unit Name: Sudbury Fine Sandy Loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW-B6WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (Acer rubrum)	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. glossy buckthorn (Frangula alnus)	25	Yes	FAC
2. speckled alder (Alnus incana)	25	Yes	FACW
3.			
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size: 5')			
1. sensitive fern (Onoclea sensibilis)	50	Yes	FACW
2. jewelweed (Impatiens capensis)	10	No	FACW
3. swamp candle (Lysimachia terrestris)	5	No	OBL
4. woolgrass (Scirpus cyperinus)	5	No	OBL
5. wrinkleleaf goldenrod (Solidago rugosa)	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	75	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. N/A			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

__ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-B6WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-5	10YR2/1	95	10YR4/6	5	C	M	FSL	
5-12	10YR4/2	95	10YR4/6	5	C	M	FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: East Belcher Road City/County: Foxborough Sampling Date: 9/11/2020

Applicant/Owner: Town of Foxborough State: MA Sampling Point: BVW-C9 UP

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2-8% Lat: 42° 3'1.29"N Long: 71°13'19.33"W Datum: _____

Soil Map Unit Name: Sudbury Fine Sandy Loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No X	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes _____	No X	If yes, optional Wetland Site ID: _____

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW-C9 UP

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. northern red oak (Quercus rubra)	25	Yes	FACU
2. red maple (Acer rubrum)	15	Yes	FAC
3. eastern white pine (Pinus strobus)	10	No	FACU
4. American chestnut (Castanea dentata)	5	No	N/A
5.			
6.			
7.			
	55	= Total Cover	

Sapling/Shrub Stratum (Plot size: 15')			
1. glossy buckthorn (Frangula alnus)	15	Yes	FAC
2. red maple (Acer rubrum)	5	No	FAC
3. eastern white pine (Pinus strobus)	5	No	FACU
4.			
5.			
6.			
7.			
	30	= Total Cover	

Herb Stratum (Plot size: 5')			
1. Canada mayflower (Maianthemum canadense)	5	Yes	FACU
2. rare clubmoss (Lycopodium obscurum)	5	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	10	= Total Cover	

Woody Vine Stratum (Plot size: 30')			
1. N/A			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	50	x 4 =	200
UPL species	0	x 5 =	0
Column Totals:	85 (A)		305 (B)

Prevalence Index = B/A = 3.6

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? Yes _____ No X

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-C9 UP

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-5	10YR2/2	100					FSL	
5-12	10YR4/3	100					FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** _____ **No** X

Remarks:

WETLAND DETERMINATION DATA FORM – Northcentral and Northeast Region

Project/Site: East Belcher Road City/County: Foxborough Sampling Date: 9/11/2020

Applicant/Owner: Town of Foxborough State: MA Sampling Point: BVW-C9WET

Investigator(s): Devin Batchelder Section, Township, Range: _____

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____

Slope (%): 2-8% Lat: 42° 3'0.98"N Long: 71°13'19.01"W Datum: _____

Soil Map Unit Name: Sudbury Fine Sandy Loam NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes** X **No** _____
Hydric Soil Present?	Yes X	No _____	If yes, optional Wetland Site ID: _____
Wetland Hydrology Present?	Yes X	No _____	

Remarks: (Explain alternative procedures here or in a separate report.)

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- X Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ Marl Deposits (B15)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Drainage Patterns (B10)
- ___ Moss Trim Lines (B16)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ Microtopographic Relief (D4)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present?	Yes _____	No X	Depth (inches): _____
Water Table Present?	Yes _____	No X	Depth (inches): _____
Saturation Present? (includes capillary fringe)	Yes _____	No X	Depth (inches): _____

Wetland Hydrology Present? **Yes** X **No** _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

VEGETATION – Use scientific names of plants.

Sampling Point: BVW-C9WET

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. red maple (Acer rubrum)	25	Yes	FAC
2.			
3.			
4.			
5.			
6.			
7.			
	25	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. glossy buckthorn (Frangula alnus)	15	Yes	FAC
2. speckled alder (Alnus incana)	10	Yes	FACW
3. red maple (Acer rubrum)	5	No	FAC
4.			
5.			
6.			
7.			
	30	= Total Cover	
Herb Stratum (Plot size: 5')			
1. royal fern (Osmunda regalis)	25	Yes	OBL
2. sensitive fern (Onoclea sensibilis)	10	Yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
	35	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1. N/A			
2.			
3.			
4.			
	0	= Total Cover	

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

___ Rapid Test for Hydrophytic Vegetation

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree – Woody plants 3 in. (7.6 cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/shrub – Woody plants less than 3 in. DBH and greater than 3.28 ft (1 m) tall.

Herb – All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft tall.

Woody vines – All woody vines greater than 3.28 ft in height.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: (Include photo numbers here or on a separate sheet.)

SOIL

Sampling Point: BVW-C9WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR2/1	95	10YR4/6	5	C	M	FSL	
3-8	10YR4/2	95	10YR4/6	5	C	M	FSL	
8-12	10YR6/2	90	10YR4/6	10	C	M	FSL	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators:

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- X Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Dark Surface (S7) (**LRR R, MLRA 149B**)
- ___ Polyvalue Below Surface (S8) (**LRR R, MLRA 149B**)
- ___ Thin Dark Surface (S9) (**LRR R, MLRA 149B**)
- ___ Loamy Mucky Mineral (F1) (**LRR K, L**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10) (**LRR K, L, MLRA 149B**)
- ___ Coast Prairie Redox (A16) (**LRR K, L, R**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR K, L, R**)
- ___ Dark Surface (S7) (**LRR K, L**)
- ___ Polyvalue Below Surface (S8) (**LRR K, L**)
- ___ Thin Dark Surface (S9) (**LRR K, L**)
- ___ Iron-Manganese Masses (F12) (**LRR K, L, R**)
- ___ Piedmont Floodplain Soils (F19) (**MLRA 149B**)
- ___ Mesic Spodic (TA6) (**MLRA 144A, 145, 149B**)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** _____

Remarks:

APPENDIX B

Site Photographs

Photo 1: East Belcher Road

Photo 2: Perennial Stream

Photo 3: BVW Identified Onsite by BVW A Flag Series

Photo 4: BVW Identified Onsite by BVW B Flag Series

Photo 5: BVW Identified Onsite by BVW C Flag Series

Photo 6: Wetland Soils Observed Onsite

APPENDIX H

PHOTOS

Photo 1: East Belcher Road

Photo 2: Perennial Stream

Photo 3: BVW Identified Onsite by BVW A Flag Series

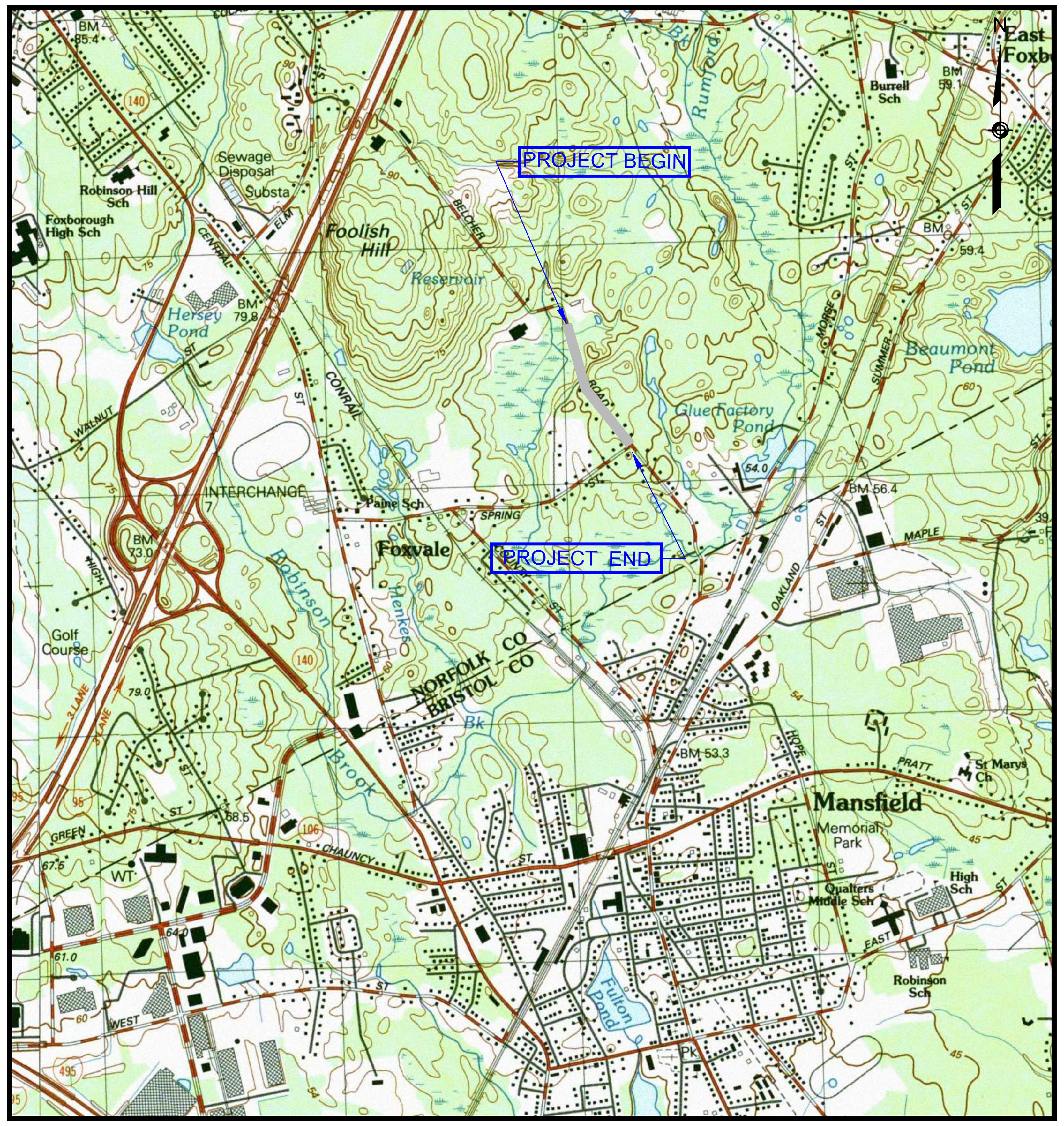
Photo 4: BVW Identified Onsite by BVW B Flag Series

Photo 5: BVW Identified Onsite by BVW C Flag Series

Photo 6: Wetland Soils Observed Onsite

TOWN OF FOXBOROUGH
MASSACHUSETTS

DEPARTMENT OF PUBLIC WORKS



LOCUS PLAN

SCALE: 1"=500'

INDEX

SHEET NO.	DESCRIPTION
1	TITLE SHEET & INDEX
2	LEGEND, GENERAL NOTES & ABBREVIATIONS
3	TYPICAL SECTIONS
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THE MASSACHUSETTS HIGHWAY DEPARTMENT STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES DATED 2020, AS AMENDED, THE OCTOBER 2017 CONSTRUCTION STANDARD DETAILS, THE 2015 OVERHEAD SIGNAL STRUCTURE AND FOUNDATION STANDARD DRAWINGS, MASSDOT TRAFFIC MANAGEMENT PLANS AND DETAIL DRAWINGS, THE LATEST MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS WITH MASSACHUSETTS AMENDMENTS, THE 1990 STANDARD DRAWINGS FOR SIGNS AND SUPPORTS, THE 1968 STANDARD DRAWINGS FOR TRAFFIC SIGNALS AND HIGHWAY LIGHTING, AND THE LATEST EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, WILL GOVERN.

EAST BELCHER ROAD
ROADWAY RECONSTRUCTION PROJECT
NOTICE OF INTENT
FINAL DESIGN

FOR PERMITTING USE ONLY
NOT FOR CONSTRUCTION

COMMONWEALTH OF MASSACHUSETTS
LAURENCE F. KEEGAN, JR.
CIVIL
NO. 33708
REGISTERED PROFESSIONAL ENGINEER

1.20.21

JANUARY 2021

Weston & Sampson

100 FOXBOROUGH BOULEVARD, SUITE 250
FOXBOROUGH MASSACHUSETTS 02035

GENERAL NOTES:

1. TOPOGRAPHICAL INFORMATION BASED ON AN ON THE GROUND SURVEY PERFORMED BY CHAPPELL ENGINEERING ON (NOVEMBER 2013). WETLAND FLAGGING WAS PERFORMED BY WESTON & SAMPSON ON (SEPTEMBER 2020).
2. THE HORIZONTAL COORDINATES ARE BASED ON NAD 83, THE VERTICAL DATUM IS NAVD 88.
3. THE LOCATIONS OF EXISTING UNDERGROUND UTILITIES ARE SHOWN IN AN APPROXIMATE WAY ONLY AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR ITS REPRESENTATIVE. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK, AND AGREES TO BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES WHICH MIGHT BE OCCASIONED BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE CONTRACTOR SHALL DIG TEST PITS WITH THE LOCATIONS BEING APPROVED BY THE ENGINEER PRIOR TO COMMENCEMENT OF WORK TO EXACTLY LOCATE EXISTING UTILIITES.
4. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, THE LOCATION, ELEVATION AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR AND THE INFORMATION FURNISHED TO THE ENGINEER FOR RESOLUTION OF THE CONFLICT.
5. THE CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE AND ANY OTHER PRIVATE UTILITIES BY THE UTILITY OWNER. ANY ALTERATIONS SHALL BE INCIDENTAL TO THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR THE TEMPORARY SUPPORT OF ALL UTILITIES TO REMAIN IN PLACE AND SHALL DESCRIBE IN WRITING, TO THE SATISFACTION OF THE ENGINEER, HIS METHOD OF TEMPORARY SUPPORT.
6. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
7. THE TERM "PROPOSED (PROP)" INDICATES WORK TO BE CONSTRUCTED USING NEW MATERIALS OR, WHERE APPLICABLE, RE-USING EXISTING MATERIALS IDENTIFIED AS "REMOVE AND RESET (R&R)".
8. ALL EXISTING STATE, COUNTY AND TOWN LOCATION LINES AND PRIVATE PROPERTY LINES HAVE BEEN ESTABLISHED FROM AVAILABLE INFORMATION AND THEIR EXACT LOCATION ARE NOT GUARANTEED.
9. ALL EXCESS MATERIAL FROM ROADWAY RECONSTRUCTION OR THE EXCAVATION PROCESS SHALL BE REUSED ON SITE OR REMOVED FROM THE SITE AND DISPOSED OF IN A LEGAL AND PROPER MANNER.
10. THE CONTRACTOR SHALL CALL DIGSAFE AT 1-888-344-7233 AT LEAST 72 HOURS, SATURDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIGSAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE TOWN PRIOR TO EXCAVATION.
11. JOINTS BETWEEN HOT MIX ASPHALT TRENCH PAVEMENT AND SAWCUT EXISTING PAVEMENT SHALL BE SEALED WITH BITUMEN AND BACKSANDED.
12. IF DEEMED NECESSARY DUE TO THE WORK, THE CONTRACTOR SHALL COORDINATE WITH THE TOWN OF ASHBURNHAM HIGHWAY DEPARTMENT, THE CHESTERFIELD FIRE DEPARTMENT, AND THE ENGINEER FOR APPROVAL OF SHUTTING DOWN ANY EXISTING WATER MAINS AND SHALL ALSO OBTAIN APPROVAL FOR DISRUPTING ANY EXISTING SEWER FLOWS.
13. THE CONTRACTOR SHALL BE AWARE THAT ONLY TOWN PERSONNEL ARE ALLOWED TO OPERATE WATER GATES AND HYDRANTS. ANY REQUESTS TO OPERATE THE GATES SHALL BE COORDINATED THROUGH THE ENGINEER.
14. THE CONTRACTOR SHALL COORDINATE ANY WORK FOR THE PROJECT WITH ALL ADJACENT/CONCURRENT PROJECTS AND CONTRACTORS.
15. THE CONTRACTOR SHALL INSTALL PRIOR TO COMMENCEMENT OF WORK, MAINTAIN, AND REMOVE AT THE END OF THE PROJECT INLET SEDIMENT CONTROL BAGS IN ALL CATCH BASINS, WITHIN OR ADJACENT TO THE PROJECT LIMITS. THE CONTRACTOR SHALL ALSO MAINTAIN SILT FENCE AND COMPOST FILTER TUBES AS SHOWN ON THE PLANS THROUGHOUT THE DURATION OF THE PROJECT AND REMOVE AT THE END.
16. ANY GRASS AREAS DISTURBED BY THE WORK SHALL BE RESTORED WITH LOAM AND SEED.
17. ANY LANDSCAPED AREAS DISTURBED BY THE WORK SHALL BE RESTORED TO EXISTING CONDITIONS WITH EXISTING OR NEW GROUND COVER MATERIALS AS DIRECTED BY THE ENGINEER. ANY PLANTS, SHRUBS, OR FLOWERS DISTURBED BY THE WORK SHALL BE RESET TO EXISTING CONDITIONS OR REPLACED WITH NEW PLANTS, SHRUBS, OR FLOWERS AS DIRECTED BY THE ENGINEER. ALL WORK TO RESTORE LANDSCAPE AREAS, NEW GROUND COVER MATERIALS, NEW PLANTS, NEW SHRUBS, OR NEW FLOWERS REQUIRED BY THE ENGINEER SHALL BE INCIDENTAL TO THE PROJECT.
18. CONTRACTOR TO COORDINATE WITH UTILITY POLE OWNERS IN AREAS WHERE UNDERGROUND UTILITY WORK IS WITHIN CLOSE PROXIMITY AND POSSIBLE UTILITY POLE SHORING IS REQUIRED WHILE INSTALLING PROPOSED UTILITIES.
19. RAISE AND ADJUST FRAMES AND GRATES, FRAMES AND COVERS AND GATE BOXES PRIOR TO PAVEMENT OVERLAY, IF REQUIRED.
20. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY PROPERTY PINS THAT ARE DAMAGED OR DESTROYED DURING CONSTRUCTION, TO THEIR LOCATION JUST PRIOR TO CONSTRUCTION.
21. ALL TRAFFIC SIGNS WITHIN THE PROJECT LIMITS SHALL BE REMOVED AND STACKED OR REMOVED AND RESET UNLESS OTHERWISE NOTED ON THE PLANS OR AS DIRECTED BY THE ENGINEER.

PAVEMENT MARKINGS SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
		PAVEMENT ARROW - WHITE
ONLY	ONLY	LEGEND "ONLY" - WHITE
	SL	STOP LINE
	CW	CROSSWALK
	SWL	SOLID WHITE LINE
	SYL	SOLID YELLOW LINE
	BWL	BROKEN WHITE LINE
	BYL	BROKEN YELLOW LINE
	DWL	DOTTED WHITE LINE
	DYL	DOTTED YELLOW LINE
	DWLEx	DOTTED WHITE LINE EXTENSION
	DYLEx	DOTTED YELLOW LINE EXTENSION
	DBWL	DOUBLE WHITE LINE
	DBYL	DOUBLE YELLOW LINE
	SWGL	SOLID WHITE GORE LINE - SIZE AS NOTED ON PLANS

GENERAL SYMBOLS

EXISTING	PROPOSED	DESCRIPTION
JB	JB	JERSEY BARRIER
CB	CB	CATCH BASIN
		CATCH BASIN CURB INLET
FP	FP	FLAG POLE
GP	GP	GAS PUMP
MB	MB	MAIL BOX
		POST SQUARE
		POST CIRCULAR
WELL	WELL	WELL
EHH	EHH	ELECTRIC HANDHOLE
		FENCE GATE POST
GG	GG	GAS GATE
BHL #	BHL #	BORING HOLE
MW #	MW #	MONITORING WELL
TP #	TP #	TEST PIT
		HYDRANT
		LIGHT POLE
CO.BD.		COUNTY BOUND
		GPS POINT
		CABLE MANHOLE
		DRAINAGE MANHOLE
		ELECTRIC MANHOLE
		GAS MANHOLE
		MISC MANHOLE
		SEWER MANHOLE
		TELEPHONE MANHOLE
		WATER MANHOLE
MHB	MHB	MASSACHUSETTS HIGHWAY BOUND
MON		MONUMENT
SB		STONE BOUND
TB		TOWN OR CITY BOUND
		TRAVERSE OR TRIANGULATION STATION
TPL or GUY	TPL or GUY	TROLLEY POLE OR GUY POLE
HTP		TRANSMISSION POLE
UFB	UFB	UTILITY POLE W/ FIREBOX
UPDL	UPDL	UTILITY POLE WITH DOUBLE LIGHT
ULT	ULT	UTILITY POLE W / 1 LIGHT
UPL	UPL	UTILITY POLE
		BUSH
SIZE & TYPE		TREE
		STUMP
		SWAMP / MARSH
WG	WG	WATER GATE
PM	PM	PARKING METER
		OVERHEAD CABLE/WIRE
		CURBING
100 99		CONTOURS (ON-THE-GROUND SURVEY DATA)
100 99		CONTOURS (PHOTOGRAMMETRIC DATA)
		UNDERGROUND DRAIN PIPE (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND ELECTRIC DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND GAS MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND SEWER MAIN (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND TELEPHONE DUCT (DOUBLE LINE 24 INCH AND OVER)
		UNDERGROUND WATER MAIN (DOUBLE LINE 24 INCH AND OVER)
		BALANCED STONE WALL
		GUARD RAIL - STEEL POSTS
		GUARD RAIL - WOOD POSTS
x	x	CHAIN LINK OR METAL FENCE
		WOOD FENCE
		HAY BALES/SILT FENCE / COMPOST FILTER TUBE
		TREE LINE
		SAWCUT LINE
		TOP OR BOTTOM OF SLOPE
		LIMIT OF EDGE OF PAVEMENT OR COLD PLANE AND OVERLAY
		BANK OF RIVER OR STREAM
		BORDER OF WETLAND
		100 FT WETLAND BUFFER
		200 FT RIVERFRONT BUFFER
		STATE HIGHWAY LAYOUT
		TOWN OR CITY LAYOUT
		COUNTY LAYOUT
		RAILROAD SIDELINE
		TOWN OR CITY BOUNDARY LINE
		PROPERTY LINE OR APPROXIMATE PROPERTY LINE
		EASEMENT

ABBREVIATIONS

GENERAL

AADT	ANNUAL AVERAGE DAILY TRAFFIC
ABAN	ABANDON
ADJ	ADJUST
APPROX.	APPROXIMATE
A.C.	ASPHALT CONCRETE
ACCM PIPE	ASPHALT COATED CORRUGATED METAL PIPE
BIT.	BITUMINOUS
BC	BOTTOM OF CURB
BD.	BOUND
BL	BASELINE
BLDG	BUILDING
BM	BENCHMARK
BO	BY OTHERS
BOS	BOTTOM OF SLOPE
BR.	BRIDGE
CB	CATCH BASIN
CBCI	CATCH BASIN WITH CURB INLET
CC	CEMENT CONCRETE
CCM	CEMENT CONCRETE MASONRY
CEM	CEMENT
CI	CURB INLET
CIP	CAST IRON PIPE
CLF	CHAIN LINK FENCE
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CSP	CORRUGATED STEEL PIPE
CO.	COUNTY
CONC	CONCRETE
CONT	CONTINUOUS
CONST	CONSTRUCTION
CR GR	CROWN GRADE
DHV	DESIGN HOURLY VOLUME
DI	DROP INLET
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DW	STEADY DON'T WALK - PORTLAND ORANGE
DWY	DRIVEWAY
ELEV (or EL.)	ELEVATION
EMB	EMBANKMENT
EOP	EDGE OF PAVEMENT
EXIST (or EX)	EXISTING
EXC	EXCAVATION
F&C	FRAME AND COVER
F&G	FRAME AND GRATE
FDN.	FOUNDATION
FLDSTN	FIELDSTONE
GAR	GARAGE
GD	GROUND
GG	GAS GATE
GI	GUTTER INLET
GIP	GALVANIZED IRON PIPE
GRAN	GRANITE
GRAV	GRAVEL
GRD	GUARD
HDW	HEADWALL
HMA	HOT MIX ASPHALT
HOR	HORIZONTAL
HYD	HYDRANT
INV	INVERT
JCT	JUNCTION
L	LENGTH OF CURVE
LB	LEACH BASIN
LP	LIGHT POLE
LT	LEFT
MAX	MAXIMUM
MB	MAILBOX
MH	MANHOLE
MHB	MASSACHUSETTS HIGHWAY BOUND
MIN	MINIMUM
NIC	NOT IN CONTRACT
NO.	NUMBER
OHW	ORDINARY HIGH WATER
OW	OVERHEAD WIRES
PC	POINT OF CURVATURE
PCC	POINT OF COMPOUND CURVATURE
P.G.L.	PROFILE GRADE LINE
PI	POINT OF INTERSECTION
POC	POINT ON CURVE
POT	POINT ON TANGENT
PRC	POINT OF REVERSE CURVATURE
PROJ	PROJECT
PROP	PROPOSED
PSB	PLANTABLE SOIL BORROW
PT	POINT OF TANGENCY
PVC	POINT OF VERTICAL CURVATURE
PVI	POINT OF VERTICAL INTERSECTION
PVT	POINT OF VERTICAL TANGENCY

ABBREVIATIONS (cont.)

GENERAL

PVMT	PAVEMENT
PWW	PAVED WATER WAY
R	RADIUS OF CURVATURE
R&D	REMOVE AND DISPOSE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RDWY	ROADWAY
REM	REMOVE
RET	RETAIN
RET WALL	RETAINING WALL
ROW	RIGHT OF WAY
RR	RAILROAD
R&R	REMOVE AND RESET
R&S	REMOVE AND STACK
RT	RIGHT
SB	STONE BOUND
SHLD	SHOULDER
SMH	SEWER MANHOLE
ST	STREET
STA	STATION
SSD	STOPPING SIGHT DISTANCE
SHLO	STATE HIGHWAY LAYOUT LINE
SW	SIDEWALK
T	TANGENT DISTANCE OF CURVE/TRUCK %
TAN	TANGENT
TEMP	TEMPORARY
TC	TOP OF CURB
TOS	TOP OF SLOPE
TYP	TYPICAL
UP	UTILITY POLE
VAR	VARIES
VERT	VERTICAL
VC	VERTICAL CURVE
WCR	WHEEL CHAIR RAMP
WG	WATER GATE
WIP	WROUGHT IRON PIPE
WM	WATER METER/WATER MAIN
X-SECT	CROSS SECTION

NOI FINAL DESIGN

Weston & Sampson
100 Foxborough Blvd., S 250, Foxborough, MA
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No.	Date	Description	Dr.By	Ck.By	App.By
A		ORIGINAL	P	P	R
B					
C					
D					
E					
F					

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

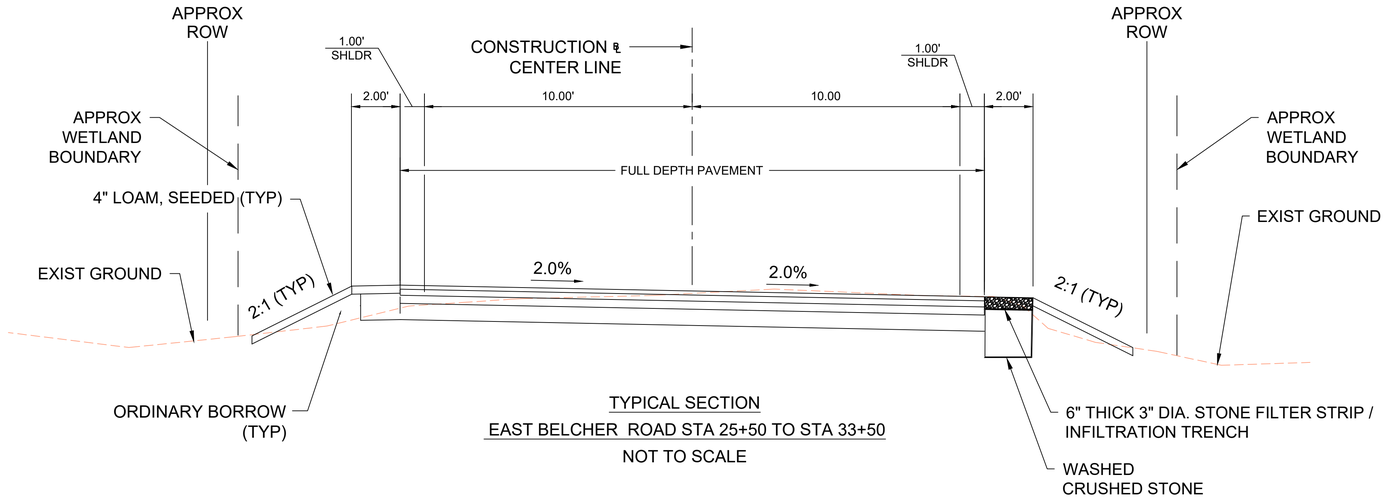
LEGEND, GENERAL NOTES & ABBREVIATIONS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	MD	RP	MK	LFK

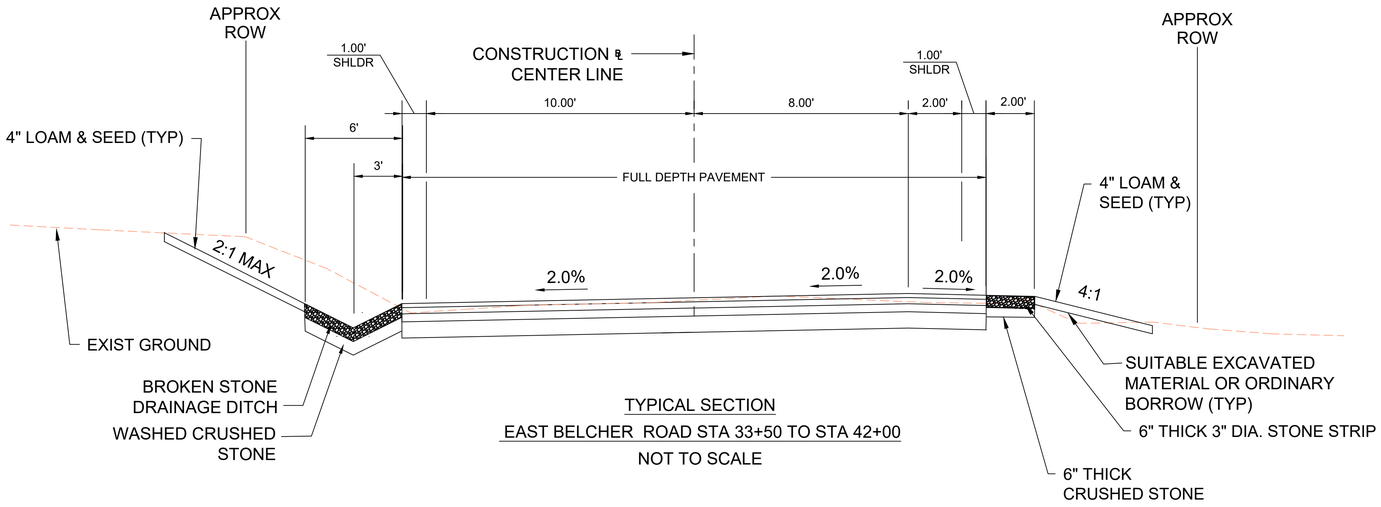
G-1

FILE NO. –

SHEET 2 OF 24



TYPICAL SECTION
EAST BELCHER ROAD STA 25+50 TO STA 33+50
NOT TO SCALE



TYPICAL SECTION
EAST BELCHER ROAD STA 33+50 TO STA 42+00
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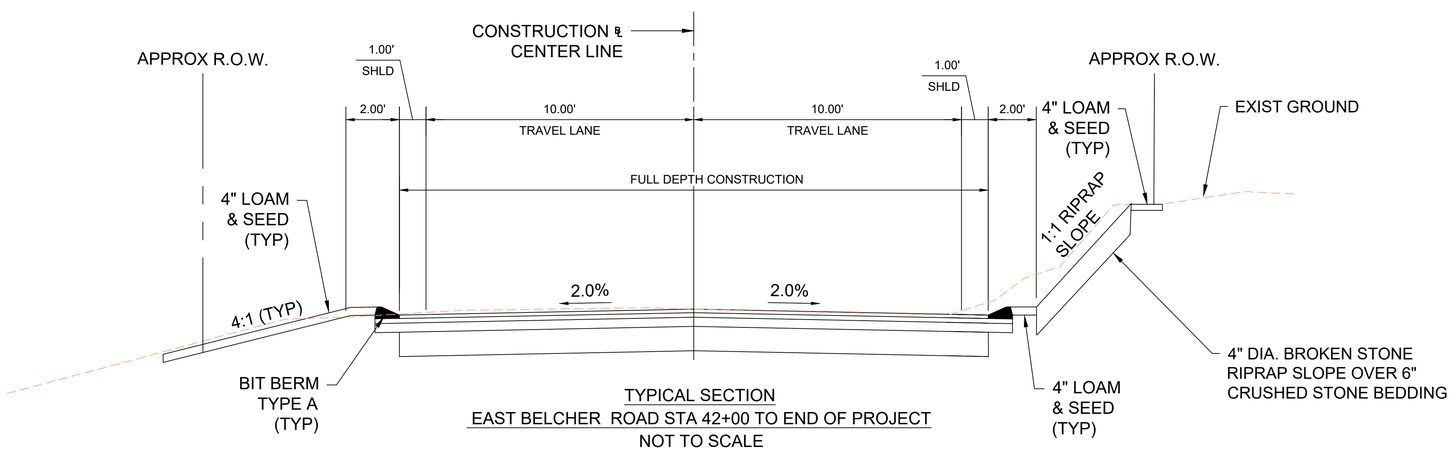


TYPICAL SECTION
EAST BELCHER ROAD STA 42+00 TO END OF PROJECT
NOT TO SCALE

PAVEMENT NOTES

FULL DEPTH PAVEMENT

1 3/4 " SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
2 1/4" SUPERPAVE INTERMEDIATE COURSE 19.0 (SIC-19.0) OVER

4" DENSE GRADED CRUSHED STONE FOR SUB-BASE OVER

8" GRAVEL BORROW, TYPE B

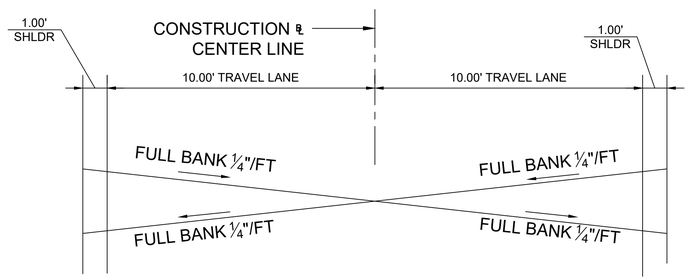
HOT MIX ASPHALT DRIVEWAY

1 1/2" HOT MIX ASPHALT - TOP COURSE OVER
1 1/2" HOT MIX ASPHALT - INTERMEDIATE COURSE OVER

8" GRAVEL BORROW, TYPE B

PAVEMENT MILLING AND OVERLAY

1 1/2" SUPERPAVE SURFACE COURSE 12.5 (SSC-12.5) OVER
1 1/2" PAVEMENT MICRO MILLING



TYPICAL SUPERELEVATION BANKING DETAIL
FULL SUPERELVETION (e=0.02)
NOT TO SCALE

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(508) 698-3034 (800) SAMPSON
www.westonandsampson.com

No.	Date	Description	Dr.By	Ck.By	App.By
A		PROVED			

DATE

REGISTERED PROFESSIONAL ENGINEER

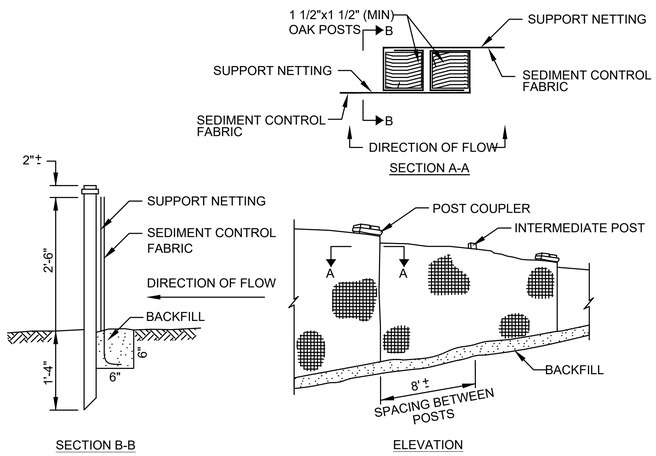
TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

TYPICAL SECTIONS AND DETAILS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	MD	RP	MK	LFK

D-1

FILE NO. –

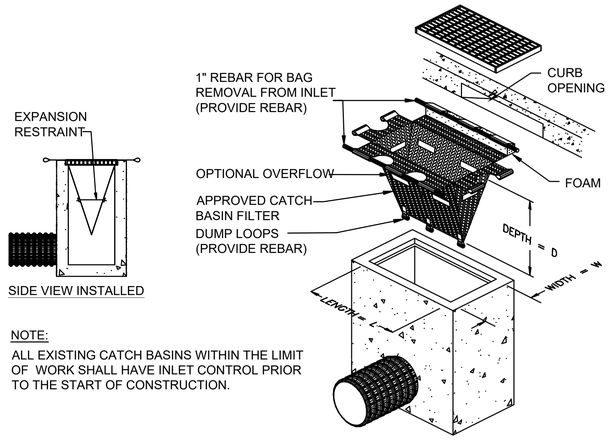


SILT FENCE

NOT TO SCALE

CONSTRUCTION SPECIFICATIONS ON SILTATION & EROSION CONTROL

1. EROSION CONTROL MEASURES SHALL BE INCORPORATED IN THE SEQUENCE OF CONSTRUCTION TO PREVENT SEDIMENT LADEN WATER FROM LEAVING THE SITE.
2. AREAS SUBJECT TO EROSION SHALL BE MINIMIZED IN TERMS OF TIME AND AREA.
3. IN GENERAL, WORK REQUIRING EROSION CONTROL INCLUDES EXCAVATIONS, FILLS, DRAINAGE, SWALES AND DITCHES, ROUGH AND FINISH GRADING, AND STOCKPILING OF EARTH.
4. DO NOT DISTURB VEGETATION AND TOPSOIL BEYOND THE PROPOSED LIMIT OF SILT FENCE ACTIVITIES.
5. TEMPORARY SILT CONTROLS SHALL BE PLACED AS SHOWN ON THE PLAN. PERMANENTLY STABILIZE EACH COMPLETED SEGMENT OF CONSTRUCTION.
6. THE CONTRACTOR SHALL REMOVE TEMPORARY SILT CONTROLS AND ALL ACCUMULATED SILT AND DEBRIS AFTER COMPLETION OF CONSTRUCTION OPERATIONS.
7. SILT CONTROLS SHALL BE IN PLACE AT ALL TIMES DURING CONSTRUCTION.
8. THE CONTRACTOR SHALL REMOVE AND LEGALLY DISPOSE OF ALL SILT AND DEBRIS FROM EACH DRAINAGE STRUCTURE UPON COMPLETION OF THE PROJECT.
9. OBJECTS AND/OR AREAS DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED TO THEIR ORIGINAL CONDITION.
10. ALL DISTURBED AREAS SHALL BE RESTORED TO EXISTING GRADE. INSPECTION SHALL BE FREQUENT AND REPAIR OR REPLACEMENT SHALL BE MADE AS NEEDED.
11. SILT CONTROLS SHALL BE REMOVED UPON THE SATISFACTORY COMPLETION OF ALL WORK SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
12. SITE PERIMETER SHALL HAVE COMPOST FILTER TUBES INSTALLED AT THE LIMIT OF WORK.

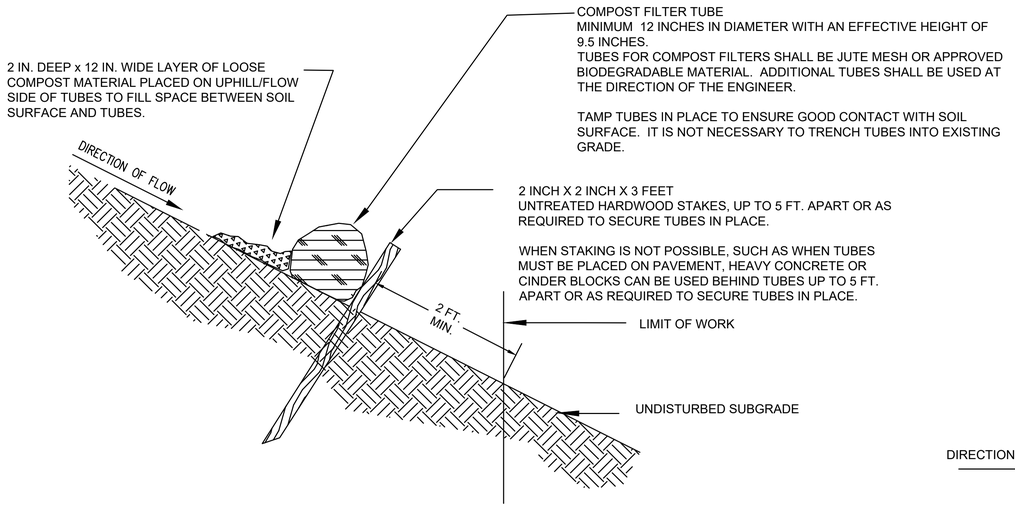


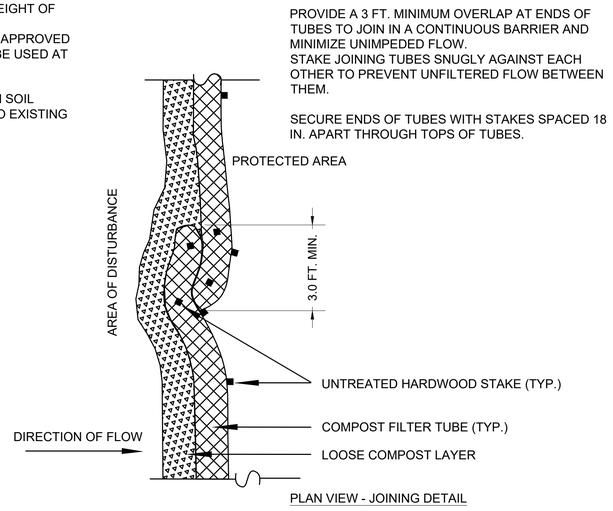
NOTE:

ALL EXISTING CATCH BASINS WITHIN THE LIMIT OF WORK SHALL HAVE INLET CONTROL PRIOR TO THE START OF CONSTRUCTION.

INLET SEDIMENT CONTROL

NOT TO SCALE





EROSION CONTROL BARRIER – COMPOST FILTER TUBE

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No.	Date	Dr.By	Ck.By	App.By	Description
		AP	PR	OV	ED

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REGISTERED PROFESSIONAL ENGINEER

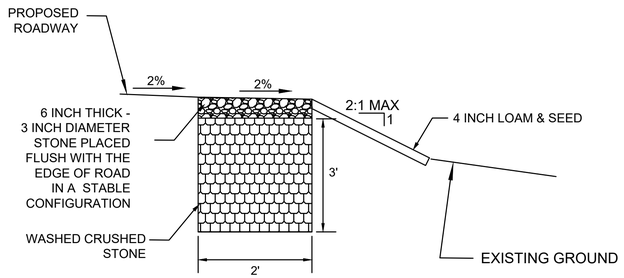
TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

CONSTRUCTION DETAILS

CADD NO. – | SCALE: AS NOTED | CONTRACT: – | JOB NO. 2120758 | DR.BY MD | DSN.BY RP | CHK.BY MK | APP.BY LFK

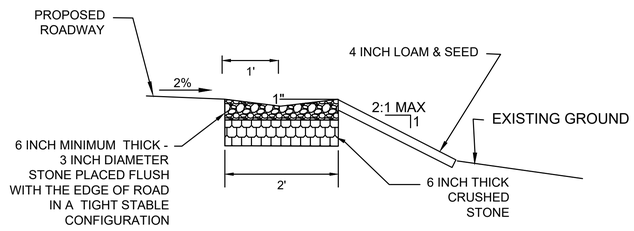
D-2

FILE NO. –



FILTER STRIP/INFILTRATION TRENCH

NOT TO SCALE



STONE STRIP

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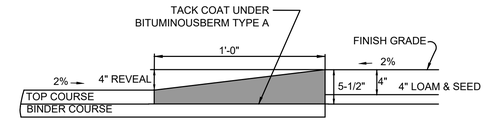
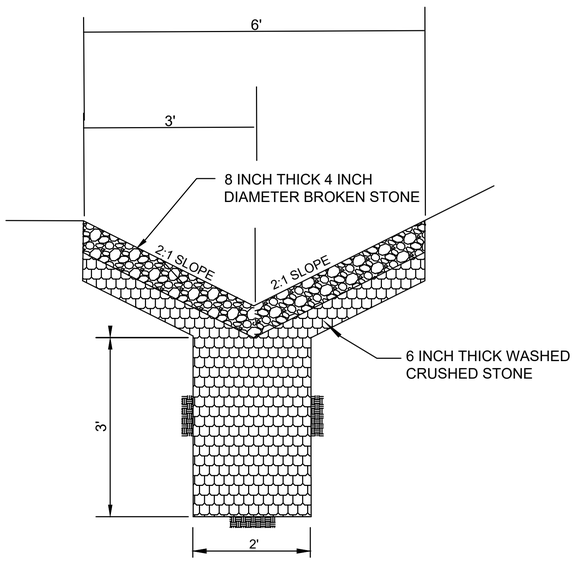


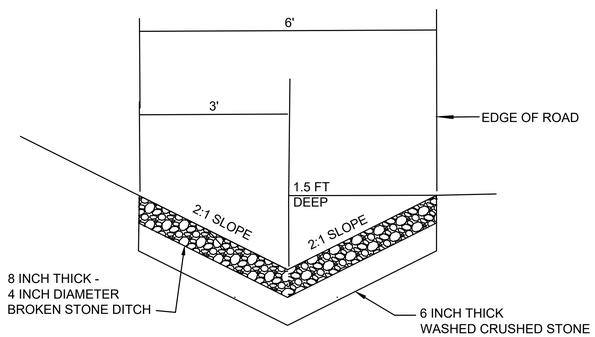
MODIFIED BITUMINOUS BERM TYPE A

NOT TO SCALE



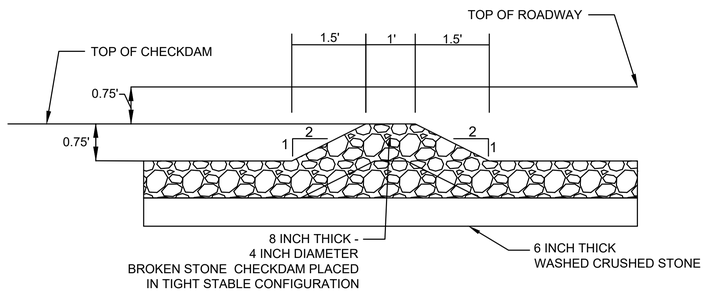
BROKEN STONE DRAINAGE DITCH WITH INFILTRATION TRENCH

NOT TO SCALE



BROKEN STONE DRAINAGE DITCH

NOT TO SCALE



CHECKDAM

NOT TO SCALE

NOI FINAL DESIGN

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No.	Date	Description	Dr.By	Ck.By	App.By
		APPROVED			

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

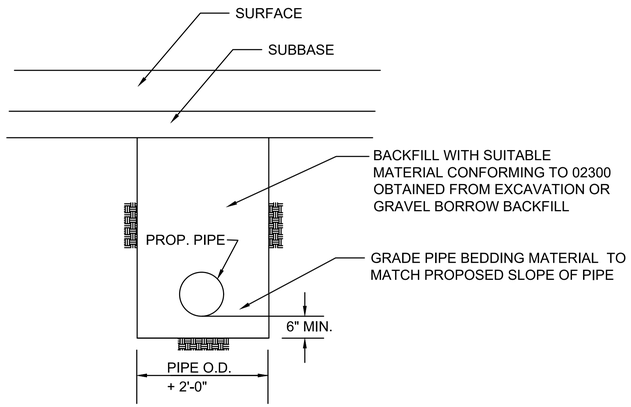
EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

CONSTRUCTION DETAILS

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	MD	RP	MK	LFK

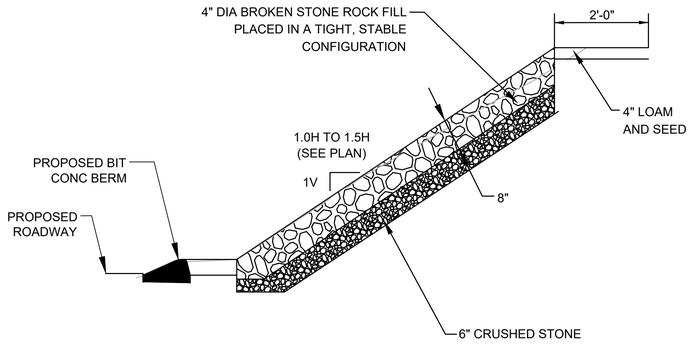
D-3

FILE NO. –



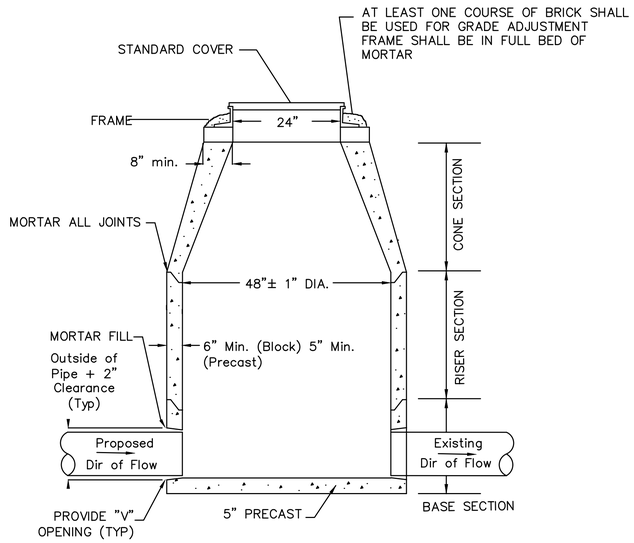
DRAINAGE TRENCH DETAIL

NOT TO SCALE



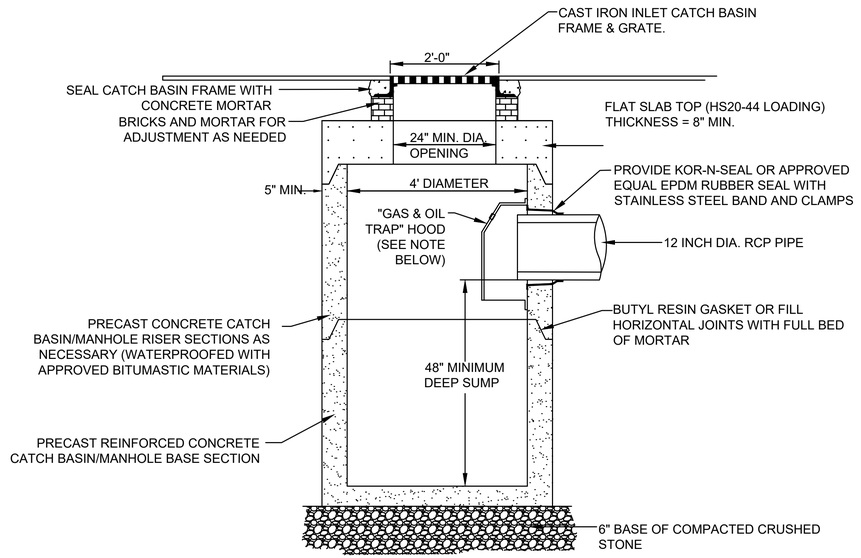
STEEP SLOPE WITH 4" DIA BROKEN STONE FILL

NOT TO SCALE



STANDARD DRAIN MANHOLE

NOT TO SCALE



NOTE:

1. FOR OIL AND GAS TRAP HOOD, USE "THE SNOUT" BY BEST MANAGEMENT PRODUCTS, INC. OR APPROVED EQUAL. SIZE PER MANUFACTURER'S SPECIFICATIONS.

DEEP SUMP CATCH BASIN WITH HOOD

NOT TO SCALE

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No.	Date	Description	Dr.By	Ck.By	App.By
		APPROVED			

REGISTERED PROFESSIONAL ENGINEER

DATE

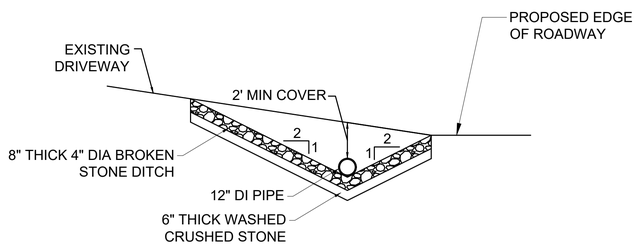
TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

CONSTRUCTION DETAILS

CADD NO. – | SCALE: AS NOTED | CONTRACT: – | JOB NO. 2120758 | DR.BY MD | DSN.BY RP | CHK.BY MK | APP.BY LFK

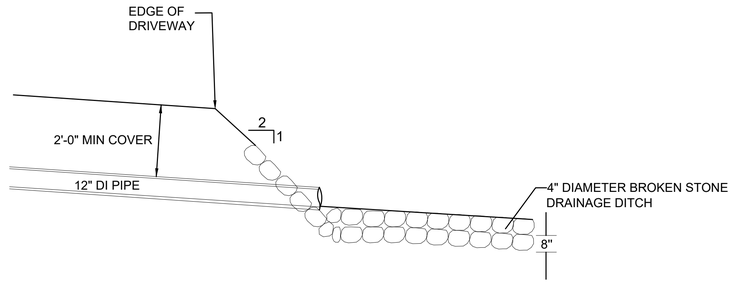
D-4

FILE NO. –



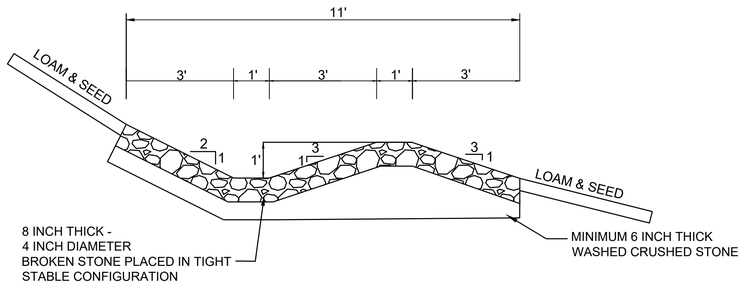
DRIVEWAY CULVERT

NOT TO SCALE

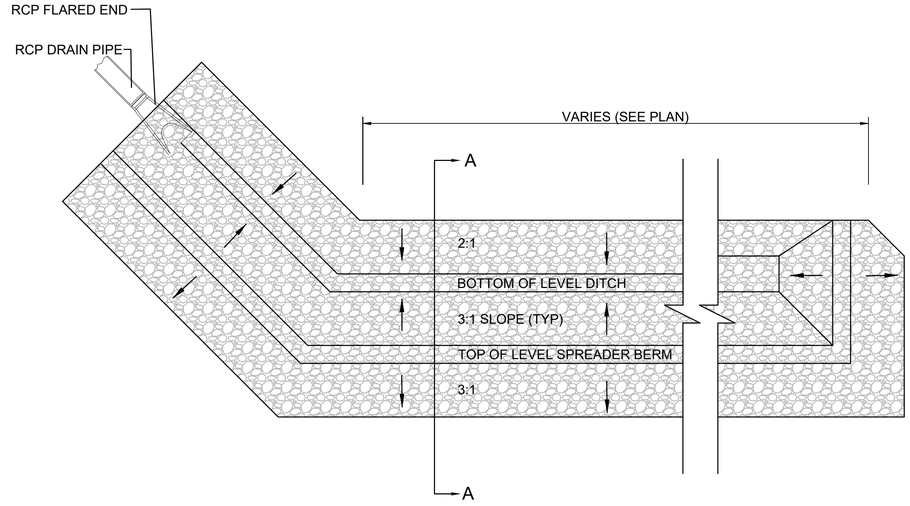


DRIVEWAY CULVERT PROFILE

NOT TO SCALE



SECTION A-A



LEVEL SPREADER

NOT TO SCALE

NOI FINAL DESIGN

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No.	Date	Description	Dr.By	Ck.By	App.By
A	P	P	R	O	V	E	D			

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

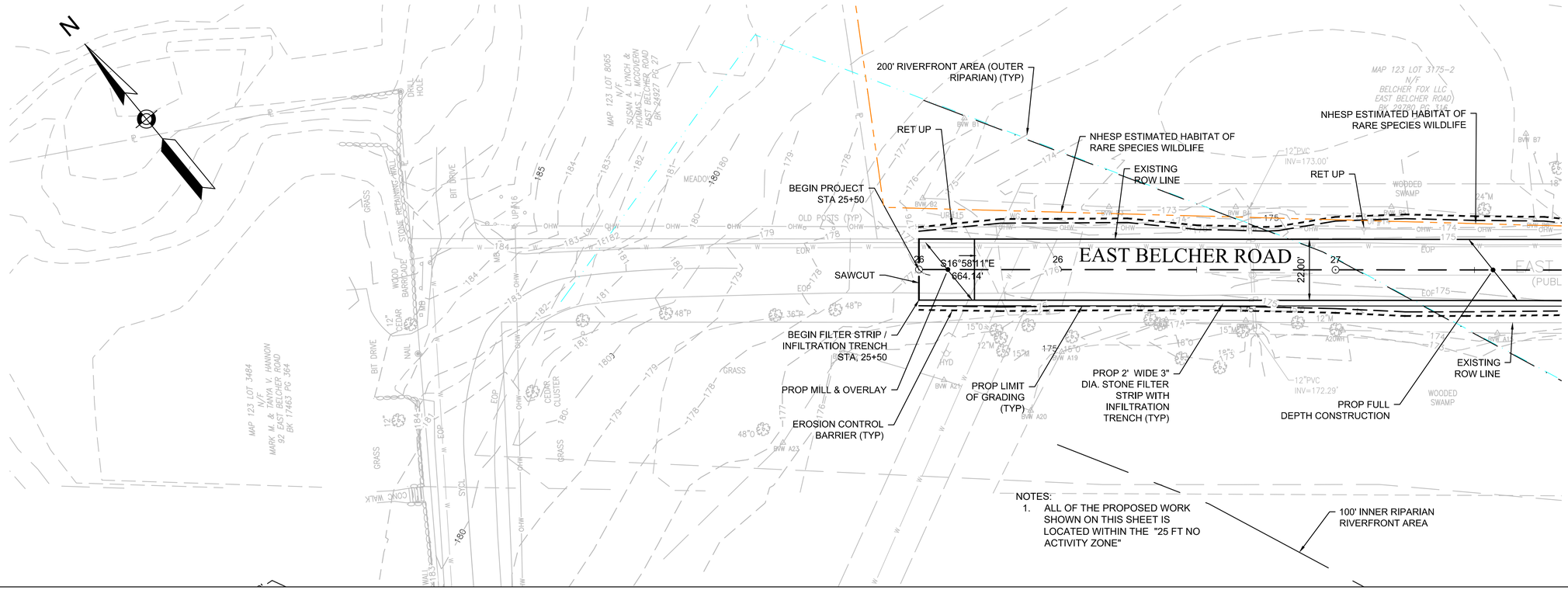
EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJECT

CONSTRUCTION DETAILS

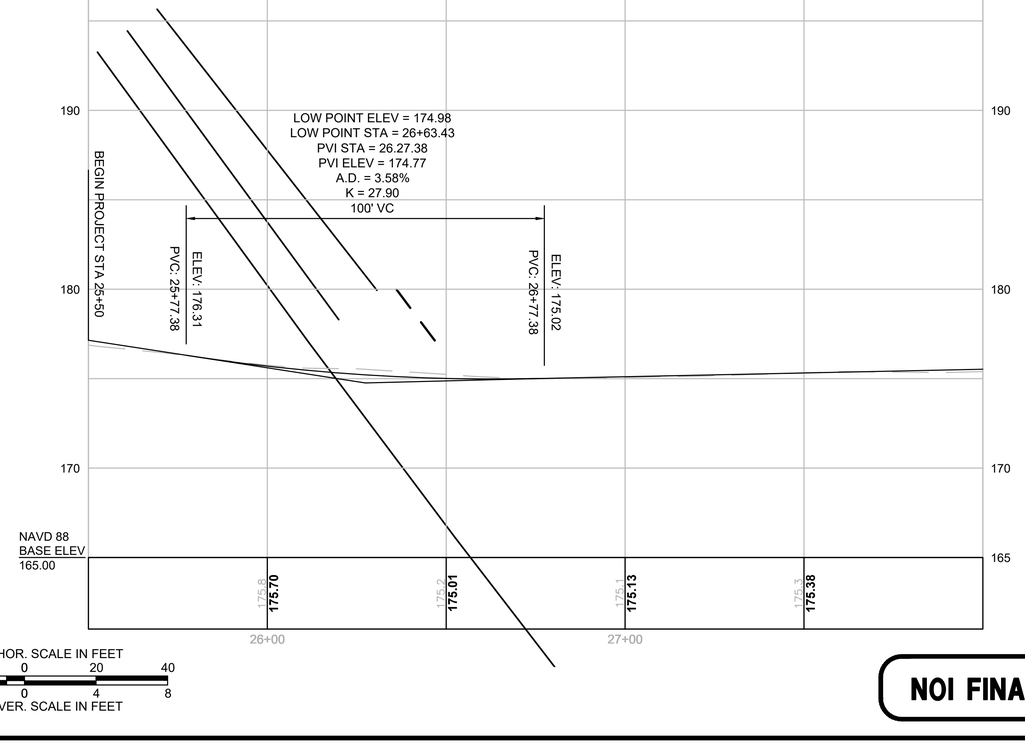
CADD NO. – | SCALE: AS NOTED | CONTRACT: – | JOB NO. 2120758 | DR.BY MD | DSN.BY RP | CHK.BY MK | APP.BY LFK

D-5

FILE NO. –



NOTES:
1. ALL OF THE PROPOSED WORK SHOWN ON THIS SHEET IS LOCATED WITHIN THE "25 FT NO ACTIVITY ZONE"



HOR. SCALE IN FEET
20 0 20 40
VER. SCALE IN FEET
4 0 4 8

NOI FINAL DESIGN

\\wse03.local\WSE\Projects\MA\Foxborough, MA\EN20-0719 East Belcher Road Reconstruction\CAD\Current_Stage-East Belcher Road\DWG\08-14_Const Plans and Profiles 2.0.dwg

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No.	Date	Description	Dr.By	Ck.By	App.By
A		PRELIMINARY			
B					
C					
D					
E					
V					
O					
R					
P					
P					
A					

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

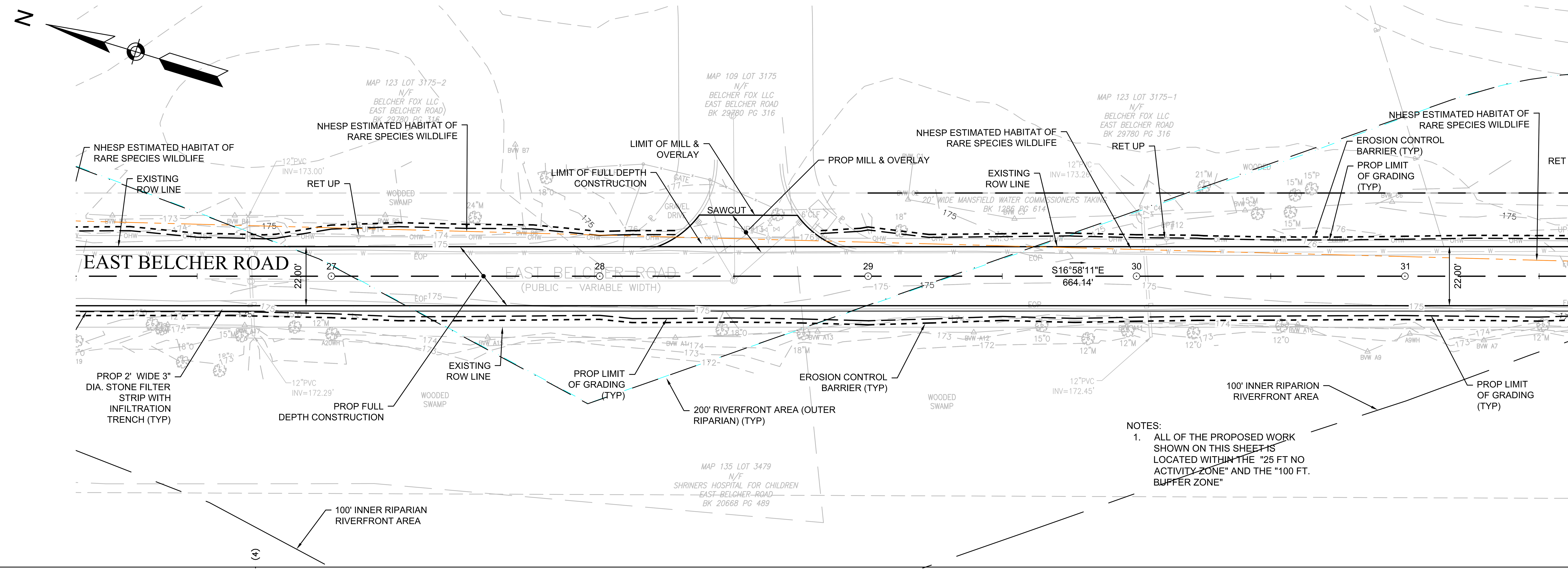
CONSTRUCTION PLAN AND PROFILE

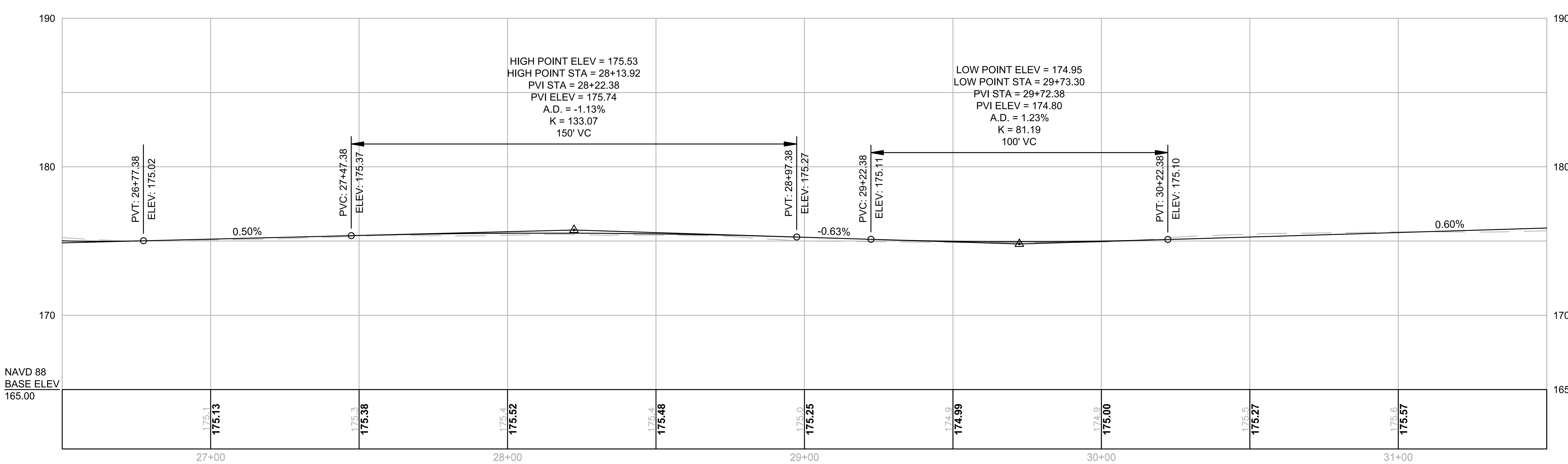
CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
–	AS NOTED	–	2120758	MD	RP	MK	LFK

C-1

FILE NO. –

SHEET 8 OF 26





HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

NOI FINAL DESIGN

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No.	Date	Dr.By	Ck.By	App.By	Description

APPROVED

REGISTERED PROFESSIONAL ENGINEER

DATE

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

CONSTRUCTION PLAN AND PROFILE

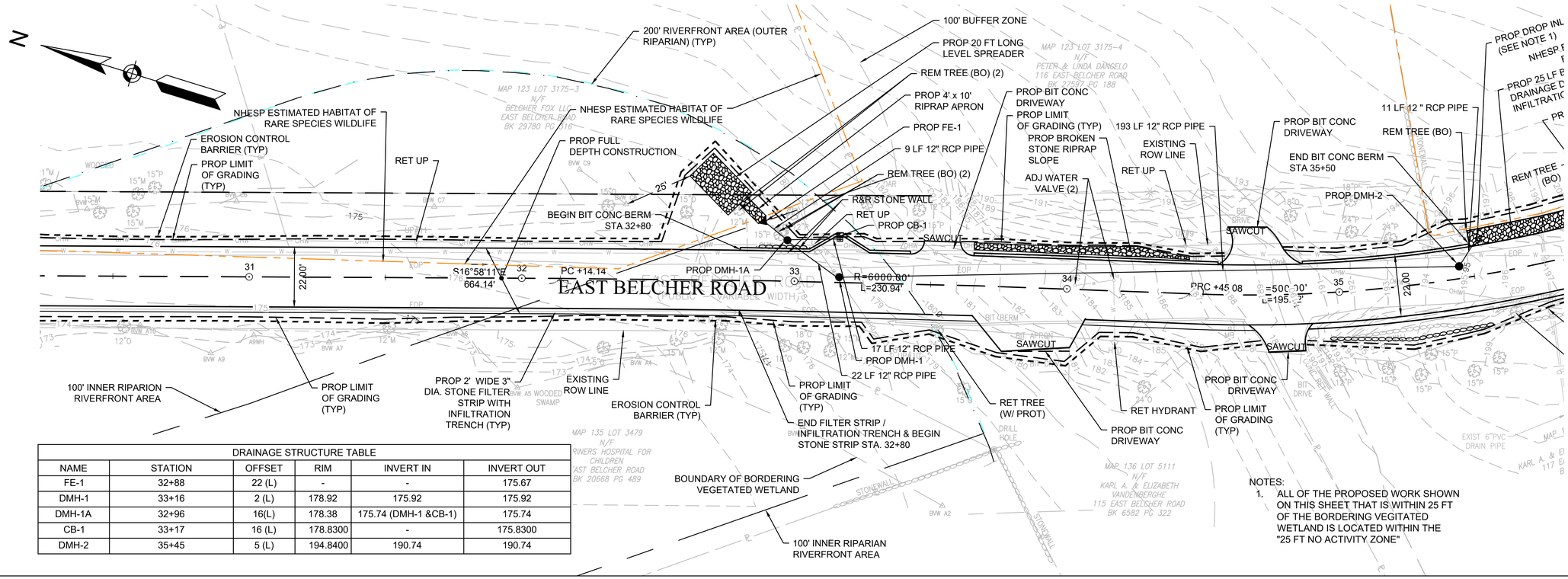
SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
AS NOTED	-	2120758	MD	RP	MK	LFK

CADD NO. -

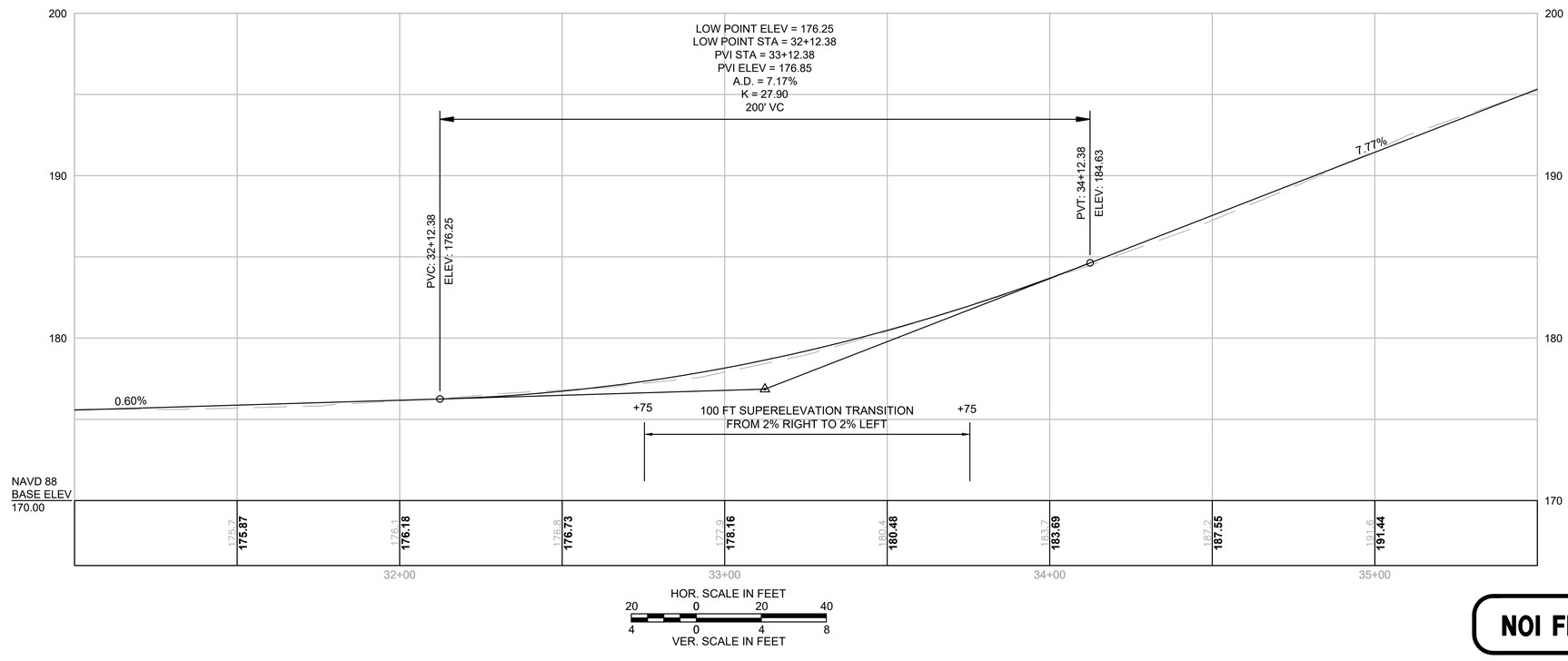
FILE NO. -

C-2

SHEET 9 OF 26



DRAINAGE STRUCTURE TABLE					
NAME	STATION	OFFSET	RIM	INVERT IN	INVERT OUT
FE-1	32+88	22 (L)	-	-	175.67
DMH-1	33+16	2 (L)	178.92	175.92	175.92
DMH-1A	32+96	16(L)	178.38	175.74 (DMH-1 &CB-1)	175.74
CB-1	33+17	16 (L)	178.8300	-	175.8300
DMH-2	35+45	5 (L)	194.8400	190.74	190.74



NOTES:
1. ALL OF THE PROPOSED WORK SHOWN ON THIS SHEET THAT IS WITHIN 25 FT OF THE BORDERING VEGITATED WETLAND IS LOCATED WITHIN THE "25 FT NO ACTIVITY ZONE"

NOI FINAL DESIGN

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No.	Date	Description	Dr.By	Ck.By	App.By
A	P	P R O V E D			

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

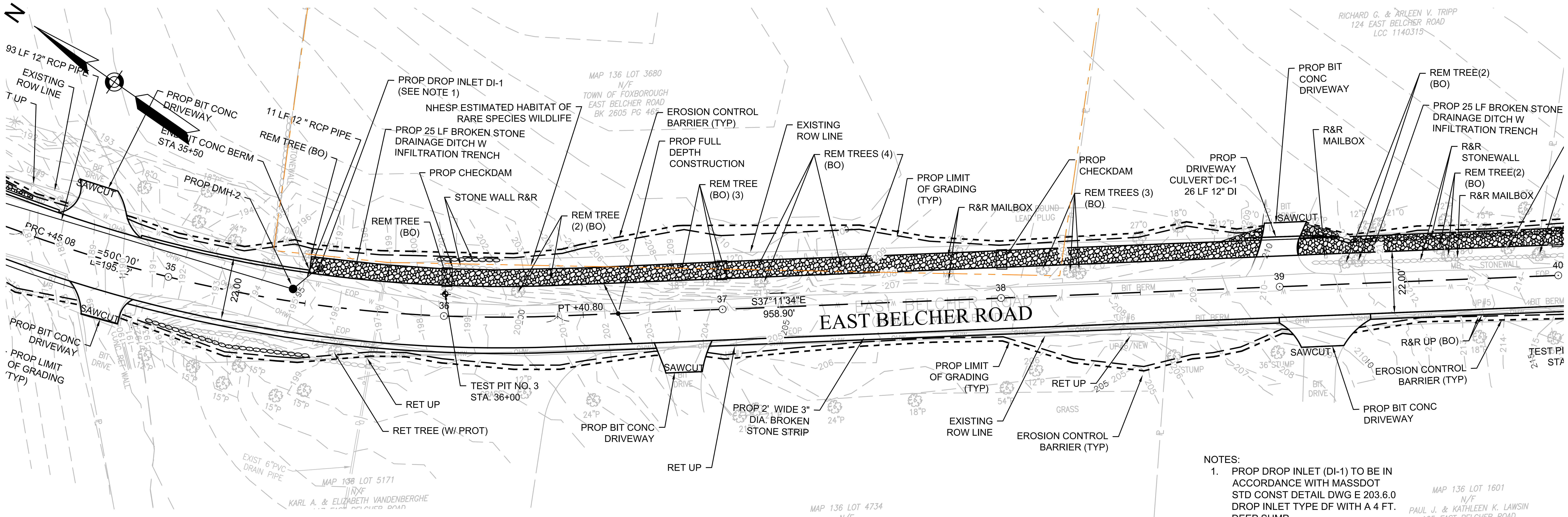
CONSTRUCTION PLAN AND PROFILE

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS NOTED	-	2120758	MD	RP	MK	LFK

C-3

FILE NO. -

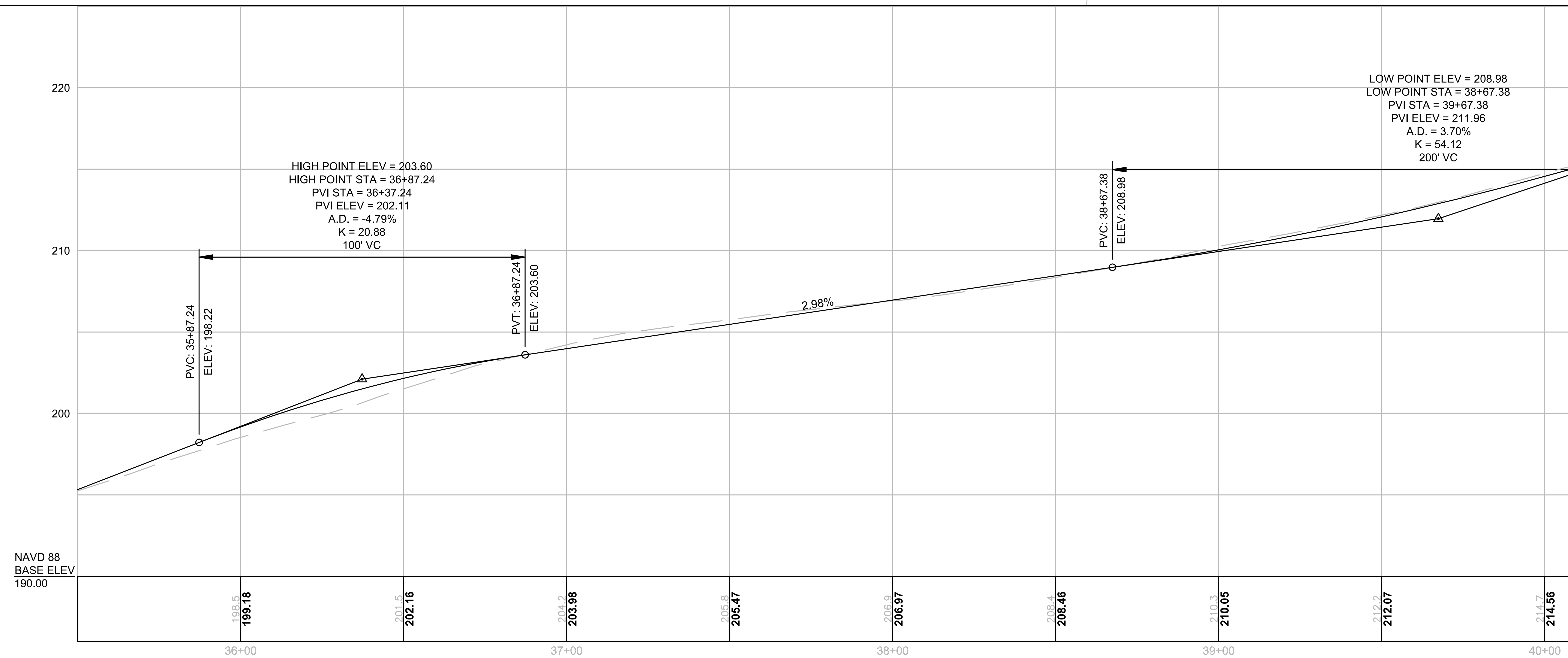
SHEET **10** OF 26



NOTES:
1. PROP DROP INLET (DI-1) TO BE IN ACCORDANCE WITH MASSDOT STD CONST DETAIL DWG E 203.6.0 DROP INLET TYPE DF WITH A 4 FT. DEEP SUMP

DRAINAGE STRUCTURE TABLE

NAME	STATION	OFFSET	RIM	INVERT IN	INVERT OUT
DI-1	35+54	14 (L)	193.9000	-	190.90
DC-1	38+88 - 39+14	17 (L)	-	207.30	206.20



HOR. SCALE IN FEET
20 0 20 40
4 0 4 8
VER. SCALE IN FEET

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No.	Date	Dr.By	Ck.By	App.By	Description

APPROVED

REGISTERED PROFESSIONAL ENGINEER — DATE

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS
EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

CONSTRUCTION PLAN AND PROFILE

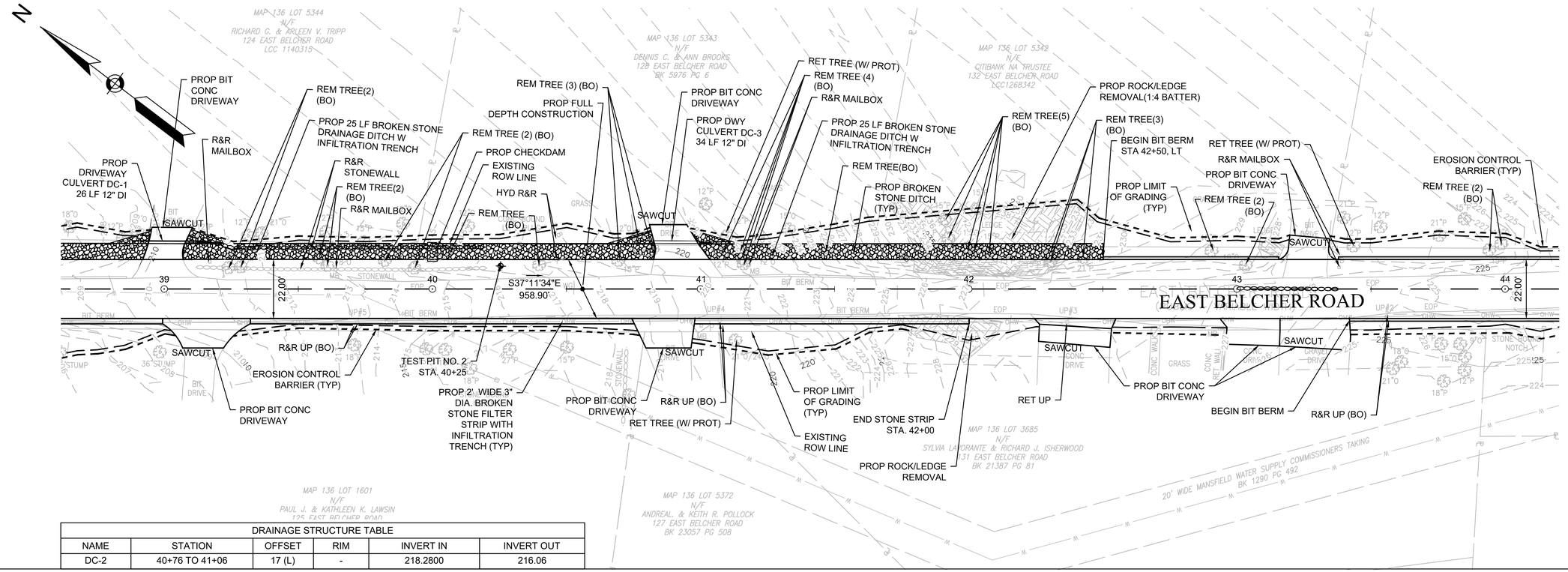
SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
AS NOTED	-	2120758	MD	RP	MK	LFK

CADD NO. -
FILE NO. -

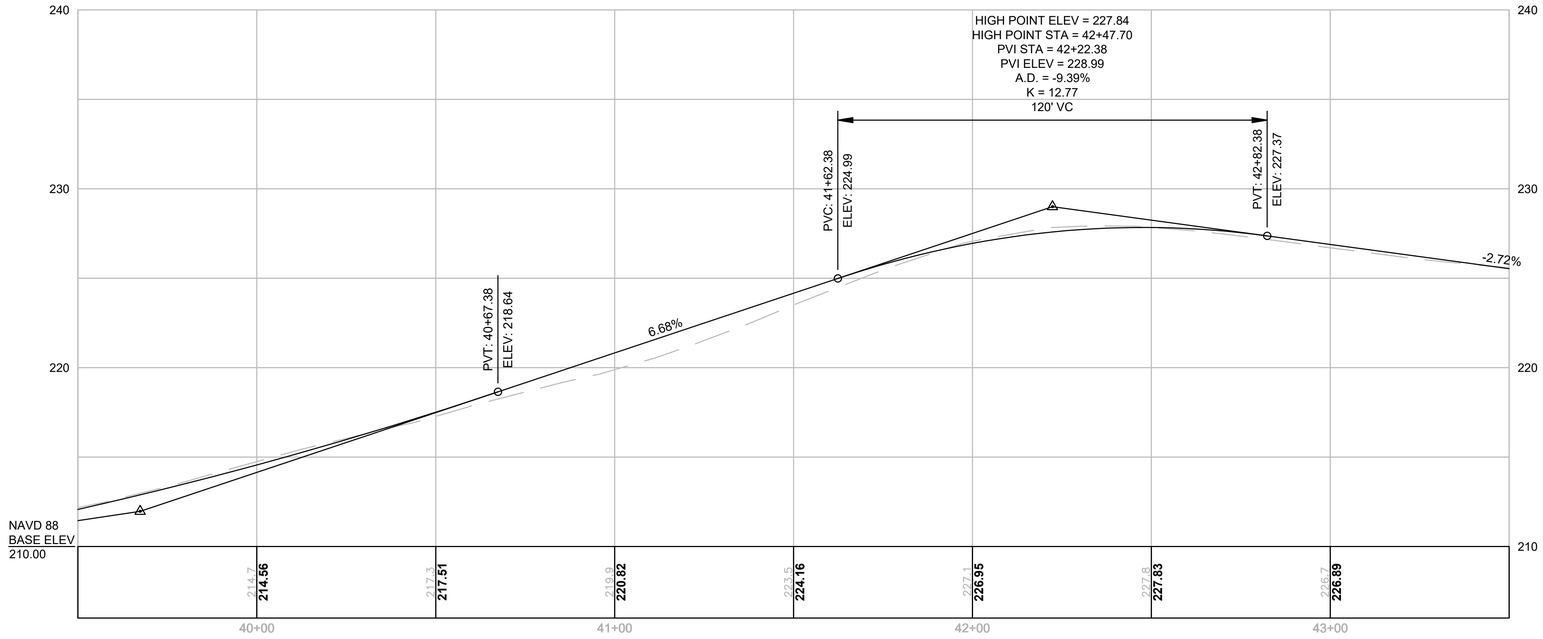
C-4

SHEET 11 OF 26

\\wse03.local\WSE\Projects\MA\Foxborough, MA\ENG20-0719 East Belcher Road Reconstruction\CAD\Current_Stage-East Belcher Road\DWG\05-14_Const Plans and Profiles 2.0.dwg



DRAINAGE STRUCTURE TABLE					
NAME	STATION	OFFSET	RIM	INVERT IN	INVERT OUT
DC-2	40+76 TO 41+06	17 (L)	-	218.2800	216.06



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No.	Date	Description	Dr. By	Ck. By	App. By
A	P	P R O V E D			

DATE

REGISTERED PROFESSIONAL ENGINEER

TOWN OF FOXBOROUGH, MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

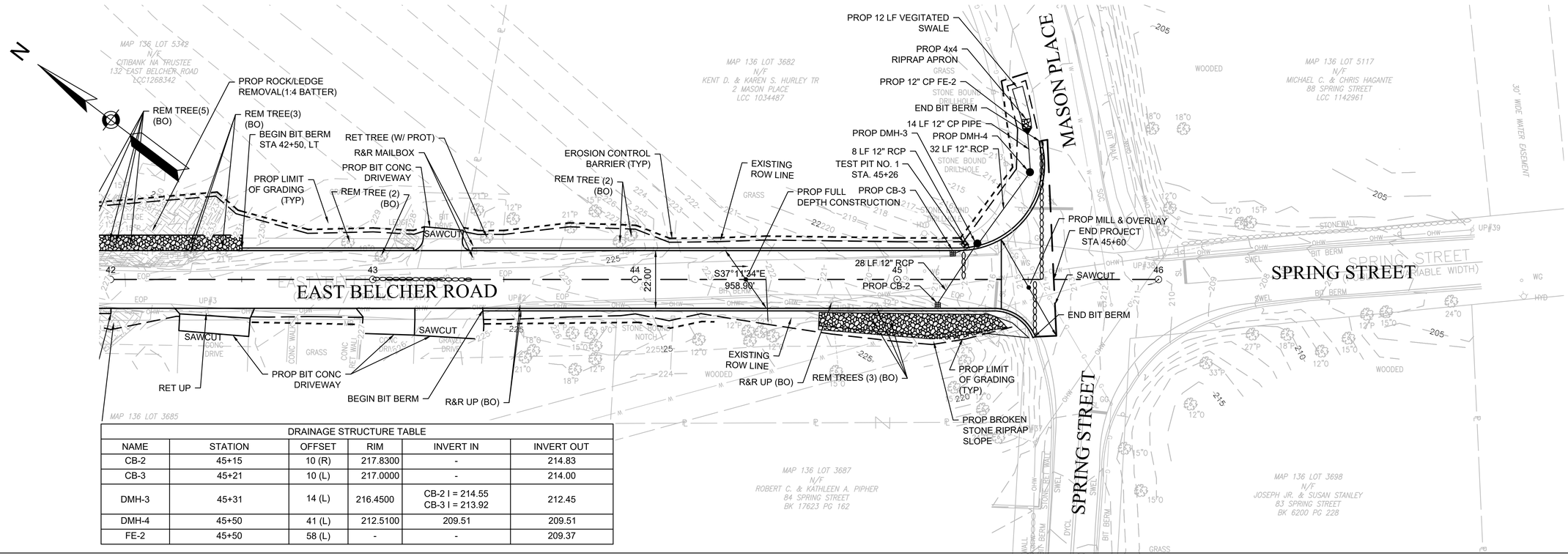
CONSTRUCTION PLAN AND PROFILE

CADD NO.	SCALE:	CONTRACT:	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS NOTED	-	MD	RP	MK	LFK

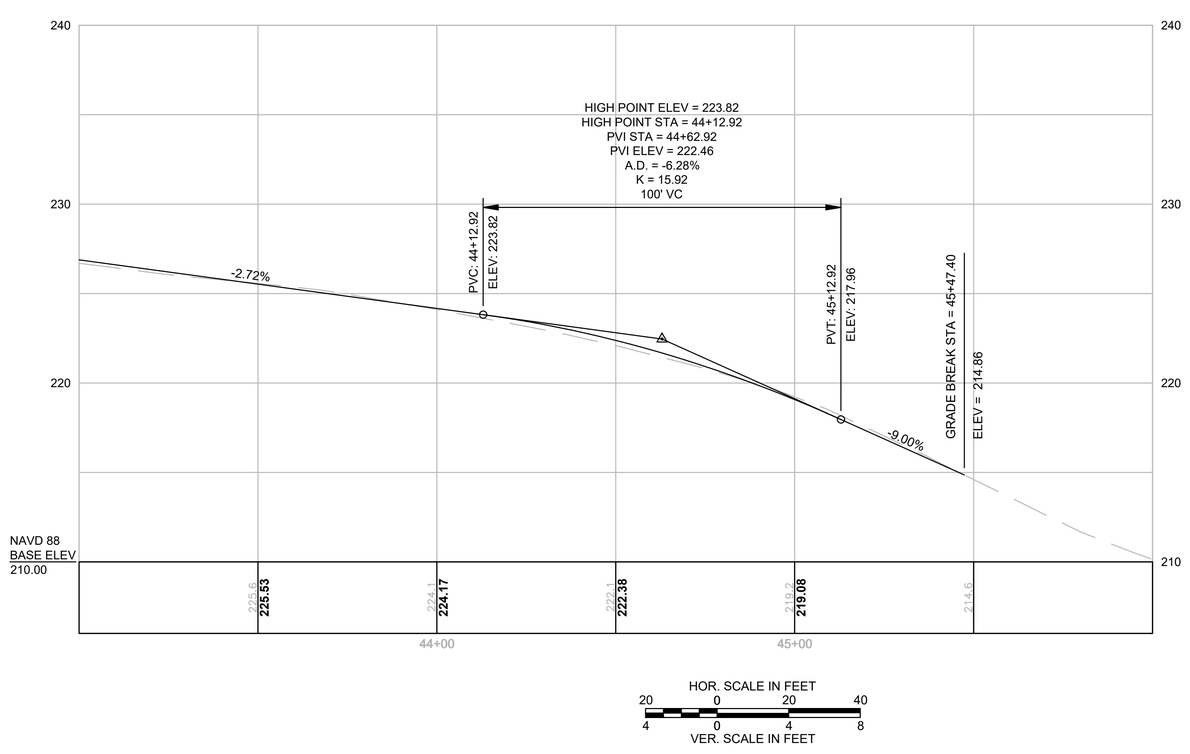
C-5

FILE NO. -

SHEET 12 OF 26



DRAINAGE STRUCTURE TABLE					
NAME	STATION	OFFSET	RIM	INVERT IN	INVERT OUT
CB-2	45+15	10 (R)	217.8300	-	214.83
CB-3	45+21	10 (L)	217.0000	-	214.00
DMH-3	45+31	14 (L)	216.4500	CB-2 I = 214.55 CB-3 I = 213.92	212.45
DMH-4	45+50	41 (L)	212.5100	209.51	209.51
FE-2	45+50	58 (L)	-	-	209.37



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DEPARTMENT OF PUBLIC WORKS

EAST BELCHER STREET ROADWAY RECONSTRUCTION PROJEC

CONSTRUCTION PLAN AND PROFILE

CADD NO.	SCALE:	CONTRACT:	JOB NO.	DR.BY	DSN.BY	CHK.BY	APP.BY
-	AS NOTED	-	2120758	MD	RP	MK	LFK

C-6

FILE NO. -

SHEET 13 OF 26